VEOLIA

Veolia Korea
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Veolia in Pulp and Paper industry

More than 1,000 Pulp and Paper Industry clients have entrusted in Veolia for the treatment of their water and wastewater

Veolia provides unique water, wastewater & reclamation solutions with capabilities ranging from process design to complete turnkey installation and associated services.

We address economic and environmental challenges by optimizing mill performance, improving energy efficiency, and assisting our clients reduce the ecological impact of their activities. Our expertise reduces water cycle costs and optimizes water consumption per ton of pulp and paper produced to maximize reuse including:

- *Raw and process water treatment*
- *Effluent treatment*
- *Sludge dewatering*

Challenges facing the Pulp and Paper Industry

The issues within the pulp and paper industry are threefold:

- Guaranteeing continuous production utilizing good labor relations, the provision of safe working conditions for employees, raw materials and production tools
- Improving competitiveness by optimizing production and ensuring targeted improvements
- Complying with evermore stringent environmental regulations

Veolia Solutions

Requirements	Technology
Clarification of raw water	• Treatment of raw water, production of process water using high-rate clarification system such as **Actiflo™**
Reverse Osmosis - Boiler feed Treatment	• Treatment of boiler feed water by carbonate removal, demineralization, reverse osmosis
Evaporation	• Treatment of black liquors by multi-effect evaporation
Crystallization	• Removal of chloride and potassium by crystallisation
Aerobic treatment - Bio-Filtration	• **Biostyr™** and Biostyr™ packaged plant • **Biosep® / Neosep® & Biosep® Pack**: Membrane Bio-Reactors
Aerobic treatment - Fixed Biofilm and MBR	• **AnoxKaldnes™ MBBR**- moving bed bio-reactor: Kaldnes™ , • Biosep ™ & Biosep ™ Pack: Membrane Bio-Reactors (MBR)
Aerobic treatment - Activated sludge	• **Azenit™** - nitrification & denitrification • **IFAS AnoxKaldnes™**
Anaerobic treatment	• **Biothane™**
Sludge treatment	• Treating and dewatering sludge

Expertise and experience permitting the identification of optimal solutions and the realization of economies of scale

- Production in water cycle costs
- Optimization of ratio of water consumption (m^3) to production of pulp and paper (tonnes)
- Recycling of water and fibres according to a technical and economic optimum

Quality control to exceptional standards

- Guarantee of continuous improvement in environmental management and compliance with regulations
- Compliance to ISO 9000, ISO 14000, ISO 18001

Reference: Anhui Shanying Paper Industry Co. Ltd., China

The mill is producing newsprint paper from the deinking process and test line from OCC (Old Corrugated Container) recycle paper. Biothane™ has applied for anaerobic Biobed® EGSB process, the bulk of the COD load is converted into biogas. The wastewater treatment plant consists of three stages also; pre-treatment for equalization, flocculation – solids removal in primary clarifier and cooling, anaerobic treatment to remove the bulk of the COD and aerobic post treatment for final polishing the anaerobic effluent to meet the effluent limits.

Raw wastewater characteristics (after pre-treatment)

Flow	m^3/d	25,000
COD load	kg/d	46,000
TSS	mg/l	< 200
SCOD	mg/l	1,840
Temperature	°C	< 40

System features

Conditioning tank	m^3	144
Biobed® EGSB	m^3	2680
Reactor volumetric load	Kg COD/m^3.d	17.2
Hydraulic retention time	h	2.5
Biogas flare	N m^3/h	700

Reference: Hongwon Paper Manufacturing Co. Ltd., Korea

In September 2014, Veolia has signed a contract with Hongwon Paper to operate its boiler facility and supply steam for a period of 10 years. The client, Hongwon Paper is a key player in Pulp and Paper industry in Korea, producing paper products mainly printing papers.

This contract follows the acquisition by Veolia of the boiler facility which has the capacity to produce 330,000 tons of steam per year. Under this contract, Veolia will improve the overall performance of heat production, especially combustion quality. This will further reduce the facility's CO_2 emissions by 3%. Veolia's efforts will help address the challenge of greenhouse gas reduction in South Korea.

Location	Pyeongtaek
Start of Operations	November 2014 (10-year contract)
Name of Client	Hongwon Paper
Contract type	AOT (Acquire – O&M – Transfer)
Scope of services	Boiler facilities operation, Steam supply, Facility maintenance
Type	Pet Coke Boiler
Stem supply	50 ton/h @ 10kg/cm^2

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Partnership with IBM

Veolia and IBM join forces to deliver new digital urban solutions to transform water, energy and waste management services for cities.

During Smart City Expo and World Congress in Barcelona, IBM and Veolia announced a new partnership and new solutions that integrate intuitive and powerful **digital technologies into urban services to improve the efficiency of municipal systems around the world.**
A partnership opens up new possibilities for smart cities.

Veolia turned to IBM to transform the way they deliver digital services and solutions for urban resources for cities. The partnership with IBM puts Veolia at the forefront of municipal service providers by offering the industry's most data-driven approach to municipal services management.

Veolia will both use the new set of digital services to improve performance with current clients, and also offer new turnkey ready-to-use digital solutions to other cities.

IBM and Veolia will first deliver new solutions for **Smarter Water, incorporating the IBM Intelligent Water software** which allows for better utilization of Big Data, and provides a management for the integration, optimization and analysis of all data related to water management.

The new solutions for water are **currently under execution in Lyon, France, and Tidworth, England, where Veolia is providing water and waste water management services to citizens** using some of the most advanced and automated water management technology available today. By integrating data across municipal water management systems and applying advanced analytics to spot trends, patterns, make predictions and provide a systems-level view of operations, Veolia will contribute to a better efficiency of water management, strong reduction of waste and better control costs for its clients and improvement of accountability to city leaders.

Designed to help cities operate more efficiently, provide better service to citizens and ensure effective management of resources, these innovative solutions enable them to address some of their most pressing needs and make cities better places to live for their residents.

As one of the world's leading operators of urban infrastructure, Veolia supplies millions of people with water, energy and waste management services every day. By combining our deep expertise with IBM's data-driven insight, Veolia is creating a paradigm shift in urban management which in turn will help cities improve efficiency and deliver better services to citizens.

Also as part of the partnership, Veolia and IBM will also introduce new digital solutions and services for energy management and waste management, areas in which Veolia has deep operations experience and IBM has proven technology.

The digital water solution is immediately available from Veolia. The solutions for energy and waste water are expected to be available in 2015.

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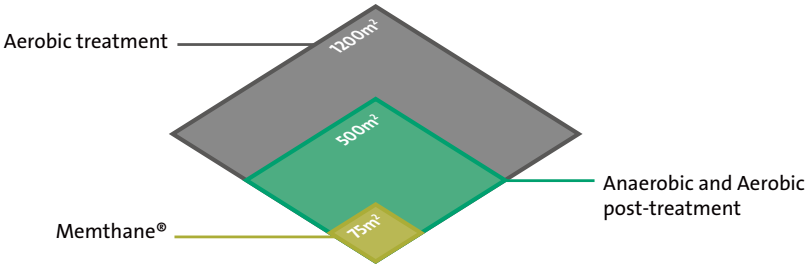
Memthane®, for industrial high-strength wastewater

The preferred solution for high-strength wastewaters resulting in crystal clear effluents of Veolia

Memthane® is an Anaerobic Membrane Bio-Reactor (AnMBR) which **maximizes renewable energy production** while producing **superb quality effluent that can be reused** or discharged directly to sewer.

It delivers a unique, small footprint solution that offers an **array of benefits,** reducing disposal costs while generating valuable biogas.



Memthane®'s footprint

Economical and easy to operate

In addition to its performance advantages, Memthane® delivers a significant total **operating costs reduction** compared to conventional technologies, taking into account all elements, including membranes, chemicals, sludge disposal and overall energy savings.

The **simple, single, fully automated reactor system** offers the possibility of remote control.

Advantages:

> Reduces costs
> Superb effluent quality
> Maximizes green biogas energy
> Robust and easy to operate
> Easy recovery of nutrients for fertilizers
> Reduces carbon footprint
> Proven track record
> Avoids biogas scouring
> Odor free

Sustainable and profitable

Memthane® treats high-strength and high-solid streams found in industries like **distilleries, dairies, bio-ethanol producers, instant coffee plants, etc.** The suspended free effluent also **facilitates easy recovery of nutrients** for fertilizer production and water recycling to the plant.

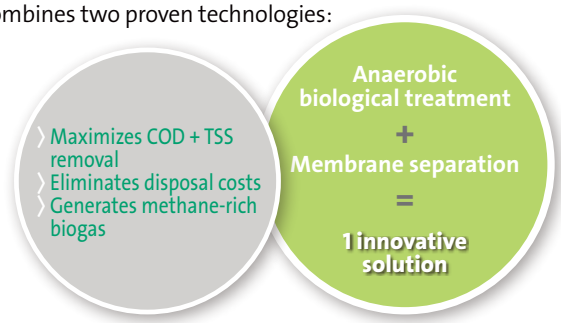
The valuable methane-rich biogas produced can cover a significant part of the production plant's energy and heat demand, which can be as high as 100% in distilleries, for example.

Memthane®, the perfect solution for:

> High concentrated streams: COD 15,000 ~ 250,000 ppm such as Dairies whey
> Ethanol Facilities: Stillage type streams: Pot Ale, Spent Wash, Thin Stillage and Vinasse
> Fat Oil and Grease (FOG) containing streams: Ice cream and Biodiesel
> Starch slurries
> High COD chemical applications

Innovative and yet already proven

Memthane® combines two proven technologies:



Reference

> 6 full-scale contracts
> 4 years of full-scale industrial operation
> Daily industries in the U.S.
> Bioethanol plant in Europe
> Cellulosic Bioethanol plant in the U.S.
> Biodiesel plant in the U.S.
> Food processing in the UK

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Energy Self-Sufficient Wastewater Treatment Plant (WWTP)

Imagine sewage treatment works that not only limit pollution discharged into the environment, but are futuristic refineries and factories that recover valuable fossil fuels, bio-plastics, potable water and minerals in large scale operations. According to water technologists at Veolia, this is no pipe dream. "Previously, we simply disposed of substances like phosphorous in sludge. But actually, its abundance in urine and other chemicals often found in wastewater, means it could easily be transformed into a resource." says Laurent Schmitt, Municipal Engineering Director at Veolia South Africa.

EXELYS™ is an innovative technology that represents the next generation of thermal hydrolysis. Thermal hydrolysis has been recognized as one of the most effective ways to enhance biogas production and solids destruction when used as pretreatment for an anaerobic digestion system. With the unique characteristics of the hydrolyzed sludge, Exelys™ is the ideal solution for significantly increasing the capacity of existing digestion systems.

Exelys™ - the key to achieving the full potential of your renewable biosolids energy
By coupling the thermal hydrolysis and the anaerobic digestion, Exelys™ offers better performance than a conventional digestion and optimizes sludge treatment by producing:

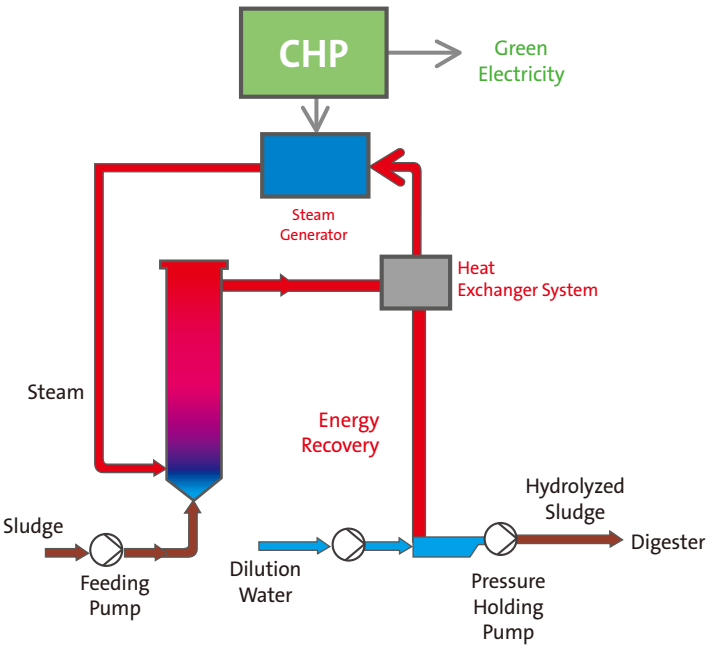
> 25 to 35% less dry matter
> 30 to 50% more biogas
> No odours
> A pasteurized digestate, for control over the sanitation hazards and safe agricultural reuse

Exelys™ handles all kinds of organic, industrial or municipal sludge and can also handle grease.

Reference

> Marquette-Lez-Lile, France, 2015: 620,000PE* and 22,000t DS/yr
> Versailles, France, 2015: 330,000PE and 8,300 t DS/yr
> Bonneuil-en-France, 2012: 15,000 PE** and 300 t DS/yr

* PE: Population Equivalent
** industrial prototype



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