Warsaw: A Green Revolution

The city of Warsaw, with the help of Veolia, has just inaugurated its new wastewater treatment plant, bringing it in line with European standards. When Poland joined the European Union, only 30 to 40% of Greater Warsaw’s wastewater underwent limited treatment. Most of the city’s effluent, especially that from the more densely populated and developed left bank, flowed directly into the Vistula River and then into the Baltic Sea.

Therefore, European Union funding was set in place to bring up to standard the existing Czajka treatment plant on the right bank of the Vistula River, ten kilometers north of Warsaw city center.

An enormous undertaking
The upgrade task was enormous: install 30 kilometers of wastewater collection system, construct a tunnel and a siphon under the Vistula River to transport the left bank effluent, rebuild, modernize and extend the existing treatment plant, and build a sludge incineration plant. The project is now complete after four years of construction, upgrade, and extension work carried out by Veolia.

With capacity for a population equivalent of 2.1 million, the Polish capital’s new wastewater treatment plant is one of the largest in Eastern Europe. It treats 435,000 m³/day of wastewater, and can handle up to 515,000 cubic meters at peak flow rate, which is well in excess of the old plant’s capacity of around 200,000 m³/day.

“Treating 435,000 m³ of wastewater a day”

The end product from the wastewater treatment plant is incinerated in a furnace at 850°C. The incineration plant utilizes Veolia’s Pyrofluid™ thermal treatment technology, which will then be treated to generate green energy. Due to the technical performance of the processes used at this plant, the incineration flue gas released into the atmosphere above the Polish capital falls well within the very stringent air quality standards applicable in this area.

The green revolution is under way in Warsaw: www.veoliawaterst.com

Turning wastewater into a resource in Denmark

The Billund Biorefinery, a new and exciting demonstration plant in the process of being built in Denmark, will showcase some of the best and most innovative environmental technologies treating bio-waste and wastewater available today.

Built by the consortium of Billund Municipality, utility company Billund Vand, and Veolia subsidiary Krüger A/S, this dual-feed plant will treat both organic waste and wastewater. It will have a total capacity of 70,000 PE and will deal with 4,200 tons of organic waste (TS) per year from both households and industries in the Billund area of Denmark.

The plant will include an impressive array of both new and established treatment technologies, including continuous thermal hydrolysis of sludge through Veolia’s new state-of-the-art Exelys™ technology, post-polishing filtration, sludge hygienization with BioPast™ technology, an Anita™ Max moving bed biofilm reactor, and advanced online dynamic control utilizing Veolia’s STAR Utility Solutions.

Closing the local resource circle by linking industrial and municipal waste treatment, the Billund Biorefinery will serve as a model for internal complementary technologies, with parallel wastewater and biomass treatment lines working in synergy.

The wastewater treatment process will produce biomass, which will then be treated to generate biogas for energy production, reducing the plant’s power requirement and creating additional income through the sale of surplus energy to the local grid.

The end product from the plant is completely sanitized organic fertilizer containing the nutrients from the bio-waste and wastewater ready to be used for new production in agriculture.

Additionally, the effluent quality will greatly improve: in fact, it will improve to such a degree that only 25% of the discharge limit will be utilized, reducing the amount of nutrients released into the environment and helping maintain the unique biodiversity in the surrounding mudflats near the river outlet.

Already attracting interest worldwide, the Billund Biorefinery is a modern day example of how a municipality is able to support its government’s desire toward reducing waste through resource recovery: www.kruger.dk

Creating energy from sludge
The treatment is based on the activated sludge principle. This technology was chosen for its reliable and solid treatment and service. The wastewater is settled and treated biologically to remove the carbon, phosphate and nitrogen. The biological treatment is managed using advanced controls, enabling a high level of treatment performance while saving energy and chemical consumption.

Once the wastewater has been treated, the sludge from the Czajka wastewater treatment plant, as well as that from Poludnie, Warsaw’s other wastewater plant, is incinerated in a furnace at 850°C. The incineration plant utilizes Veolia’s Pyrofluid™ thermal treatment process. This process oxidizes the organic matter producing recoverable ash and energy.

The incineration plant also uses the sludge’s inherent heat to generate green energy. Due to the technical performance of the processes used at this plant, the incineration flue gas released into the atmosphere above the Polish capital falls well within the very stringent air quality standards applicable in this area.

The green revolution is under way in Warsaw: www.veoliawaterst.com
Global leader in water technologies

“€2.1 billion revenue, 10,381 employees worldwide”

Serving municipal and industrial clients worldwide through a network of 135 business units, Veolia Water Technologies: > delivers engineering and turnkey design & build projects > provides client-tailored water treatment solutions and associated services Years of dedication toward developing and improving a vast array of technologies in any water-related field have made Veolia the world leader in water and wastewater treatment.

We rely on the best water-related technologies available anywhere, backed by the knowledge of how to combine them to create tailor-made solutions that help cities and industries manage, optimize and recycle water.

The best technologies, from a partner you can trust
Veolia combines expertise with innovation to offer technological solutions suited to each application. Our differentiating water treatment processes, combined with outstanding management skills, often make us the only company capable of answering to large-scale, technologically challenging projects.

Our portfolio of more than 350 technologies features everything from online diagnostic solutions to evaporation and crystallization, energy-producing sludge treatment, state-of-the-art desalination, laboratory-grade water and mobile solutions.

Using water resources to create sustainable, cost-effective solutions is the focus of everything we do. We utilize tools such as Carbon Footprint, Water Impact Index and True Cost of Water evaluations to help our clients achieve their corporate sustainability goals and lower their operating costs. www.veoliawaterst.com

Memthane®, for industrial high-strength wastewater

Memthane®, Veolia’s Anaerobic Membrane Bio-Reactor (AnMBR), delivers high-energy efficiency and superb quality effluents, enabling wastewater treatment system clients to simultaneously save money and improve their environmental performance. Memthane® opens the door to treating high strength, high solid wastes found in industries such as distilleries, dairies (whey), bio-ethanol producers and instant coffee plants which were previously considered untreated from an economic standpoint. Memthane® is not just an anaerobic MBR technology, but a small footprint solution that offers an array of benefits, eliminating disposal costs while generating valuable biogas and remaining easy to operate and maintain.

“The valuable methane-rich biogas produced can cover a significant part of the production plant’s energy and heat demand, as high as 100% in distilleries”

Memthane® maximizes renewable energy production while producing superb quality effluent that can be discharged directly to the sewer or often easily reused. The suspended free effluent can also facilitate easy recovery of nutrients for fertilizer production. With a COD removal efficiency of >98%, this powerful green energy source offers the possibility of making production plants energy self-sufficient, reducing the dependency on costly external fossil fuels.

An innovative yet simple process
Memthane® combines two technologies with proven track records: both AnMBR’s anaerobic biological wastewater treatment and Pentair’s X-Flow Ultra Filtration (UF) membrane separation process. Influent is fed to the anaerobic bioreactor where the organic components are converted into energy-rich biogas.

Next, the anaerobic effluent is processed through the UF membrane unit, separating the ‘clean’ permeate from the biomass. The biomass is returned to the bioreactor, while the ultra-clean filtrate is discharged as particle-free, low BOD/COD effluent, often at levels low enough for direct discharge to the sewer. In addition to its performance advantages, Memthane® delivers significant total operating costs reduction compared with other technologies, taking into account all elements, including membranes, chemicals, sludge disposal and overall energy savings. The simple, single, fully automated reactor system also offers the possibility of remote control www.veoliawaterst.com/memthane

Utilizing sludge to produce value-added bioplastics

Veolia has developed the innovative Cella™ technology, which combines environmental protection with the value-added benefits of biopolymer production. A raw product, rich in biopolymer, can then be produced and recovered as a key ingredient in bioplastics, which have exciting applications in new materials and consumer products. This technology combines a responsibility of environmental protection with the added value of generating renewable resources.

“Recovering organic matter from wastewater for conversion into valuable end-products”

In 2013, Veolia took a significant step forward in the technical and commercial evolution of producing bioplastics from residuals and promoting the development of circular economies. A letter of intent between the governor of Friesland in The Netherlands and Veolia was signed in order to develop the first full-scale demonstration of biopolymer production from agricultural, industrial and/or municipal sources. This future full-scale demonstration plant in Friesland dedicated to biopolymer production will put to commercial practice the knowledge base, momentum, and commitment where technologies such as Cella™ catalyze new relationships between people and organizations.

For Veolia, the demonstration plant represents not only a milestone for the Cella™ technology, but also a decisive step in the company’s ongoing innovation and commitment to its customers and the community www.veoliawaterst.com
Cost-effective solution to treat high-ammonia effluents

The ANITA™ Mox process is a sustainable and cost-effective solution that treats effluents highly loaded in ammonia. This process, developed by Veolia subsidiary AnoxKaldnes, combines an aerobic and an anoxic process into one Moving Bed Biofilm Reactor (MBBR), using both conventional nitrile producing bacteria and a specific anammox biomass. The high-ammonia effluent flows into a MBBR reactor filled with carriers which are kept in suspension by aeration and mixers.

Eliminating external carbon sources in Denmark

Through the installation of the ANITA™ Mox technology, the central wastewater treatment plant in Holbæk, Denmark has been able to increase its capacity, while at the same time, remove nearly 80% of the nitrogen in the reject water from the digester without the use of an external carbon source.

The key to this technology is the anammox bacteria, which, under oxygen-poor conditions, is able to convert ammonia into free nitrogen, and thus remove the nitrogen from the reject water. Normally a very time-consuming process to achieve a sufficient number of anammox bacteria, Veolia has shortened the process by designing carriers with especially large surfaces where the bacteria can adhere to and reproduce easily. Additionally, the process is shortened by preparing a number of seeding carriers beforehand so they are active when the reactor is connected to the plant.

An ideal solution in Chicago

Veolia has also been awarded a contract by the Metropolitan Water Reclamation District of Greater Chicago (MWRD) to install an ANITA™ Mox MBBR system in Illinois (USA). The MWRD's Egan Water Reclamation Plant (WRP) currently dewater and dries the biosolids from both the Egan and Kirie WRP's which produce a centrate stream with high ammonia concentrations. The centrate is then pumped to a gravity sewer, co-mingled with combined sewage, and then treated at the O'Brien WRP in Skokie 20 miles away. The transport of the centrate stream creates problems such as potent odors and heavy corrosion in the MWRD's collection system and is a significant ammonia load to the O'Brien WRP. The ANITA™ Mox system will allow this centrate stream to be treated at the Egan WRP and greatly reduce costs.

After a thorough evaluation, the ANITA™ Mox process was selected because it is robust, stable and has a simple flow-through operation. As a MBBR process, it eliminates the need for additional solids management and is a more forgiving process when it comes to pH control. With a large percentage of the nitrogen removed, the ANITA™ Mox effluent also can be returned to the mainstream treatment process at Egan. This system provides the MWRD an ideal solution to efficiently treat their waste streams while simultaneously lowering their operating costs.

The system is guaranteed to remove 75% of the ammonia and 65% of the total nitrogen in this side stream flow and will use 60% less oxygen than the current conventional treatment for nitrogen removal. In addition, it will produce 80% to 90% less sludge than conventional treatment methods. Significant cost savings in these two areas, in addition to the savings generated by eliminating the need to pump the centrate stream off-site, will provide the MWRD great overall value that will significantly reduce secondary costs.

www.veoliawaterst.com/anita

Exelys™: continuous thermal hydrolysis

Biosolids offer a large potential energy source for wastewater treatment facilities. As such, it is essential that they be utilized as effectively and efficiently as possible to capitalize on the production of biogas.

Enhanced anaerobic digestion has become the performance benchmark for biogas production -- with thermal sludge hydrolysis being recognized as the most effective pre-treatment option. Therefore, Veolia has developed the Exelys™ technology, an exclusive and truly continuous thermal hydrolysis system.

The Exelys™ Process

Through its innovative design and continuous operational configuration, Exelys™ is the most energy-efficient technology available for thermal sludge hydrolysis.

Dewatered sludge with a high solids concentration is continuously pumped under pressure into a reactor tube. Steam is injected into the sludge where it condenses and heats the sludge. The sludge then flows in a plug-like manner through the reactor tube at a temperature of 165°Celsius and 9 bar pressure, with a retention time of at least 30 minutes. This provides the conditions required to hydrolyze the biological sludge and significantly increase the biogas potential of the solids going to the anaerobic digesters.

At the end of the reactor tube, the hydrolyzate is cooled down, first through a heat exchanger (with heat recovery) and then by water addition. This reduces its temperature and solids content so that it can be added directly to the anaerobic digestion process. Because of the high temperature and pressures in the reactor tube, a truly pasteurized sludge digestate is created.

Due to the continuous operation, high solids content of the feed, and an effective control system, the Exelys™ thermal hydrolysis process consumes considerably less energy per unit of hydrolyzed solids while maintaining a high level of performance.

Furthermore, downstream there are few solids to dispose of, thus resulting in low disposal costs.

Maximizing biogas

During a full-scale test in Hilleroed, Denmark, biogas production was increased by as much as 40% and sludge quantities were reduced up to 35% through the use of the Exelys™ process combined with anaerobic digestion. Not only was biogas production maximized while minimizing sludge volumes, local subsidy premiums for green energy also made it possible to sell excess energy for cogeneration.

The Exelys™ process will also be installed at wastewater treatment plants in France (Marquette-Lez-Lille and Versailles), Denmark (Bilund) and Slovenia (Ljubjana).

www.veoliawaterst.com/exelys
Veolia’s specialized environmental monitoring subsidiary, Endetec, has recently put into operation its sophisticated real-time monitoring technologies at high-profile events.

Spread across sensitive points in a water network, they continuously measure the key parameters of water quality: pressure, chlorine, temperature and conductivity in line with World Health Organization guidelines. The system identifies the introduction of contaminants in water networks.

“Sophisticated real-time water quality monitoring”

This monitoring solution can be implemented on a temporary basis, in the case of major events, or permanently, wherever safety and operational safety of drinking water is essential. In September 2012, Veolia was recognized for its innovative approach during the Francophone Games in Nice, France, which brought together 3,000 artists and athletes from around the world. The monitoring system was used in cooperation with the French security forces’ anti-terrorist RAID unit, specialized in fighting NRBC threats (Nuclear, Radiological, Biological and Chemical). This was the first time such a solution had been deployed against possible terrorist attacks.

Treating micro-pollutants efficiently

The European Union has recently identified several types of molecules whose toxicity is inducing endocrine-disrupting effects on aquatic fauna. Although applicable standards for setting minimum concentrations for priority substances and persistent organic pollutants (POP) have yet to be established within the European Union, Veolia already offers efficient solutions for treating micro-pollutants also removes certain priority substances. The combination of the two technologies achieves removal rates between 60% and 98%. These two complementary treatments enable not only micro-pollutant removal but also absorption of byproducts generated by ozonation. Another advantage of this combination is that the activated carbon dosage can be reduced thus lowering treatment costs.

Sludge drying: something new under the sun

As a pioneer and expert in solar sludge drying, Veolia has developed the new and innovative SOLIA™+ process. This compact process can achieve a dry solids content up to 90% while reducing sludge volume and removal costs.

Mainly dedicated to small and mid-sized municipalities and industries, SOLIA™+ opens the way to all outlet disposal routes: agricultural reuse, composting, landfill, incineration and co-incineration.

The process is inserted in the sludge treatment processes downstream of the dewatering step and, through the use of solar energy, increases dryness from 20% to 80%, thus reducing the amount of sludge and decreasing the removal costs four-fold.

Based on a solar drying and bio-drying combination, SOLIA™+ dries and stores sludge in a horticultural greenhouse under continuous ventilation with dry air from the outside. Dewatered sludge and drying sludge are mixed and shaped into windrows by the SOLIAMIX+ windrow turner. Windrow operation and regular addition of fresh sludge maximize bio-drying, and promote easy storage of sludge on a 6 months to 1 year cycle in the greenhouse. Solar radiation, along with bio-drying, promotes a temperature rise within the windrows, thus improving water evaporation.

www.veoliawaterst.com/solia

In urban and industrial wastewaters. One such solution is Veolia’s ACTIFLO® Carb process which can either be used alone or combined with a pre-ozonation step. ACTIFLO® Carb is a compact high-rate clarification process into which powdered activated carbon is injected. It enhances efficiency by removing refractory compounds. Ozonation, meanwhile, is a drinking water disinfection technique for pathogenic germ removal. Through an oxidation effect, it

www.endetec.com

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www.veoliawaterst.com
Improving cities’ water resources management

Perched on a rock on the edge of Copenhagen’s harbor, the Little Mermaid has gazed toward shore for more than 100 years. According to the fairytale on which this world-famous sculpture is based, she is drawn from the sea each day in hope of seeing her true love, the prince, once more. Until recently, another motivation might have been escaping from the filthy waters.

For many years, the harbor, contaminated with sewage and industrial wastewater discharges, had been considered a public health hazard and was closed to swimming. Now, following a major modernization of the city’s sewer system and installation of state-of-the-art control systems, Copenhagen’s waters are safe for humans. The harbor has become a tourist and recreation hub and its revitalized waterfront has seen new shops and restaurants, increased harbor area property values, and economic returns from the building redevelopments.

Copenhagen is just one of many examples of the technology and infrastructure investments being made by cities as they confront the increasing pressure placed on water resources by skyrocketing urbanization.

Booming cities, water worries

According to the United Nations Department of Economic and Social Affairs, urban populations worldwide are growing at a rate of two people per second. Within two decades, nearly 60% of the world’s population will live in cities. In the developing world, urban areas gain an average of five million residents every month. Exploding population growth — in cities and in general — is placing unprecedented strain on resources. Especially ensuring adequate water and sanitation.

While urbanization brings opportunities to improve water resource management and increased access to drinking water and sanitation, population growth is outpacing the ability to devise solutions, according to the United Nations. In the past decade, the number of urban dwellers who lack access to a water tap in their home or immediate vicinity has risen by an estimated 114 million — while the number of those who lack access to the most basic sanitation facilities has risen by 134 million. The resulting impacts can be measured in both human and economic terms, through increased disease and lost productivity of people too sick to work.

Cities in developed countries, while not faced with the same lack of basic human needs of the population while managing sanitary sewer overflow treatment requirements prior to discharge. Veolia’s BioACTIFLO® process combines biological treatment with the ACTIFLO® microsand ballasted high-rate clarification system, providing highly effective removal of suspended solids and biological oxygen demand.

In the northern French city of Lille, a new city-center treatment plant is meeting the growing needs of the population while contributing to sustainability. In addition to wastewater, the plant treats stormwater using the ACTIFLO® process. The Veolia-built plant also generates a low carbon footprint.

“The Water technology and infrastructure investments to combat skyrocketing urbanization pressures”

Around the world, cities are looking to new technological solutions to improve water resource management. For example, Copenhagen’s success in making its harbor safe again for public swimming was made possible through a multi-year investment in modernizing its sewage system and the installation of large storage tanks. Water resource recovery plants are now equipped with STAR Utility Solutions from Krüger, a subsidiary of Veolia. This real-time control system minimizes sewer overflow by controlling pumps and gates within the sewer system to reduce potential environmental impacts from combined sewage overflow.

Consumption of energy and chemicals is minimized while the quality of the outlet is maintained or even increased. In addition to improving health conditions and quality of life for Copenhagen’s citizens, there are economic rewards from the investments as well, such as increasing harbor area property value and spurring the opening of new shops and restaurants.

Stormwater overflow prevention

Stormwater solutions help cities protect water quality and manage sanitary sewer overflow treatment requirements prior to discharge. Veolia’s BioACTIFLO® process combines biological treatment with the ACTIFLO® microsand ballasted high-rate clarification system, providing highly effective removal of suspended solids and biological oxygen demand.

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Water reclamation

In Sydney, Australia, a novel and sustainable design strategy has been implemented for new inner-city development projects. In addition to designing, building, operating, and maintaining the buildings’ recycled water plant, Veolia implemented a total water cycle management plan to achieve a range of social, economic, and environmental benefits. The plan included installing high-efficiency fixtures and fittings, as well as treating sewage to produce high-quality recycled water used for cooling towers, garden irrigation, and toilet flushing. In addition, rainwater collected from the building roofs is filtered, ultraviolet-treated, and distributed to the local community’s public domain for landscape irrigation and other water-resource needs. Among the achievements is a 92% reduction in potable water consumption, saving the equivalent of 86 million bottles of water per year, and a 2,500-ton carbon dioxide reduction in the buildings’ carbon footprint.

Pristine lakes

One of Copenhagen’s most popular recreational areas is the Inner Lakes. To protect the aquatic environment, the lakes are supplied with sufficient amounts of freshwater and the correct nutrient balance is maintained to reduce algae growth, improving water clarity and oxygen conditions, which preserves flora and fauna. An ACTIFLO® plant at Lake Emdrup removes phosphorus and reduces chemical oxygen demand and suspended solids, playing an important role in maintaining the improved quality of the water that flows to the Inner Lakes.

Like the revitalized harbor district nearby, the lakes are drawing Copenhagen’s tourists and residents to enjoy the cold, clear northern waters. Illustrations of how city water reclamation strategies can create an environment that even a mermaid can love.
The superior filtration solution

The Hydrotech™ Discfilter is a mechanical and self-cleaning water filter that offers a large filter area in a small footprint. This design is superior to any filtration in fine solids removal and product recovery within microscreens.

With flow capacity up to just make this 3,600 m³/h per filter and filter opening range of 10-100 micron, Veolia offers a full range of microscreen filters.

The patented moving backwash spray header ensures efficient cleaning of the filter media, increased life time of the filter media and 20% savings of rinse water consumption. The spray headers fold out to facilitate maintenance of the spray nozzles.

The filters operate automatically with water and energy savings incorporated.

Microscreen filtration is a proven solution for a variety of applications including some of the following examples.

Municipal phosphorous removal

In Sweden, the Hydrotech™ Discfilter technology will be installed at an underground wastewater treatment plant. This will be the first major Discfilter installation in Europe to replace competing equipment for raw water filtration. Veolia will dismantle the plant’s existing filters and install three new Hydrotech™ Discfilters. As these filters supply process water to the entire plant, the installation will be done during full operation, replacing the existing filters one-by-one, so as not to jeopardize production.

Aquaculture RAS system

Veolia will install a new recirculation aquaculture system (RAS) for Marine Harvest’s new hatchery in Steinsvik, Norway. This plant, including Hydrotech filters, is among the most modern and largest within Europe with a total construction cost for the project estimated near 24 million EUR. Additionally, Veolia built two RAS plants at the hatchery in Dalsfjord, Norway.

HOW DOES IT WORK?

> The water to be treated flows by gravity into the filter segments from the center drum. Solids catch on the inside of the filter panels mounted on the two sides of the disc segments.
> As the solids catch on the inside of the filter media, impeding the flow of water through the disc, the water level inside the discs begins to rise, triggering a level sensor that starts the disc to rotate and begin a backwash cycle.
> High pressure rinse water backs the solids off the filter media and into the solids collection trough.

Integrated solution for high-rate clarification without chemicals

Spidflow™ is a high rate dissolved air flotation (DAF) process with a surface velocity higher than 30 m/h. It is usually used in pretreatment for seawater desalination and surface water clarification.

The Spidflow™ process comprises of three steps:
> Coagulation
> Flocculation
> Clarification by rapid flotation

It is a flexible, reactive solution that can adapt to variations in water quality, while maintaining a small footprint and very competitive investment cost.

Spidflow™ achieves a high quality of clarified water while minimizing the use of chemicals. Because of the high level of sludge concentration obtained, an additional thickening step downstream is avoided.

Recently, the Spidflow™ process has been successfully implemented downstream of biological treatment with fixed growth AnoxKaldnes™ Moving Bed Biofilm Reactors (MBBR). The Spidflow™ and MBBR combination offers an advantage in wastewater treatment where there isn’t a strong phosphate removal objective. This is due to the fact that clarification by rapid flotation can operate without the addition of reagents.

In fact, post-MBBR clarification by rapid flotation is so effective that coagulation and flocculation stages are not necessary, thus generating both CAPEX and OPEX savings.

In 2013, pilot tests clarifying water discharged from a MBBR biological stage were conducted at the Vallecrosia treatment plant in Italy. Further tests are ongoing at the San Remo (Italy) plant that are showing excellent results without the addition of coagulants and flocculants.

The Spidflow™ process, following MBBR, targets both municipal and industrial markets; the main advantage of this technology is its high mirror speed compared to classical DAF, where this latter is limited to 10 m/h.

www.veoliawaterst.com/spidflow
Manage water supplies more efficiently

The True Cost of Water

1. Direct water costs: capital & operational expenditures for water infrastructure
2. Indirect water costs: existing costs that are usually not attributed to water, such as water-related legal costs

The True Cost of Water takes into account:

1. Direct water costs: capital & operational expenditures for water infrastructure
2. Indirect water costs: existing costs that are usually not attributed to water, such as water-related legal costs

“If correctly valued, water will be better managed”

These elements are organized into four categories: operational, such as water shortages; financial, such as an increase in the cost of capital; regulatory, such as an obligation to meet environmental standards; and reputational, such as temporary loss of license to operate as a result of local pressure.

Veolia’s True Cost of Water approach is able to focus on the financial implications of water-related risks. It helps the user anticipate, prioritize, and more effectively mitigate water-related risks that can negatively affect the bottom line by creating a risk-reward tradeoff analysis.

By including this approach into business decisions, decision-makers can better understand the importance of investing in sustainable practices such as water reuse and wastewater resource recovery. Return on investment is no longer simply based on current costs but is instead connected to the risk-based costs. www.veoliawaterst.com

By 2050, it is predicted that 70% of the world’s GDP will be produced in water-scarce regions while an increasing number of cities and industries will be facing economic challenges due to severe water events such as flooding.

These and other risks related to water are a critical consideration for today’s decision-makers. Existing water footprint indicators give us insight into the vulnerability and resilience of a specific activity to water challenges. Now, decision-makers are looking at an even more pragmatic and straightforward metric: dollars.

Veolia has developed an approach called The True Cost of Water that combines traditional CAPEX and OPEX calculations with analysis of water risks and their financial implications.

Veolia, the world’s leader in water and environmental solutions, has been awarded the contract by Shell Canada to design and supply a water treatment facility to recycle the water used for steam generation at Shell’s Carmon Creek Project in Alberta, Canada.

The Shell Carmon Creek Project, under construction, will produce up to 80,000 barrels per day of oil using enhanced oil recovery methods, where steam is injected into the underground reservoir to help produce the heavy oil. The water co-produced with the oil recovered from underground will be treated and re-used to generate steam. This approach maximizes the amount of process water recycled (approximately 99%).

Veolia’s engineering and design expertise has produced a treatment system that will allow production of up to 50,000 metric tons of steam per day critical to the oil production process. Proprietary water technologies that include the separation of hydrocarbons, warm-lime softening, after filters, ion exchange and evaporation will offer a comprehensive solution for recovering and recycling of the produced water.

Veolia previously supplied Shell with a sustainable water management solution for its Pearl GTL complex in Qatar that also involved a highly integrated water treatment system aimed at maximum water recovery. www.veoliawaterst.com

Enhanced Oil Recovery for Shell

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Auditing Vallourec’s water footprint

To assess and compare the water footprint of seven of its biggest production plants worldwide, Vallourec has turned to Veolia’s measurement and decision-making assistance tool: the Water Impact Index (WIIX).

Water is essential in the industrial production process of Vallourec, the world leader in premium tubular solutions for industrial applications, and the company pays constant attention to reducing the amounts used. In the space of 10 years, Vallourec has reduced its water withdrawals by 40% per metric ton of tube produced.

Vallourec now intends to do more than simply measure how much water it extracts and wants to know the full impact of its water use on the natural environment. For those reasons, Vallourec selected Veolia to help it assess the water footprint of its seven biggest sites by using the WIIX. In addition to the amounts of water they extract, the sites were chosen on the basis of their water management costs and their representativeness of Vallourec’s main geographical production regions.

Other installations that are among Vallourec’s highest water consumers should soon also be put to the test by the WIIX.
Reducing L’Oréal’s environmental footprint

Reconciling product effectiveness and resource recovery and making production processes sustainable while minimizing their environmental footprint is a growing concern of businesses. As a leader in the beauty products market and mindful of its commitment as a “major global citizen,” L’Oréal has therefore deployed an environmentally friendly strategy at all its production sites worldwide, with the commitment to decrease its global water consumption, CO₂ emissions, and waste by 50%. The cosmetics company has chosen Veolia Water Solutions & Technologies to meet those challenges at some of their facilities.

Optimized eco-efficiency in China

In 2010, L’Oréal BeautyCos International Co., who develops, produces and markets cosmetic and skin care products, selected Veolia to upgrade and improve the eco-efficiency of the existing wastewater treatment plant of its factory in Suzhou near Shanghai (capacity of 31 COD/d for 285 m³/d of wastewater). This factory has been identified as a challenge at some of their facilities.

“Total carbon emissions at the wastewater treatment facility cut by 43%”

Veolia has specifically designed and built a solution combining two patented technologies, Biotheke® Biobulk CSTR and AnoxKaldnes® MBBR, for the first time in order to achieve the intended results. Before total implementation, the solution was tested on a pilot scale on-site in order to monitor performance expectations.

This plant’s revamping allows L’Oréal to expand production and address future challenges, since the production site will be able to set up a recycling system for its fluids (black water, air conditioning), reducing the plant’s total water use.

L’Oréal’s Suzhou facility benefits from significant results:
- 8.5% reduction in energy use, a 58% reduction in sludge production compared to existing processes.
- 82% reduction in carbon emissions linked to waste transportation and the elimination of highly concentrated liquid waste, which is now treated at the wastewater treatment plant.

Minimized environmental footprint in Mexico

L’Oréal additionally has selected Veolia to integrate advanced technology for water treatment in its San Luis Potosi, Mexico, facility—L’Oréal’s largest hair coloration plant. This 32,000 m² factory has a targeted capacity production of 210 million units of hair color products in 2014.

Veolia has designed and completed the efficient treatment plant supported by its own patented technologies. In particular, all industrial wastewater will be treated by Disolved Air Flotation (DAF) and Moving Bed Biofilm Reactor (MBBR), with the objective of removing high Chemical Oxygen Demand (COD) and high suspended solids concentration, with low chemical usage and a small footprint.

The high level of suspended solids and the reasonable level of oil and grease in the effluent need to be removed prior the biological treatment in order to minimize the carbon footprint emission of the plant, the civil work footprint and its overall plant operation cost.

The dissolved air process with coagulant and flocculation taking place in the Idraflat®, Veolia’s patented DAF unit, enhances the thickening and clarification of the effluent. A third treatment step to completely remove the color from the wastewater has also been added. The result significantly lowered CO₂ emissions.

The overall wastewater plant will be able to achieve 99% COD removal. Production is ramping up efficiently at the San Luis Potosí facility, and its industrial wastewater treatment will generate crystal clear water quality.

Unique approach

By creating unique waste and effluent treatment systems, L’Oréal is able to achieve significant reduction of its environmental footprint and operating costs at its production sites. This innovative water approach is a breakthrough in the beauty industry.

HYDREX™ biosourced additives

As part of an innovative and sustainable initiative, Veolia, through its patented HYDREX™ water treatment additives line, has developed a comprehensive range of additives for coagulation and flocculation steps suitable for municipal and industrial needs.

These additives are produced from renewable resources such as activated starch and vegetable extracts to replace traditional flocculants based on polyacrylamides.

“Connecting treatment efficiency with sustainability”

HYDREX™ biosourced flocculants

The HYDREX™ biosourced flocculant range, made of activated starch, is used for clarification in drinking water production. Its main advantages include:
- A wide range of uses in various clarification systems (settling and flotation)
- Treatment performance higher than other biosourced flocculants available on the market
- Competitive OPEX

HYDREX™ biosourced coagulants

The HYDREX™ biosourced coagulant range is made of activated vegetal extracts from acacia bark—is a by-product from the pulp and paper industry.

Used for wastewater treatment, its main advantages include:
- Biodegradable and non-toxic
- Vegetal extract resource is affordable, abundant and sustainable
- Competitive OPEX
- Treatment performance comparative or better than metal salts
- Suited for wide pH range
- Less sludge
- Easy and reliable start-up

After a series of test sessions at municipal wastewater treatment plants (ranging from 125 to 175,000 PE) and industrial facilities, many positive impacts on the treatment line have been identified. The use of the HYDREX™ biosourced coagulant range enables generation of operational profit up to 50%--especially on the sludge treatment and disposal steps.

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