Veolia

Resourcing the world

Our Strategy and Japanese Water Treatment Technologies

Veolia, the global leader in optimized resource management

- Over 200,000 professionals dedicated to designing and implementing the best possible solutions for **local management of essential resources**: water, energy and raw materials.

- Veolia **partners with manufacturers, cities and local residents** to make optimal resource management the foundation for a **new approach** to human progress, regional appeal and sustainable growth.

Water, waste and energy: a unique combination of expertise

€22.3 billion in revenue

202,800 employees on **5** continents

94 million people supplied with drinking water

62 million people connected to wastewater systems

86 million MWh generated

38 million metric tons of waste recovered

(2013 global data)

Our mission:
Resourcing the world

The world is still developing and needs new resources: natural resources, economic resources and human resources.

We play our part by designing and deploying solutions for **Resourcing the world**:

Developing access to resources:
Veolia offers **operational solutions that consume fewer environmental resources and are more economically efficient**, so as to expand both the potential and the accessibility of the resources available.

Preserving resources:
Veolia develops solutions **to conserve resources and optimize their use**, while protecting their quality and efficiency throughout the use cycle.

Replenishing resources:
Veolia provides **solutions for creating new "secondary" resources** that will gradually offset the increasing scarcity of natural "primary" resources, generating new opportunities for social and economic development that protects the environment.

Our Expertise

Municipal & Industrial Clients

- Serving **municipal and industrial clients worldwide,** our business units:
  - *deliver **engineering and turnkey design & build** projects*
  - *provide client-tailored **water treatment solutions** and associated services*

Design & Build

Siven, Venezuela
Design, Engineer, Build -Process water & wastewater treatment plants

Lille Marquette, France
Design, Build, Operate – Municipal wastewater treatment plant

Hong Kong, China
Design, Build, Operate – Sludge incineration plant

Lower Tukhela, South Africa
Design, Build – Municipal drinking water treatment plant

Our **differentiating technologies** and solutions, combined with **outstanding management skills** make us the preferred partner for

- **Large and complex projects**
- **“Difficult to treat” wastewater**

Desalination

Az Zour North, Kuwait
Multi Effect Distillation
486,400 m^3/d

Fujairah, UAE
Hybrid Desalination
136,500 m^3/d

Sydney, Australia
Seawater Reverse Osmosis
250,000 m^3/d

Sadara, Saudi Arabia
Seawater Ultrafiltration/Reverse Osmosis
178,000 m^3/d

With **100 years** of proven experience and **12 million** cubic meters of water produced per day, Veolia is the global leader in desalination.

- **Thermal water desalination**
- **Reverse osmosis desalination**
- **Hybrid water desalination**

State-of-the-art technologies

Actiflo®
High rate clarification

Multiflo®
Enhanced clarification and lamella settling

Biothelys™
Exelys™
Thermal hydrolysis

ROSS™
Treatment of oilfield produced water

AnoxKaldnes™ MBBR
Moving Bed Biofilm Reactor

Memthane®
Anaerobic Membrane Bio-Reactor

Hydrotech™
Discfilters

Kaldnes® RAS
Recirculating Aquaculture Systems

Evaporation & Crystallization

Shell Pearl GTL, Qatar
Zero Liquid Discharge
HPD® technology

Iberpotash, Spain
Potash and salt recovery
HPD® technology

Veracel Celulose, Brazil
Black liquor evaporator system
HPD® technology

Renault, Morocco
Zero Liquid Discharge
Evaled™ technology

Evaporation & crystallization technologies help to **reduce environmental impact,** by improving performance and recovering resources, and to **optimize production costs,** by boosting productivity.

- **Eliminate pollutants**
- **Recover resources**
- **Recycle water**

State-of-the-art Solutions

Endetec™
Environmental monitoring solutions

Advanced on-line control systems

Hydrex™
Water treatment chemicals

Aquamove™
Mobile water solutions

Orion®
Hot water sanitizable solution

MEDICA®Biox
Treatment of clinical analyzer effluents

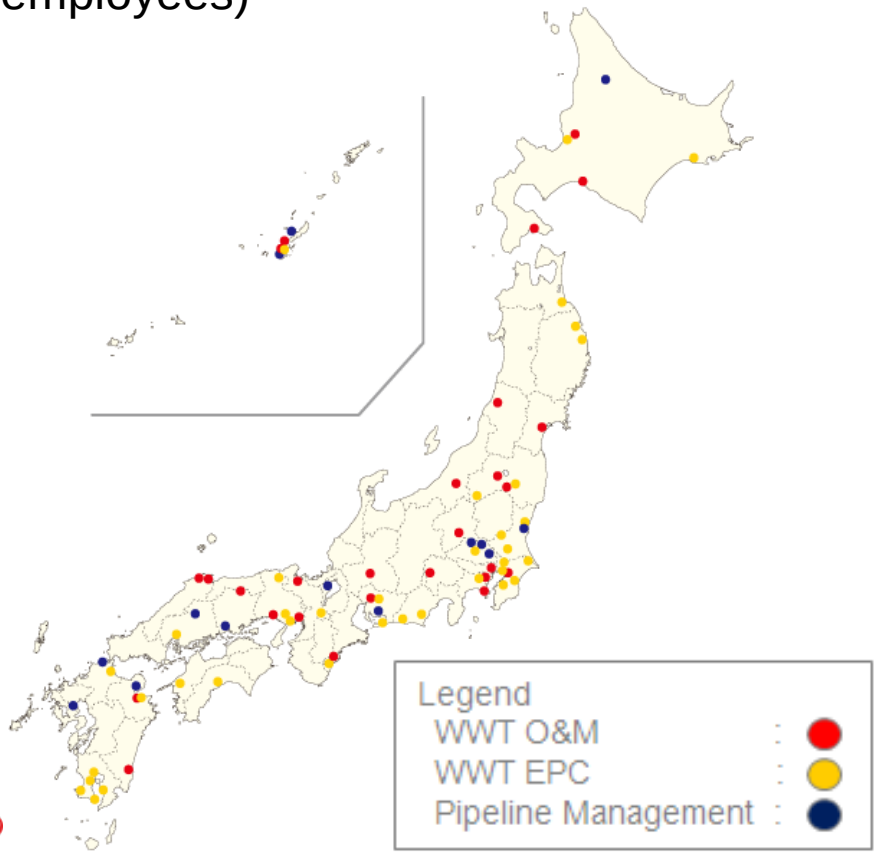
PURELAB®
Laboratory water purification systems

Service and Maintenance

VEOLIA IN JAPAN

Veolia Water in Japan

- 10 years establishment in Japan, fast-growing to cover all municipal and industrial water business
- Present in all major cities (3 500 employees)



Main projects in Japan

Showa Denko – Chiba Hard-disk plant BOT

Pioneering in financing type contract and outsourcing for ultra-pure water

DIC – Multi-sites

Wastewater O&M and engineering for a leading industrial Group

Customer Service - Osaka

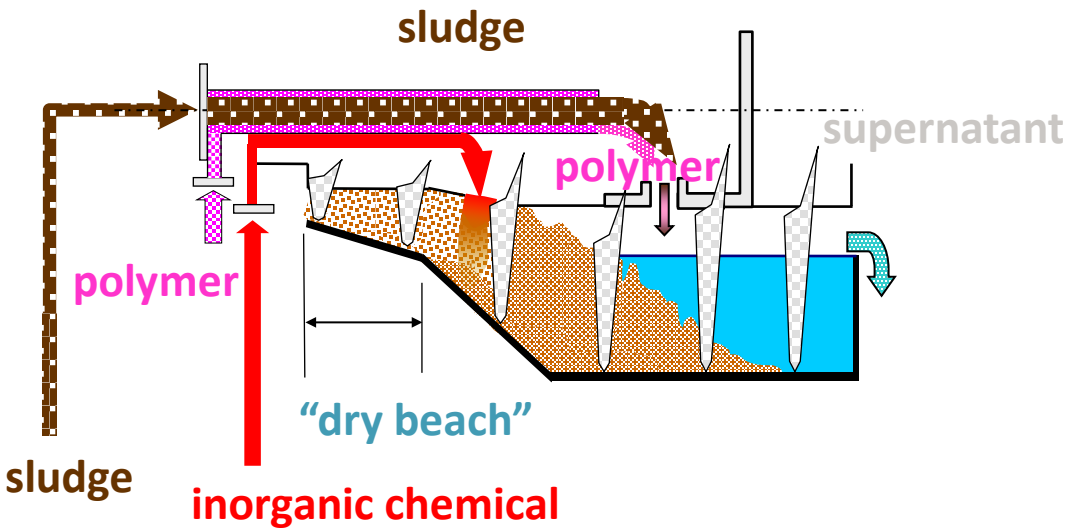
Multi-year contract to serve Osaka city's water customer services (40 millions)

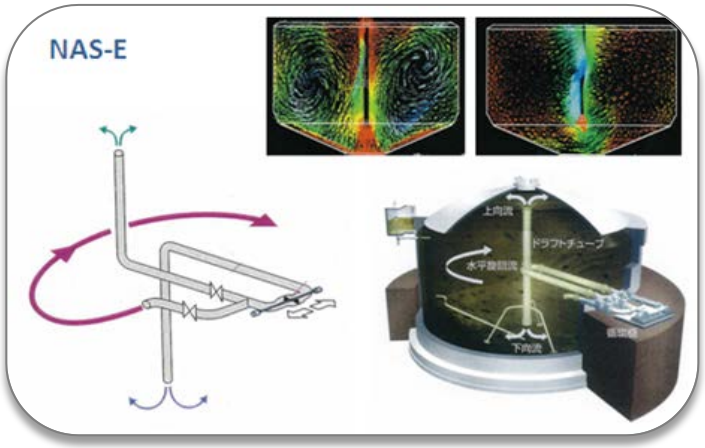
Chiba Prefecture & City Wastewater O&M

Comprehensive WWTP delegation contract, servicing 1 Million users

NE Company Profile

- Company name : **Nishihara Environment (NE)**
- Year of Foundation : 1917
- Number of employees : 580
- Main business field : Municipal





NAS-E

Digester mixer using alternative sludge circulation

SKS Company profile

- Company name : **Showa Kankyo System (SKS)**
- Year of Foundation : 2005 (previously Showa Denko Engineering)
- Number of employees : 120
- Main business field : Industrial

Comprehensive Proposal for O&M business

EPC & Equipment

- EPC's Ability
- Equipment Line
- Small work / Maintenance

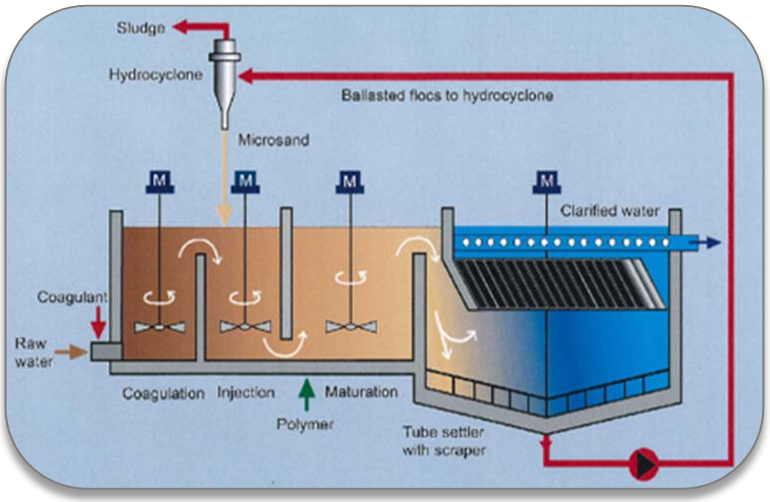
Comprehensive Proposal

Operation

- Operation
- Chemicals / Parts sales
- Cleaning

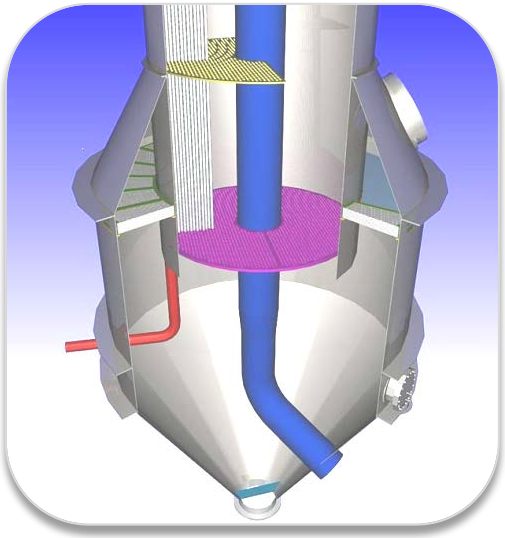
NE Business Reference – Imperial Palace Project

- Water treatment of moat surrounding Imperial Palace to remove phosphorus and algae
- Technology : ACTIFLO
- Capacity : 20,000 m3/day
- Completion year : 2013



SKS Business Reference – Nippon Paper Project

- Treatment of black liquor in pulp mill
- Technologies : Evaporators
- Capacity : 28 t/h (680 t/day as raw liquor)
- Completion year : 2011

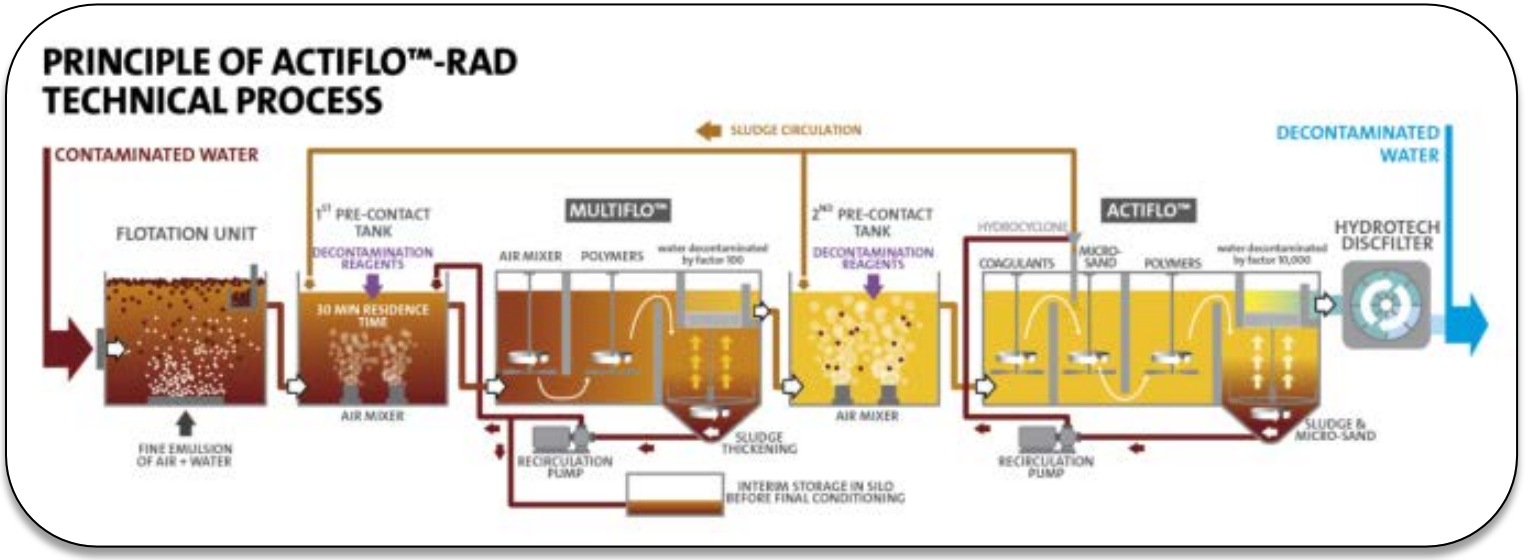


SKS Business Reference – Fukushima Project

- Radioactive contaminated WWT at Fukushima Daiichi nuclear power plant
- Technologies : ACTIFLO-RAD
- Capacity : 1 200m3/day (ACTIFLO-RAD)

  91 m3/day

  Completion year : 2011



Veolia Research & Innovation 2015

RESEARCH & INNOVATION

VEOLIA Research & Innovation (VERI)
Missions, Strategy & Organization

Veolia Research & Innovation missions

Relying on Scientific Excellence in our R&I programs to support:

- the **development of business,**
- the **improvement of performance and productivity,**
- while preparing for a **competitive edge for tomorrow.**

VERI Strategy : programs aligned with Group Strategy

Water

Energy

Waste

7 waves of growth to focus on

MARKETS

Oil & gas

Mining

Food & Bev

Dismantling

TRANSVERSAL THEMES

Circular economy

New urban business models

Cutting-edge solutions for complex issues

Client segmentation

- Oil&gas, Mining, Primary Metals, Solutions to complex challenges….
- Food & Bev, Pharma, Cosmetics, Others,…
- Circular Economy, Dismantling
- Innovative City Model Smart cities & sustainable city
- Traditional Business for City
- Waste
- Water, Energy, Health&Safety

VERI

CAPABILITIES

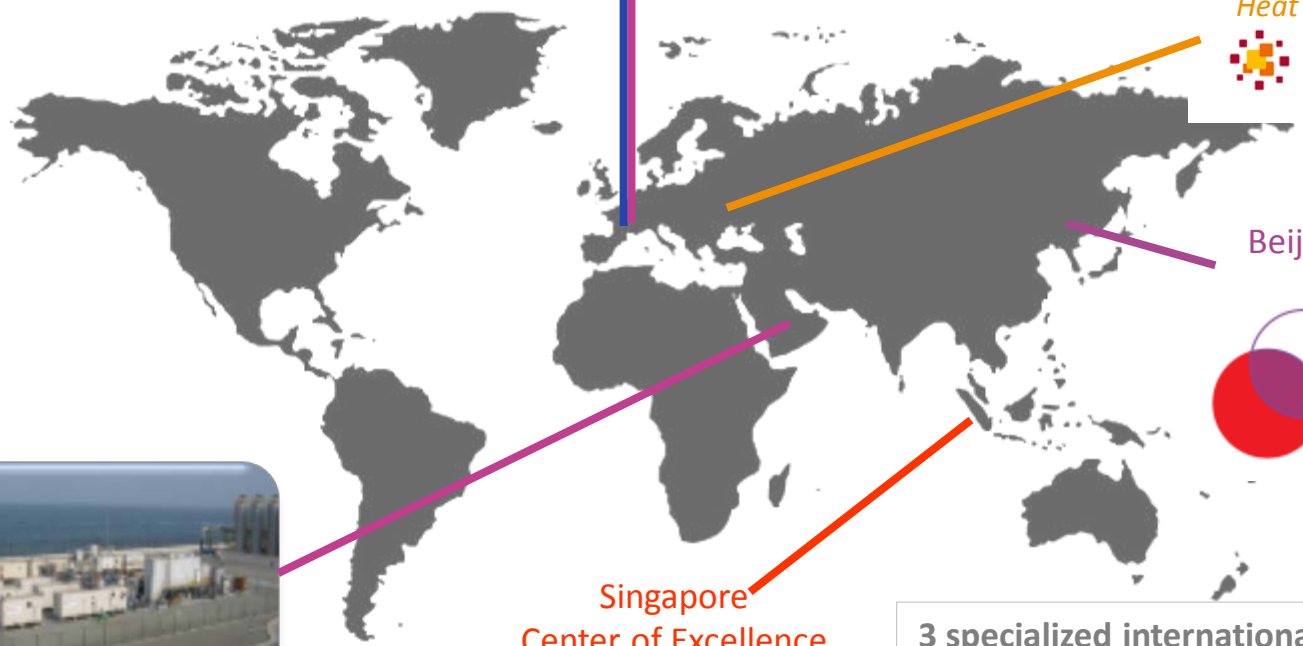
Veolia R&I key figures

Research & Innovation within the Group consists of 3 pillars:

1. An internal R&D structure
2. A worldwide innovation internal network
3. An open innovation approach

R&I Means & Resources

France: 3 centers: Limay (78);Maisons-Laffitte (78) ; Saint-Maurice (94)
2 test platforms: *Drinking water (Annet-sur-Marne 77);*
Municipal waste water (Saint-Thibault des Vignes 77)



Warsaw
Heat distribution networks
Heat-Tech Center
Research and Innovation

Beijing *Emerging pollutants*
Joint Research Center for Advanced Environmental Technology
清华大学－威立雅环境先进环境技术联合研究中心

Singapore
Center of Excellence
Urban modeling

Fujaïrah (UAE)
Desalination platform

3 specialized international centers
3 research centers in France operating as a network
3 test platforms
278 pilots

INNOVATION PROCESSES

In-house Innovation Network

➔ *Veolia Global Research & Innovation Network*

Focus on establishing and coordinating the internal innovation processes within the Group including the Research & Innovation Network

To cultivate a company-wide dynamic of innovation generation, sharing and deployment

Connect	Collaborate	Engage
• Provide links among Veolia's practictionners of innovation	• Interact and get involved in ideation & selection of the corporate R&I Portfolio	• Provide tools and training for people and BUs who wants to engage in innovation activities
• Encourage generation and propagation of local ideas/solutions/information in a more organic fashion	• Direct access to contribute and/or learn from R&I projects	• Inspire, reinforce values and cohesion around innovation & improve innovative thinking and behavior
• Share best practices and knowledge	• Use Veolia Innovation Accelerator to source, access innovative solutions	• Inspire, celebrate & recognise Innovation success

Open innovation

***Objective:* Accelerate Veolia's capacity for innovation**

- **A dedicated process (VIA 2.0):** Program designed and developed by VERI to identify and implement the best eco-innovations in conjunction with entrepreneurs
- To set up a more effective sourcing coverage
- To better support the integration of external solutions
- To better feature success stories or positive impacts of open innovation activity
- **Enter VIA**: www.via.veolia.com

VIA Model

Deployments

Call for innovative solutions
Or
"Challenges"

Territorial & Local initiatives

Territorial Innovation Accelerator

NIA NORDIC INNOVATION ACCELERATOR

Strategic Partnerships

To enhance the quality of scientific knowledge & to prepare the R&I needs of tomorrow

- ✓ More than **220 partnerships worldwide** with academics (**130**), industries (**90**), laboratories, associations and public authorities

- ✓ Partner in nationally funded (ANR, Ademe, etc.) and international funded projects (European Union, Life, WERF, ARC, DOE, etc.)
- ✓ Participation *in France* in **5 future investment programs** and **10 competitiveness clusters**. (Water/Energy/Waste/Others)
- ✓ 5 **research chairs** on major issues (Life Cycle Analysis, biodiversity, hydrolosciences, radar meteo and greenhouse gas emission and survey) :

COMMENTS ON JAPANESE TECHNOLOGY & NEDO

Comments on Japanese Water Technologies

World-wide a strong need for

- **- Un-conventional new water ressources**
- **- Energy Efficiency**
- **- Sustainability**
- **- Cost efficiency**
- **- Compact Technologies**

Comments on promising NEDO R & D

Advanced Material for RO

- Chlorine resistant RO membrane
- Will open new fields of application for waters with very high fouling potential

Low Energy NF membranes

- Low energy NF membrane will replace conventional processes
- Need for a stable and mature product to quickly implement the technology

Low pressure SWRO membrane

- 20 – 30% energy reduction would make a remarkable benchmark
- Could be very attractive in bundling with renewable energy

Comments on promising NEDO R & D

Nitrogen Removal with Anammox bacteria

- Evolution from warm water side-stream application
- Could be a very competitive in high nitrogen industrial effluents

Separation and Recovery Technologies

- Recycling processes are indispensable in modern industry
- New business models through the recovery of precious metals

Energy savings in MBR

- Energy efficieny in MBR plants is a key factor
- 40% energy saving is an ambitious goal

Comments on promising NEDO R & D

Large scale PRO

- PRO plant bundled with MBR as fresh water source
- Need to show economical return-on-investment

Integrated SWRO and sewage re-use

- Low energy SWRO for industry
- How to overcome the remaining technical and market obstacles?

…

What makes the success of NEDO R & D?

- Relevance of research subjects

- Enhances Japan’s outstanding technical capabilities

- Stimulates exchange of ideas

- A strong culture of project management

- Supports introduction of new products up to its commercialisation


VEOLIA
Veolia
Resourcing the world
THANK YOU FOR
YOUR ATTENTION !