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# Arab Water World

عالم المياه العربي



**“ The Need to  
Maximize the  
Contribution of  
Wastewater  
Reuse “**

**Exclusive Interview with  
Dr. Mazen Basheer  
Managing Director at  
Passavant Energy & Environment  
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**Why Water Issues Are Now  
Commercially Important**

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**Water Reuse in Qatar  
Using UV Disinfection**

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**Unlocking Desalination  
Growth Potentials**

(P.22)



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## COVER STORY

Dr. Mazen Bachir, Managing Director at Passavant Energy & Environment dives through the opportunities for EPC specialists in the wastewater treatment sector in the MENA region over the next decade and the significance of this sector in the region.



## Private Sector's Contribution In Water Projects



## مساهمة القطاع الخاص بمشاريع مائية

Day after day, the need for drinking water and improving lifestyles is increasing in all countries of the Middle East and North Africa region, due to the rise in population. This is considered a heavy economic burden which only the rich oil and gas producing countries will be able to handle. However, the natural stocks of oil and gas will eventually decline in these countries, what makes them incapable of establishing new plants or even enhancing the existing ones. The circumstances in non-oil-producing countries, which already suffer from the lack of sufficient funds to secure water, will only become worse.

The best and safest solution to overcome the problems of securing the necessary funds to implement these projects is establishing partnerships between the private and public sector. To achieve this, a group of decision makers specialized in the civil and scientific domain in each country must meet and join forces to present their financial contributions, and establish a company which aims to put the citizens and the public sector within a legal and institutional framework, safe from any political cover. The establishment of such companies will help reduce the expenditure of tens of billions of dollars annually on water projects that citizens have no role or opinion in.

The success of these institutions or companies, that combine both the public and private sector, basically depends on science and competency. The studies to be undertaken by these institutions must be reliable and credible. This in turn will reassure citizens that their financial contribution in this company, which both the citizens and the government have shares in, will offer them a long-term economic security. What is considered a commodity is a priceless asset as it is sustainable and limitless. Water does not only bring wealth and growth to the region's economy, but directs people towards the path of national consensus.

يوماً بعد يوم، تزداد الحاجة إلى مياه الشرب وتحسين النمط المعيشي في جميع بلدان منطقة الشرق الأوسط وشمال أفريقيا بسبب ازدياد عدد السكان. وبشكل هذا الواقع عبئاً مادياً ثقيلاً لن تتمكن من مواجهته سوى الدول الغنية المنتجة للنفط والغاز. وسيأتي يوم سيتدنى المخزون الطبيعي للنفط والغاز في هذه الدول، مما يجعلها عاجزة عن إقامة محطات جديدة أو حتى تطوير محطاتها الحالية. أما الدول غير المنتجة للنفط والتي تعاني من النقص في السيولة المادية الكافية لتأمين المياه، فإن أوضاعها سوف تتحول من سيء إلى أسوأ.

الحل الأضمن والأفضل للتغلب على مشاكل تأمين الأموال اللازمة لتنفيذ هذه المشاريع هو إنشاء شراكة ما بين القطاعين الخاص والعام. ولتحقيق ذلك، يجب أن يلتقي مجموعة من صنّاع القرار في المجال المدني والعلمي في كل بلد، وأن يضموا قواهم للمساهمة المالية، لإنشاء شركة ترمي إلى إدخال المواطنين والقطاع العام ضمن إطار عمل قانوني ومؤسسي سليم بمنأى عن أي تأمين سياسي. سيؤدي إنشاء مثل هذه الشركات إلى الحد من إنفاق عشرات المليارات من الدولارات سنوياً لتنفيذ مشاريع مائية لا يكون للمواطن أي دور أو رأي فيها.

يعتمد نجاح هذه المؤسسات أو الشركات التي تجمع ما بين القطاعين الخاص والعام أولاً وأخيراً على العلم والإختصاص. فالدراسات التي ستقوم بها هذه المؤسسات يجب أن تكون موثوقة وغير قابلة للطعن أو الشك. وهذا بدوره سيطمئن المواطنين بأن مساهمتهم المادية في هذه الشركة المختلطة، التي يملك فيها المواطنون والدولة أسهماً، ستوفر لهم أمناً إقتصادياً طويل الأمد. إن ما نعتبره سلعة هو ثروة لا تقدر بثمن كونها مستدامة ومتواصلة بلا نهاية. المياه لا تجلب الثروة والنمو لإقتصاد بلدان المنطقة فحسب بل توجد الشعوب على طريق التوافق الوطني.

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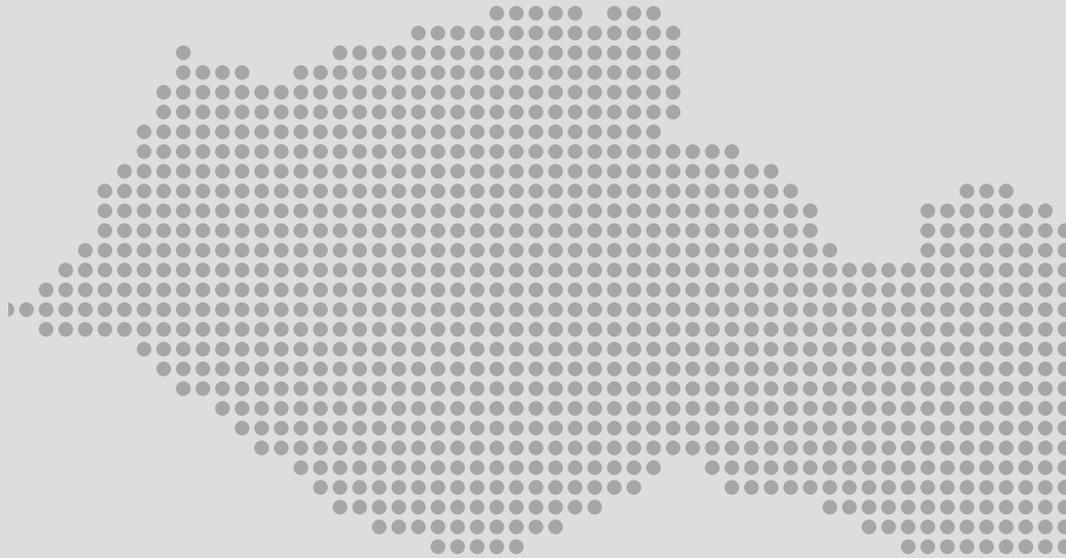
## Iraq

### Promoting Solar Power

With hopes to encourage and popularize the use of solar panels as an alternative and renewable energy source on a larger scale, the Iraqi Ministry of Agriculture announced that an experimental solar-operated irrigation pump has been installed in the Karbala province of Iraq, and the status is now operational. Deputy Agriculture Minister *Mahdi al-Qaisi* said, "Shortage and fluctuation of electricity supplies and the rise of fuel prices are considered foremost among the problems directly affecting agricultural processes. Recently, we started to use the technology of solar panels in an experimental and guiding way by installing the first water pump to operate on solar energy at a farm in the city of Karbala in a bid to familiarize farmers with the importance of this technology and encourage them to use it." Al-Qaisi also said that the ministry will work on "promoting the use of this technology for various agricultural applications, such as using [this pump] in greenhouses, introducing it to activities related to transformative food industries or in operating refrigerators used to store vaccines and veterinary medications."

na has invested in Jordan in response to the country's advanced alternative energy initiatives and regulatory frameworks, and the proactive drive the government is making to reduce its dependence on imported energy products. Khoreibi added, "Demand for electricity is growing rapidly and power developers have recently signed twelve power purchase agreements totaling 200 MW of solar PV in Jordan. These projects represent the first step in the private development of solar projects in the region. Our new presence in Jordan underlines our commitment to the country and its energy aspirations."

"Several residential areas have been recurrently flooded with raw sewage causing property damage, injuries and deaths. Illegal dumping and burning of waste are common practices across rural and urban areas causing soil, air and water pollution as well as health hazard," said *Steen Jorgensen*, World Bank Country Director for West Bank and Gaza. The USD10 million grant for the Gaza Solid Waste Management Project approved by the Bank on March 31, 2014, aims to improve the solid waste disposal in the Gaza governorates through the provision of an efficient, socially acceptable and environment



## Jordan

### Enviromena in Jordan

**Enviromena Power Systems (Enviromena)** announced the launch of its first regional office outside of the UAE in the Hashemite Kingdom of Jordan. *Sami Khoreibi*, CEO of Enviromena, said, "We decided to open up an office in Jordan to demonstrate our commitment to building up solar capacity in a country poised for significant expansion in renewable energy. Not only is Jordan a country with one of the world's highest solar irradiation, but it is also led by favorable government policy towards energy." Envirome-



## Palestine

### World Bank Supports Improving Sanitation Services

Two projects in the Gaza Strip will respond to health and environmental threats and provide long-term solutions to the treatment of sewage and solid waste. The USD13 million grants by the **World Bank** are focused on improving sanitation services in the Gaza Strip, a development priority in the densely populated area facing severe public health and water pollution threats.

friendly mechanism. It will promote citizen engagement towards more accountability through awareness campaigns and the use of social media including text messaging and interactive website. The USD3 million grant to the North Gaza Wastewater Treatment Project, approved by the Bank on April 10, 2014, is in line with the Bank's commitment to provide a sustainable solution to managing wastewater in North Gaza.



## Saudi Arabia

### 41 GW of Solar Power by 2032

The Kingdom of Saudi Arabia has announced plans to invest USD109 billion to produce 41 gigawatts (GW) of solar energy by 2032, which is almost 30 percent of its total energy

requirement by that time. Over the next two decades, the government plans to establish energy generation projects, which runs on photovoltaic cells (PV cells) with a capacity of 16 GW. In addition, it will also facilitate energy generation projects that will make use of energy concentrate with a capacity of 26 GW. All these initiatives will boost the Kingdom's potential for becoming the largest producer

of the Ministry of Water and Electricity and organized by **Riyadh Exhibitions Company** and **Informa Exhibitions**, Saudi Energy 2014 will be held from May 26 to 28, 2014 at the Riyadh International Convention and Exhibition Centre. With regional investments in the energy sector at its peak, Saudi Energy 2014 will be a marketplace for specialized and related industries and companies to promote their products and services.

specific is dealing with a number of 1.8kg per person per day of solid waste generation which sums up to a national figure of 28000kgT per day, 92% of which is directed towards landfills with an all-time low of 3% Recycling rate. Hence, **NISPANA** presents "Waste Management & Recycling Summit-Qatar", 27<sup>th</sup> & 28<sup>th</sup> August-2014 at Doha, Qatar, a 2 day conference to bring forward and highlight the future opportunities in this sector, and capture the most effective and latest technologies. The summit focuses on investment in waste management and bringing in the government officials, waste generators industry experts & solution providers such as: landfill professionals and recycling firms from across the globe to share their expertise & educate the attendees to make this initiative a bench mark in Waste Management sector.



## UAE

### Energy Report Soon

The UAE Ministry of Energy and the Dubai Carbon Centre of Excellence (DCCE) have signed a three-year memorandum of understanding to prepare a state of energy report for the UAE as the country strives to diversify energy sources and reduce carbon emissions. Dr. Al Neyadi said the State of Energy Report in the UAE will become a reference book that will document best practices and success stories in the energy sector. "The State of Energy Report 2015 will focus on the concerted efforts of the UAE in the field of renewable energy and climate change where the UAE is deemed to be the prime stimulator for investment in renewables and use of low-carbon technology in the region as well as being a global forum for cooperation and dialogue on sustainable development and reduction of emissions," Dr. Al Neyadi said, adding, "Efforts are currently under way to raise the contribution of clean energy sources up to 24 percent of the overall energy in the UAE."



## Qatar

### Waste Management Summit in August

Qatar's foray into waste-to-energy indicates the lucrative business opportunities in the emerging sustainable waste management sector. The "3<sup>rd</sup> edition Waste Management & Recycling Summit- Qatar, 2014" is an initiative to understand and explore the role of waste resources for a sustainable future. Qatar being the focus of the 3<sup>rd</sup> edition, in

of solar energy in the world. Saudi Energy 2014 – The International Trade Exhibition for Electricity, Power Generation, Alternative Energy, Water Technology and Lighting will take place in the kingdom to throw the spotlight on the latest products and services for the power sector. Held under the patronage

# Water Treatment

## Water Treatment Chemicals

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# Increase in Chemical Water Treatment Usage Spurred by Fresh Water Demand

**W**ater treatment chemicals are primarily used for removing impurities from drinking as well as industrial water and wastewater. They are used in industries such as power generation, food & beverage, chemical processing, pulp & paper, oil & gas, metal & mining, and others. According to many market specialists, this market is set for an optimum growth, with Asia-Pacific the key market for water treatment chemicals. The water treatment chemicals market worldwide is steadily increasing with an average yearly growth rate of about 5.3% during the next decade. The following article sheds the light on the growth factors driving the market, focusing on the main regions headlining significant growth in the future perspective.



**Markets & Markets'** report "Water Treatment Chemicals Market By Type (Coagulants & Flocculants, Corrosion Inhibitor, Scale Inhibitors, Biocides, Chelating Agents, Anti-foaming Agents, pH Adjusters & Others) & Application (Industrial & Municipal) - Global Trends & Forecasts to 2018", states that key chemicals that are used in the water treatment include corrosion inhibitors, scale inhibitors, coagulants & flocculants, biocides & disinfectants, chelating agents, anti-foaming agents, pH adjusters & stabilizers, and others. Coagulants & flocculants are the most commonly used water treatment chemicals. However, scale and corrosion inhibitors together represent the significant market share in terms of value. Biocides and disinfectants also represent more than 10% of the value market, and are expected to grow at a decent pace. However, increasing regulations against the use of chemicals in water treatment is one of the key restraints in the industry. Power generation is the important industrial application area for water treatment chemicals. Municipal water treatment represents around 35% of the total consumption of water treatment chemicals globally.

*"Municipal water treatment represents around 35% of the total consumption of water treatment chemicals globally"*

Geographically, Asia-Pacific is the key market for water treatment chemicals. It represents more than 35% of the market in terms of consumption, says Markets and Markets. Rising demand for clean water in China and India is driving the Asia-Pacific as well as the global market for water treatment chemicals. China is the largest consumer for water treatment chemicals in the world.

### **A long-term increase in demand**

Wastewater from industries such as power, paper and pulp, chemical processing, metal and mining is one of the major contributors to the rising water pollution, globally, according to "Global Water & Wastewater Treatment Chemicals Market Forecast & Opportunities, 2018" by **TechSci Research**. As a result, new regulations for maximum limits of pollutants are being passed, globally, depending on the industry and type of pollutant. Consequently, the demand for chemicals utilized in the industrial and municipal wastewater applications is expected to witness long-term increase over the next 10-15 years. In emerging markets, improvements of health and sani-

tation standards are the major drivers for the growth in water and wastewater treatment chemicals market.

TechSci Research's report states that the global water and wastewater treatment chemicals market is projected to grow at a CAGR of around 4.5% during 2013-18 as a result of growing usage of water in end user industries and stringent water treatment regulations across the globe. Shale gas and oil exploration, geothermal energy as well as renewable sources of energy consume considerable amount of water for their operations which is further driving the market. Growing desalination trends in water scarce regions, especially the Middle East and Asia-Pacific, has promoted the growth of membrane chemicals like antiscalants, antifoulants and other cleaning chemicals. Nanotechnology based chemicals and biodegradable chemicals have increased the usage of high performance water treatment chemicals, especially in developed markets of North America and Europe.

### What is driving the market

On the same hand, **Freedonia Group** assures that the market is set for a significant growth, where the world demand for water treatment chemicals is forecast to rise 5.8 percent per year to USD30.6 billion in 2017. This demand, according to Freedonia Group's study "World Water Treatment Chemicals", will be driven by rising water quality standards in manufacturing and other industrial applications, expanding access to safe drinking water in underserved regions, and a shift toward higher value chemicals with improved performance and/or environmental profiles, particularly in developed countries.

Increases in developed countries will be tempered by greater competition between water treatment chemicals and equipment in some applications, reflecting a more complex industry response to environmental concerns, according to "World Water Treatment Chemicals". In developed areas, such as the US, Western Europe and Japan, where the use of water treatment chemicals is well-established, growth in demand is expected to be moderate and the shift in product mix will be more complex. Higher industrial water quality standards and environmental regulations are expected to contribute to rising demand for water treatment equipment, which can be used to partially replace some types of chemicals such as biocides, says the study. On the other hand, Freedonia

*"The construction of more and better drinking water facilities will trigger a steady growth of chemicals usage"*

agrees with Markets and Markets where water treatment equipment can also support the use of higher value specialty corrosion inhibitors, scale inhibitors, and coagulants and flocculants, which can improve equipment function and prevent damage to equipment.

At the same time, **Helmut Kaiser Consultancy** believes that the water treatment chemicals market worldwide is steadily increasing with an average yearly growth rate of about 5.3% during the next decade. The growth mainly comes from two sides: on one hand, emerging markets like China, India are rapidly developing their industrial and municipal water treatment networks; on the other hand, the higher value formulations are replacing low-cost, commodity compounds in almost all markets and applications. These high-value formulations function more efficiently with less dosage and are less toxic than the conventional low-cost commodity type chemicals.

Similarly, the increasing public environmental concerns and more strict legislations will contribute to the growth of chemical water treatment usage, according to Helmut Kaiser Consultancy's report "The Market of Chemicals for the Treatment of Water, Wastewater and Sludge Worldwide 2010, 2011-2025". The elevated drinking water standards, especially in the developing countries, will help the drinking water treatment industry grow more than 9% every year in the world. The World Bank will make more than USD450 billion of necessary investments within the next 10 years as a starting point for improving the global drinking water.

The same study states that in many regions of the world, especially in Africa, South America and parts of Asia, drinking water is a quality problem on one hand and a shortage problem on the other hand. Production and treatment of drinking water can be financed locally in the mentioned regions only to a limited degree. More than one third of the world population is today already affected by quality and quantity shortages, with increasing tendency. In industrialized countries increasingly quality and, temporarily, quantity problems also exist. The construction of more and better drinking water facilities will trigger a steady growth of chemicals usage. ■

### Prepared by:

*Rawand Fakhri  
Editor & Researcher*

تستخدم المواد الكيميائية في معالجة المياه لإزالة الملوثات والشوائب من مياه الشرب وكذلك المياه الصناعية ومياه الصرف الصحي. يتم استخدام هذه المواد في صناعات عديدة مثل توليد الطاقة والأطعمة والمشروبات، والمعالجة الكيميائية، وصناعة الورق والنفط والغاز والمعادن والتعدين وغيرها. بحسب العديد من خبراء السوق، من المتوقع أن تحقق هذه السوق نمواً ملحوظاً، حيث ستكون منطقة آسيا والمحيط الهادئ السوق الرئيسية للمواد الكيميائية لمعالجة المياه. تشير التقارير أن سوق المواد الكيميائية في جميع أنحاء العالم هي في ازدياد مستمر حيث من المتوقع أن يبلغ متوسط معدل النمو السنوي حوالي 5.3٪ خلال العقد المقبل. يقول أحد المتخصصين في مجال دراسة هذه السوق أن النمو يأتي أساساً من الأسواق الناشئة مثل الصين والهند التي تشهد نمواً سريعاً في شبكات معالجة المياه الصناعية والبلدية الخاصة بها. بالإضافة إلى ذلك، تساهم زيادة المخاوف البيئية من قبل عامة الشعب والتشريعات الصارمة بنمو استخدام المعالجة الكيميائية للمياه. يلقي هذا المقال الضوء على عوامل النمو التي تقود هذه السوق، ويركز على المناطق الرئيسية التي من المتوقع أن تشهد نمواً كبيراً في المستقبل المنظور.

## Aussie Ingenuity Makes Waves in Asian Resort



The AutoChlor inline chlorination system is a simple and automatic process

**Australian Innovative Systems' (AIS)** AutoChlor technology will be keeping over 2.5 million liters of water sparkling clean and safe for swimmers at the Philippines' first 3,500 square meter manmade beachfront lagoon, Azure Beach. The multi-award winning, Australian designed and manufactured, AutoChlor inline disinfection system was specified and installed by leading Philippine based pool and spa company, **Chemsphere Corporation** of Quezon City. Owner of Chemsphere, *Rogelio Heredero* said that his company's decision to nominate AIS' commercial technology for the project was a natural choice. "Our company is a leader in its field and so is AIS. The Azure project is a signature project for the Philippines. Given the prestigious nature

and scale of this development it was vital that we chose an effective, reliable and easy to operate water hygiene system with a proven track record of operating in other large scale resort projects." In discussing AutoChlor's suitability for the project, AIS CEO *Elena Gosse* said that the inline chlorinator eliminated the expense, inconvenience and chemical supplier dependence associated with the alternative, outdated option of purchasing, transporting, storing and handling chemicals on-site. "The AutoChlor inline chlorination system is a simple and automatic process, Gosse said. "For the end user this translates to minimal staff input, lower operational costs and a reduced chance of workplace accidents involving chlorine or other chemicals" she said. ■

## Westfall's Static Injection Mixer

A fixed plate injection mixer for water/ effluent treatment plants that features a short laying length, integral injection, and low head loss is available from **Westfall Manufacturing Company** of Bristol, RI - U.S.A. The Westfall Model 2800 Static Mixer is a wafer-style fixed plate with a patented design that rapidly mixes fluids through a combination of alternate vortex shedding and intense shear zone turbulence. Featuring a laying length of 2.54 to 50.8mm and integral injection assemblies,

it achieves better than 98% injected fluid dispersion only 10 diameters downstream. A fraction of the size of a conventional 7.62m long mixer which is costly to transport and install, the Westfall Model 2800 Static Mixer measures only 1.5m dia. X 2.54mm thick and is available up to 3m dia. ■



The Westfall Model 2800 Static Mixer

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# An Overview of RO Reject Brine Water Management to Discharge Bodies

**N**ature has never misled mankind. Natural water body resources have never required any terminal conditions to be satisfied for its free supply of potable water. However, man, in his selfish attitude, when tries to pollute the environment, has to take the recourse. When potable water sources started depleting, new ways and means were introduced to public by ways of desalination, evaporation and reverse osmosis technology etc., to produce drinking water. However, the associated thick concentrated water from these processes which is called the reject water, has the highest concentration of different salts, and today's problem is, how to dispose such a huge pile of salts without affecting the environment. This paper discusses some key issues, regulations and the technological advancement in disposing reject water by acceptable means.



## Introduction

Huge demand of potable water in water deficit coastal states in the United States has necessitated the invention of the Reverse Osmosis Process, which has led the world to a thirst free situation as of today. The technological advancement in applications of membrane processes was efficiently explored in recent decades due to huge demand of potable water. However, relatively little improvements have been reported in the management and handling of reject water or brine. The disposal or management of desalination brine (concentrate) is expensive and faces major environmental challenges. In spite of the scale of this economical and environmental problem, the options of brine management have been limited. This brief review presents an overview of the existing methods on brine treatment, minimization, and disposal practices based on the newest and most updated technologies. In addition, the review outlines the advantages and disadvantages of the most common treatment and disposal methods from an environmental perspective.

## Impacts of brine water reject discharge in to land and water body

Primary changes that the land would undergo upon

discharge on to land can be stated as below:

1. Direct dumping of brine on to land brings salt build up. Soil can tolerate the salt content to a lower extent only. Any further addition would render the soil unable to withstand the flora and the microorganisms that are contained in the soil.
2. Continuous piling of Brine water to land produces solid rock slates or layers upon evaporation of the water content. This is later converted into salt rocks with respect to time.
3. Leaching is the major issue with untreated brine discharge on Land. The leach water carries proportional concentration of brine and reach out neighboring area rendering the land unusable with slow buildup of salt. The movement of water due to concentration gradient also plays a major role in transporting the salt content to virgin soils below earth.

*“Leaching is the major issue with untreated brine discharge on Land”*

## Effects of brine discharge to sea water

Studies have shown results of benthic infaunal communities and sea grasses are the most sensitive to the acute effects of concentrate discharge; some communities seem to be tolerant to effects of up to 10 psu increases, while others are affected by increases of only 2-3 psu. However, few studies have evaluated dis-

charges to embayments, where less dispersion of the discharge may occur, and the chronic impacts on demersal vertebrates, particularly those which have significant life history behaviors (i.e. reproduction, migration driven by salinity variations).

### Biological impacts

Following are the organisms affected by brine discharge, which have been proved in laboratory studies:

- Mollusks
- Oyster (*Crassostrea virginica*)
- Fish: Echinoderms
- Chordates
- Sea Grasses
- California Biota
- Benthic Communities
- Diatom Communities
- Soft Bottom Benthic Infauna
- Meiofauna
- Coral Communities

### Existing regulatory criteria for salinity discharge into water bodies

There are few actual regulations, standards, or guidelines for brine discharges around the world. The salinity limit is usually stated as an increment of no more than 1 to 4 ppt relative to ambient. However, limits are also less frequently expressed as an absolute salinity or a minimum level of dilution. The point of compliance for the salinity limit is the boundary of the mixing zone, which is usually specified in terms of a fixed distance from the discharge that ranges from 50 to 300 m.

### Concentrate discharges

The concentrate produced by the reverse osmosis (RO) process contains multiple chemical constituents in addition to natural seawater components, and the amounts and types of these constituents vary as a function of the source water treated.

The objective of this review is to make a survey to identify technologies that could be used to develop multiple concentrate management alternatives that an industry could implement as a part of advanced water reclamation and reuse.

### Evaluation of the Technologies

The technological requirements can be broadly classified into three step approach, which includes:

- I. RO brine analysis to determine the components
- II. Chemistry Development which is based on type & concentration of fouling substance identified in the RO brine, a chemical treatment process is developed to counteract each of the fouling factors:

- Cold lime Softening
- Colloidal silica removal by adsorption on  $Mg(OH)_2$
- Activated Carbon for organic reduction & oxidant destruction



- pH optimization for the selected treatment & the secondary RO

III. Microfiltration to the adequate SDI then secondary RO [Kepke et al] considered the options of RO brine concentrate treatment:

Some of the disposal options for brine management include deep well injection, natural treatment systems (Wetlands), electro dialysis / Electro dialysis reversal, VSEP membrane System, precipitative softening/RO, high efficiency RO, Mechanical evaporation, evaporation ponds and land fill.

Concentrate management alternatives that can be applicable at any industrial facility can be further categorized into the following methodologies using electro mechanical equipment and processes:

#### I - Wastewater effluent mixing

Blending RO concentrate with secondary treated effluent from a wastewater treatment plant (WWTP) can be practiced to mitigate the impact of the high total dissolved solids (TDS) (or other solute) concentrate

#### II - Volume reduction processes

The concentrate volume reduction processes such as Electrodialysis Reversal (EDR), Vibratory Shear-Enhanced Processing (VSEP), and Enhanced Membrane System (EMS):

##### a. Electrodialysis Reversal (EDR)

Electrodialysis (ED) is a process that uses an electrical current to remove salt ions from a solution.

##### b. Vibratory Shear-Enhanced Process (VSEP)

VSEP, a patented process of New Logic, is developed to reduce polarization of suspended colloids and sparingly soluble salts on the membrane surface by introducing shear to the membrane surface through vibration.

*"Electro-dialysis (ED) is a process that uses an electrical current to remove salt ions from a solution"*



### c. Enhanced Membrane Systems (EMS)

EMS refers to the use of a nonconventional RO system to permit operation at higher recovery and at higher flux.

### III - Zero liquid discharge technologies

Processes capable of reducing the concentrate, either directly from the conventional RO or the volume-reducing processes to zero liquid discharge (ZLD):

#### a. Mechanical evaporation

Mechanical evaporation can process the concentrate by converting the water component into condensable water vapor, leaving behind a wet salt to be land filled.

#### b. Vertical tube falling film brine concentrator

The brine concentrator uses a unique process called seeded slurry evaporation to overcome the limitation imposed on conventional evaporators by the saturation limits of low-solubility scaling compounds.

#### c. Brine Crystallizer

The crystallizer is a forced-circulation-type evaporator, which is specially designed to precipitate, grow, and handle crystals in the concentrate as water is continuously evaporated.

#### d. Evaporation Ponds

Evaporation ponds rely on solar energy to evaporate water from the RO concentrate stream, leaving behind precipitated salts—which are ultimately land filled.

#### e. High efficiency RO

High efficiency reverse osmosis system, as a combination of the hardness removal pretreatment which include Lime soda softening followed by filtration and weak cation exchange resin is also recommended for brine discharge management. The expected recovery would attain 95%.

### Conclusion:

Thus the available means for final disposal of brine for the present time can be concluded as:

- Disposal to Landfill with proper chemical and biological final treatment
- Ocean Discharge within the regulatory limits and with further investigation without any environmental impact to the ocean biota.
- Deep Well Injection at select sites, with prior study of environmental impact assessment
- Discharge to Waste Water Treatment Plant, without overloading the process parameters of the plant.
- The technologies which may be useful in this application but are still under development include:
  - Two-pass nanofiltration
  - Forward Osmosis
  - Membrane Distillation
  - Capacitive Deionization

The zero liquid discharge technologies, on the other hand, will include:

- Thermal processes
- Enhanced Membrane and Thermal processes
- Evaporation Ponds
- Wind-aided Intensified Evaporation

RO Reject Brine Management should be legislated as a mandatory requirement in all desalination processes, as it would also not affect the ocean and land, but the intercontinental water territories too. The discharging countries should not blame the lack of technology or the financial means for the Brine Management. An international body must be constituted by the international authorities for environment protection, so that the complete system should safeguard not only mankind, but the surrounding species too. After all man cannot recreate the biodiversity that nature has created and sustained for millions of ages. ■

*“RO Reject Brine Management should be legislated as a mandatory requirement in all desalination processes”*

### Source:

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لم تعمل يوماً الطبيعة على تضليل البشرية، ولم تطلب موارد المياه الطبيعية أي شروط أو مقابل لمياه الشرب التي توفرها. عندما بدأ استنزاف مصادر مياه الشرب، أدخلت طرق ووسائل جديدة لإنتاج المياه الصالحة للشرب مثل التحلية، والتبخير وتقنية التناضح العكسي إلخ. ومع ذلك، تملك المياه المركزة السميكة التي تنتج عن هذه العمليات، والتي تسمى بالمياه المنتبذة أيضاً، أعلى نسبة من الأملاح المركزة المختلفة. باتت المشكلة اليوم هي كيفية التخلص من هذه الكمية الضخمة من الأملاح دون التأثير على البيئة. يناقش هذا المقال بعض القضايا الرئيسية والقواعد والتقنيات التكنولوجية المتقدمة التي تساعد على التخلص من المياه المنتبذة بوسائل مقبولة، ويتم عرض الإيجابيات والسلبيات لطرق المعالجة والتخلص من المياه المركزة الأكثر شيوعاً من وجهة نظر بيئية.

## Heat Recovery & Energy Savings Became Possible

DDI's patented "Rectangular, Square, Cube" Large Gap Heat Exchangers present a practical and simple solution to save energy which is wasted, with a return on investment within a few years. Failed attempts to modify



Worry free, non-plug operation

existing spiral, and shell and tube, heat exchangers for heat recovery application due to plugging or baking, led to the development of new breed of DDI "Rectangular, Square, Cube" Large Gap Heat Exchangers that provide worry free, non-plug operation, despite presence of stringy and sticky materials in municipal sludge or grey water flow. **DDI Heat Exchangers Inc.** designs & manufactures unique types of Heat exchangers & heat recovery exchangers with rectangular channels. Sold via a network of professional representatives in USA, Canada and other countries, the patented design allows liquids of very high percentage solids to flow without plugging in industrial processes, or large buildings grey water. In a small hotel of just 100 rooms & laundry & restaurant, the owners can save USD230,000 in a few years. In hotels, condos with over 200 rooms the saving can be USD500,000 in less than 2 years. In order to reduce its initial capital cost, DDI is offering the customer to pay only part of the capital cost. The user can install the HX from their operating budget. DDI and the user will share the cost of the energy saved via heat recovery by the DDI energy recovery exchanger for many years. ■

## Effluent Treatment Plant in Combined Cycle Power Plant

The main function of the Erzin CCGT Power Plant Effluent Treatment Plant is to provide discharge limits for deep sea discharge system. The classification of Erzin power plant wastewaters is divided to three parts according to their sources and compositions. The parts of treatment plant are Oil Water Separator, Neutralization of Waste Water, and TSS Settlement. *Alkanok, G. and Erdem, D.* from **Eke Industrial Plants Construction Company** explain that in the scope of this project, oil and water are separated by the gravity and the help of filters through oil water separator. Effluent waters flows to the division pit by gravity. Wastewaters which are stored in division pit are transferred to the Neutralization Basin. The general operation principle of the Neutralization Basin with two compartments is "fill, recycle/mix, neutralize and empty". Total capacity is net 140m<sup>3</sup> for both compartments of neutralization basin. Neutralization is performed by the addition of acid and caustic continuously depending on the pH measurement. Another system is TSS Settlement System by dosing coagulant and polymer in a lamellar clarifier that is to provide lower than 50mg/L TSS as a discharge limit sourced from backwash waters of auto-



Erzin CCGT Power Plant Effluent Treatment Plant, Turkey

matic filtration which use sea water and concentrated sea water. Consequently, guaranteed discharge limits are performed with proper capacity, type and quality via Effluent Treatment Plant integrated with all equipment. In the manner of treatment plants, EKE can provide suitable process design with acceptable discharge limits by utilizing experience in water and wastewater applications. ■

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tors (OTSGs) to drive the steam-assisted gravity drainage (SAGD) process for the production of bitumen, which is a heavy crude oil produced from oil sands. MEG Energy will use GE evaporators to treat its OTSG blowdown and recycle it as boiler feedwater as opposed to disposing of it by deep well injection. "We've witnessed industry trends of SAGD projects either installing new systems with OTSG evaporators or retrofitting existing units. As projects in Alberta's oil sands increase, more companies are turning to GE's evaporative technologies to address the critical issue of how to handle produced water," said *Bill Heins*, general manager, thermal systems—water and process technologies for GE Power & Water. GE will supply fifth generation, fully modularized evaporator systems, which are designed to achieve the lowest possible project costs. These advanced, module designs incorporate years of experience and optimizations resulting from numerous modularized evaporator projects designed and supplied by GE to clients in the Canadian oil sands. GE Power & Water provides customers with a broad array of power generation, energy delivery and water process technologies to solve their challenges locally. Power & Water works in all areas of the energy industry including renewable resources such as wind and solar; biogas and alternative fuels; and coal, oil, natural gas and nuclear energy. The business also develops advanced technologies to help solve the world's most complex challenges related to water availability and quality. Power & Water's six business units include Distributed Power, Nuclear Energy, Power Generation Products. ■

## MEG Energy Corp. Selects GE Evaporation Technology

GE reports that **MEG Energy Corp.** has selected its evaporation technology for Phases 2B and 3A of the Christina Lake Project, located in Northern Alberta, Canada. GE's evaporators will be used to recycle a significant portion of the steam generator blowdown for reuse as boiler feedwater. The Christina Lake project uses both cogeneration and once-through steam genera-

# The World's Desalination Laboratory: Saline Water Projects in Saudi Arabia

**T**he Kingdom of Saudi Arabia is the largest country in the world with no rivers or lakes, and home to a population of 29.2 Million. Desalination in the Kingdom has been an established source of water, which has brought sustenance and growth to the country. The Kingdom has consistently innovated and invested in desalination technologies for the last five decades and is now respected by the water starved world which looks towards the country for inspiration. The country kick-started its desalination mode 50 years ago producing a humble 300 cubic meters of desalinated water per day expanding to current day production of 5 million cubic meters per day (cmpd). This translates to 18-20 percent of global desalination capacities. It is therefore no surprise that Saudi Arabia is looked upon as the world's laboratory for desalination. By 2025, the country is expected to double its desalination capacity to 10 million cubic meters.

## Saline water projects in the Kingdom of Saudi Arabia

The **Saline Water Conservation Corporation (SWCC)** is the premier entity under the authority of the Saudi Government and is responsible for the country's publicly owned desalination plants and network transmissions. The SWCC is responsible for 28 desalination plants along the East and West coasts, as well as other producers (private and independent) such as Shoai-ba III, Shuqaiq II, and Jubail plants. The SWCC is also the world's largest water desalination entity.

According to SWCC's annual report 2012-13, the entity produced 955 million cubic meters of desalinated water annually. This is an increase of 7.8 percent from the previous year. It is also reported that total expenditure on SWCC desalination projects exceeded SAR100.4 billion (USD26.7 billion), of which operation and maintenance costs stood at SAR42.3 billion (USD11.3 billion). Geographically, plants located on the East coast produced an equivalent of 52.8 percent and the share of West coast plants was 47.2 percent of the total production capacity.

Further, new plants are under implementation and are expected to increase the production capacity by 2 million cubic meters per day. These include:

- Ras Al-Khair plant with a capacity of 1.025 Million cmpd. The plant is expected to be fully operational by the second quarter of 2014. The Ras Al-Khair plant is also considered to be the world's largest desalination plant and will also be producing 2,400 Megawatt (MW) of electricity.
- Yanbu Power and Desalination Plant: Phase three of the plant is expected to be completed by the fourth quarter of 2014 and will have a production capacity of 550,000 cmpd along with 2,500 MW of electricity.
- Jeddah Phase three Sea Water Reverse Osmosis (SWRO) plant which was recently commissioned and has a production capacity of 240,000 cmpd.
- SWCC has also announced the approval of a 600,000 cmpd desalination plant (SWRO) at Rabigh. The plant is expected to become the world's largest reverse osmosis based desalination plant when completed in 2018.

Exhibit 1: Water source & major desalination locations, Saudi Arabia, 2012



Source: SWCC, Kaust, Frost & Sullivan Analysis

Exhibit 1 presents the geographic coverage and desalinated water production in the kingdom of Saudi Arabia.

## Desalination power play

There has been a strong link between power and desalination in the form of numerous Integrated Water and Power Plants (IWPPs) projects, which are running successfully in Saudi Arabia and across the Middle East. This is primarily due to high energy requirements in the desalination processes where waste heat and energy from co-located power plants feed desalination requirements. The total fuel used to produce water and electricity in the kingdom is 1.3 to 1.5 million barrels of oil equivalent a day. Desalination utilizes 0.3 million (approximately) of oil equivalent per day using gas and liquid fuel, making it the second largest energy consuming sector in the kingdom.

Thermal technologies have been a popular choice for desalination in Saudi Arabia mainly due to familiarity, robustness, and favorable success rates. However, with the emphasis on increasing energy efficiency, membrane-based (reverse osmosis) desalination is gaining traction. A number of larger desalination plants along the East coast are based on thermal technologies, primarily due to the feed water quality in the Northern part of the Red Sea being unclear and challenging. Fol-

*"The Kingdom (...) is now respected by the water starved world which looks towards the country for inspiration"*

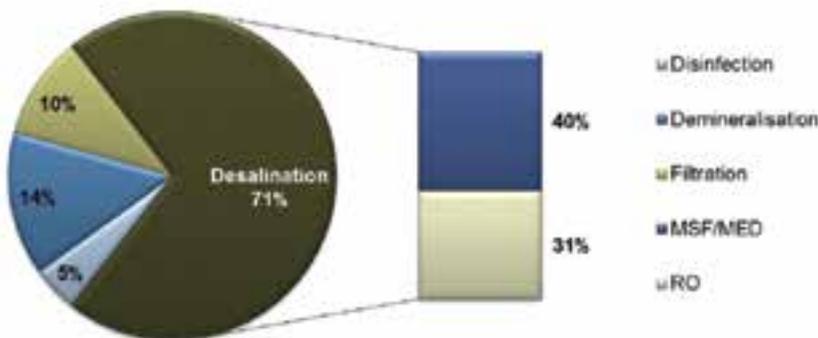
Following many years of investment, Research and Development (R&D), and progress in pre-treatment, the opportunities for RO desalination have improved significantly in the country. The focus is clearly shifting to bringing greater energy efficiency in desalination. It is important for the KSA to build highly-efficient and less fuel consuming desalination plants.

### Solar desalination, hub for the future

The Saudi Government and relevant water and electricity authorities are aware that reducing dependence on fossil fuels and increasing operational efficiency is the way forward. The kingdom has the largest solar radiance in the world and bonding solar and desalination is expected to be the next leap forward. However, its path is still unclear, as the two solar technologies, namely, solar photovoltaic and concentrated solar power work best inland, while we all know the source of desalination lies in the sea. Overcoming technical and economic challenges of solar desalination will be the key to wider adoption of the concept.

Saudi Arabia, through the King Abdullah Initiative, has already started work on its first solar powered desalination plant at Al-Khafi near the country's border with Kuwait. The plant will produce 30,000 ccmpd of desalinated water in the first phase and will be extended to

**Exhibit 2: Water treatment equipment segment: percent sales breakdown, Saudi Arabia, 2012**



Source: Frost & Sullivan Analysis

*“Desalination in the kingdom is an industry in itself and is non-linear in nature”*

300,000 ccmpd capacity by phase two. There are also plans to extend this initiative throughout the country in phase three.

### Long haul in a growth market

Pursuing a two-fold objective of energy efficiency and operational reliability, the Government has allocated SAR24 billion (USD6.4 billion) for water and sanitation projects in 2013 alone and committed over SAR247 billion (USD66 billion) on desalination plants and upgrades over the next 10 years. With an aim to double the production of desalinated water by 2025, the KSA offers a host of opportunities to water technology and solution providers from across the globe.

The desalination segment accounts for over 70 percent of the total water and wastewater treatment equipment market in the kingdom as presented in exhibit 2. Desalination in the kingdom is an industry in itself and is non-linear in nature. This implies that the production of desalinated water is associated with other major factors such as oil prices, energy requirements, and the financial framework. However, growth of the desalination segment has been driven by more familiar factors such as population, industrial growth, and water security. The market in Saudi Arabia has reaped benefits for numerous domestic and international companies. Constant investments in building new plants, and upgrades of existing ones translates into opportunities for a wide range of manufacturers, suppliers, consultants, and financial institutions.

The kingdom's outlook on desalination expertise goes beyond meeting water supply and towards exporting know-how, skill sets, and taking their experience global. The mantra for international technology and service providers eyeing the Saudi desalination market is to be ready to commit for the long haul. ■

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تعتبر المملكة العربية السعودية أكبر بلد في العالم من دون أنهار أو بحيرات، وهي موطن لـ ٢٩.٢ مليون شخص. كانت ولا تزال تحلية المياه في المملكة مصدراً مَبْتَكراً للمياه، ومصدر رزق ونمو. ابتكرت واستثمرت المملكة باستمرار في تقنيات تحلية المياه على مدى العقود الخمسة الماضية وباتت الآن تحظى باحترام من قبل العالم المتعطش للمياه والتي ينظر إليها اليوم نظرة إلهام. بدأت المملكة العربية السعودية بتحلية المياه منذ ٥٠ عاماً وكان إنتاجها المتواضع يصل إلى حوالي ٣٠٠ متر مكعب من المياه المحلاة يومياً؛ أما اليوم فقد توسع إطار هذا الإنتاج وأصبحت تنتج ٥ مليون متر مكعب من المياه المحلاة يومياً. هذا يترجم إلى ١٨ - ٢٠ في المئة من قدرات تحلية المياه العالمية. لذا فإنه ليس من المستغرب أن يُنظر إلى المملكة العربية السعودية على أنها مختبر تحلية مياه البحر في العالم. بحلول عام ٢٠٢٥، من المتوقع أن تتضاعف طاقة تحلية المياه في البلاد إلى ١٠ مليون متر مكعب. تحلية المياه في المملكة هي صناعة في حد ذاتها وليست امتداداً لشيء آخر أو تسلسلية. هذا يعني أن إنتاج المياه المحلاة يرتبط بعوامل رئيسية أخرى مثل أسعار النفط، ومتطلبات الطاقة، والإطار المالي.



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# Micro-Bubble Membrane Cleaning

## Why Size Matters & Chemicals Count

Following three years of research by *Max Fazel* and his R&D colleagues, **Genesys International** have launched an innovative technique for cleaning spiral wound reverse osmosis (RO) membranes. Genairclean™ is powered by air, transformed into micro-bubbles. But why is the size of the bubbles so important to effective cleaning? And how does the Genairclean™ technique achieve the optimum size during the cleaning in place (CIP) process? Genesys sales and marketing manager, *Matt Armstrong*, has the answers.

It's well known that any fouling of an RO membrane surface has a dramatic effect on energy consumption and plant efficiency. This is a particular problem for plants that suffer from a high fouling rate, such as waste water RO plants, where frequent cleaning is needed. Any RO system that faces significant repeat fouling can be very difficult to clean using commodity chemicals or even specialty chemicals. And the cleaning itself inevitably begins to cause damage, reducing the life of the membrane. Thankfully Genesys has come up with a solution. Genairclean™ is a simple, energy-neutral technique that thoroughly cleans fouled membranes without damaging them, increasing plant efficiency and membrane life.

### The air cleaning principle

The principle of agitating deposits at the membrane surface using bubbles is applied in various industries. Ohl et al explain the mechanism at work like this: "When bubbles expand and collapse close to boundaries, a shear flow is generated which is able to remove particles from the surface, thus locally cleaning it."

Compressed, injected air is used in cleaning and backwashing membrane bioreactors, microfiltration and ultrafiltration membranes, but it hasn't been proved effective for cleaning RO membrane elements.

Research by Willems et al into using single-source compressed air to increase RO membrane efficiency noted considerable drawbacks related to the velocity of the bubbles. Too low meant stagnant bubbles blocked flow through the membrane. Too high and the bubbles passed straight from inlet to outlet. Both effects reduced the spread of the bubbles, leaving large areas of foulant untouched. The 2 µm polyamide surface of an RO membrane is also prone to damage from such harsh treatment.

### Getting the bubble size right

To enhance the cleaning of an RO membrane, bubbles must be:



**pH cleaner Genesol 704**

- Small enough to pass through and interact within the spacer mesh
- Able to cover the entire membrane surface

Using a flat sheet test rig (FSTR) with viewing window, Genesys' research team was able to observe activity at the membrane surface and measure bubble size. They had formulated both high and low pH membrane cleaners incorporating effervescent reagents designed to produce micro-bubbles ranging between 5 and 500 µm in size. They could see that these effectively agitated deposits at the membrane surface, helping to dislodge them.

However they found that they could enhance this effect by inducting air into the cleaning solution using a physical method. This prevented the micro-bubbles from coalescing to form larger bubbles, allowing a suspension of bubbles and cleaning solution to distribute evenly over the membrane surface.

In the course of their experiments, our lab team tried various combinations to compare their effectiveness. Using only air and water with the physical bubble generator produced large and inconsistent bubbles. Adding commodity chemicals didn't reduce the bubble size. Also, at 1-2mm in size, the bubbles produced in the presence of commodity chemicals tended to become lodged in the feed spacer. This minimized contact between the cleaning solution and the membrane and spacer surfaces, reducing the potential cleaning action.

In contrast, the Genairclean™ process, with the special combination of physical and chemical bubble generation, creates consistently small micro-bubbles that circulate in the cleaning solution. This increases turbulence at the membrane surface, removing more foulant, more quickly.

Genesys has named its energy-neutral physical air generator the Genairator™. It can easily be installed on

any existing CIP system, with set-up costs typically less than USD500.

#### Genairclean in action

The Genairclean™ method uses high pH cleaner Genesol 704 to remove organics and biofilm, followed by low pH Genesol 701 to remove inorganic foulants. The cleaning chemicals gently lift deposits from the membrane surface during a soak phase, during which permeate flows back across the membrane due to normal osmosis. This lifts deposits from the feed side membrane surface, enhancing the cleaning effect and minimizing abrasive damage. The cleaning solution is then circulated for 20 minutes, allowing micro-bubbles to dislodge the cake layer on the membrane surface. These steps can be repeated, depending on the extent of the foulant. Laboratory and pilot plant results indicated positive results for foulant removal. Flux rates were improved compared to using conventional and commodity cleaners, and membrane autopsy confirmed improved cleanliness without damage.

The Genairclean™ method is then put to the test at a treated sewage effluent (TSE) treatment plant that produces high quality water for reuse. Run by **SAFI** (a **Besix Group company**), the 6,800 m<sup>3</sup>/d plant at Ajman, UAE, treats TSE water obtained through conventional activated sludge then passes it through microfiltration (MF) and

RO membranes to “polish” it. The Genairclean™ method cleaned the plant far more efficiently and more quickly than the conventional cleaning techniques they had used previously.

Additional studies at an industrial water reclaim system in the UK have proved cumulative improvements. Previously CIP procedures were carried out every seven to ten days with an average first stage dP of 2.4 bar. Permeate flow was 15m<sup>3</sup>/hr compared with a target of 20m<sup>3</sup>/hr. New elements gave an initial permeate flow of 25m<sup>3</sup>/hr, which rapidly decreased to 15m<sup>3</sup>/hr over an eight week period. After repeated use of the Genairclean™ method, stage 1 dP is now stable at 0.5 to 0.75 bar and the CIP frequency has been significantly reduced to every eight weeks. Meanwhile the permeate flow has increased to an impressive 25m<sup>3</sup>/hr – the performance expected from a new membrane.

#### Conclusions

- The Genairclean™ method can reduce required cleaning frequency and increase operational efficiency
- Bubble size and coverage is vital to foulant removal
- Using the correct mix of chemical and physical bubble generation creates the optimum bubble size and distribution. ■

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# GE & Saudi Aramco Launch Global Innovation Challenge

**GE** ecomagination and **Aramco Entrepreneurship** launched an open global technology challenge to accelerate the development of solutions focused on improving energy efficiency of seawater desalination. The USD200,000 challenge will be awarded to four winners at a prize of USD50,000 each, and further investments towards commercialization of the best ideas amongst all submissions will be considered. Current desalination techniques are typically very energy intensive: energy consumption can account for up to 70 percent of the desalination costs. The global production of desalinated



water uses approximately 75.2 terawatt-hours of electricity per year, enough to power nearly 7 million homes. The goal of this challenge is to identify novel ways to lower these costs around the world, either through technology advances, process improvements, or both. The open innovation challenge aims to identify new solutions to lower total desalination costs and emissions through: cleaner energy sources; incorporating advanced materials; and integrating processes better. Solutions must be innovative, impactful, feasible and scalable across the globe. This technology challenge also received endorsement from the **Saudi Arabian Saline Water Conversion Corporation (SWCC)**, which owns and operates around 25 percent of the entire world's desalination capacity. The Governor of SWCC, Dr. *Abdulrahman Al-Ibrahim*, said that the theme of this international open innovation competition is consistent with SWCC's strategic objective of constantly working to bring down the cost of desalinated water in the Kingdom. The deadline to submit entries is July 16, 2014, and winners will be announced in November 2014. ■

## Sustainable Development of the Water Sector

**Valoriza Agua** is the head of the set of companies that, belonging to the **Sacyr**, operate in the water field. It focuses on the water cycle management, and the design, engineering, construction, operation and maintenance of all kinds of water treatment plants. Its activities include desalination of brackish water and seawater, potabilization, water treatment and reuse, and the industrial water treatment, among others. With more than 100 plants designed and built in the past years, Valoriza Agua is one of the reputable water technology companies in Spain. Likewise, it counts with a great international expansion as it is present in Portugal, Algeria, Tunisia, Middle East, Brazil, Australia and Chile, and it gives service to more than 3 million people. The outstanding activity fields are: Desalination of brackish and seawater by reverse osmosis (BWRO & SWRO); desalination of brackish water by reverse electrodialysis (EDR); Drinking Water Treatment and Wastewater treatment; Purification and Reuse: wastewater tertiary treatment, urban sewage water and industrial effluents; Water treatment for industrial uses; Zero Liquid Discharge (ZLD). As a top company in the water field, the company bases its strategy on preserving and expanding its international presence and contributing to the sustainable development of the



**The plants guarantee a reduction in energy consumption**

water sector. Valoriza Agua is a specialist in the sector of sea-water desalination for human consumption and agricultural irrigation. Its plants guarantee a reduction in energy consumption also taking care of the existing natural resources. ■

# Feature

## Water Distillation

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# Unlocking Desalination Growth Potentials

**T**he water industry is taking significant steps to address the issues of scarcity and sustainability, embracing new technologies that are certainly helping to accomplish the main purpose: maintaining fresh water. Desalination systems have long been an expensive solution to water scarcity issues. The market landscape, however, has changed over the last 20 years. Decades of research and technological improvements have greatly increased the energy efficiency of thermal desalination plants, helping bring down operating costs. Meanwhile, membrane-based desalination has radically changed the economics of the sector, making desalination more affordable and less dependent on thermal energy sources.

**Global Water Intelligence's** report "Industrial Desalination & Water Reuse: Ultrapure water, challenging waste streams and improved efficiency" predicts that salt removal and wastewater recycling technologies are expected to become an essential ingredient in operational strategy, growing by 11.4% over the next five years to reach a total market value of USD11,963 billion by 2025. The report explains that, in addition to scarcity of water, global economic growth is also challenged by the need to develop new sources of energy and mineral resources, by increased demand on agricultural productivity and by the call to better management of carbon emissions. Indeed, the role of treated water itself is becoming more important as, within the move towards recycling, it becomes the vector for energy and materials recovery. However, removing salt from water and turning low quality wastewater and raw water sources into high quality process water is the key driver of water efficiency for the global economy. Desalination and water reuse technologies are unlocking the potential for growth, and will also be the main beneficiaries, according to the report.

Here, **Visiongain** calculates that the global desalination market will be worth USD3,917 million by the end of this 2014. This includes the market estimates for reverse osmosis (RO); multi-effect distillation (MED); multi-stage flash (MSF); electrodialysis (ED), electrodeionization (EDI) and electrodialysis reversal (EDR); and the aggregated CAPEX on hybrid plants or other technologies.

## Membrane equipment demand to rise

World demand for water treatment equipment is expected to grow almost seven percent per year through 2017, says a report by **Freedonia**. Increasing standards for process and supply water in manufacturing and other industrial applications in all regions will contribute to strong growth prospects for membrane equip-



*"Membrane equipment demand will also be promoted by greater interest in water reuse"*

ment, which is projected to increase its market share to 20 percent by 2017. Membrane equipment demand will also be promoted by greater interest in water reuse, particularly in developed countries, and by the growing market for water desalination equipment, particularly in the Middle East and Northern Africa, according to the report. The market for filtration equipment is relatively mature and faces competition from membrane systems and other newer technologies. As a result, demand for filtration equipment is expected to grow at a more modest pace, with most gains occurring in the municipal markets in developing parts of the world. Freedonia states that among other types of equipment such as thermal distillation equipment and evaporators, which are increasingly being replaced by membrane systems for use in desalination applications, demand is projected to rise at a slower rate. ■

### Prepared by:

Dina Fawaz

Acting ER Manager/Senior Editor & Researcher

تتخذ صناعة المياه خطوات هامة لمعالجة قضايا ندرة المياه والإستدامة، وتحتضن تقنيات جديدة لا شك أنها تساعدها على تحقيق الهدف الرئيسي: تأمين المياه العذبة. كانت أنظمة تحلية المياه فيما مضى حلاً مكلفاً لحل قضايا ندرة المياه، ومع ذلك تغير مشهد السوق على مدى السنوات العشرين الماضية. ساعدت عقود من البحث والتحسينات التكنولوجية وزيادة كبيرة في كفاءة استخدام الطاقة في محطات تحلية المياه الحرارية على تخفيض تكاليف التشغيل. وفي الوقت نفسه، غيرت تحلية المياه التي تعتمد على الأغشية اقتصاديات القطاع تغييراً جذرياً، مما جعل تحلية المياه تقنية أكثر يسراً وأقل اعتماداً على مصادر الطاقة الحرارية. تعتبر عملية إزالة الملح من المياه وتحويل الجودة المنخفضة لمياه الصرف الصحي ومصادر المياه الخام إلى مياه عالية جودة المحرك الرئيسي لكفاءة استخدام المياه بالنسبة للإقتصاد العالمي.

# inge GmbH and Aquasource: Long-Term Agreement

**inge GmbH**, a subsidiary of **BASF SE** and **Aquasource** have agreed to enter into a strategic cooperation effective April 1<sup>st</sup>, 2014, with each company focusing on its respective competences. Aquasource will choose inge® patented Multibore® membranes for all types of water, where a UF in-to-out technology is suitable. Within this cooperation, inge® will concentrate on the development and production of UF membranes while Aquasource becomes a center of excellence for membrane systems. Both partners target to combine technologies to provide customers with even better solutions. Aquasource provides engineering, processes and applications and selects the best membrane technology for the customers' needs. Know-how on membrane material is considered to be the key success factor for future innovations in polymer membranes. Since the acquisition by BASF in 2011, the Greifenberg (Germany) based inge GmbH has access to the comprehensive know-how of the BASF polymer experts and expands as a growth field the range of products and solutions of BASF's Water Solutions business worldwide. In the last two years, BASF and inge® have jointly defined several R&D proj-



ects in order to drive forward innovation in UF membranes. This shows BASF's commitment to expand its membrane technology and become one of the reputable suppliers of chemistry-based solutions for the industrial and municipal water treatment. inge®'s CEO Bruno Steis and Marc Messerli, CEO of Aquasource, jointly summarize the advantages as follows: "This strategic cooperation will allow our clients to benefit from the competence of two leading European companies in developing innovative membrane technologies, with inge® focusing on membrane optimization and Aquasource on the provision of membrane systems for water treatment plants." ■

## Extended Pilot Plant Range Meets the Demand

**Axium Process**, filtration specialist, has expanded its range of mobile membrane filtration units to support the increasing demand for pilot plant trials by manufacturers wishing to evaluate membrane technology as a solution to their process requirements. The pilot plants, which can be used for both "in process" applications or for waste stream concentration or purification, are designed for pilot microfiltration, ultrafiltra-



Axium's range of mobile pilot plants

tion, nanofiltration and reverse osmosis trials. Capable of processing from 0.15m<sup>3</sup>/h up to approximately 120 m<sup>3</sup>/h (based on water), Axium's range of mobile pilot plants can be customized to suit customer specific requirements utilizing either tubular, hollow fiber, spiral or ceramic membranes and can operate in either batch or continuous mode. The company is independent of any membrane manufacturer ensuring that the optimum membrane can be selected for a given application. Trials can be carried out at Axium's Swansea based facility or on site at customers' premises to fully quantify product variations and with fresh feed, as well as providing an opportunity for customers to gain firsthand experience with membrane operations using their own feed material. Membrane filtration is used by manufacturers operating throughout a wide range of industries including food, dairy, beverage, chemical, textile and pharmaceutical for applications such as product separation, process water recovery and waste volume minimization. The technology can offer enormous potential for cost savings in terms of reduced water usage, heat recovery, chemical recovery, reduced effluent volumes and disposal costs. ■

# Industry Spotlights

## Flow Meters

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# Increase in Annual Demand for Smart Water Meters by Value by 2018

**A** new report "Water Meters: Global Market and Forecast 2013 – 2018" from energy and utility industry specialists **StatPlan Energy** highlights strong prospects for smart water meters to 2018. StatPlan Energy estimates the 2014 global water meter market will be worth USD2.62 billion. By 2018 it will have increased by 13.2% to just over USD3 billion. Smart meters will gradually take share of the total market by value, increasing from 13% to 18% over that time and by 2018 the installed base of smart water meters will be between 120 and 130 million.

"The smart meter "revolution" is slower to develop than many expected (similarly in other sectors) but we support the increasing view from market participants that there is now sufficient traction at a global level to build business activities around the trend", comments StatPlan Director *Euan Blauvelt*. Blauvelt continues: "As issues of water scarcity and continuity of supply become more acute, and demands on water supplies from agriculture, industry and residential become increasingly unsustainable in many parts of the world, intelligent metering at all levels of the water distribution system has to be part of the solution. But because domestic use is often a relatively small element of demand, a focus on residential metering has a substantially smaller impact on water conservation. If the same level of knowledge and control could be applied to the agricultural sector, what a difference that would make. A saving of 20% due to more advanced metering in the consumption of irrigation water, which would entail the use of a small number of large bulk and transfer irrigation water meters would save 14% of total consumption of water, compared with an overall saving of 4% if a large number of residential water meters achieved a 20% saving in that sector."

The country by country analysis covers approximately 93% of the global market for water meters. Regional and global analyses take account of smaller markets as well. The report provides data on residential meters (individually identifying billing, prepayment, sub meters and smart meters), meters for apartments and small commercial buildings, meters for ICI (Industrial, Commercial, Institutional), Bulk Transfer/Custody Transfer meters and network management (non-custodial) meters. The analysis is in unit terms, USD value terms and ASPs.

StatPlan Energy has identified six key drivers in the gas meter market, all of which contribute to the forecasts produced, short- and long-term. New technology introduc-



*"By 2018, the installed base of smart water meters will be between 120 and 130 million"*

tions (smart metering and smart grids) and regulatory and government action of course have the major impact, but StatPlan considers other key variables which, especially in the long term, have a fundamental impact on future demand.

These include demographic trends (population change and household growth), increased gasification (number of end points) and the replacement cycle (which can only be calculated accurately if both the installed base AND the history of installation is understood). StatPlan Energy has developed 19 key databases, rigorously researched and constantly updated, that provide our forecasts with the most robust foundations.

StatPlan Energy is a market research and publishing company specializing in the energy and utility industry and associated industries around the world. It publishes a range of reports, forecasts and databases and offers ad hoc consultancy for the electricity and utility sectors. Clients include many of the world's leading management consultancies, investment institutions and manufacturers. ■

#### Source:

StatPlan Energy Limited

Web: [www.statplanenergy.com](http://www.statplanenergy.com)

يسلّط تقرير جديد أصدرته الشركة المتخصصة بمجال الطاقة StatPlan Energy تحت عنوان "عدادات المياه: توقعات السوق العالمية 2013 - 2018" الضوء على الإمكانيات القوية التي تحملها سوق عدادات المياه الذكية حتى عام 2018، حيث تتوقع الشركة أن تبلغ قيمة هذه السوق العالمية خلال عام 2014 حوالي 2,62 مليار دولار أمريكي. بحلول عام 2018، من المتوقع أن تزداد قيمة السوق بنسبة 13,2% لتصل إلى ما يزيد قليلاً عن 3 مليار دولار أمريكي. سوف تأخذ العدادات الذكية تدريجياً حصة السوق من حيث القيمة الإجمالية، وتكون قد سجلت بذلك زيادة من 13% إلى 18% خلال تلك الفترة. في الوقت نفسه وبحلول عام 2018، من المتوقع أن يبلغ عدد عدادات المياه الذكية المثبتة ما بين 120 و 130 مليون عداداً.

# National Water Company Deploys Itron Technology

**Itron, Inc.** announced that Saudi Arabia's National Water Company (NWC) is installing Itron's water technology to help the city of Jeddah conserve water resources. Itron meters and communication modules will enable NWC to measure water consumption more accurately, helping the utility and its customers to better utilize the country's scarce water resources. Itron's metering technology, in-

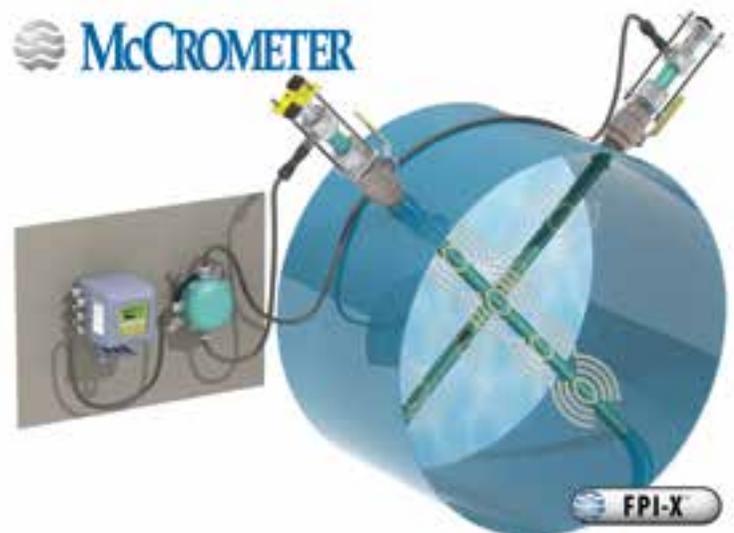


Jeddah to utilize Itron water meters and communication modules

cluding 141,000 residential and commercial & industrial water meters equipped with wireless communication modules will enable NWC to track and use water resources more efficiently. The single-jet technology used in Itron water meters is built to operate in harsh conditions, including high temperature and loaded water that are often found in Saudi Arabia. Itron is supplying customized wireless communication modules specially designed for high temperature climates. The communication modules can be read remotely through heavy protective metal covers that encase water meters in the city, reducing time spent locating and reading meters. The contract duration covers a two-year period, after which the majority of water meters in Jeddah will be ready for AMI integration. Installation of the water meters is underway. "At Itron, we pride ourselves on tailoring solutions to each of our customer's unique needs. The meters and communication modules we're installing for NWC in Jeddah are a great example of our ability to create a technology solution for every customer, addressing specific utility requirements," said *Mathias Martin*, Itron vice president of sales, EMEA. ■

# New FPI-X Mag Flow Meter

Process and plant engineers contending with swirl and other flow disturbances in the line will find the new FPI-X™ Dual Sensor Electromagnetic Flow Meter from **McCrometer** delivers accurate and repeatable measurement under extreme flow conditions unachievable with other technologies. The McCrometer FPI-X flow meter reliably achieves  $\pm 0.5\%$  accuracy under the most severe swirling flows. Designed for use in close proximity to cascading or multiple pump arrays, this meter delivers the advantage of accurate measurement where no flow meter previously could serve. Whether installed near pumps, valves, elbows, headers, or any other equipment that makes it impossible to create a symmetrical velocity flow profile in the pipe, the FPI-X will outperform traditional mag meters. The FPI-X mag meter provides measurement in difficult sites that otherwise require multiple meters in various locations, saving customers both money and installation time. The FPI-X also eliminates the expensive flow conditioners and piping modifications necessary with other meters. It is the latest product line extension from McCrometer, and is based on its patented and award winning FPI Mag meter technology. The new technology features a field-proven dual sensor configuration designed with multiple electromagnetic coils installed throughout both sensors to produce a magnetic



Ideal for municipal water, industrial processes, district energy and campus HVAC

field across the complete cross sectional area of the pipe. Placing voltage sensors in two planes across the pipe compensates for differences in velocity caused by severe flow disturbances. More velocity sensors results in a more accurate measurement. ■

## ReVision™ Flow Correction for Ultrasonic Clamp-On Measurements

Ultrasonic transit time clamp-on sensor measurements are widely used because the installation can be done without draining pipes or stopping operations. Dr. Thomas Hies at Hydrovision Asia, Singapore explains that such flow measurements require long straight pipes to ensure fully developed flow profiles. However in many applications long straight conduits are not available and disturbances like elbows will cause swirls. To correct these errors caused by disturbances a new approach for real-time correction has been developed and implemented. Based on complex Computational Fluid Dynamic (CFD) simulations the flow for different pipe dimensions and disturbances like elbows has been analyzed. Thereafter these results have been implemented in a real-time surrogate model called ReVision™ and an accurate flow measurement can be achieved by rebuilding the whole velocity profile across the pipe. The ReVision™ technology depends only on the measured discharge value and the following input parameters: Selection of a predetermined disturbance, orientation of the ultrasonic measurement planes, upstream or downstream installation distance



**DN1000 ReVision™ clamp on installation at 2 diameters downstream of a 90° elbow** between flow meter and disturbance and the inner pipe diameter. The concept has been widely tested using ultrasonic clamp-on flow meters ranging from pipe sizes of DN150 to DN1000 and for 45° and 90° elbows. The ReVision™ technology from **HydroVision** is available as a real-time application for ultrasonic clamp-on sensors as well as for wetted sensor installations. ■

## Control Flow From Outside A Pipe

This new Model DFS 5.1 Doppler Flow Switch by **Greyline Instruments Inc.**, controls flow with a non-contacting ultrasonic sensor mounted on the outside of pipes ½ inch diameter or larger. It installs in minutes. No pipe drilling or cutting is required and there is no maintenance. The Greyline DFS 5.1 is designed for pump protection, valve control and flow/no-flow alarms. It is ideal to control wastewater, slurries, caustics, acids and "difficult liquids". The water tight NEMA4X switch enclosure includes a 5 ampere DPDT control relay with adjustable ON and OFF set point controls, adjustable time delay, flow rate bar graph and relay status LED's. A sensor mounting kit is included with each switch and sensor cable can be extended up to 150m. The DFS 5.1 control relay can be set to turn ON and OFF at any flow rate between 0.25 and 10 ft/sec (0.075 to 3 m/sec). ■



The Greyline DFS 5.1



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# Why Water Issues Are Now Commercially Important

**W**ater is essential for life, but many businesses still fail to recognize the commercial importance of this vital resource. Darran Messem explains why businesses must take note. In the twenty years leading to 2030, global freshwater demand is expected to rise by 40%. But despite the stress on water globally, few organizations currently measure their water use, or manage the risks associated with the depletion and degradation of this critical resource.

Water stress is already causing serious impacts in countries around the world, and has direct production impacts on industries such as agriculture, food and drink production, and energy generation. Dealing with this stress can also exacerbate climate change, leading to greater levels of carbon emissions and causing wider environmental damage. For example in China severe water shortages in Tianjin and Beijing are leading to a need to spend at least USD3.3 billion over the next five years on building desalination plants to get fresh water from seawater.

Given the energy input required to run the desalination units this water costs around 30% more at present than more normal alternatives, and the fact that the energy is derived from fossil fuel further degrades the already poor local air quality.

The total cost of water consumption and disposal within an organization can often be surprising, and the associated greenhouse gas emissions very substantial. Therefore businesses should be including water measurement and reduction as part of both organizational cost reduction and sustainable development strategies.

It is helpful here to consider the potential impact of a cubic meter of water, which can cost a UK business up to £50 (USD84.14) and be responsible for up to 270 kilograms of carbon emissions. For perspective, a cu-

bic meter of water is 1,000 liters, 220 gallons, or 1,759 pints, and it takes around 2,500 cubic meters of water to fill an Olympic swimming pool.

This cubic meter of water may cost anywhere between £1 (USD1.68) and £6 (USD10.10) depending on the mains water supply. Pumping that water for an hour could cost around £14 (USD23.57) in electricity. Heating the water to create steam would incur a further £33 (USD55.55) of gas costs. Simply heating the water to 60°C for general commercial processes would cost £2-3 (USD3.27 – 5.05) in electricity.

*“Using a single cubic meter of water can very quickly add a lot to operating costs”*

Using a single cubic meter of water can very quickly add a lot to operating costs, especially when you consider that UK businesses alone use 10 billion cubic meters of water each year.

The commercial benefits of water reduction have been discovered by Berendsen, Britain's largest laundry business. Berendsen were one of the first companies to achieve certification to the Carbon Trust Water Standard. Since 2007, Berendsen has reduced water use by more than 50%, or the equivalent of more than one billion liters a year. Part of this achievement was made through reducing the water required to wash linen, from 20 liters a kilo to just 2 liters. The associated energy cost reductions from the need to heat and pump less water has proven to be highly valuable to the company.

Reducing water use can also provide numerous benefits when considered as a key part of implementing a wider sustainability strategy. For example, public transport operator the Stagecoach Group, worked with the Carbon Trust to develop a combined energy, water and waste reduction program that delivered a robust investment case and compelling payback.

Similarly, shipping company DFDS worked with the Carbon Trust to come up with a combined scenario for a major reduction in energy, water and waste costs compared to business-as-usual projections. The company's footprint was 10,000 tons of CO<sub>2</sub>, 432,000 liters of water, 496 tons of waste and 1.8 million liters of fuel consumed every year. Taking action to reduce this had a surprisingly attractive return on investment.



Taking action on water, as well as any corresponding energy use and waste production, doesn't just save operating cost - it is an essential part of an organization's risk mitigation strategy too. Even in areas perceived to be relatively wet, the demands of growing population, rising living standards and both domestic and industrial processes place huge demands on water systems.

Dry summers, and in particular dry winters, can prevent reservoirs and aquifers recharging, and water shortages quickly result. Minimizing water consumption reduces exposure to water resource scarcity. For organizations dependent upon large scale water supply - for example food and drink production - water

*"Water resource management is a key survival strategy"*

resource management is a key survival strategy.

The case for water efficiency in business is clear. Reduce your water bill. Reduce your energy use. Reduce your greenhouse gas emissions. Protect your business from future water scarcity. It is time businesses started waking up to water and taking serious action. ■

**Source:**

*Darran Messem  
Managing Director, Carbon Trust Certification and Director, International  
Carbon Trust*

**Web:** [www.carbontrust.com](http://www.carbontrust.com)

صحيح أن المياه ضرورية للحياة، ولكن لا تزال العديد من الشركات تفشل في التعرف على الأهمية التجارية لهذا المورد الحيوي. في هذا المقال، يشرح داران ميسيم، المدير التنفيذي لشركة كربون تراست، لماذا يجب على الشركات الإنتباه لبعض الأمور المهمة. خلال فترة العشرين العام المقبلة وصولاً حتى عام ٢٠٣٠، من المتوقع أن يرتفع الطلب المياه العذبة في العالم بنسبة ٤٠٪. على الرغم من الضغط على المياه على الصعيد العالمي، عدد قليل من المنظمات حالياً يقيس مدى استخدامها للمياه، أو يدير المخاطر المرتبطة باستنزاف وتدهور هذه الموارد المهددة. يقول ميسيم أن الأمر بالنسبة لكفاءة استخدام المياه في مجال الأعمال التجارية واضح جداً. خفض فاتورة المياه، الحد من استخدام الطاقة، الحد من انبعاثات غازات الدفيئة، الحماية من ندرة المياه في المستقبل، هي بعض النقاط التي يلقي ميسيم الضوء عليها في هذا المقال.

## Downtown Jebel Ali Specifies Balmoral Water Storage

**Balmoral Tanks** was commissioned to provide 1428m<sup>3</sup> of water storage for Downtown Jebel Ali. The tanks were installed in tower blocks and provided water storage for firefighting sprinklers as well as drinking and irrigation purposes. The project covered commercial and residential properties and Allan Joyce, managing director of Balmoral Tanks, said: "This was a very high profile project so the consultants and contractors wanted to fit the best possible water storage solution available to them. "In the end we provided practically 1500m<sup>3</sup> of water storage in some 14 GRP tanks on time and on budget. This was a huge achievement and one that we are very proud of." Balmoral Tanks is a well-known European tank design and manufacturer. Its products span hot press GRP and hot press steel as well as steel cylindrical tanks. Most carry full WRAS, LPCB and FM Global accreditation for potable and firefighting sprinkler water storage. The company also introduced its own vortex inhibitor, the Balmoral Fireflow™, which is fully LPCB-accredited. The proprietary inhibitor allows more water from the sprinkler storage tank to be used meaning that a smaller tank can be specified than one using traditional inhibitor technology. Balmoral GRP sectional water tanks provide water storage in capaci-



**Balmoral GRP Fire tank illustration**

ties of 1m<sup>3</sup>-1000m<sup>3</sup> and are erected to heights of 4m in 1m and 0.5m increments. With an unrivalled reputation for quality and service, Balmoral GRP sectional tanks can be pre-insulated and carry full WRAS and LPCB approvals. ■

# Managing Water Resources to Achieve Sustainability

**Ecoseal Developments Pty Ltd** is an environmental consulting company with extensive experience in providing services of groundwater modeling, seawater intrusion modeling, and water resource management, for the water industry and for communities and water users who rely on this critical resource. The company's mission is to help communities manage water resources and water environments to achieve sustainability. By improving water management outcomes, Ecoseal serves the long term economic benefit of communities that rely on this



Management of shallow watertables in irrigation areas

vital resource. Ecoseal has undertaken several projects in planning, management and modeling of groundwater basins and irrigation areas. The company has undertaken the development of groundwater simulation models for protection and management of surface and groundwater resources. Its work focuses on using advanced groundwater flow and transport models such as MODFLOW, MT3D, SEAWAT and models developed by Ecoseal to quantify recharge, groundwater flow, and salinity transport at regional as well as local scales. The main scope of the company's business involves consulting and research partnership services in: Water resources studies and management; Impacts of climate change on water resources; Groundwater modeling and aquifer management; Seawater intrusion modeling; Groundwater pollution and transport studies; Risk assessment of coastal groundwater resources to climate change; Management of shallow watertables in irrigation areas; Modeling depressurization of aquifers for mining and gas production; Development of indicators for managing stressed aquifers; Project assessment, evaluation and review. Ecoseal's projects reach across Australia, South-East Asia, South Asia, the Middle East and the Pacific Region. ■

# Industrial Penstocks Win Contract Race in Dubai

A groundbreaking new design has helped **Industrial Penstocks** (part of **F J Holdings Ltd**) win an important new contract in Dubai to design, manufacture, supply and supervise the installation of a high-head special stainless steel grade 316 Penstock. Located at a wastewater pumping station in Nad Al Sheba, best known for its horse racing course, the 2400mm x 2400mm square Penstock was designed to suit a 15m on-and-off-seating head. Utilizing the very latest in CAD and FEA (finite element analysis) software, Industrial Penstocks says it is pushing penstock design further than other manufacturers to meet the exacting requirements in the Middle East for greatly reduced leakage tolerances. *Paul Higginson*, Director at Industrial Penstocks explained: "Despite strong competition, we demonstrated our proven high-head design track record to win this contract – and showed that we are able to fully comply with the Dubai Municipality's specification." He added: "The tolerances that are specified in the Gulf States are far more testing than anywhere else in the world, but we have geared ourselves up to meet the challenge and go beyond." The on-site hydraulic test in Dubai recorded that the design, manufacture and installation of the Penstock performed a near drop-tight



High-head special stainless steel grade 316 Penstock to be built in Dubai

solution. Results recorded were 50% less than allowed. The Penstock is the second of its kind in the region to be supplied and installed by Industrial Penstocks. ■

# Dando Drilling's Program in Borno State, Nigeria

**W**ater scarcity is one of the most challenging issues in the 21<sup>st</sup> century and the lack of clean water and adequate sanitation has devastating effects. The range of water and sanitation related diseases include cholera, guinea worm disease, bilharzia and intestinal worms; but one of the most pernicious is diarrhoea, claiming the lives of 1.8 million people per year, 90% of which are children under five. Through its Millennium Campaign, the United Nations is working to reduce the proportion of people without access to safe drinking water by 2015 by 50% and is being aided to reach this goal by many international organizations and government departments. According to the World Bank only 47% of Nigeria's population has access to improved sources and drinking water of the highest quality.

Groundwater is an extraordinarily valuable resource for many reasons. The quality is normally excellent because the soil and rocks which the groundwater flows through help remove pollutants and it therefore requires far less treatment than river water to make it safe to drink and, because groundwater responds slowly to changes in rainfall, it stays available during droughts when rivers and streams have dried up. Additionally – and of particular importance in the developing world – it can often be found close to villages and therefore removes the costs associated with capturing, treating and piping surface water. Wells can also be sealed to avoid pollution from outside contaminants.

For these reasons, the Nigerian government is investing significant resources in tackling water scarcity by drilling new water wells. The Borno Rural Water Supply (BRWS) scheme is a long-term initiative that will ultimately provide 480 water wells in rural areas within the State. In 2012, the State government awarded a contract to **Dando Drilling International Limited** to supply ten drilling rigs and associated equipment together with commissioning and training services as part of the BRWS.

The specification and expectations of the rigs was clear; Borno State required reliable and robust equipment that would work for decades in extreme climate conditions and Dando Drilling proved to be the supplier of choice having been actively designing and shipping water well drilling rigs into Africa for over 140 years.

Dando Drilling International has invested heavily in workshop technology, the very latest design and manufacturing software and additional highly skilled and experienced staff to reach its goal of becoming one of the foremost providers of drilling rigs for the water sector and this is exemplified in the Dando Watertec range of top drive rotary drilling rigs. The rigs are recognized as being one of the most capable and fit-for-purpose range of water well drilling machines available on the market. In particular, Borno's rig of choice, the Watertec 40, is capable of a wide range of drilling



Maiduguri, Borno State, Nigeria

techniques and is a tried and tested hugely successful deep water well drilling rig designed for drilling large diameter water wells to great depths in some of the world's most challenging climates and terrains.

*“The Nigerian government is investing significant resources in tackling water scarcity by drilling new water wells”*

With a lifting capacity of 40,000kgf, the rig is favored by large aid agencies, government departments and private contractors for deep borehole drilling projects worldwide. With a total land mass of 69,435 square kilometers, Borno is one of the driest north-eastern states of Nigeria with semi-arid climate which consists of three seasons; long hot dry, short rainy and cold; temperatures can be as high as 45C and the surface resources, except for lake Chad, tend to dry up in the hot season.

Maiduguri, the largest city and capital of Borno State, lies on the Nigerian sector of the Chad basin with its dry season lasting longer than its rainy season contributing to serious droughts and levels of desertification. The exploitation of groundwater through the drilling of boreholes has therefore become essential to meet the increasing demand for water of Nigeria's growing population. Ten Watertec 40s have already been shipped and commissioned by Dando engi-



Maiduguri, Borno State, Nigeria

neers in Maiduguri. During the commissioning work a borehole of 600meters was drilled using a 123/ 3/4 tri-

*“The remaining rigs are being commissioned and training is being provided”*

cone bit, and was cased using 8 inch (200mm) diameter steel casing screens. An entire community in Maiduguri has already started enjoying the services of the new boreholes drilled with all four rigs currently working at various locations in Borno State. Elsewhere in Borno State a water well of 800m using mud rotary technique has been recently recorded and is believed to be the deepest water well in Nigeria to date. The remaining rigs are being commissioned and training is being provided which will allow them to be deployed in this life-saving project. ■

Source:

Dando Drilling International Limited

Web: [www.dando.co.uk](http://www.dando.co.uk)

تعتبر ندرة المياه إحدى القضايا الأكثر تحدياً في القرن ٢١ ولا شك أن النقص في المياه النظيفة ومرافق الصرف الصحي الملائمة لها آثار مدمرة. تعمل الأمم المتحدة من خلال حملتها الألفية على الحد من نسبة الأشخاص الذين لا يمكنهم الحصول على مياه الشرب بنسبة ٥٠٪ بحلول عام ٢٠١٥، ويساعدها العديد من المنظمات الدولية والإدارات الحكومية لبلوغ هذا الهدف. بحسب تقارير البنك الدولي، يملك ٤٧٪ فقط من سكان نيجيريا الحق بالوصول إلى مصادر مياه الشرب المحسنة وذات الجودة العالية. باعتبار أن المياه الجوفية مصدراً قيماً لأسباب عديدة، تستثمر الحكومة النيجيرية موارد كبيرة لمعالجة ندرة المياه من خلال حفر آبار مياه جديدة. يعد مخطط برنو لإمداد المياه للمناطق الريفية مبادرة طويلة الأجل من شأنها أن توفر في نهاية المطاف ٤٨٠ بئراً من المياه في المناطق الريفية داخل ولاية برنو.

## Rovatti Pompe's Latest Developments

**Rovatti Pompe** is proud to highlight the latest developed product for deep installations: the new 16EX series of 16" AISI 316 casted stainless steel electric borehole pumps. With this new mixed-flow line, the well-known Extreme range is enlarged, again, welcoming an even bigger, powerful and efficient solution for deep installations. Designed and developed to satisfy the most severe working conditions with the purpose of pumping corrosive and aggressive fluids in several sectors (such as pumping sea water in reverse osmosis applications) with the new 16" 16EX series the Rovatti Extreme range of borehole pumps can now meet flow requirements up to 1200 m<sup>3</sup>/h, head up to 700 meters (thanks to the radial encapsulated 8ERCX series) and motor power up to 400 kW representing, in a nutshell, the best possibility of increasing the state of the art of any pumping station guaranteeing exceptional hydraulic efficiency next to the maximum corrosion and wear resistance. The Company is also proud to promote the exclusive 6" and 8" vertical turbine pumps 6VX and 8VX series. This innovative range of products have been engineered and designed for efficient and reliable pumping of aggressive liquids in a wide range of industrial, marine and civil applications. While all parts in contact with the pumped liquid are manufactured in AISI 316 casted stainless steel, shafts



The new 16" 16EX series

and couplings are made of AISI 329 Duplex stainless steel. Through this construction the hydraulic components do not show welding joints and are characterized by compact and smooth surfaces. ■

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# Refined Evolution of Small Scale Drilling Systems

The PORTADRILLMINIâ drill by **A & D Drilling Supply Corporation** is a rugged, highly portable air/water/mud injection rotary drill, which has been designed to drill water wells (200 ft.) faster than any other mini drill. It is the result of 10 years of practical experience in confined and remote location water well drilling. This drill is a refined evolution of traditionally available small scale drilling systems. It combines all of the features necessary for rapid, cost effective well and bore hole drilling under even the most challenging conditions. No two drilling projects are the same and one needs the type of rig that will give the flexibility to customize the equipment to suit the specific needs of each drilling operation. The PORTADRILLMINIâ drill comes with a host of features that make it easy to get it right the first time every time. The three way air/water/mud injection system with independent control valves allows to pump various combinations of air, water or slurry into the well shaft to keep drilling smoothly regardless of the type of earth being drilled through. The company's patented pull down system allows the operator to adjust pull down pressure on the fly for optimal drilling efficiency and bit life. This



**The PORTADRILLMINI drill**

combination of weights, springs, cables and pulleys is the most versatile and responsive pull down system available on a portable rig. PORTADRILLMINIâ's selection of 6 and 8 HP engines allows choosing the right combination of power and affordability to suit the specific drilling needs. ■

# Schlumberger: Water Resources Development

**Schlumberger Water Services (SWS)** operates globally, specializing in the development, management, and environmental protection of water resources. The company's teams of highly skilled professionals provide cost-effective solutions to water supply and disposal challenges, including potable water supply and industrial waste water disposal. SWS is a specialist in the water



**Knowledge, technical innovation and teamwork are at the center of SWS**

well design and engineering field and applies technological innovation and alternative project delivery methods. Schlumberger developed the borehole geophysical logging techniques almost 100 years ago that are now commonly used as part of most deep well drilling and water supply investigations. Its areas of specialization include but are not limited to hydrogeological investigations, well production and well field design, construction and project management, oilfield and mine water management (dewatering), development of groundwater resources and alternative water supplies, high-resolution geophysical logging, surface geophysics, and long-term monitoring projects. SWS' technical experts apply innovative techniques such as directional drilling to optimize well performance in challenging environments. Focus areas also include the development of traditional (fresh) and alternative (brackish/saline) water supplies, desalination, injection well design and permitting, construction services, well mechanical integrity testing, groundwater recharge and storage program design and implementation (Aquifer Storage and Recovery), groundwater modeling and simulations, and development of database water management solutions. Well rehabilitation and well field troubleshooting services to solve complex water supply problems are also provided. ■

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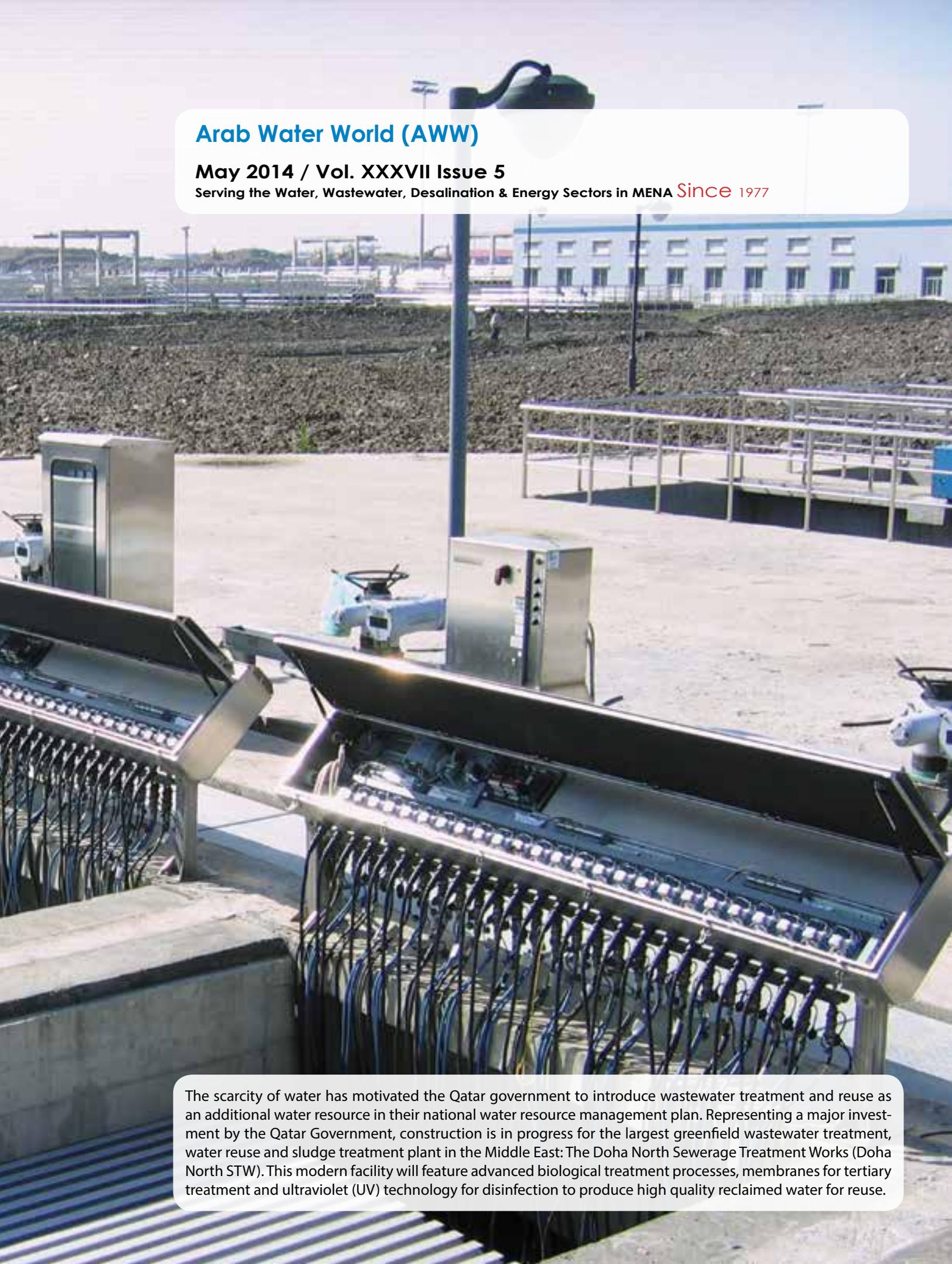
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## Arab Water World (AWW)

May 2014 / Vol. XXXVII Issue 5

Serving the Water, Wastewater, Desalination & Energy Sectors in MENA Since 1977

The scarcity of water has motivated the Qatar government to introduce wastewater treatment and reuse as an additional water resource in their national water resource management plan. Representing a major investment by the Qatar Government, construction is in progress for the largest greenfield wastewater treatment, water reuse and sludge treatment plant in the Middle East: The Doha North Sewerage Treatment Works (Doha North STW). This modern facility will feature advanced biological treatment processes, membranes for tertiary treatment and ultraviolet (UV) technology for disinfection to produce high quality reclaimed water for reuse.



# Iran Water Sector: A Need to Rethink Water Strategies

*Iran's water consumption is expected to continue to rise all the way through to 2017. The demands of the irrigation industry as well as the increase in population will certainly have a negative impact on the overall water industry in the country. Despite the government's persistence to improve the treatment facilities and supply networks and construction of new dams, increasing drought conditions and continuous pressure on groundwater reserves is starting to become a burden on the country. Plans to increase the amount of treated wastewater used for irrigation will improve water productivity, but facing severe water conditions requires a different thinking in the agricultural practices.*

Due to Iran's growing population and agricultural industry, BMI expected, in previous reports, water consumption to rise over the coming years despite increasing drought conditions and vulnerable groundwater reserves. A high level of government investment in the sector is improving supply networks, sanitation and treatment facilities as well as funding major dam-building projects.

Water quality in the country is poor due to a severe lack of sanitation facilities in rural areas and inadequate wastewater treatment but the situation is improving with constant construction and modernization projects, according to BMI's report Iran Water Report Q4 2013. In recent years of drought, groundwater supplies have been overused to the point where some reserves are at risk of becoming permanently contaminated or dry. The pressure on these supplies is decreasing with the construction of dams throughout the country but also with new wastewater treatment facilities. The reuse of treated wastewater, particularly for irrigation, will reduce the strain on supplies while the reduction in untreated sewage will improve water quality, states BMI. More recently, in BMI's Iran Water Report Q1 2014, forecasts have been revised over the past quarter as both extraction and consumption levels have risen beyond previous expectations. With a continually increasing population and a growing agricultural industry, there will be more strain than ever on the country's limited water supplies. Increasing drought conditions and vulnerable groundwater reserves are spurring on the government in its efforts to improve existing infrastructure, says the report.

As drought conditions in Iran become increasingly common and water consumption continues to rise in all

*"The supplies are not being given the chance to replenish and are thus at risk of becoming permanently dry or contaminated"*



sectors, BMI says that the pressure on Iran's groundwater supplies is beginning to cause irreparable damage. With illegal extraction and overuse, the supplies are not being given the chance to replenish and are thus at risk of becoming permanently dry or contaminated. The country's flourishing dam-building industry is attempting to reduce the pressure on groundwater supplies but even this will not be enough to cope with the needs of an expanding agricultural sector and a rising population. The report continues by explaining that the number of wastewater treatment facilities is increasing as the country focuses on improving water quality and preserving fresh supplies. However, with 92% of the country's water being used by the agricultural industry, the practice of cultivating highly water intensive crops that are dependent on irrigation means that a re-think of agricultural practices could have a more beneficial effect on water usage than simply increasing wastewater treatment, according to BMI. ■

#### Prepared by:

Soha Ghandour  
Assistant Editor & Researcher

تتوقع دراسات السوق أن يستمر استهلاك المياه في إيران بالارتفاع وصولاً حتى عام ٢٠١٧. لا شك أن مطالب صناعة الري فضلاً عن الزيادة في عدد السكان هي من العوامل التي لها بالتأكيد تأثير سلبي على صناعة المياه في البلاد بشكل عام. على الرغم من استمرار الحكومة بتحسين مرافق معالجة المياه وشبكات الإمدادات وبناء سدود جديدة، بات ازدياد الجفاف والضغط المستمر على احتياطات المياه الجوفية يشكل عبئاً على البلاد. فالخطط التي يتم وضعها وتنفيذها من أجل زيادة كمية المياه المعالجة المستخدمة في الري تحسن إنتاجية المياه، ولكن بظل الظروف القاسية التي تواجه قطاع المياه في إيران، هناك حاجة للتفكير بشكل مختلف في الممارسات الزراعية. يعتقد خبراء السوق أن الضغط على إمدادات المياه الجوفية يسبب ضرراً لا يمكن إصلاحه. مع عمليات الإستخراج غير المشروعة والإفراط في استخدام المياه، لا تجد إمدادات المياه فرصة لإعادة التعبئة وبالتالي فهي عرضة لخطر أن تصبح جافة بشكل دائم أو ملوثة.

## Excellence in Water Engineering

Iran is progressively moving towards a higher level of self-sufficiency in water resources. **RSA Electronics'** Project: A smart management tool for groundwater resources: the case of Northern Khorasan, Iran is the Honor Awards for the Small Projects Category of the 2014 IWA Europe & West Asia Regional Project Innovation Awards. This honor award recognizes excellence and innovation in the conception and results of water engineering projects. RSA- electronics and the water utility of Northern Khorasan are honored for its novel technology and processes that incorporate new thinking, leading to significant improvements in management of groundwater resources. This project is aimed at decreasing the environmental hazards by monitoring and management of groundwater resources via smart energy and water meter (SEWM). Northern Khorasan is the case study in Iran. The project implemented at this province completely and all of the wells equipped with smart energy and water meter. With making use of this innovative solution, in about 90% of water wells' electro-pump's power are cut in non-irrigation seasons for three months or more; in this case, yearly water level drop of groundwater has decreased



**RSA Electronics' Honor Awards for the Small Projects Category**

from 75 cm to 6 cm; it means the volume of over-pumping has declined from 30 million cubic meters to 10 million cubic meters per year. In other words an amount of 20 million cubic meters is saved. Also beneficiaries are biased toward increasing the efficiency of water use (irrigation methods, etc.). ■

## Re-Engineering, A New Approach to Sustainable Water Schemes

The special climatic conditions of Iran along with its topography make water a scarce commodity. Being an arid to semi-arid land, people who lived in these areas had to devise special water conservation schemes for optimum benefits of this precious commodity. In



**BANDAB C. E. considers impacts of design-criteria changes**

fact, to these people water was not only scarce, but was also considered to be sacred. About 3300 years ago, this belief was materialized in the hydraulic installations at Chogha-Zanbil, constructed for diversion of the Karkheh River in southwest of Iran. "Qanat", a system of water conveyance from an elevated water source by means of digging underground canals, is an Iranian invention of eons ago, which is still being used in parts of the country to preserve every drop of water. To gain the best results in managing such invaluable resource, a new way of thinking has to be generated, a new approach which improves the productivity and performance of all water schemes. Re-Engineering of the existing schemes can undertake mentioned responsibilities and is supposed to be a reliable solution for sustainable development needs. This innovative approach, which is developed by **BANDAB C. E.**, considers impacts of design-criteria changes, assumptions in overall performance of existing schemes including dams, and evaluation of ongoing and assumed demands to find projects which are more capable of being Re-Engineered. ■



# ABTIN Co. Presents New Innovative Devices

**ABTIN Co.** decided to use a new technique due to the country's comparative advantages, such as relatively cheap labor, energy and transportation. According to standards of flumes and weirs installation in open channels and a variety of orifices, nozzles and ventures in closed conduits, it seems that the installation of such supplies in addition to cost-

effectiveness and sustainability of water measurement structures towards quite electronic measuring devices have an advantage in comparison to Europe and the United States of America. MAHAN was invented with the help of mobile systems to measure parameters including depth and pressure according to predetermined standard relations and transfer measured data to a server via GPRS and SMS. Thus, the present structure alongside the electronic system is much more long-lasting than conventional electronic devices.



A mobile phone, a flow meter

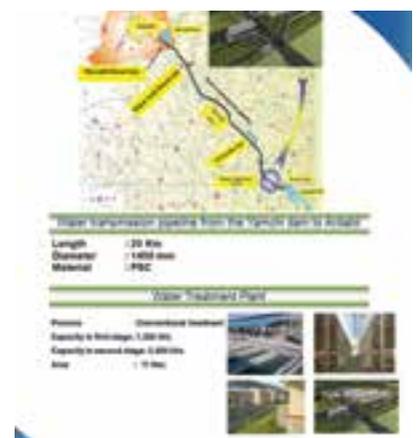
### Water level telemetry

ABTIN Co. also introduces MELIKA, a system able to reach water surface and measure water level with the help of a long tube supported by a towing cable to an accuracy of 1 cm. The device shield has been designed so that it could easily be attached to the well tube with a simple welding. The top part of the device is made of concrete which acts as a protective part. Data logger, modem and batteries are installed inside this section. The safety lock is designed so that it cannot be opened by conventional wrenches. ■

# Iranian Expertise in Water & Wastewater Applications

The professional activities of the **ABRAN Consulting Engineers** started in 1953, under the name of Kuros Consulting Engineers as the first consultant company in Iran in the field of water & wastewater. In 1981, after some organizational changes, the company continued its professional activities under the name of ABRAN Consulting Engineers, in the field of urban water and wastewater as well as water resources studies. Now, with 15 representative offices across Iran and one agency in Munich, Germany and using 150 of most experienced engineers and 50 of most skilled technicians in the field of designing and supervising, this company is known as a first-ranked company. Officially and legally in Iran, the company has a certificate of grade no 1 in water and wastewater consulting. The company is certificated from the Iranian department of planning and strategic supervision for consulting services in: Water and Wastewater Design; Irrigation and Drainage Networks Design; Residential, administrative, commercial, industrial and Military buildings Design; Environmental Studies; Retrofitting in Water Engineering; Safety, Risk reduction and passive defense; Project management services in water and wastewater Proj-

ects. The memberships are: **Iranian Society of Consulting Engineers-professional group of Water and Wastewater Systems; German-Iranian Chamber of Commerce; International Water Association (IWA); Iranian Hydraulic Association; Iranian Value Engineering Association; Iranian Association of water and wastewater Experts( IAWWE).** The company's certificates are: ISO 9001: 2008 from CCPL Norway since 2009; ISO 14001: 2004 from CCPL Norway since 2010; OHSAS 18001: 2007 from CCPL Norway since 2010. ■



Water supply plan from Yamchi dam to Ardabil city, IRAM



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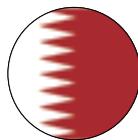


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# Water Reuse in Qatar Using UV Disinfection

In many Middle Eastern countries, limited water resources can pose severe constraints on economic and social development and threaten the livelihood of people. Available surface water sources are declining as a result of over-pumping of groundwater beyond natural recharge rates resulting in lower water tables, increased groundwater salinity and depleted ground water sources. Globally, and more in the Arab region today, there is increasing water stress in terms of water scarcity and deterioration of water quality. This looming crisis has prompted many governments to seek a more efficient use of water resources and develop interventions to narrow the gap between supply and demand in the region. The scarcity of water has motivated the Qatar government to introduce wastewater treatment and reuse as an additional water resource in their national water resource management plan. Representing a major investment by the Qatar Government, construction is in progress for the largest greenfield wastewater treatment, water reuse and sludge treatment plant in the Middle East: The Doha North Sewerage Treatment Works (Doha North STW). This modern facility will feature advanced biological treatment processes, membranes for tertiary treatment and ultraviolet (UV) technology for disinfection to produce high quality reclaimed water for reuse.

For the past two decades, UV technology has been successfully used around the world for municipal applications including wastewater and drinking water disinfection. UV is a cost-effective and reliable technology that protects the public against pathogenic microorganisms, including protozoa, bacteria and viruses. As a growing alternative and in many cases, a direct replacement technology to chemical (chlorine) disinfection, UV does not produce harmful by-products and is non-toxic.

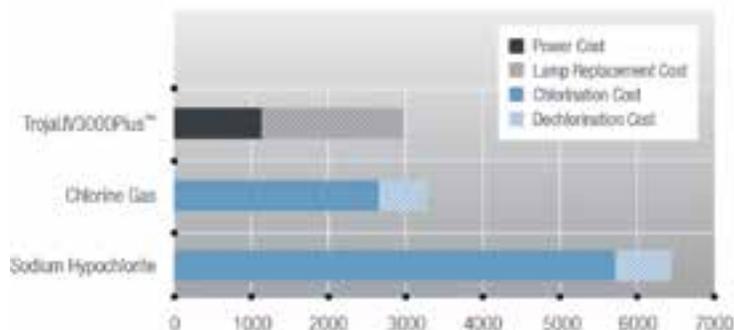
The presence of pathogenic bacteria, viruses and protozoa in wastewater and drinking water represents a potential risk to the public. To prevent the transmission of waterborne diseases, regulations specify water treatment processes, nutrient removal, final effluent quality and disinfection criteria based upon the specific requirements of the reuse application.

UV disinfection systems have been successfully designed, tested and installed in thousands of municipal treatment plants around the world. While individual applications (e.g. wastewater, stormwater, drinking water) and treatment objectives differ, they have one important goal in common – to provide cost-effective and safe water for the public while minimizing the environmental impact of the treatment process.

UV disinfection of wastewater is a physical process whereby ultraviolet lamps, producing energy in the UVC range (200-400 nm), are housed within a specifically designed treatment reactor. The UV lamps produce photons that attack the microorganisms in wastewater as it flows through the reactor. Within a few seconds of exposure, the DNA of the microorganisms is permanently altered and the bacteria can no longer reproduce or infect those coming in contact with the water.

## Project Background: Doha North STW

Qatar occupies a peninsula, projecting northwards from the Arabian mainland, on the west coast of the Persian Gulf. The peninsula is roughly 180 km long and between 55 and 85 km wide. With a peak design capacity to treat wastewater of up to 439,000 m<sup>3</sup>/day, Doha North STW will serve a projected population of over 900,000 people. With



Annual operating and maintenance costs of disinfection alternatives

*“The scarcity of water has motivated the Qatar government to introduce wastewater treatment and reuse as an additional water resource”*

the facility becoming a source of water supply for non-potable use, it will free up precious drinking water supply for the community.

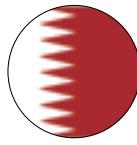
Doha North STW selected the TrojanUV3000Plus™ system (instead of chlorine) to disinfect their municipal wastewater plant effluent to reuse standards. The selection criteria included:

- Proven technology
- Validated equipment to substantiate performance guarantee
- Low lifecycle costs providing cost-effective disinfection over the lifetime of equipment
- Automatic and effective lamp cleaning to reduce maintenance for sleeve cleaning
- Low environmental impact of technology
- Reputable local service and technical support

## Evaluating Disinfection Alternatives

Traditionally, disinfection using chlorine gas has been the most common method of wastewater disinfection. Chlorine gas itself is relatively inexpensive but is a highly toxic chemical that must be transported and handled with extreme caution. It is stored under pressure in large tanks and is released into the wastewater as a gas. It is a strong oxidizing agent that can be extremely dangerous to humans if exposed.

Sodium hypochlorite is a diluted liquid form of chlorine. It is a clear, yellow liquid that is corrosive. Because it is diluted, it is not as volatile or toxic as chlorine gas – nor does its



unintended release have the same disastrous potential. It is typically purchased and delivered to the treatment plant in large volumes. As with chlorine gas, sodium hypochlorite can create disinfection by-products and often requires a dechlorination step.

In the interest of balancing public safety and environmental protection with the need for effective disinfection, over 25% of wastewater treatment plants in North America have converted to UV. UV disinfection is a physical process that instantaneously disinfects microorganisms as they pass by ultraviolet lamps submerged in the wastewater effluent. As well, UV is effective against chlorine-resistant Cryptosporidium and Giardia (pathogens in surface water sources that can easily find their way into drinking water supplies). The annual cost of operating and maintaining a disinfection system can have a significant impact on the economic evaluation of the technology. The O&M costs include the cost of chemicals, electricity, replacement parts, and labor required to maintain each system. The hazards of chlorine gas results in a significant amount of investment into training staff, emergency preparedness planning and maintaining the chlorine system. Chlorine gas prices are relatively low, but this is often outweighed by the intensive maintenance and safety precautions needed for the system. Due to the corrosive nature of chlorine, piping and pumps are prone to leaks and scaling and subsequent replacement. Scaling build-up in piping and pumps require regular acid cleanings to remove. The O&M costs associated with UV, however, consists primarily of lamp replacement costs and the electrical cost of operating the UV system.

Any disinfection alternative evaluation should also take into account the non-economic factors that can heavily weigh into the decision-making process. These factors typically include, but are not limited to operator & community safety, ease of operation, process reliability, constructability & space requirements and sustainability/environmental impact.

#### More about the UV Disinfection System

The UV system consists of seven (7) duty UV channels for the current design capacity plus provision for expansion of one additional channel to meet the future peak flow. For the current capacity, 420 UV modules will be installed in the duty channels with provision to increase by an additional 120 modules to meet the future flow capacity.

*“Middle East is seeing an increasing number of wastewater plants disinfect utilizing ultraviolet disinfection”*



Fig.1: UV3000Plus installation (typical) and UV Module

Keppel Seghers (Singapore), the environmental arm of Keppel Integrated Engineering, in partnership with the Public Works Authority of Qatar will design and build the plant and subsequently operate the plant for a period of 10 years. The Doha North STW is the first wastewater treatment facility in Qatar to use advanced membrane and ultraviolet light to treat and reclaim high quality wastewater for non-potable use. The reactor was third-party validated in accordance with NWRI UV Guidelines (2003) for wastewater reuse. Upon completion of installation, the UV system will resemble what is shown in figure 1.

Around the world, municipal UV systems have been installed to safely and reliably disinfect wastewater. These systems are used to safeguard public health through pathogen removal, but they also minimize the operating costs and environmental impact of the treatment process. Drawing from global experience and track records with proven installations, the Middle East is seeing an increasing number of wastewater plants disinfect utilizing ultraviolet disinfection. Each UV installation will be successful if the stakeholders proceed through planning and design phases with diligence. The UV manufacturer can contribute valuable experience to the process by educating municipalities about the science of UV disinfection, understanding the impact of effluent quality on UV disinfection and by properly designing and validating their reactors over a range of operating conditions. ■

#### Source:

Wayne Lem, Jennifer Muller

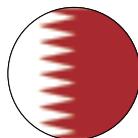
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في العديد من دول الشرق الأوسط، يمكن أن تشكل موارد المياه المحدودة قيوداً شديدة على التنمية الاقتصادية والاجتماعية كما أنها تهدد معيشة الناس بشكل عام. تستمر مستويات مصادر المياه السطحية المتاحة بالإنخفاض نتيجة الإفراط في ضخ المياه الجوفية بما يتجاوز معدلات التغذية الطبيعية، مما أدى إلى انخفاض في مستويات المياه الجوفية، وزيادة الملوحة فيها واستنزاف مصادرها. على الصعيد العالمي، وبشكل خاص في الدول العربية، تزداد اليوم ندرة المياه وتتدهور نوعية المياه. وقد دفعت هذه الأزمة العديد من الحكومات إلى زيادة كفاءة استخدام الموارد المائية وتطوير بعض الأساليب لتضييق الفجوة بين العرض والطلب في المنطقة. حفزت ندرة المياه الحكومة القطرية على ادخال معالجة مياه الصرف الصحي وإعادة استخدامها كمصدر مياه إضافي في الخطة الوطنية لإدارة الموارد المائية. باعتبارها استثماراً كبيراً من قبل حكومة قطر، يتم بناء أكبر محطة لمعالجة المياه العادمة، وإعادة استخدام المياه ومعالجة الكمأة في الشرق الأوسط: أشغال معالجة مياه الصرف الصحي شمالي الدوحة. تعد هذه المنشأة حديثة وتتميز بعمليات المعالجة الحيوية المتقدمة، والأغشية للمعالجة الثلاثية إلى جانب تقنية الأشعة ما فوق البنفسجية للتعقيم، من أجل إنتاج مياه معالجة عالية الجودة لإعادة استخدامها.



# Water Security Mega Reservoirs Project Milestone

Qatar's General Electricity and Water Corporation (**KAHRAMAA**) announced the tender for local and international companies to bid for the construction of five primary reservoir and pumping station (PRPS) packages as part of its Water Security Mega Reservoirs project. The five separate packages (A – E), cover material supply, construction, testing and commissioning related to the reservoirs, pumping stations, pipework, mechanical, electrical, ICA (instrumentation, control and automation), civil, structural and architectural works for the mega reservoir sites at Umm Birka, Umm Slal, Al Thumama, Rawdhat Rashid and Abu Nakhla. Contractors are required to submit their proposals by 5th June 2014.

The objective of the Water Security Mega Reservoirs project is to provide seven days' potable water storage in new reservoirs, combined with existing and future secondary reservoirs, to preserve Qatar's water quality

in line with KAHRAMAA and **World Health Organization (WHO)** standards. The project entails the construction of five mega-reservoir sites and approximately 200 kilometers of large diameter ring mains.

Each reservoir site will ultimately include up to nine reservoir modules, with up to five per site being included in the current tender, each of which will be among the largest of their type in the world. The reservoirs and pipeline network, with associated pumping stations, will provide up to 17 million cubic meters of strategic potable water storage. A massive ring main system will be provided between the independent water and power generation plants, allowing water to flow from North to South and vice versa; so that it may be delivered to any location in



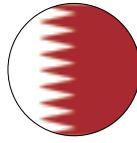
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Eastern Qatar, irrespective of water availability.

**Hyder Consulting** is the detail design and site supervision consultant on the project and has been working closely with KAHRAMAA since March 2012 to fast track the unique design of the mega reservoirs, pumping stations and pipework to meet the client's ambitious program. This technically demanding undertaking involves complex hydraulics and operational philosophies, mixed with the engineering and stakeholder challenges associated with delivering such significant volumes of water storage and networking. The Mega Reservoirs project has successfully achieved its early milestones; cumulating in the tendering of the five PRPS packages.

Hyder's multi-disciplinary team is responding to this complex and demanding project with technical and methodological innovation which is being delivered through its global offices in Doha, Bangalore, Manila and the UK. A detailed fast track design, procurement and construction sequence has been devised to achieve project completion as scheduled in 2017. *Kamiran Ibrahim*, Managing Director Utilities said, "Hyder is proud to have contributed to the successful progress of this strategically important project for the state of Qatar and its

people. It is also hugely significant for the utilities sector in the region and globally. As the largest ever water security undertaking, it is sure to have an impact around the world where other countries are seeking to ensure strategic water supplies for their populations."

According to *Maheer Chatila*, Country Manager Qatar, "The issue of the tender for the five PRPS construction packages represents a major milestone on the Water Security Mega Reservoirs project. This is one of the largest contracts ever tendered by Hyder and we are mobilizing a team to answer questions from contractors as they begin preparing their proposals. We look forward to moving to the construction stage where; as site supervision consultant, Hyder will remain closely involved in the realisation of this project alongside KAHRAMAA."

*Helen Bali*, Technical Director Utilities and Project Manager said "We believe that in constructing a such a world landmark project, KAHRAMAA will truly give Qatar the best in water security, creating an asset that will support generations to come with the confidence to turn on their taps, to know the water will run; and providing the flexibility to cater for major global events such as the World cup in 2022." ■

**And for us, each plant is as important as the first.**

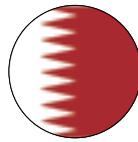
From our first installation at Port Hueneme, California, to our biggest project-to-date in Israel, NanoH<sub>2</sub>O prides itself on its team of dedicated technical field and application engineers who support each project from start to finish. Our *Q+ Projection Software* and *QSee Normalization Programs* are widely considered to be the most intuitive and comprehensive tools in the industry.

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## Providing Complete Valuable Turnkey Solutions

**Watermaster** pursues the keen endeavors in reaching full-scale turnkey solutions for the well-being of its customers. The company is a specialized contracting company that emphasizes on the wellness industry and has extensively committed its resources to the R&D and Water Services within two divisions: Treatment: water, wastewater and its condiments; Recreational: swimming pools, water features and wellness. The scope ranges from Design Concepts, Turn-key Projects Realization to After Sales Services. The company provides customers with all phases from the preliminary ones. The successful track record in the field of water treatment reflects Watermaster's reputation and mission statement. For over 30 years, the company has served the public and private sectors with executing a large number of luxurious projects; in Lebanon, Qatar, Iraq, Syria and other MENA countries. On the international side, the company's strategy continues to be one of expansion, with an aim is to substantially increase the contribution of international affiliations to the business. Through its dedicated managers, and extensive participation in various



**Watermaster emphasizes on the wellness industry**

events on the regional and international levels, Watermaster has proven itself in this field and became an accredited member of the following International organizations: **American Water Works Association** and **Water Quality Association**. Not only have the company established itself among accredited members in this area, but it also became the founding member of the **Al Miyah Holding Group**, currently operating under its umbrella. Watermaster Qatar is proud to be a member of **Investment Holding Group**. ■

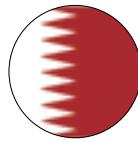
## New Authorized Bobcat Dealer Appointed for Qatar

The Heavy Equipment Division of the **Jaidah Group** has been appointed as the country's new authorized dealer for the **Bobcat** range of compact equipment. Under the new agreement, **Jaidah Heavy Equipment** is now responsible in Qatar for the complete range of Bobcat products including skid-steer, compact tracked and all wheel steer loaders, telehandlers, ex-

cavators and utility vehicles as well as a comprehensive selection of over 70 different types of Bobcat attachments that together deliver versatility and time-saving efficiency across a huge range of different applications. Headquartered in Doha, the Jaidah Group has been established in the Qatari market for many years, operating in a number of market sectors, including Heavy Equipment, Technology products and services, Automotive, Oil and Gas, Industrial Supplies and Furniture. The company imports, stores, markets, sells and delivers products on behalf of a number of internationally recognized manufacturers like Bobcat, and provides a variety of design, installation, support, maintenance and repair services associated with these products. The Heavy Equipment Division prides itself on its ability to provide state-of-the-art products, parts and service solutions covering transportation, power generation, construction machinery and the material handling equipment needs of major projects in Qatar. To cope with growing demand in the Qatari market, Jaidah Heavy Equipment plans to expand its servicing operations by 20% to 25% over the coming year and intends to build two new facilities and expand one of its existing workshops during the course of the next three years. ■



**Bobcat range of compact equipment**



## Public Sector Firms



- **Qatar General Electricity & Water Corporation (KAHRAMAA)**  
**Managing Director:** Fahad Hamad Al-Mohannadi  
**E-mail:** [GM@qewc.com](mailto:GM@qewc.com) / **Website:** [www.qewc.com](http://www.qewc.com)

**Activity:** KAHRAMAA owns, constructs, operates and maintains electricity generating stations and water desalination plants. It is the sole distributor of water and electricity in Qatar.



- **Public Works Authority-Ashghal**  
**President:** Eng. Nasser Bin Ali Al Mawlawi  
**E-mail:** [customerservice@ashghal.gov.qa](mailto:customerservice@ashghal.gov.qa)  
**Website:** [www.ashghal.gov](http://www.ashghal.gov)

**Activity:** Responsible for the design, construction, delivery and maintenance of all major water projects, including storm and rain water, wastewater and sewerage drainage and water treatment.



- **Ministry of Environment**  
**Minister:** Ahmad Bin Amer Al Hemaiddi  
**Email:** [Responsibility@moe.gov.qa](mailto:Responsibility@moe.gov.qa)  
**Website:** [www.moe.gov.qa](http://www.moe.gov.qa)

**Activity:** Balancing between the social and economic development needs and protecting the environment.



- **Ministry of Energy & Industry**  
**Website:** [www.mei.gov.qa](http://www.mei.gov.qa)  
**E-mail:** [did@mei.gov.qa](mailto:did@mei.gov.qa)  
**Minister:** Dr. Mohammed Saleh Al Sada

**Activity:** Develops and supports ventures that help diversify economy and encourages the private sector to increase its participation in industrial development and develops both clean and energy-intensive industries.

## Exhibitions & Conferences



- **Power & Desalination Summit - Doha / 12-13 May 2014**  
**E-mail:** [sobia.jameel@fleminggulf.com](mailto:sobia.jameel@fleminggulf.com)

**Website:** [www.energy.fleminggulf.com](http://www.energy.fleminggulf.com)

**Activity:** The 3<sup>rd</sup> Edition Power and Desalination Summit will discuss power and desalination technologies.



- **Second Arab Water Conference - Doha / 27-29 May 2014**  
**E-mail:** [awc@qmdi.qf.org.qa](mailto:awc@qmdi.qf.org.qa)  
**Website:** [www.awcqatar.com](http://www.awcqatar.com)

**Activity:** It will discuss vital issues concerning water conservation.

## Trade Associations



- **The Qatari Businessmen Association**  
**Chairman:** Sheikh Faisal Bin Qassim Al Thani  
**E-mail:** [qba@qataribusinessmen.org](mailto:qba@qataribusinessmen.org)  
**Website:** [www.qataribusinessmen.org](http://www.qataribusinessmen.org)

**Activity:** QBA strives to serve the vision of Qatar by accomplishing ambitious projects that have pushed Qatar into the globalization market.

## Publications



- **Qatar Construction Guide**  
**E-mail:** [qba@qataribusinessmen.org](mailto:qba@qataribusinessmen.org)  
**Website:** [www.qatarconstructionguide.com](http://www.qatarconstructionguide.com)

**Activity:** A rich directory of construction and water companies based in Qatar engaged in pipes-valves, water treatment, WWT, drainage & water treatment, drilling & irrigation.

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| Arab Water World (AWW)<br><a href="http://www.awwmag.com">www.awwmag.com</a> | Arab Construction World (ACW)<br><a href="http://www.acwmag.com">www.acwmag.com</a> | Middle East Food (MEF)<br><a href="http://www.mefmag.com">www.mefmag.com</a> | MENA Health World (MHW)<br><a href="http://www.mhwmag.net">www.mhwmag.net</a> |

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# Expected Water Sector Development Demands Urgent Infrastructure Upgrade

**D**espite the harsh reality and necessity to overcome challenges in the municipal and industrial sectors in Russia, perspectives for the water and wastewater market development over the coming years are highly opportunistic. Market reports point out that Russia's water market may have reached over USD900 million in 2010, but the required urgent facility and technology upgrades mean the sector will double in value by 2017. Development has already started supported by financial programs, increasing private investments in municipal and industrial sectors driven by the urgent need to rehabilitate old and inefficient infrastructure.

According to **Business Monitor International (BMI)**'s Russia Water Report Q1 2014, substantial development programs aimed at updating Russia's ageing water infrastructure are encouraging an influx of private investment and considerable opportunity for long-term growth. The water and wastewater equipment market is expected to almost double in size over the next five years as the country expands access and treatment facilities.

However, facing these growth and expansion expectations, BMI considers that Russia's water sector is in need of massive development and expansion due to its inadequate and ageing infrastructure. The chairman of Duma's sub-committee, Georgij Karlov, was quoted saying that "statistically, one-third of the Russian population uses water that is not properly prepared for consumption. Alas, still many enterprises and even towns, let alone rural locations, do not possess discharge treatment and water purification facilities, and those that are available are often obsolete". The government's low water tariffs have led to severe under-financing of municipal water networks "Vodokanals" (Water supply and wastewater treatment in Russia is managed by Vodokanals) as well as high average water consumption per capita, states BMI; these factors combine to produce a network that is not able to keep up with demand.

Similarly, **Frost & Sullivan's** recent reports on the water and wastewater sector in Russia expect that the Russian water and wastewater market is predicted to almost double by 2017. However, infrastructure upgrade is urgent as Frost & Sullivan's research analyst, Paulina Szyplinska, puts it "Water supply and wastewater treatment facilities are in most cases outdated and require immediate modernization, replacement and introduction of modern treatment solutions. Approximately 75% of the infrastructure must be replaced in the next five to ten years." An increased focus on sludge treatment to sludge volumes, safe storage and incineration is expected in Russia to help large metropo-



*"Russia's water sector is in need of massive development and expansion due to its inadequate and ageing infrastructure"*

lises deal with disposal problems. Szyplinska concluded that market improvement is partly down to financial aid from international agencies, governmental support in the privatization of water utilities.

These she said have created growing opportunities for foreign entrants, and made it easier for the Russian water and wastewater treatment sector to develop. "Increasing interest in the operational and process efficiency of water services, and treatment solutions coupled with a resurgent, diverse and robust industrial sector is driving demand for advanced systems and high-end services. This presents a platform of interesting opportunities for market players who are looking at entering or consolidating their position in the Russian water sector", she added.

Over the coming years, Frost & Sullivan believes that the main focus is on reconstruction of facilities and introduction of tertiary treatment for better nitrogen and phosphorus removal from wastewaters. A shift towards development of modern ultraviolet, ozone and membrane separation treatment is also expected in the water treatment segment, with decrease of traditional chlorine disinfection. Advanced treatment technologies have already been successfully implemented in large Russian metropolises, like St Petersburg. ■

#### Prepared by:

Rawand Fakhri  
Editor & Researcher

على الرغم من الواقع القاسي وضرورة التغلب على التحديات في القطاعات المحلية والصناعية في روسيا، فإن آفاق تطوير سوق المياه والصرف الصحي خلال السنوات المقبلة تعد مليئة بالفرص. تؤكد التقارير أن قيمة سوق المياه في روسيا قد وصلت إلى أكثر من ٩٠٠ مليون دولار أمريكي خلال عام ٢٠١٠، ولكن التطوير المطلوب والمستعجل للمرافق والتكنولوجيا يعني أن قيمة هذا القطاع ستتضاعف بحلول عام ٢٠١٧. وقد بدأ التطوير بالفعل وذلك بدعم من البرامج المالية، وزيادة الاستثمارات الخاصة في البلديات والقطاعات الصناعية، ويقود هذا التطوير الحاجة الملحة لإعادة تأهيل البنى التحتية القديمة وغير الفعالة. تعتبر مرافق إمدادات المياه ومعالجة مياه الصرف الصحي في معظم الحالات قديمة وتحتاج إلى تحديث فوري، إلى جانب استبدال واستحداث حلول المعالجة الحديثة. تشير التقارير أنه يجب استبدال ما يقارب من ٧٥٪ من البنى التحتية في الخمس إلى العشر سنوات القادمة.



# Improvements Expected In the UK Water Sector

**T**he four nations that make up the United Kingdom show a number of differences in the way their water sectors are run and each system has its own strengths and weaknesses. In Scotland and Northern Ireland, where the water sectors are owned and run, and often subsidized by the respective governments, tariffs are kept extremely low. This is highly beneficial to customers, especially in Northern Ireland where water is free, but means that investment potential from outside sources is very limited. In England and Wales however, where the water sectors are completely privatized, investment is rife, especially from large, foreign consortiums. This influx of finance has created a top of the range infrastructure, a network that covers the entire country and impressively high water quality. Due to the fact that each private company has monopoly over a certain area, lack of competition has created relatively high consumer rates.

Throughout the whole of the United Kingdom, as populations continue to rise, the need for constant upgrades, development and expansion is ongoing. England and Wales are geographically divided into areas that are then overseen by a particular, private water provider. There are currently 16 regional water companies throughout the two countries and these are regulated by a non-governmental body known as the **Water Regulatory Authority (OFWAT)**. OFWAT is in place to ensure that water tariffs remain affordable for the customer while also allowing for profit to be made by the providers. In Scotland and Northern Ireland the water sector is overseen by one company which is controlled by the government of that country. Yet here again differences can be found. In Scotland, the monopoly of the single company allows for decent tariffs for the customer but the sector is potentially harmed by the fact that no outside investment is generated and there is no influx of private companies that may have greater resources and financial backing with which to improve the sector.

In Northern Ireland the water provider is completely subsidized by the government meaning that there are no charges at all for customers. Over the last 25 years significant investments have been made to the water infrastructure throughout the United Kingdom. The rewards of this approach are that the Kingdom has a water system that is efficient and has maximum access with minimum losses. This has resulted in the highest customer satisfaction levels in Europe. Although it may be argued that, due to the small geographical area of the United Kingdom, achieving such a high level of water network standards should be easy, it has been estimated that the funding amounts to about

*"Throughout the whole of the United Kingdom (...) the need for constant upgrades, development and expansion is ongoing"*



GBP£5bn (USD7bn) every year. Yet there remain problems to be solved. For example there are still some rural areas that are not connected to mains water or sewage works, as well as continuing issues with pollution levels in major rivers and other natural water sources. In the near future **Business Monitor International (BMI)** expects improvements to be made to many existing treatment works and sewerage facilities. ■

#### Source:

Business Monitor International (BMI)  
United Kingdom Water Report Q2 2014  
Web: [www.businessmonitor.com](http://www.businessmonitor.com)

تظهر الدول الأربع التي تشكل المملكة المتحدة عدداً من الإختلافات في الطريقة التي تدار بها قطاعات المياه وكل نظام له نقاط قوته ونقاط ضعفه. في إسكتلندا وأيرلندا الشمالية، حيث تتواجد قطاعات المياه ويتم تشغيلها وغالباً ما تدعمها الحكومات المعنية، تبقى الرسوم الجمركية منخفضة إلى حد كبير. يعد هذا مفيداً للغاية بالنسبة للعملاء، وخاصة في أيرلندا الشمالية حيث المياه مجانية، ولكن في الوقت نفسه يعني أن إمكانات الإستثمار من مصادر خارجية محدودة للغاية. أما في إنكلترا وويلز، حيث يتم خصخصة قطاع المياه بشكل تام، فإن الإستثمار منتشر، خصوصاً من اتحادات أجنبية كبيرة. وقد خلق تدفق الأموال هذا بنية تحتية عالية المستوى، وشبكة تغطي البلد بأكمله ونوعية مياه عالية الجودة. وحقيقة أن كل شركة خاصة تحتكر منطقة معينة قد زال المنافسة وبالتالي خلق معدلات مرتفعة نسبياً بالنسبة للمستهلكين.



# Viking Johnson Works with Major UK Companies

For more than 80 years, **Viking Johnson** has been one of the top brands of Crane Building Services & Utilities. The company is a specialist in the design and manufacture of couplings, flange adaptors, and pipe repairs products, as well as joints and flow control system solutions servicing the international water, wastewater, gas and industrial markets. Products are suitable for dedicated and wide tolerance applications ranging from 15mm to 5000mm in diameter and can be used to connect or repair many types of pipe material. The Company's innovation program has been recognized and The Remote EasiClamp was awarded "Best Production innovation Award" in 2010 by the society of British Water & Wastewater industries. Viking Johnson has a 14 acre manufacturing facility based in the UK where products are manufactured on site by a skilled and experienced workforce. The company works with all the major water utility companies in the UK and recently invested £1.6 million (USD2.68 million) in manufacturing capabilities for large diameter products, with the aim to significantly improve lead times, product availability & flex-



**Viking Johnson's project in Liverpool**

ibility. Viking Johnson now offers a fast track service within the UK which is vital for incidents such as the high profile incident in Huyton, Liverpool, when a mains pipe burst causing huge disruption to residents and businesses. Viking Johnson's 24 hour fast track service ensured that Large Diameter Stepped Couplings were supplied within 24 hours so that the repair could be made without delay. ■

## Trade Associations



### • RenewableUK (Formerly BWEA)

**Website:** [www.bwea.com](http://www.bwea.com)

**E-mail:** [info@renewable-uk.com](mailto:info@renewable-uk.com)

**Activity:** Promotes the use of wind, wave and tidal power in and around the UK.



### • International Water Association (IWA)

**Website:** [www.iwahq.org](http://www.iwahq.org)

**E-mail:** [members@iwahq.org](mailto:members@iwahq.org)

**Activity:** A global reference point for water professionals, spanning the continuum between research and practice and covering all facets of the water cycle.



### • Irish Wind Energy Association (IWEA)

**Website:** [www.iwea.com](http://www.iwea.com)

**E-mail:** [office@iwea.com](mailto:office@iwea.com)

**Activity:** Promoting the use of wind energy in Ireland and beyond as an economically viable and environment sound alternative to thermal or nuclear generation.



### • The International Society for Trenchless Technology

**Website:** [www.ukstt.org.uk](http://www.ukstt.org.uk)

**E-mail:** [Info@istt.com](mailto:Info@istt.com)

**Activity:** Provides information on and promotes trenchless pipeline.



### • Society of British Water & Wastewater Industries (SBWWI)

**Website:** [www.sbwwi.co.uk](http://www.sbwwi.co.uk)

**Email:** [hg@sbwwi.co.uk](mailto:hg@sbwwi.co.uk)

**Activity:** Represents 100+ companies engaged in water and wastewater treatment.

## Exhibitions & Conferences



### • Water, Wastewater & Environmental Monitoring

- England / 5 - 6 November 2014

**Website:** [www.wwem.uk.com](http://www.wwem.uk.com)

**E-mail:** [info@wwem.uk.com](mailto:info@wwem.uk.com)

**Activity:** Focuses on measurement, testing and analysis for the water and wastewater and environmental industry.

## Publications



### • Global Water Intelligence magazine

**Website:** [www.globalwaterintel.com](http://www.globalwaterintel.com)

**E-mail:** [info@globalwaterintel.com](mailto:info@globalwaterintel.com)

**Editor-in-Chief:** Chris Gasson

**Activity:** Offers a market analysis of the international water industry.



### • Filtration + Separation

**Website:** [www.filtsep.com](http://www.filtsep.com)

**E-mail:** [a.burrows@elsevier.com](mailto:a.burrows@elsevier.com)

**Managing Editor:** Alan Burrows

**Activity:** Information tool for filtration users worldwide.



### • Water International Journal

**Website:** [www.iwra.org](http://www.iwra.org)

**Editor-in-Chief:** Prof. James E. Nickum

**Email:** [iwrapubs@gmail.com](mailto:iwrapubs@gmail.com)

**Activity:** International gateway to the sustainable management of water resources around the world.



### • Desalination

**Website:** [www.journals.elsevier.com/desalination](http://www.journals.elsevier.com/desalination)

**Editor-in-Chief:** Nidal Hilal

**E-mail:** [N.Hilal@swansea.ac.uk](mailto:N.Hilal@swansea.ac.uk)

**Activity:** Dedicated to communicating the latest developments in desalination and advanced water purification.



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Photo Courtesy of Neptune™ Chemical Pump Co.

## Wilo Shapes the Future at WETEX Dubai

This year once again the German pump specialist **Wilo Middle East** took a place at WETEX Dubai 2014 from 14-16 April 2014 at Dubai International Convention and Exhibition Centre. Wilo made its presence felt in the pump sector across UAE and Middle East countries, showcasing its high quality, innovatively designed products while promoting its brand name and securing a large share of the national and international market.

### German engineering at WETEX

Wilo covered all the fields of applications by displaying different types of pumps for heating, air-conditioning and cooling, water supply, drainage and sewage and industrial processes. The German pump manufacturer is widely spreading its technology, marking new achievements. The WETEX was a very unique occasion to share the community Wilo's success story in protecting the environment by saving power and water.

### Milestones at WETEX

The fair's major success is presented by visitors' number which passed 1500 visitors from around 25 countries all over the world. Wilo Middle East believes in being proactive, in maintaining a live contact with the customers in



Wilo at WETEX 2014

order to maintaining a continuous focus on practical applications and facing new challenges every day. After all, it is the customer's needs and desires that form the basis for the company's actions and performance.

Wilo Middle East has been present in Middle East region for over 20 years through its local distributors. With growing markets in building technologies and the introduction of high-efficiency pumps, the customers' needs for technical support and service become more urgent. ■

## Eijkelkamp & Schlumberger: Long-Term Contract

**Eijkelkamp Agrisearch Equipment** and **Schlumberger Water Services** have signed a



**Eijkelkamp**

Agrisearch Equipment

a Royal Eijkelkamp Company

new long-term contract. This means that Eijkelkamp will remain the exclusive distributor for the Diver® water level logger plus the relevant software and accessories for the next three years. Eijkelkamp and Schlumberger will also be cooperating closely on the development of new solutions in the field of water and groundwater monitoring. Eijkelkamp's Managing Director *Frank Tillmann* feels proud that Eijkelkamp and Schlumberger will continue their intensive cooperation in the years to come. This renewing of cooperation and development paths is intended to ensure joint global growth in water and groundwater monitoring projects. Eijkelkamp and Schlumberger have already cooperated closely on a number of occasions in the past, including the development of Diver Data Cables and various Eijkelkamp products such as e+ WATER L, e+ CONTROL and e-SENSE telemetry. ■

## Neptune™ Chemical Pump at AWWA's ACE14

**Neptune™ Chemical Pump Co.** announced that it will be exhibiting its metering pump technologies in Booth 2253 at the American Water Works Association's Annual Conference & Exposition (ACE14), being held June 8-11 in Boston, MA. Neptune will be showcasing the Series 7000 me-



Neptune Series 7000

chanically actuated diaphragm metering pump and Series 500 hydraulically actuated metering pump. The mechanical design of the Series 7000 eliminates the use of contour plates on the liquid side of the diaphragm while the simple, straight-through valve and head design allows for improved flow characteristics. The unit is self-priming, provides superior performance, and has a maximum capacity range up to 1,135 L/h (300 gph) at 150 psi. The Series 500 pumps feature EZE-CLEAN™ valve cartridges that can be removed for cleaning without disturbing the piping to the pump, and a Variable Oil By-pass™ stroke adjustment that allows for better valve performance than traditional variable linked designs. ■

# The Need to Maximize the Contribution of Wastewater Reuse

**A**s the world turns towards remedies to maintain fresh water supply, many industry specialists are helping out by offering the best technologies available. In an exclusive interview conducted by **Arab Water World (AWW)** team, Dr. Mazen Bachir, Managing Director at **Passavant Energy & Environment** dives through the opportunities for EPC specialists in the wastewater treatment sector in the MENA region over the next decade and the significance of this sector in the region. The following interview also sheds the light on the company's experience in providing municipal wastewater treatment and industrial projects in different parts of the world.

**Q. What are your views on EPC opportunities in the area of drinking and wastewater over the next decade?**

**Mazen Bachir:** The Middle East's energy sector is experiencing a surge in its water and renewable energy investment with nearly 100 projects, worth USD32.7 billion, initiated in 2013. Several regional governments are ramping up efforts to invest more in natural resources capacity as population in the Middle East is expected to grow by 31% by 2025, reaching 500 million, putting a significant strain on dwindling water resources. The Middle East is one of the regions in the world where water is very scarce, resulting in significant investment in water infrastructure and non-traditional water technologies such as desalination and wastewater reuse – of which the region is emerging as a world leader. So we see tremendous opportunities for EPC specialists in this sector over the next decade.

**Q. Why is wastewater treatment of significance in the Middle East, and how is this market segment evolving in this region, particularly in the UAE?**

**Bachir:** The region dwells five percent of the world population and has less than one percent of the world's available water. Water scarcity is a major threat for food security and political stability in the region. Much of the water crisis is caused by the way water is used. More than 89% of MENA's withdrawn water is allocated to agriculture and only 11% to municipal and industrial uses. Alleviation of the water scarcity implies reallocation of freshwater from agricultural to domestic and industrial uses. According to the **World Bank**, a reduction in agricultural water use by 15% would double the water available to households and industry in the region. There is a lot more that needs to be done in this regard, though the UAE has been pro-active in setting up wastewater treatment plants. According to the **Environment Agency Abu Dhabi (EAD)**, 60 percent of the 284 million cubic meters of treated sewage generated in the emirate each year is re-used. The EAD aims to improve this figure to 100% by 2018.

**Q. What are the challenges facing the Middle East in this area?**

**Bachir:** There are two basic requirements for utilization



**Dr. Mazen Bachir, Managing Director at Passavant Energy & Environment**

of wastewater as a solution for water shortage problems whilst minimizing the health and environmental risks: (i) the need for comprehensive wastewater collection systems, and (ii) the need for well-operated wastewater treatment facilities. There is also a third requirement, namely securing users for the treated effluents. Thus, to maximize the contribution of wastewater reuse to the total water availability, the generated wastewater needs to be collected, treated, and used as three "pillars" of wastewater utilization.

In the MENA countries, the reclaimed-wastewater market is unbalanced; i.e., growing supply - which is demonstrated by the increasing sewerage coverage and number of wastewater treatment plants - and stagnant demand - which is demonstrated by the substantial proportions of treated effluents that are not used but discharged into the receiving water bodies. Balancing the reclaimed-wastewater market (i.e., reducing the gap between supply and demand) implies increasing the rates of collection, treatment, and reuse close to the rate of wastewater generation. The MENA countries adopt supply-driven approach in which the concern

for reuse of reclaimed wastewater is often subsequent to design and implementation of treatment plants. For example, Tunisia started to explore wastewater reuse after the implementation of many treatment plants for environmental considerations along the sea coast that is far away from agricultural lands. We feel MENA countries would be better off adopting a demand-driven approach when implementing new wastewater treatment plants.

**Q. What is Passavant's Energy & Environment's experience in providing municipal wastewater treatment and industrial projects? What do your specialized solutions include?**

**Bachir:** Passavant Energy & Environment has a long history of developing new technology in the field of effluent and sludge treatment. Passavant Energy & Environment has been proactive in leading the trends of the industry and the evolution of clients' demands in municipal and industrial wastewater treatment which has made us a worldwide leader in water reuse and sludge treatment technologies. Passavant has a proven track record of assuming EPC contracting roles on municipal, industrial projects, delivering turnkey, and large-scale treatment plants.

The resulting output of Passavant Energy & Environment commissioned technology have proven to consistently match the cleanliness targets set out at the design stage, with a zero compromise approach. Passavant offers advanced wastewater and sludge treatment technologies with the unique ability to develop custom solutions for every stage of wastewater treatment. These include the mechanical, biological and clarification stage, including advanced wastewater treatment technologies for reuse applications like irrigation and agriculture.

Passavant Energy & Environment has become a world pioneer in the concept of energy reuse in wastewater treatment. Whilst the technology is known in related sectors, such as seawater desalination, the concept and necessity of energy re-use is a new one in the Middle East, due to the abundance of cheaply available energy. This is what makes Passavant Energy & Environment stand out the most in the field of wastewater treatment; namely, the ability to combine treatment, with water re-use and now, significantly, energy reuse.

**Q. As an EPC player, how much of engineering work is carried out in-house?**

**Bachir:** Passavant R&D teams are constantly engaged in researching new breakthroughs and developments to facilitate better water treatment standards. Areas of Passavant's research include technologies for treatment and reuse of water, such as co-fermentation as well as anaerobic and membrane technology. The company's



WWTP Fujairah, U.A.E.

knowledge base is highly regarded in the industry and the German government as well. In particular, Passavant has tied up with the **German Federal Ministry for Research & Development**, the **German Water Association** as well as renowned technical universities and research institutes to focus on its R&D initiatives.

Passavant also systematically incorporates this research into its projects, to ensure that clients get the benefits of cutting edge technology in projects. This helps Passavant's solutions be flexible and ahead of competing technologies. The wastewater specialist considers itself to be the only truly PEPC contractor, putting process know how and design at the heart and initiation of its EPC activities.

**Q. What is the significance of technology in wastewater and sludge treatment and what is Passavant's specialization in this regard?**

**Bachir:** Passavant Energy & Environment is constantly developing and creating its own technologies which have been field tested extensively and proven to deliver results in different environments around the world. Two of our vaunted technologies include:

**Sequential gas lance mixing system**

The company innovated the technique of injecting gas directly above the digester bottom, via flexible insert lances. This method delivers two crucial advantages. It prevents the buildup of deposits, even in shallow digester bottoms. It also eliminates the need for continuous operation of the mixing system which brings down



WWTP Constanta Romania

operation costs. It also facilitates easier maintenance of digesters by allowing cleanup work while the digester is still operating without the need to empty digesters. The passavant-patented mixing system is one of the core contributors to its energy reuse contribution, maximizing the recovery of the energy contained within the generated biogas.

#### Turbo-LME process

One of the biggest challenges in water treatment and purification is to produce flocs that can be separated from water using sedimentation. Passavant's unique multi-chamber flocculation, combined with a lamella separator, achieves optimal sludge concentration by thickening the separated floc in a single column. The unique lamella geometry creates a high quality of effluent that was not achievable previously, and in an area of land, previously considered too small for relative flow treatment capacity, and certainly untenable for conventional technologies. The system is able to operate under high hydraulic loads with additional maximum sludge thickening.

**Q. What are the key advantages for Passavant when it comes to having the necessary capabilities, presence and requisite resources in this region to secure good projects?**

**Bachir:** Passavant has been involved in the Middle East for more than a decade now. We've delivered projects in KSA, UAE, Jordan, Algeria, Iraq, Qatar, Egypt and Leba-

non. Our relationship with our parent company, **Drake & Scull International (PJSC)**, gives us a strong regional footprint, stretching from Western Europe to East Asia. Our track record of leading trends in the region, gives us head start over our competition. For instance, we were the first EPC experts to install a waste to energy project in the middle east, specifically in Saida Lebanon, and proved that the technology can deliver benefits in this market. Our European engineering teams have in-depth knowledge about the region, and we can also tap into DSI's network of offices, resources and personnel to undertake various aspects of the project, from EPC to MEP, civil and infrastructure development.

**Q. What sort of competition exists in this sector in the Middle East, and what gives passavant the edge in this market?**

**Bachir:** The market is competitive with active participation by leading global players. With the increasing number of projects being announced, there is work for everybody. Passavant's profound in-house process knowledge, cutting edge technology, skilled engineering, local experience and proven track record across the globe help us position ourselves ahead of competition.

**Q. Does knowledge of local needs and experience help when it comes to acquiring projects? What factors make you eligible as compared to others?**

**Bachir:** Having local experience is a tremendous advantage as it lends us credibility in the eyes of the client. Our local operations teams are familiar with the local environment, the local regulations and the local challenges. Language and more specifically culture is not a barrier for us as a sizable portion of our workforce hails from the region. We know this market, we know our technology, and we know how to install this technology efficiently and effectively here. Our post operation maintenance capabilities also add to our value proposition, which improves our standing.

**Q. What are your current projects in the region/UAE and the status of these projects?**

**Bachir:** We are currently delivering water and wastewater treatment plants in Al Arar (KSA), Kerbala (Iraq), Gabal El Asfer (Egypt), Khalifa City BWRO (UAE) and Heart of Doha BWRO (Qatar, as well as various containerized solutions in Iraq, KSA and the UAE. We are the first to successfully install a waste to energy plant in Saida, Lebanon, which not only converts domestic waste into electricity, but also achieves Zero Liquid Discharge, which in turn helps to protect the environment. These projects are on track for scheduled completion. We are well established in Europe, and have made inroads in Eastern Europe and Turkey. We are bidding for projects in UAE and are confident of picking up more projects in the region this year. ■



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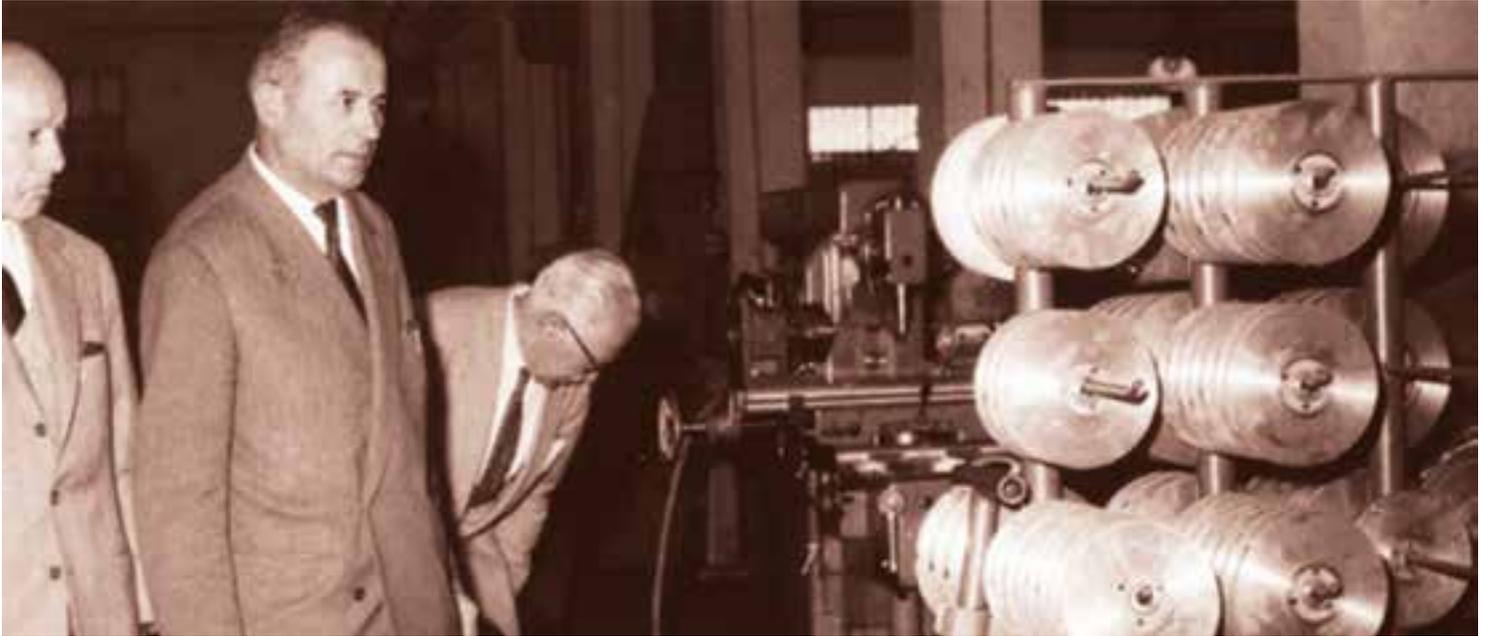
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# Caprari: 70 Years on the Cutting Edge



## Decades of experience

The **Caprari Group** is one of the major enterprises on the international scene when it comes to manufacturing pumps and centrifugal electric pumps, or creating advanced solutions for managing the integrated water cycle. From extraction in deep wells to distribution in water supply networks, collecting civil or industrial wastewater through to treatment and reuse, Caprari stands out for excellence in the quality of its products, solutions and services, available in a vast and complete range. Caprari provides specific skills and experience acquired and consolidated during almost 70 years in the business for professionals in the integrated water management industry.

In 1945, *Amadio Caprari* established Idromeccanica Caprari, based in Rolo, Reggio Emilia and in 1950, was already manufacturing the first vertical lineshaft pump for deep wells. The company moved to Modena the following year with a new factory, where special focus was given to Research & Development. The corporate organizational structure was reinforced over the next few years and the company began to export its products. The Group's current headquarters situated in Modena, was inaugurated in 1965.

The first submersible electric pump for deep wells was manufactured in 1968, while the first foreign subsidiaries opened during the Seventies. Production of pumps for wastewater and water treatment systems began in 1988. Use of CAD/CAM systems for the design and manufacturing processes started at the beginning of

the Nineties and ISO 9001 Quality Certification was obtained during those same years. The Company opened a new logistics facility and Training Center to provide a further boost to the specialist training work performed since the 70's. Caprari has created and provided the most advanced computing tools and digital technologies so as to help its partners in the best possible way. The iPump® Portal, a complete and user-friendly web "container" was also devised by Caprari for this purpose. The K-Kompact series pumps for treating and conveying wastewater were introduced in 2005. The new High Flow Line Series of multistage and single stage vertical lineshaft and surface pumps for high flow rates was launched in 2012. The factory was further enlarged the following year.

Established as a family business, Caprari is now an International Group. It has three production sites: the headquarters in Modena, the factory in Rubiera (Reggio Emilia) where submersible motors are manufactured and since 2010, Caprari Pumps Shanghai has been dedicated to the Chinese market. In addition, there is a fourth enterprise, Fondmatic SpA, a foundry situated in Crevalcore (Bologna). The foreign subsidiaries are now nine, and Caprari operates in 80 different countries throughout all five continents with over 600 dealers in a widespread distribution network. Caprari has obtained UNI EN ISO14001:2004 Certification and BS OHSAS 18001 Certification, environmental sustainability and safety having always been the cornerstones of its corporate policy. ■

## GEA's Ecoforce Decanter at IFAT Entsorga 2014

An optimum track record in terms of performance and reliability, to always be first past the flag, is not only the formula for sustainable success in motor sports. Under the motto "GEA Westfalia Separator Technology – Keeps you up and running" **GEA Westfalia Separator Group** realizes this high quality standard consistently. At IFAT Entsorga from 5 to 9 May the company will therefore exhibit the waterMaster CF 6000 from the ecoforce decanter series. The CF decanter series ensures highest uptime reliability along with maximum performance and separation efficiency round-the-clock, with minimal energy consumption. A mobile decanter installation will give a breath of fresh air on the open-air exhibition ground.

### Simple, efficient, reliable and remote-enabled

For the first time at IFAT Entsorga GEA Westfalia Separator Group will be presenting its new GEA Westfalia Separator IO control technology. It combines easy, efficient and flexible plant handling with the greatest possible mobility for the operators through mobile operating panels or access via tablet or smartphone. This makes possible permanently optimal performance control of the decanter no matter where the operator happens to be.



**An optimum track record in terms of performance and reliability**

### Availability, efficiency and cost control throughout the life cycle

The maximum availability of the systems is assured by the service provided by the original manufacturer: GEA Westfalia Separator serv&care. With serv&care GEA Westfalia Separator Group dispenses with rigid service and maintenance concepts and tightly structured packages in favor of customized, needs-based services. ■

## CHEM-PRO M™ Diaphragm Metering Pump

The CHEM-PRO M™ series metering pump has the features and attributes industry pros have wanted, but couldn't find in Diaphragm Metering Pumps currently on the market. These features



**CHEM-PRO M™ series**

include: NSF 61 listing – a must in municipal water systems; 200:1 turndown; a large, easy to read LCD screen that displays the pumps' output rate; a 4-20mA output is standard on all models; a robust #316 Stainless Steel pump head cover for added strength; and a comprehensive 3 year warranty. The CHEM-PRO M also features **Blue-White Industries'** exclusive DiaFlex™ Diaphragm. The single piece DiaFlex is manufactured 100% in house of molded Kynar. There is zero delamination or breakdown with DiaFlex. Optional advanced communications include: Industrial Ethernet, Modbus TCP, ProfiNet, Modbus, and Profibus. CHEM-PRO M is sold and serviced exclusively by highly skilled, factory authorized technicians. ■

## Portable Seawater Pump

A new high pressure fire pump designed for marine duties has been released by **Australian Pump Industries**. Called the Aussie Sea Skipper, the self-priming pump has been designed to tolerate saltwater making it suitable for applications on work boats, barges, ferries, trawlers and patrol boats.



**Dane Van Der Neut from Patonga NSW checks out the new Aussie Sea Skipper pump**

"We've taken our high pressure 4" fire pump and converted it for a life at sea," said Aussie Pump's product manager Brad Farrugia. "Key components are designed to be corrosion resistant, so now we have a high performance pump that's ideal a range of duties including marine firefighting and salvage," he said. The new 4" Sea Skipper (QP402-ED-L100E) incorporates a number of features that make it suitable for use with saltwater. The broad shouldered pump casing is covered inside and out in a thick Geomat coating. This protects the marine grade aluminum against oxidization. ■

# ISK - SODEX 2014 Opens its Gates May 7



The event will be organized in 11 halls of Istanbul Expo Center

HVAC&R sectors will come together at ISK-SODEX 2014 from May 7 till May 10 at Istanbul Expo Center. International Heating, Refrigeration, Air Conditioning, Ventilation, Insulation, Pumps, Valves, Installation, Fittings, Water Treatment, Solar Systems Exhibition ISK-SODEX 2014, which is the biggest exhibition in its own sector in Eurasia, is expected to accommodate important business connections with the foreign buyer delegation program.

The demand for heating, refrigeration and ventilation sectors is increasing in Turkey. The air conditioning sector is rapidly developing and it is considered as one of the most important sectors in the country. It has been announced by Turkish Ministry of Economy that the Turkish air-conditioning sector has an important position in the world. According to the data of the Turkish Ministry of Economy, Turkish Air Conditioning Sector will reach the total production volume of USD60 billion with the of domestic market size reaching USD35 billion in 2023.

ISK-SODEX 2014 is supported by important associations of the sectors which are:

**ISKAV (Heating, Cooling, Air-Conditioning Research and Education Foundation), ISKID (Air-Conditioning & Refrigeration Manufacturers Association), DOSIDER (Natural Gas Equipment Manufacturers and Businessmen Associations), TTMD (Turkish Society of HVAC & Sanitary Engineers), IZODER (Association of thermal insulation, waterproofing, sound insulation and fireproofing material producers, suppliers and applicators).**

A Foreign buyer delegation program will be organized by the Turkish Ministry of Economy in order to support the export rate, diversifying the export of the products, finding new markets and protecting the market share.

Large numbers of delegates from 62 countries are invited to ISKSODEX 2014. Hence, it is expected to conduct important business connections with the foreign buyer delegation program. The exhibition is expected to get 80.000 plus visitors from Turkey as well as from different parts of the World especially neighboring countries. Professional trade visitors from Iraq, Iran, Bulgaria, Syria, Azerbaijan, Morocco, Tunisia, Algeria and Lebanon will intensively visit the exhibition. Hence visiting ISK SODEX will mean visiting the entire region, making this event an event not to be missed.

The event will be organized in 11 halls of Istanbul Expo Center which is approximately 55.000 sqm area in total. ISK-SODEX 2014, which is set to welcome 1300 companies, is therefore the biggest meeting point of international platform within Eurasia region for HVAC&R. The exhibition will be presenting the latest innovations in the HVAC&R sectors. Wide range of new products in heating, ventilation, air-conditioning, refrigeration, insulation, pumps, valves, installation, fittings, water treatment and solar systems will be exhibited by 1300 companies at the event.

The venue of ISK-SODEX 2014 is in Istanbul Expo Center, which is located in the World Trade Center Complex on the European side. Istanbul Expo Center is located at a very easy accessible point. It takes approximately 5 minutes from the Ataturk Airport to reach to the exhibition area via subway and by car/taxi. Also, the visitors can take the subway from all central places to reach the exhibition area. Alternatively, the metro bus is another easy way to reach to the exhibition area.

Being an exhibitor at ISK-SODEX 2014, companies can add value to their brand awareness and prestige as this fair includes all the sector insights. So, Exhibiting in ISK-SODEX is an indispensable investment for all brands. ■



10<sup>th</sup> INTERNATIONAL RECYCLING, ENVIRONMENTAL TECHNOLOGIES AND WASTE MANAGEMENT TRADE FAIR

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Tüyap Fair and Congress Center, İstanbul

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Organization



# REW Istanbul: Ready for the Big Opening in June

The national investments regarding the environmental technologies are at full speed in line with the Vision 2023 Project developed in order to assist Turkey reach the desired wealth level and known as National Technology Projection Project. Within the scope of the project, both public and private institutions have liabilities such as utilizing environment-sensitive, clean production technologies, holding technologies that will ensure the recycling of the waste, developing the technologies for the sustainable use of resources, designing and installing the new systems based on the clean technologies and in line with the sustainable efficiency model. Emphasized as the largest commercial event of its region in this field, REW Istanbul offers various technology and application solutions on the international scale to the environmental problems of Municipalities and Organized Industrial Zones as well as the industrial enterprises which need to hold an Environment License and seek solutions to solid waste storage, elimination and waste water treatment under the main categories of solid waste, water and waste water, waste gas and green energy.

Organized by **Istanbul Fuar Hizmetleri A. S. (IFO)**, an affiliate of London-based **Tarsus Group**, Recycling,



**REW Istanbul 2014 is expected to attract 400 exhibitor companies from 25 countries**

Environmental Technologies and Waste Management International Fair REW Istanbul is taking place on 12-14th June this year. The industry that became a billion-dollar market with the investments by the countries of the region, primarily Turkey, is gathering together at REW Istanbul again. The event that is set to take place at Tuyap Beylikduzu Fair and Congress Center is particularly important for the SMEs, heavy industrial enterprises, municipalities with waste management responsibilities, OIZ representatives, machinery and equipment manufacturing companies and those who plan to invest in this industry. REW Istanbul that will feature the newest products, technologies and practices of 2014 in "Solid Waste, Waste Water, Waste Gas and Green Energy" is expected to attract 400 exhibitor companies from 25 countries while it is aimed that 12.500 local and international decision-maker professionals visit the fair this year.

The environmental technologies industry that has become one of the world's most important markets in line with the continuous growth on the global scale in the industry is gathering together at REW Istanbul for the 10th time. The fair starting on 12th June Thursday is deemed to be the most significant commercial event of Eurasia region in this category. Taking place on an area of 20 thousand square meters this year; REW Istanbul will be the meeting place of the various innovations and novelties from waste collection and carriage vehicles to separation, treatment and press machinery, from recycling systems to recovery premises and products, from renewable energy technologies to urban environmental cleaning tools & vehicles.

**REW Istanbul 2014 objective: 400 exhibitor companies, 10 thousand decision-maker professional visitors**

REW Istanbul that opened its doors in 2005 when there was no such established industry in Turkey is celebrating its 10th year with growth on year-on-year basis. The fair that hosted 9196 visitors from 57 different countries from Saud Arabia to Germany, from South Korea to Italy last year is expected to attract 12.500 professionals this year. REW Istanbul that also grew with respect to square meters compared to 2013 is taking place in 3 different halls this year. It is expected that 400 companies from 25 countries will exhibit at the fair that has become a global gathering for the environmental technologies. ■

## 39<sup>th</sup> Mostra Convegno Expocomfort: A Fruitful Closure

MCE-Mostra Convegno Expocomfort has solidified its position at the heart of companies' business strategy dedicated to residential and industrial installations, air-conditioning and, renewable energy. The 39th MCE registered an all-time best for attendance figures, notwithstanding a critical week due to public transport strike faced by MCE with a replacement shuttle bus service, so as to avoid annoyance and nuisance to its exhibitors or visitors. The event featured more than 2,000 exhibitors, of whom 43% from abroad and 156,000 trade visitors, with a 3% increase in international visitor numbers compared to the 2012 edition. In particular, there has been a rise in the number of attendees coming from the Russian Federation, Turkey and Poland compared to the previous edition. Moreover, there has been an increase in participation from many strategic markets compared to the 2012 edition, such as: India, China, United Arab Emirates, United States of America, Australia, Baltic States and the countries of former Yugoslavia, accompanied by a growing number



**More than 2,000 exhibitors, of whom 43% from abroad and 156,000 trade visitors**

of attendees coming from across the African continent (in particular, Algeria, Ethiopia, Ghana, Libya, Nigeria). "We are proud of the outstanding results achieved at MCE 2014", declared *Massimiliano Pierini*, Business Unit Director of Reed Exhibitions Italia, "and we will continue to be a strategic tool developing our exhibiting companies' business, in close collaboration with the main trade associations." ■



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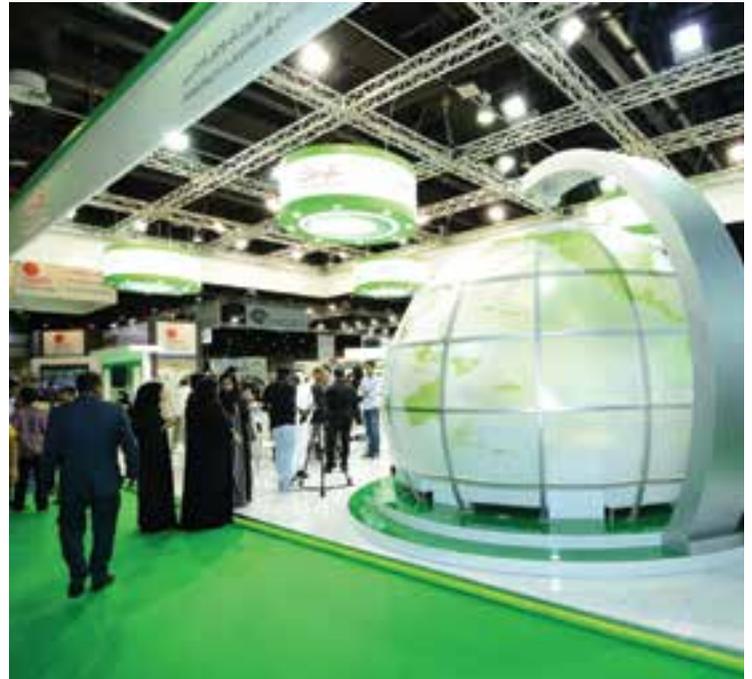
# WETEX 2014 Concludes Successfully

Under the directive of Sheikh *Mohammed bin Rashid Al Maktoum*, Vice President and Prime Minister of the UAE and Ruler of Dubai and under the patronage of Sheikh *Hamdan bin Rashid Al Maktoum*, Deputy Ruler of Dubai, Minister of Finance and **Dubai Electricity and Water Authority (DEWA)** President, the 16th Water, Energy, Technology and Environment Exhibition (WETEX) 2014, concluded successfully with participation of over 1400 companies. The participants included ministries, government departments, agencies and non-profit organizations, in addition to a number of educational institutions that attended Green Week activities and displayed many creative projects based on conservation of electricity and water, held from 14 – 16 April 2014 at Dubai International Convention and Exhibition Centre.

WETEX 2014 incorporated companion events such as Green Week as well as SmarTech Shopper and the World Green Economy Summit 2014, all of which helped consolidate the exhibition's position as a major global specialized exhibition. WETEX 2014 recorded unprecedented success in terms of number of participants, companion activities, and visitors, whose numbers exceeded 23,000 visitors. The 32 scientific seminars and specialized workshops held on the sidelines were attended by 3,500 engineers and technicians from DEWA and other companies. The seminars handled a variety of topics shedding light on latest global developments in water, renewable energy, environment green economy and sustainable development sectors.

Several educational institutions and government departments are participating in Green Week, including Higher Colleges of Technology, Hamdan Bin Mohammed Smart University (HBMsU), Dubai Modern Education School, Greenwood International School, Gulf Buds Private School, Al Ittihad Private School in Al Mamzar, Willow Children's Nursery Dubai, Emirates Wildlife Society, 'Ambassador of Sustainability' – Dubai Municipality, DEWA where engineers are providing comprehensive explanation on the Mohammed bin Rashid Al Maktoum Solar Park as well as Sustainable Building. Also, the Department of Rational Consumption is giving updates on energy conservation campaigns implemented by DEWA.

The 16th edition of WETEX was the largest to date, spread over 47,000 sq.m. in 9 halls at Dubai International Convention and Exhibition Centre. WETEX 2014 attracted 16 Strategic Sponsors, 10 Platinum Sponsors and 32 Gold Sponsors, who represent energy, water, electricity, oil and gas and environment sectors in the region and the world.



During WETEX 2014

As a Sustainable World-Class Utility, DEWA is contributing effectively to the process of social, economic and environmental development in Dubai by providing continuous and stable supply of electricity and water, aiming to achieve Dubai's vision of using renewable energy to strengthen the Emirate's position as a global hub for business, tourism, green economy and sustainability.

*Saeed Mohammed Al Tayer*, MD & CEO, DEWA, commented on the event in general and Green Week in particular, "Organizing this exhibition is in line with UAE's strategy on green sustainability and the Green Economy for Sustainable Development initiative of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, which strives to establish the UAE as a world leader in green economy and a center for export and re-export of green products and technologies."

Al Tayer added that the exhibition, which is organized by DEWA under the umbrella of the Dubai Supreme Council of Energy, under the theme "At the forefront of sustainability" recognizes the enormous achievements of UAE and encourages and enhances collaboration, innovation and creativity, and these are factors that formed the basis for Dubai's successful bid for Expo 2020. The exhibition also sets the knowledge economy as one of the primary success factors in achieving the vision of our wise leadership to transform Dubai into a smart city. ■

## 2014

## May

 Turkey**ISK - SODEX 2014**

International HVAC & Refrigeration, Pumps, Valves, Fittings, Water Treatment and Installation Exhibition

7 – 10

Istanbul Expo Center/Yesilköy

Istanbul – Turkey

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**E-mail:** [info@hmsf.com](mailto:info@hmsf.com)

**Web:** [www.hmsf.com](http://www.hmsf.com)

 Libya**Infrastructure Libya 2014**

International Exhibition for Libya's Infrastructure Sector

12 – 15

Tripoli – Libya

Tripoli International Fair

**Info:**

AGD (Arabian Group for Development)

**Tel:** +20 2 330 37 257

**Fax:** +20 2 330 46 007

**E-mail:** [info@stonegateegypt.com](mailto:info@stonegateegypt.com)

**Web:** [www.agd-exhibitions.net](http://www.agd-exhibitions.net)

 Saudi Arabia**Saudi Water Technology 2014**

International Water Technology Conference & Exhibition

26 – 29

Riyadh International Exhibition Center

Riyadh – Saudi Arabia

**Info:**

Riyadh Exhibition Co. Ltd

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**Fax:** +966 1 454 4846

**E-mail:** [esales@recexpo.com](mailto:esales@recexpo.com)

**Web:** [www.recexpo.com](http://www.recexpo.com)

## June

 Turkey**REW Istanbul 2014**

International Recycling, Environmental Technologies and Waste Management Fair

12 – 14

Tüyap Fair Convention & Congress Center

Istanbul – Turkey

**Info:**

IFO (Istanbul Fair Organization Ltd.)

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**E-mail:** [rew@ifocom.tr](mailto:rew@ifocom.tr)

**Web:** [www.ifo.com.tr](http://www.ifo.com.tr)

## September

 UAE**Power + Water Middle East 2014**

Expo Showcasing power and water related products and services

Abu Dhabi National Exhibition Center - Adnec

Abu Dhabi – UAE

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 China**Tube CHINA 2014**

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24 – 27

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Shanghai - China

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## November

 UAE**The Big 5 Show 2014**

International Building & Construction Show

17 – 20

Dubai International Exhibition Center

Dubai – UAE

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## December

 Saudi Arabia**Saudi Water & Power Forum 2014**

Saudi Water & Power Exhibition & Conference

2 - 4

Riyadh – Saudi Arabia

Al Faisaliah Hotel

**Info:**

Jerome Golding

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## 2015

## January

 UAE**International Water Summit 2015**

International Water Expo

20 – 22

Abu Dhabi – UAE

Abu-Dhabi National Exhibition Center – Adnec

**Info:**

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## Railway Development to Fuel Intra-GCC Petrochemicals Trade



## تطوير شبكات السكك الحديدية سيدعم تجارة البتروكيماويات في الخليج

Trade in petrochemicals between Gulf Co-operation Council (GCC) states is set for robust growth in the coming years led by the development of the region's rail and transport network, predicts the **Gulf Petrochemicals & Chemicals Association (GPCA)**. "An integrated railway network is an important catalyst in driving increased economic integration between GCC countries as it fosters the region's development agenda," said Dr. *Abdulwahab Al-Sadoun*, GPCA Secretary General. "Railways will similarly have a positive effect on the intra-regional petrochemicals supply chain as it will enhance cross-border trade within the Gulf, while minimizing the risk of transporting chemicals across long distances."

The GCC petrochemicals industry is an export-oriented sector. In 2012, 60.7 million tons of petrochemicals produced in the Gulf were exported to diverse markets such as China, the European Union and North America. According to GPCA estimates, only 6.2% of exports occurred within the GCC region. "Intra-GCC chemicals trade has seen a cumulative growth of 13% over the last five years," explained Dr. Sadoun. "This is a positive development as it signifies deeper trade ties within the Gulf."

In the medium term, intra-regional trade is set to surge following the planned expansion of the GCC railway network. "The GCC railway network will enable the region's petrochemical companies to optimize their supply chains," he added. The GCC railway network is an estimated USD200 billion venture, and will link the six Gulf countries for the first time. The project is expected to be completed by 2018, and talks are underway to connect Jordan and Iraq once the core GCC states are linked. Post-2020, GPCA predicts that the Gulf states will be less reliant on petrochemical imports to fulfill regional demand for a whole host of products across sectors like aviation, food & beverage and infrastructure.

**Dr. Abdulwahab Al-Sadoun**,  
Secretary General  
Gulf Petrochemicals & Chemicals Association (GPCA)

يتوقع الإتحاد الخليجي للبتروكيماويات والكيماويات (جيبكا) أن تحقق تجارة البتروكيماويات بين دول منطقة مجلس التعاون الخليجي نسب عالية في السنوات المقبلة مدفوعة بالتطوير الملحوظ الذي تشهده البنية التحتية في دول المجلس وتحديدًا تطوير شبكة السكك الحديدية وطرق المواصلات والنقل. وبهذا السياق قال الدكتور عبدالوهاب السعدون، الأمين العام للإتحاد: «يعتبر توفر شبكة متكاملة للسكك الحديدية أحد أهم العوامل المحفزة لتحقيق التكامل الإقتصادي بين دول منطقة مجلس التعاون الخليجي، إذ أن ذلك يدعم الخطط التنموية التي تتبناها المنطقة. وللسكك الحديدية تأثير إيجابي مماثل على سلسلة الإمداد المرتبطة بصناعة البتروكيماويات بين دول المنطقة، حيث أنها تشجع على التبادل التجاري بين دول الخليج، وتساهم في خفض مخاطر نقل الكيماويات لمسافات طويلة.»

ويُشار إلى أن قطاع البتروكيماويات في المنطقة يُعد من القطاعات التي تعتمد على التصدير: ففي العام ٢٠١٢، تم تصدير ٦٠,٧ مليون طن من البتروكيماويات التي تم إنتاجها في المنطقة إلى أسواق متنوعة وعديدة بما فيها الصين والإتحاد الأوروبي وأمريكا الشمالية. وتشير تقديرات الإتحاد إلى أن ٦,٢٪ فقط من الصادرات البتروكيماوية الخليجية كانت من نصيب دول المنطقة. وبخوض ذلك، علق الدكتور السعدون قائلاً: «شهدت تجارة الكيماويات في منطقة دول مجلس التعاون الخليجي نمواً مطرداً بنسبة ١٣٪ على مدى السنوات الخمس المنصرمة، وهذا يمثل دلالة إيجابية لأنه يشير إلى العلاقات التجارية المتوطدة والراسخة ضمن منطقة الخليج.»

وعلى المدى المتوسط، من المتوقع أن تحقق التجارة ضمن المنطقة زيادة مفاجئة، عقب اعتماد خطط التوسعة لشبكة السكك الحديدية في الخليج. وبهذا الصدد أضاف الدكتور السعدون بقوله: «ستتيح شبكة السكك الحديدية لشركات البتروكيماويات العاملة في المنطقة الإرتقاء بمستوى سلاسل الإمداد لديها ورفع سويتها إلى الحد الأمثل.» وتبلغ تكلفة مشروع شبكة السكك الحديدية في منطقة دول مجلس التعاون ٢٠٠ مليار دولار، والذي سيعمل على ربط دول المجلس الست لأول مرة. ومن المتوقع إتمام أعمال المشروع بحلول العام ٢٠١٨، والمباحثات جارية حالياً لإضافة الأردن والعراق إلى الشبكة ما أن يتم الإنتهاء من ربط دول مجلس التعاون الخليجي مع بعضها البعض. ويتوقع الإتحاد للفترة ما بعد العام ٢٠٢٠ أن تصبح دول الخليج أقل اعتماداً على واردات البتروكيماويات من خارج دول المجلس لتلبية الطلب على الصعيد الإقليمي على مجموعة من المنتجات ضمن قطاعات مثل الطيران، والأطعمة والمشروبات، والبنى التحتية.

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تُعرف مجلة "عالم المياه العربي" حول العالم بكونها المجلة المتخصصة الأولى في مجال الأعمال في منطقة الشرق الأوسط وشمال أفريقيا لخدمة قطاعات المياه والصرف الصحي وتحلية المياه والطاقة. يتم نشر المجلة من قبل سي بي اتش ورلد ميديا منذ العام ١٩٧٧.

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\* MHW magazine is currently suspended due to restructuring; we will resume publishing it later this year.

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RO

NF

UF

MBR

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