

Transfer and financing of technology and innovation in the framework of PPP, to better protect the seashore and the Oceans



Foreword: R&D spirit at Veolia

- **Innovation is central to Veolia's strategy.**
 - **Half of the techniques that will be used in 15 years time to protect the environment have not yet been invented.**
 - **Veolia has a portfolio of more than 2,000 active patents, 850 researchers, and 200 research partnerships with universities and centers.**
 - **However, R&D is not enough. There is a great need for a professional management of new technologies. No matter how much R&D you do, it will amount to nothing if the technologies invented are not used in a professional manner.**
- Even the most efficient technologies will disappoint if they are not properly applied.
 - Therefore it is vital to organize appropriate technology transfer as well as intensive training, in order to fight against environmental pollution.



Part I - Technological and economical innovation in the framework of PPP



The Caserne dam project, operated by Veolia in the frame of a PPP, helps to keep France's historic Mont-Saint-Michel free of 5 million m³ of sediment that encircles it.

Situated on the Couesnon River, the dam's eight 20-ton gates keep the water moving and contribute to increasing the depth of the bay by 70 centimeters in a 2 km radius.

The project is "repairing what man has damaged" on the World Heritage Site.



Innovating not alone, but in tandem with our clients

- ◆ **The strong relationships we have forged in PPP with our clients and the resulting trust are conducive to innovation.**
 - They allow us to “*dare*” to do things together.
 - We can test innovations with these clients, industrialize them and distribute them together.
- ◆ **Our PPP are laboratories for fashioning the know-how of the 21st century, through working in close cooperation with our public clients.**
 - Our contracts are not just “*deals*,” but also important instruments for creating, and showcasing, the expertise of the 21st century;
 - That is what our clients want. E.g., the Chinese expect foreign companies to invent the technologies of the future in their country.
- ◆ **We have the good fortune to work for demanding clients, who constantly push us to improve the services we provide. By regularly raising the standards we must meet, they encourage Veolia to surpass itself and show creativity.**



City and R&D in the framework of PPP

- **In the knowledge economy of this century, the success of cities will increasingly depend on its capacity to attract researchers and innovators.**
 - Innovation plays a crucial role in the economic competition between cities.
 - But it is critical, too, in the deployment of the best urban public policies, by broadening the array of technologies at the disposal of policymakers.
- **Therefore many public authorities required private operators, not only to transfer technology, but to do R&D.**
 - In Berlin, we have founded, in partnership with our public client (the State of Berlin), one of the most advanced water research centers in the world.
 - It is studying groundwater recharge processes, a solution for the future for combating water scarcity, preserving freshwater resources and satisfying growing demand.
 - This research center is contributing to Berlin's technological reputation in water and wastewater.



The total traceability of water in large distribution networks

(1) – Main feature of Shanghai-Pudong PPP

- **In 2002, the Shanghai municipality awarded Veolia the contract to manage its water services for 50 years.**
 - Pudong is one of the fastest growing area of China: from 1.9 million people at the contract's start to 5 million at the end.
 - Type of contract: Shareholding + management responsibility.
- **Tenders' evaluation was based on all aspects, not just on price. Each aspect had an evaluation weight:**
 - 20% for the price proposal
 - 20% for the detailed financial plan
 - ➔ • 20% for the detailed technological plan
 - ➔ • 20% for the detailed customer service plan
 - ➔ • 20% for the detailed management organization plan and the detailed human resources plan



The total traceability of water in large distribution networks (2)

- 50 years ago, networks grew according to a tree structure: a main trunk split into multiple branches without any of these crossing each other.
- Today, the network's branches crisscross and so enable constant supply. However, quality control has become extremely complex as a result, and traceability a real headache.
- Tracking in real time the quality of water in pipes spread out over several thousands of kilometers is a Herculean task, since water flows every which way, under the ground and continuously.



The total traceability of water in large distribution networks (3) – An innovation making water even safer



- **Our engineers trialed an innovative solution on a small section of the Shanghai network, namely the area devoted to the Universal Exhibition held in the city in 2010.**
 - The system is comprised of a new ultra-compact, multi-parameter probe, a detailed network modeling program and a software application to cross-reference network data.
 - A new probe measures the various key parameters as soon as water exits the production plant and right throughout the network. This data combined is used to establish an identity card for the water. This in turn is used to produce a water label based on the composition and origin, just like a bar code.
 - Water quality can now be checked in real time at all points throughout the network.
- **We are now implementing a larger-scale version of this solution for the Ile-de-France Water Authority (the largest European water services), accompanied by proof of its reliability thanks to the trial project in China.**



An innovation protecting the environment may be connected with several PPP

- **The discovery of a process for recycling lithium:**
 - this might seem unimportant and yet it is a crucial advance. This rare and expensive metal, demand for which is constantly growing, is essential for the batteries of electric vehicles and hence to the world of tomorrow.
- **This technical innovation is creating a new economic model.**
 - By reutilizing something that was otherwise worthless, the new business model we invented gives the means to satisfy people needs and to conserve raw material at the same time.
- **This innovation also illustrates the evolution in our business.**
 - It consisted of i) supplying essential services to municipalities ii) taking responsibility for the pollution they generate and rendering it harmless.
 - Today, these two facets of our activity are converging towards **solving problems of scarcity**. Scarcity of energy, scarcity of raw materials, scarcity of water.
- **We collect old batteries in the frame of our domestic waste collection PPP contracts with municipalities. And now, Veolia is n° 1 for batteries' recycling in France.**



Part II – Technology transfer in the framework of PPP



Technology transfer is an expectation in most PPP

- **Training and technology transfer are a priority for most public authorities. Since improving public services will not be achieved without boosting local means and skills.**
- **Technical reasons for entering into PPP:**
 - to benefit from technical skills and managerial know-how.
 - to integrate an international network and benefit from the best expertise, innovation and research.
 - to intensify training and transfer high level know-how.
 - to obtain technical and legal security in the sensitive fields of public health and environmental protection.
- **PPP hurry up the transfer of know-how. Through outsourcing, clients access to the advanced expertise of high level operators.**
- **The size of a global company like Veolia enables each municipality, wherever it is located, to benefit from best practices.**



Developing long term contracts facilitates technology transfer



	Types of contracts	Typical length	
Heavy Capex	Build Operate Transfer	10-25 yrs	<i>Technology transfer</i>
	Concession	10-30 yrs	
Light Capex	Operations & Maintenance	3-15 yrs	
	Design Build Operate (DBO)	2-15 yrs	
No Capex	Works	< 1 year	
	Design and Build	< 3 years	
	Service contracts	~ 5 years	

- It is necessary to allow the operator sufficient time to efficiently transfer technology and to be sure that the local staff is capable to control the technology transferred.
- By adopting a long time frame , PPP provides the possibility of achieving significant progress in technology transfer and training in many fields.

How do we organize technology transfer in PPP?

- **Intensive training program for all levels of the organization (technical, H&S, management, IT, English, financial...)**
 - Target of 100% of the employees being trained.
 - Increase of training budget.
 - Creation of Training Centers closed to the needs (21 Campuses and learning centers in 12 countries around the world).
 - Access to training courses outside.
- **A pragmatic and rigorous approach to transfer technologies:**
 - Expertise transfer programs, for capitalizing on expertise and managing the intellectual capital within the Group.
 - Twinning between Veolia operations in different countries to facilitate the dissemination of technologies and methods
 - Constant benchmarking of best practices between the services that we manage to showcase local innovation and put it to use.
 - Networking so that the outsourced service benefits from the progress made in other services managed by Veolia
 - Complementary seminars for the exchange of experience.





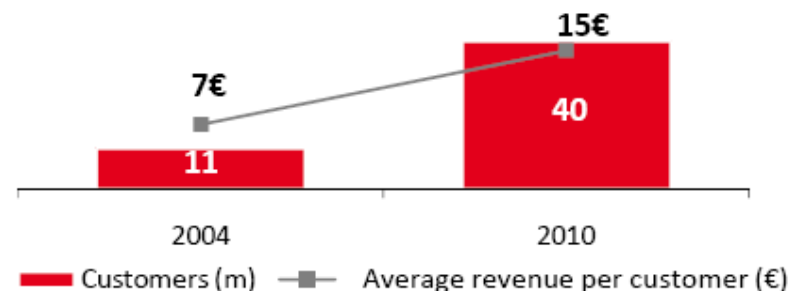
Part III – Financing technology transfer



Financing technology transfer

- **Financing technology transfer is comprised in most PPP contracts, in particular when they include investments financing:**
 - ~ \$32 million invested per year at the beginning of Shanghai – Pudong concession.
- **Wanting the best service, major cities are more inclined to financed added-value solutions and technology transfer in PPP.**
- **In China we are capturing organic growth to fund technology transfer:**
 - Veolia manages installations in key economic growth locations: Shenzhen, Shanghai, Tianjin...
 - Clients are first-class cities, looking for first-class service. They agree to pay to fund technology up-grading.
 - Our company has been going to volume and price increases to fund the technology transfers required, and that bet is paying off.
 - Contract duration allow to smooth the costs of technology and investment on several years (Concession average duration in water: 34 years).

Number of water & wastewater customers and billing by customer



Technology transfer financing in the solid waste sector (1)

Context:

- Since several years, the Chinese Central government has decided to seriously address the issue of treatment of hazardous industrial waste, which is definitely one of the main environmental problems facing the country.

The client: the Hunan Environmental Protection Bureau

- In July 2012, Veolia Environmental Services, in partnership with a Chinese company, has been awarded the concession for a hazardous waste treatment center in Changsha, the capital of Hunan province.

Scope of the contract:

- It covers the design, construction and operation of facilities with the capacity to treat up to 54,500 metric tons of hazardous waste a year.
- Works are due to start up in 2012 and the plant will come into operation in 2014.



Technology transfer financing in the solid waste sector (2)

◆ Technical issues:

- The treatment center will use a variety of techniques: energy recovery from waste, physical-chemical treatment, solidification and landfilling.

◆ Introduction of innovative solutions to reduce energy consumption and greenhouse gas emissions:

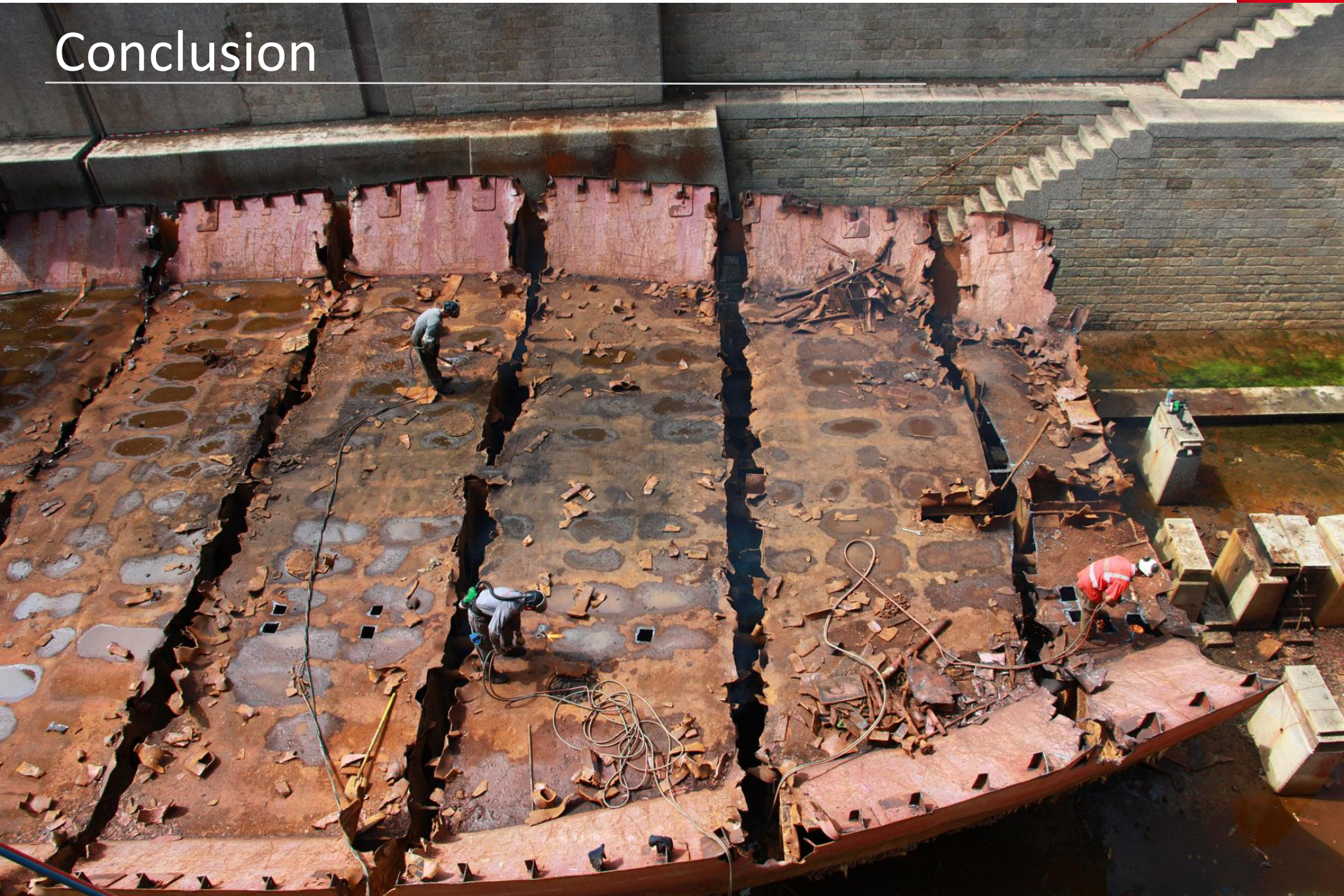
- Innovation in energy recovery involves reducing the use of fossil fuels and reusing the steam produced by the waste incineration process.
- Veolia has developed low-energy treatment processes that produce very few CO₂. During physical-chemical treatment, the hazardous waste will be treated by high-environmental-performance “cold” processes.

◆ Market and financial conditions:

- A 25-year concession contract.
- Veolia Environmental Services will take a controlling interest in the JV.
- Exclusivity clauses for over 10 cities, which account for 85% of the province's GDP.
- Cumulative revenue over the contract period is over 320 M€.



Conclusion



Site of the dismantling of the Anna, France

The need for innovation, the need for dreams

- **Knowledge economy and technology transfer naturally go hand in hand.**
 - The increasingly technical nature of activities of all kinds is putting pressure on cities and corporations alike to beef up their technology transfer programs.
 - They spur growth for cities and for businesses!
- **Innovations depend as much on our dreams—the dream of storing electricity, the dream of membranes that do not become clogged, etc.—as on our research.**



Thank you
for your
attention

