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

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

**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
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

- Biohelys™
  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 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

**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
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 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
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
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
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 (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

7 waves of growth to focus on

MARKETS
- Oil & gas
- Mining
- Food & Bev
- Dismantling
- Circular economy

TRANSVERSAL THEMES
- 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
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

Veolia R&I key figures

- 850 experts worldwide
- 6 specialized research centers
- 3 test platforms
- 278 research pilot units
- Over 2,000 patents
- 220 academic and industrial partners
- 5 research chairs
- Participation in 10 competitiveness centers and in 5 future investment programs in France

(2013 global data)
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

Beijing
Emerging pollutants

Fujairah (UAE)
Desalination platform

Singapore
Center of Excellence
Urban modeling

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**
- Provide links among Veolia’s practitioners of innovation
- Encourage generation and propagation of local ideas/solutions/information in a more organic fashion
- Share best practices and knowledge

**Collaborate**
- Interact and get involved in ideation & selection of the corporate R&I Portfolio
- Direct access to contribute and/or learn from R&I projects
- Use Veolia Innovation Accelerator to source, access innovative solutions

**Engage**
- Provide tools and training for people and BUs who wants to engage in innovation activities
- Inspire, reinforce values and cohesion around innovation & improve innovative thinking and behavior
- 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

Deployments

Call for innovative solutions
Or
“Challenges”

Territorial & Local initiatives
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

- **5 research chairs** on major issues (Life Cycle Analysis, biodiversity, hydrolosciences, radar meteo and greenhouse gas emission and survey):

- 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
World-wide a strong need for

- Un-conventional new water resources
- 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 efficiency in MBR plants is a key factor
- 40% energy saving is an ambitious goal
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?

Comments on promising NEDO R & D
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
THANK YOU FOR YOUR ATTENTION!