

PLANET

#December 2014/January-February 2015

TOMORROW CIRCULAR ECONOMY



Smart cities

Looking toward
the future
of urban life

REDUCE EMISSIONS SUSTAINABLE GROWTH SMART NETWORKS RESOURCING THE WORLD

United Kingdom
Extreme
Recycling

In the 3.0 age
Prague, Warsaw,
Pudong

Brazil
Circular economy:
a boost for the cellulose
industries

New York
Take a walk on
the High Line

CONTRIBUTORS



Editor-in-chief Justine Shui

Communications Director,
Veolia China & Asia

This second edition of the relaunched Planet continues to offer a vast array of articles that demonstrate how the women and men of Veolia resource the world. In this edition, we've put a special focus on the way in which Smart Cities contribute to this ambitious objective. As a communications specialist based in China, I am pleased to present the Forum debate, in which our Asia Director Regis Calmels and leading professor Dr. Gu Shu Zhong discuss the country's exciting and fast-paced urban development. The unprecedented scale of the Jing-Jin-Ji project is just one example of the many stories coming from China and other parts of the world that will majorly impact the future of waste, water and energy. In Outfront, we look even further into the bigger questions of development and sustainability raised by the smart cities model. I hope you enjoy reading this edition of Planet magazine and discovering the work Veolia is undertaking in these areas for the world of today and tomorrow.

Also in this issue

Paulo Gaia

General Manager of
the Jacareí plant, Fibria



Paulo studied Chemistry at the Federal University of Pará in Belém, Brazil. He has worked in R&D and the Environment in the paper pulp industry for twenty-seven years. Aware of the importance of the sustainable development of populations, Paulo is constantly seeking to innovate to improve production by using resources that are more sustainable for the environment and for business.

Iwan Baan

Dutch photographer

Iwan "unexpectedly fell" into architectural photography in 2005 when he offered to cover Rem Koolhaas' project for the construction of the Chinese CCTV channel's head offices in Beijing. He has photographed buildings designed by the most renowned architects ever since: Rem Koolhaas, Herzog & de Meuron, SANAA, Morphosis, Frank Gehry, Toyo Ito, Steven Holl, Diller Scofidio + Renfro and Zaha Hadid, to name just a few. His photos are regularly published in The New York Times, Domus, The New Yorker, etc.



Taisei Muira

Chairman and CEO of m2ocity



Taisei has headed this Veolia and Orange subsidiary, which is the first telecommunications company exclusively dedicated to communicating objects and the leader on the smart meter remote reading market in France, since 2010. He studied at the École nationale supérieure des mines de Nancy (France) and the Institut français du pétrole before joining Veolia. Taisei fosters a dynamic of innovation within m2ocity to provide smart solutions to help cities become more sustainable and more attractive for their residents.

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DECEMBER 1-12, 2014, LIMA, PERU

CLIMA2014

FROM LIMA TO PARIS, THE HOME STRETCH

THE TALKS IN LIMA SHOULD LEAD TO A BINDING FRAMEWORK FOR A NEW INTERNATIONAL CLIMATE AGREEMENT, APPLICABLE TO ALL COUNTRIES, WHICH WILL BE SIGNED DURING THE CRUCIAL CONFERENCE IN PARIS IN 2015.



[HTTP://WWW.CLIMA14FDR.COM/ABOUT-UN-COP-20-LIMA-PERU.HTML](http://www.clima14fdr.com/about-un-cop-20-lima-peru.html)

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THE POST



Antoine Frérot
 Chairman and CEO
 of Veolia

July 9 **The French Minister of the Economy, Production Recovery and the Digital Sector asked me to develop, along with the relevant stakeholders, an ambitious industrial plan to recycle waste and green materials.** This is sorely needed as only 51% of the 350 million metric tons of waste generated each year in France is recycled. In other words, half of this huge reservoir of raw materials within our reach slips away! The report submitted on July 9, in consultation with industry professionals, defines 111 sorting, waste recovery and recycling plant projects representing nearly 800 million euros in investment and the creation of 1,650 jobs in France. Immediate action must be taken, among other things, in reducing the use of landfills, recovering more energy from waste, and developing four specific recycling processes due to the volume of waste produced or the value of the elements they contain. The four processes in question are plastics, circuit boards, carbon fibers from the dismantling of aircraft and construction materials. Of course, such an ambition requires the development of new industrial infrastructures and must be accompanied by additional efforts in research and development.

September 23 **In my speech on ways to fight climate change at the UN in New York,** I wanted to remind the policy makers, business leaders and heads of associations present of the obligation to address, alongside carbon dioxide emissions, short-lived air pollutants, such as methane or black carbon, and, more generally, the urgency of decarbonizing the economy. As we already know, if we do not develop new technologies, the fight against global warming has already been lost! We must constantly innovate and improve the processes available. I highlighted a few of

the innovative initiatives we are partnering with many communities and industries to “detoxify” our carbon-addicted economy: the collection of biogas produced from the storage of household waste to heat a city, biofuels produced from used food oils to power buses, methane derived from agricultural waste to produce electricity, etc. These effective solutions now need to be developed on a large scale if we want to limit the temperature increase to 2°C. In this way, the greatest threat to the climate – Man – can become its main ally. It is a question of pragmatism and determination.

October 30-31 **The theme of work, for which the mayor of Seoul convened his advisory board this year, concerns smart cities, sustainable growth and the challenges of an ageing population,** an issue faced by South Korea along with many other developed countries. As a member of this board, which represents an original way of working in which the mayor surrounds himself with people outside of his administration to consider the future of his city, I wanted to participate in this work and present solutions for the development of cities with an increasing proportion of senior citizens, based on our Group’s experience. As well as discussing this topic, which coincides with Veolia’s conviction that technological intelligence serving the city contributes to the quality of life and urban well-being of all, I went to meet and talk with a few of our local teams, encouraging them to keep pushing the boundaries when it comes to reinventing environmental services.

CURRENTS



6/7



Hunter Water wants to reduce the water bill

It's an unprecedented move for Australia's largest public water service provider. Hunter Water, which serves over half a million inhabitants in six regions of New South Wales, has for the first time entrusted a private operator with the management and maintenance of its 25 production plants and wastewater treatment facilities. For an eight-year period as part of a contract worth €193 M (279 M Australian dollars) – the largest ever attributed by Hunter Water, Veolia will be tasked with carrying out its traditional role, as well as meeting several challenges. In particular, these include reducing the pressure on local water prices by the order of \$23 M over the next decade. Even though at \$1.026 per cubic meter, Hunter Water's customers already have the lowest water bill in the province...

4CT™ makes Singapore smart

Singapore is one of three cities, with Mexico and Lyon (France), to aspire to the title of the first smart city. Since 2013, the city-state has had ForCity (4CT), an urban modeling simulator. This open and upgradable platform interconnects the models of different components of the urban ecosystem: mobility, energy services, use of soils, water, waste, buildings, environmental impacts and a lack of resources. This data allows decision makers to compare several urban planning options in 3D. This decision-making tool, developed by Veolia in partnership with stakeholders such as the French electricity giant EDF, will allow Singapore to optimize its strategic choices and in particular compare different approaches on the basis of maps, three-dimensional scenes, curves and charts. Adapted and applied to the question of developing the Jurong East district, 4CT™ will then focus on other districts in Singapore, before tackling the ambitious challenges of other South-East Asian cities confronted with complex planning decisions.



The Campus network

celebrates its 20th birthday

When Veolia opened its first Campus in France in 1994, the group was seen as a pioneer. It was looking to respond to the challenges posed by new environmental disciplines, at a time when the training offering provided by the public authorities was inadequate. Keen to develop the skills of its staff members in all of its business activities, the Group would therefore gradually expand beyond national borders. But how could employees be encouraged to assimilate the Campus "culture" in places as diverse as Prague, Shanghai and Libreville? Based on a benchmark educational model developed by the Group, each country would deploy it across its area and adapt it to its specific "business" and "cultural" characteristics. And it has been a success... Twenty years later, the Campus network has become a significant factor in terms of bonding and improving social relations within the Group. And a point of pride for staff members who have benefitted from it. The latest addition, dedicated to Veolia's industrial activities, opened in South Korea in late 2013. It is entirely in line with the planned transformation of the Group, which has become a benchmark international player, a partner of choice for local authorities and businesses.

90% of a training ship to be recycled

On the docks of the Bassens terminal in Bordeaux (France), the 9,000 metric tons of the former *Jeanne d'Arc*, which served as a French Navy training ship, will be dismantled in line with strict rules with regard to personnel safety and environmental protection. Removing asbestos from the hull is set to take ten months, with a further six months for cutting, preparing and recovering over 90% of the materials and disposing of unrecyclable waste. This includes scrap, non-ferrous metals, WEEE, cables and wood. Non-recyclable waste, such as asbestos, and residual waste will be sent to ad hoc waste treatment facilities. Bartin Recycling Group, a Veolia subsidiary, is at the helm of this exceptional project.



97%

This is Veolia's target material (steel and non-ferrous metals) recovery rate during the four-year dismantling of 317 passenger cars from the RER A (Greater Paris transport network), each 25 meters long and weighing over 30 metric tons. A dedicated site established in France's Aube region will treat nine carriages per month.

Drinking water in Niger goals accomplished

Today, 2.3 million inhabitants are served and the Millennium development goals concerning access to water in cities in Niger have been met. A challenge in a country where the demographic growth and urban density of the capital, Niamey, put pressure on the limited water resources. This pressure is exacerbated by the poor quality of the water from the River Niger, which requires advanced treatments. Since 2001, Veolia has deployed all its know-how regarding access to water, the sector's number one priority in this country, through the drinking water production plant in Goudel. This equipment is the Nigeriens' pride and joy, as Niamey is the only capital in West Africa to provide drinking water for its inhabitants 24/7. And which received a visit, last July, from the French president accompanied by his Nigerien counterpart.

Telex

Biodiversity index Those of a sensitive nature, look away now! The latest "Living Planet Report®" reveals that the Living Planet Index® (LPI) has declined by some 52% since 1970. As a reminder, the LPI measures over 10,000 representative populations of mammals, birds, reptiles, amphibians and fish.

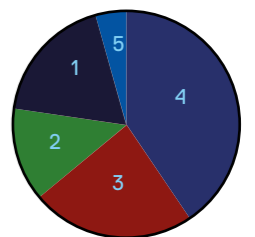
Natural catastrophes that are... less catastrophic

According to estimates by Munich Re, the world's leading reinsurer, natural catastrophes caused \$41 billion (€31 bil) worth of damage over the first six months of 2014, compared to \$59 billion in the first half of 2013. A figure that is also well below the average for the first half-year over the past ten years (\$94 billion).

PET recycling boosted in the US

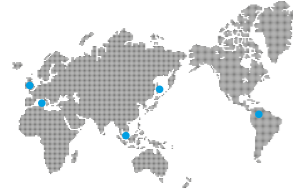
In 2013, the recycling rate for plastic (PET) bottles in the United States reached 31.2%, which marks a slight rise over 2012 (30.8%), according to the latest study from the U.S. National Association for PET Container Resources (NAPCOR) and the Association of Postconsumer Plastic Recyclers (APR).

3D printer market share per sector, in 2012



1 Automotive 2 Consumer Products 3 Aerospace 4 Medical 5 Others

CURRENTS



God save the Queen's... Awards

In the United Kingdom, the Queen's Awards for Enterprise have become an institution. In 2014, Her Majesty the Queen honored Veolia UK, which won a Sustainable Development award. It recognizes the company's new business strategy based on producing green energy, which it places at the center of the circular economy. Veolia UK recycles over a million metric tons of waste per year and converts the fermentable part to energy used to supply electricity and heat to over 300,000 households.

Oil companies commit to reduce their footprint

Ecopetrol, a Colombian national oil company, and Formosa Petrochemical Corporation (FPCC), a major player in refining and producing hydrocarbons in Taiwan, are both confronted with optimizing their industrial effluents and committed to reducing their ecological footprint. The two groups have chosen Veolia, in a contract worth some €53 M in Colombia and over €15 M in Taiwan.

Zero landfill in Staffordshire

The Four Ashes industrial estate in Staffordshire now counts a state-of-the-art energy recovery facility to receive the county's residual waste. Designed to treat 300,000 metric tons per year, the equipment should produce over 23 MW for the national electricity grid, i.e. 35,000 households served. For Staffordshire's taxpayers, it represents savings of more than £250 M over the next twenty-five years. With some 40 long-term jobs created when it was commissioned.



The 7th continent, an ocean of waste

Every year, 6.5 million metric tons of detritus are dumped into the oceans, 80% of which is plastic. Carried by swirling currents under the influence of the Earth's rotation – vortices known as gyres, this detritus is concentrated in gigantic patches that cover millions of square kilometers. The South Pacific, North and South Atlantic, the Indian Ocean, etc.: few areas are spared. The Mediterranean is no exception to this large-scale dumping of plastics and is being "scrutinized" in its turn. Since May, the Tara Méditerranée expedition, partnered by the Veolia Foundation, has been collecting samples in this biodiversity reserve that plays home to 8% of marine species and is experiencing an unprecedented demographic tension. Scientists alternate with each other to discern the impacts of this pollution on the ecosystem along with its infiltration into the food chain, ultimately ending up on our plate. While the first results will not be published until 2015, a glimmer of hope remains: plastic pollution of the oceans is one of the few reversible phenomena. Provided that we stop dumping our waste into them!

+95%

This is the extraction efficiency obtained by Veolia to recover bromine residue from the effluent from a brominated rubber manufacturing plant. One of the petrochemical complexes of Sinopec — the leading Chinese company in the national oil sector and the world number three — is planning to reuse the bromine as a raw material, as it forms an ingredient in cleaning agents, fire extinguishers and high-performance tires.

Café by Veolia in Prague

What would you say to enjoying a good cup of coffee in a low-key atmosphere, while being brought up to date on the latest information on Veolia and its activities? Prague residents can now do just that at the Café by Veolia, a warm and friendly space that presents the group in a "different" light. In the new administrative buildings, the shared space where Veolia took up residence in July 2014, the Café by Veolia will also host press conferences, internal events and team meetings. During his visit to Prague on October 22, Antoine Frérot officially opened this brand new Prague hot spot...



Sorting at a touch

Waste sorting (or quality control) can now be refined without any direct contact between the operator and waste. With the remote-controlled waste sorting process I-SORT3R™ developed by Veolia, the operator indicates the waste to be ejected on the touch screen. Established since 2013 in the Amiens materials recovery facility (France), the prototype is now operational.

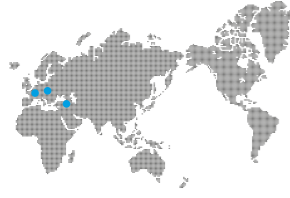


“Sustainable urbanization depends upon a healthy connection between urban and rural development and nowhere is this more important than in relation to food and water. The need for this integrated approach is so urgent.”

His Royal Highness, Charles, Prince of Wales, in a video message addressed to all mayors, researchers and youth leaders gathered at the Resilient Cities 2014 Congress in Bonn (Germany) in May 2014.



CURRENTS



Łódź, a changing city

The transformation of Poland's third city is well underway. The former textile industrial city, which still has many vestiges of the golden days of spinning, has become a dynamic center with its hotels, museum, mall and leisure center. Even better, Łódź is now equipped with cogeneration plants and 60% heated thanks to the heating networks operated by Veolia Poland, which also provides 50% of the electricity in winter. The city's first heat plant is among the latest transformations in progress to benefit from this network. Built in the early 20th century, it will shortly become a cultural center, an interactive technical museum featuring an area dedicated to the arts, and a festival venue in one. We have come full circle!



Paper recycling illustrated reference guide

In November 2014, in partnership with Afnor (French standardization association), Veolia is publishing an illustrated reference guide to recycled paper and cardboard qualities in an international version in four languages: English, German, French and Chinese. Its content has been reworked for easier use by operators and offers a European standard / USA standard comparison that is one-of-a-kind on the market. Veolia, a benchmark in terms of paper and cardboard recycling, is looking to market this new edition on at least three continents.



In Asia, L'Oréal

reduces its "water" footprint

L'Oréal aims to double its customers – which currently total a billion in number – over the next ten years. Out of the billion expected new consumers, 650 million will come from Asia. Mindful of its "global citizen" commitment, the cosmetics leader has deployed an international environmentally friendly strategy across all of its 43 production sites. One of its goals is a 60% reduction in its water footprint by 2020. L'Oréal has chosen Veolia to support its development in Asia. The first highlight was in 2012 with the opening of the production center for South-East Asia in Jababeka, Indonesia – for which Veolia provided the engineering and construction. In 2014, L'Oréal entrusted Veolia with developing and constructing a wastewater treatment facility in Suzhou, China, boasting an optimized design in terms of its carbon and water footprint. The initiative has proven successful, with L'Oréal winning an award at the Global Water Summit in 2013 for its good water management.

Singapore

even cleaner than ever

Meeting the high standards of the "Asian Switzerland" when it comes to maintaining its public spaces comes down to performance. When renewing the urban waste management contracts in two of its five districts, Singapore wished to benefit from an integrated approach under the direction of a single specialist subcontractor. Offering street cleaning services since 2008, Veolia was chosen. Its pioneering approach was the determining factor in this decision: the first to develop a quality management system in the public sector – ultimately resulting in ISO 9000 certification – and the first and only public cleaning service provider to win a Clean Mark Award (gold) organized by Singapore in 2013.

A wastewater plant presented

at the Junior Nobel for water

Four 15-year-old pupils from Hoche high school in Versailles represented France at the Stockholm Junior Water Prize, akin to a "Nobel for water" for young people. Pride of place was given to their model of a wastewater treatment plant for educational purposes, to help pupils understand how this type of equipment works. It offers a real teaching aid to be replicated in all educational establishments, as well as a tool for asking questions on possible energy recovery from wastewater, as the model illustrates all the principles of a 100% sustainable wastewater treatment plant. In competition with 30 other international teams, our budding researchers were not the ultimate winners, but they came home with new ideas, determined to improve their scientific strategy!



Emergency in Iraq

In order to deal with the influx of displaced Iraqis in the Kurdistan region (northern Iraq), the local authorities have decided to set up four camps. In total, over 400,000 people have taken refuge in the Dohuk Governorate as of summer 2014. As the sanitation situation is becoming a cause for concern, France has sent almost 20 metric tons of humanitarian aid material by plane for storing and distributing drinking water (cisterns, water distribution manifolds, etc.). This includes 12.5 metric tons of equipment provided by the Veolia Foundation. It will supply 50,000 people with drinking water. Several Veolia volunteers have gone in turn to support the Red Cross teams in place, helping to assemble and install this equipment.

THE FOUR LARGEST MEGALOPOLISES IN THE WORLD PILLARS OF TOMORROW'S URBAN WORLD

Megalopolis, backbone, belt... All these terms are used to define this type of urban area made up of several agglomerations, whose suburbs and peri-urban rings are so extensive that they end up running into each other.

In 2014, the planet's power and wealth - i.e. 75% of global GDP - are concentrated in three megalopolises, known as the Triad: the Northeast Megalopolis (or "BosWash") in the United States, the Taiheiyo Belt (or "Tokaido Corridor") in Japan, and the European Backbone (or "Blue Banana"). However, the race to implement ambitious projects, such as Jing-Jin-Ji in China (cf. page 12), could very well change the state of play.

3 EXISTING MEGALOPOLISES

In the United States
NORTHEAST MEGALOPOLIS
Boston
New York City
Philadelphia
Baltimore
Washington D.C.

In Europe
EUROPEAN BACKBONE
From London to Milan through the Rhine Valley

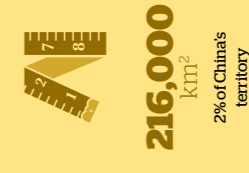
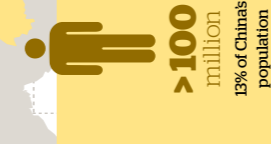
In Japan
TOKAIDO CORRIDOR
Greater Tokyo
Nagoya
Osaka
Kobe
Kyoto
Hiroshima
Fukuoka-Kitakyūshū



1 MEGALOPOLIS IN THE PIPELINE

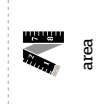
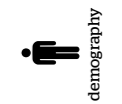
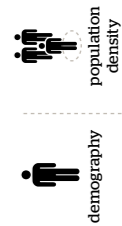
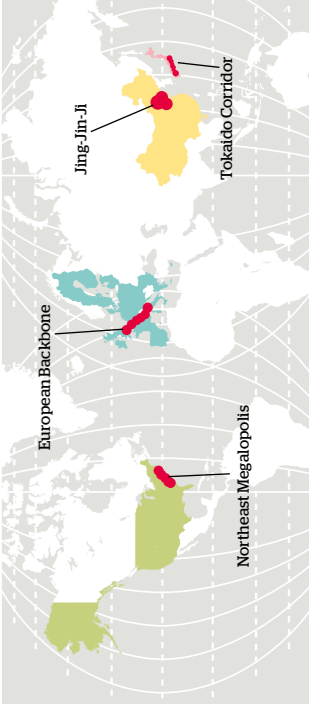
In China, the government wants to merge the administrative provinces of Beijing, Tianjin and Hebei into a single integrated urban entity: **Jing-Jin-Ji**.

JING-JIN-JI



AROUND THE WORLD

Other megalopolises are already in the works - for example, in Africa - or forming, especially in India. Irrespective of their number or location around the globe, they are set to play home to 70% of the planet's population by 2050, and will therefore structure the territories of the future. An incredible challenge that calls for thinking with regard to governance on this scale, as well as how these urban concentration functions, so that they prove resilient (cf. page 12)... and therefore viable.



Sources: CityForum www.city-data.com/forum/world/1801289-japanese-megalopolis-versus-euro-pean-megalopolis-versus.html • IMF, global GDP in 2013 • Beijing Review, May 1, 2014, South China Morning Post, June 27, 2014 • With the collaboration of Espaces et Sociétés - UMR 6590 CNRS.

Megalopolis: is scale the future for urban resilience?

Gu ShuZhong / Régis Calmels, the great debate

12/13

What does urban resilience mean for you?



Gu ShuZhong
Director, Professor
Institute of Resources and
Environmental Policies
Development Research Center
of the State Council

“For me, urban resilience focuses on a city’s capability of reacting to changes, while sustainable development covers a broader range of issues. Urban resilience is a key part of sustainability, and a sustainable city must have strong resilience, so that when it encounters changes or threats of any kind, it is well prepared and can adapt to them as quickly as possible.”



Régis Calmels
Asia Director of Veolia

“When we speak about resilience, we need to look at the short-, medium- and long-term perspectives. In the short term people living in urban areas should be happy because they can see the right decisions made to improve quality of life, for example in terms of waste management, waterworks and air quality issues. In the medium and longer term, residents should be able to see that decisions made in the past were not only the right decisions but were also well applied, the facilities that were built were of a high quality, their operations are being well managed and the projects are long-lasting. In this way, people will naturally have the proof in the long term that the decisions taken were sustainable.”

The Chinese government is undertaking an exceptional project entitled “Jing-Jin-Ji”. Merging the cities of Beijing and Tianjin with the industrial centers of Hebei Province, the authorities are looking to create the world’s largest megalopolis capable of supporting extremely fast-paced growth. But is a city’s size the sole criterion in guaranteeing sustainable urban resilience? Planet garners two expert views.

In the light of the dizzying expansion of Chinese cities, two schools of thought are going head-to-head: proponents of the development of megalopolises and those who favor smaller decentralized cities. Do you think that the Jing-Jin-Ji proposal is a credible concept in sustainable urbanism?

Dr. Gu ShuZhong / While the question of scale is an important element in a city’s development and its urbanization process, the quality and viability of the project come first and foremost. In particular, the carrying capacity of resources and the environment and the carrying capacity of local resources, based on the population and industries, should be taken fully into account. If all of these questions are handled well, a city can be healthy and sustainable irrespective of its size. If this is not the case, even a small city can face problems such as water shortage, inefficient waste management and chronic air pollution.

Régis Calmels / / The development of the Jing-Jin-Ji megalopolis is the third most important case of an extremely major decision taken in China in terms of urbanization. It follows two very successful urban resilience policies of the last 30 years. The first was the creation of the Special Economic Zone in Shenzhen in the 1980s. The second was the creation of the state-level new area in the 1990s, implemented with great success in Pudong and ensuring Shanghai’s position today as one of the world’s most resilient and successful urban centers. The next logical step for China is the creation of this megalopolis, drawing together the best urban management and infrastructure for economies of scale and sustainability.

The development of Jing-Jin-Ji would raise major challenges as well as provide fantastic opportunities. What are the biggest difficulties in ensuring social and environmental standards across such a large urban population?

R. C. / On a macroeconomic level, one of the

“A megalopolis generates tremendous economies of scale on many levels.”

Régis Calmels

“The collaborative development of Beijing, Tianjin and Hebei already enjoys consensus among the people living within the region, and is recognized by the central government.”

Dr. Gu ShuZhong

most critical issues is governance: improving the organization, simplifying decisions, increasing efficiency and satisfying all of those involved. Of course, in such a situation, each party is trying to defend its position and its interests.

Satisfying our partners has long been an integral part of Veolia’s corporate culture. Starting with honoring the commitments made to our stakeholders, especially our clients and staff. Implementing these commitments is usually more efficient if private companies are taking care of these issues.

G. S.Z. / The governance of Chinese cities still has much room for improvement, whether this involves the management of city spaces, urban transportation, industry structures, the environment, etc. China – like any other country – has only limited experience in the governance of a megalopolis, and there are added challenges to the governance of Jing-Jin-Ji: the administrative systems of the cities are separated, and there are some overlaps among the cities in the positioning of functional areas. It is therefore essential to eliminate – or at least reduce – the gaps among the administrative systems, enhance coordination among the three cities and provinces, and establish a coordinating organization on a central level. However, the collaborative development of Beijing, Tianjin and Hebei already enjoys consensus among the people living within the region, and is recognized by the central government. Moreover, Jing-Jin-Ji now has a mechanism to steer the region’s development, with a view to mitigating barriers and conflicts and creating synergies.

How could a megalopolis offer a solution to China’s urgent resources challenge?

R. C. / A megalopolis generates tremendous economies of scale on many levels, not just on a technical or engineering level, but in terms of control and optimized decision-making. We are all the more interested in the opportunities that Jing-Jin-Ji may bring because Veolia already

DECEMBER 2-5, 2014, LYON, FRANCE

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Veolia works closely with the Tianjin municipality to supply three million of the city's inhabitants with drinking water and to treat hazardous waste.

a leading reference company in China's urban areas, particularly in Shenzhen, Shanghai, Tianjin and Harbin. It is now looking to establish new partnerships, especially with industries in China, in order to continue to offer innovative solutions in the fields of waste management, water and energy services. ■

14/15

••• has city water supply and hazardous waste projects in Tianjin, working side by side with the municipal government and a number of industrial clients. With common decisions taken across a larger region, a company such as Veolia could deliver a much wider array of innovative solutions. For example, in Jing-Jin-Ji, there are many opportunities to develop common networks for cooling or heating, leading to energy savings and thus positive impacts on air quality.

What role will private companies and non-governmental agencies play in ensuring the resilience of China's urban populations?

G. SZ. / City governance, especially in the case of a megalopolis, is not just the responsibility of the government, but also needs the joint efforts of all stakeholders, starting with private companies. Well-reputed private companies with recognized expertise play an undeniable role in city governance, particularly in urban water services and solid waste disposal. During this process, the companies should be rewarded so that they are motivated to provide better services. They should also be supervised by all relevant parties, with governments playing a key role in terms of control and regulation.

R. C. / The challenge lies in building urban resilience and meeting the demands of a growing city whilst constantly improving the quality of service provided. Veolia is already

Partnerships for preserving resources

> Conservation is the key to megalopolis resilience. This is why Veolia is helping municipalities and industrial companies protect their valuable resources for long-term sustainability. At the chemical firm Tianjin Soda, Veolia has developed a pilot industrial wastewater reuse project. Under testing at one site, it dramatically reduces the plant's city water usage, while maintaining top-quality cooling and demineralized water production for the plant. As part of its concession agreement for drinking water and wastewater treatment for the Tianjin Shibe region, Veolia has also implemented an advanced non-revenue water project that will save millions of tons of water over the project's lifetime. Hazardous waste has not been forgotten either. In Tianjin, Veolia opened the first integrated hazardous waste treatment-disposal-recycling center, treating 48 of the 49 types of hazardous waste regulated by the Chinese government – all except explosives. "Implementing these technologies not only requires first-class technical know-how," states Régis Calmels. "Building good relationships with the local government authorities and state-owned enterprises remains our priority. It's the basis for solid partnerships."

*Knowledge is precious.
And sharing it a pleasure.
In this age of connectivity,
it circulates increasingly
freely, thanks to the personal
commitment of enthusiasts who
make it available to all.*

Above and beyond

Meeting Veolia Employees from all over the world.

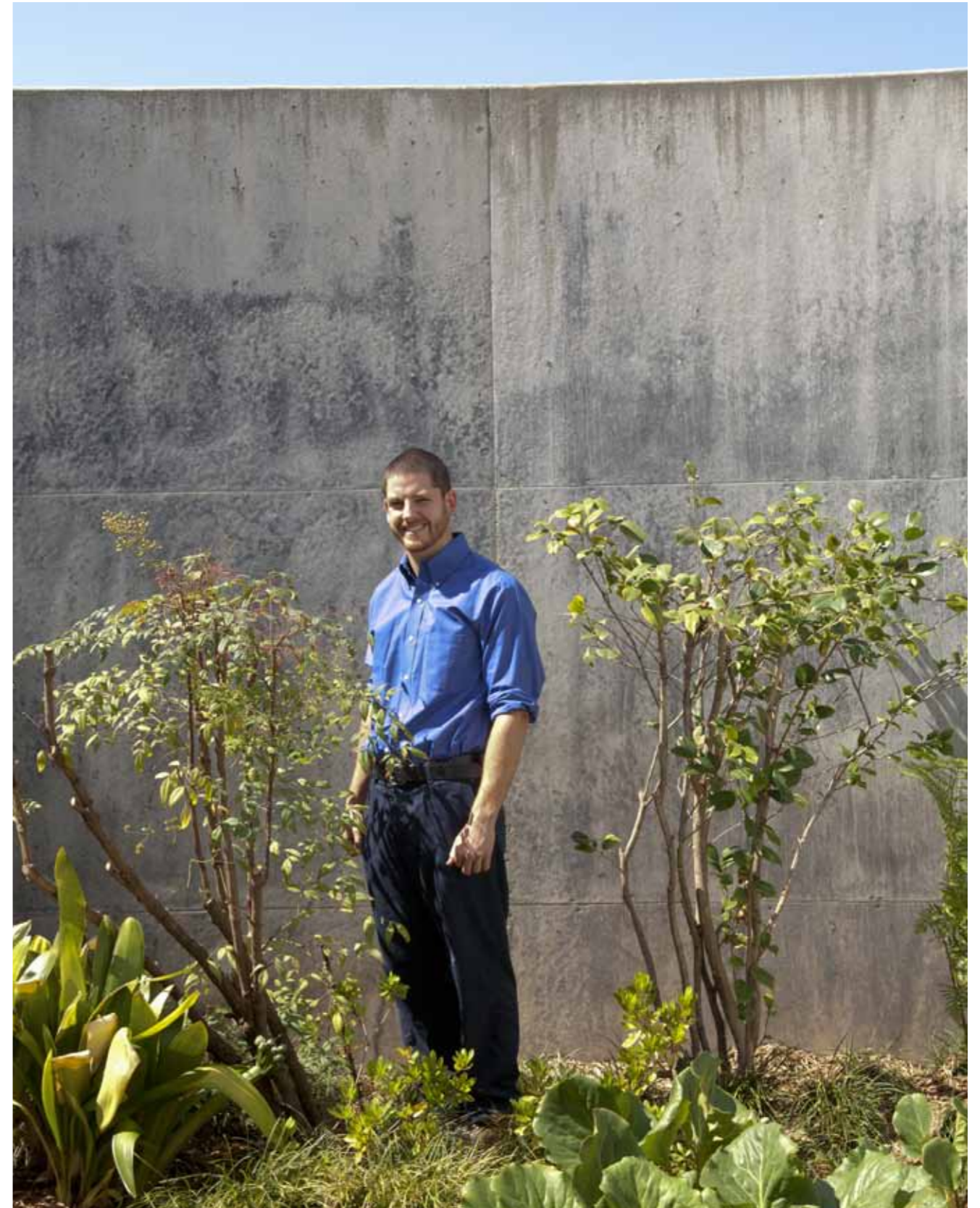
Christian Williams

Wastewater treatment operator
Veolia North America,
Water solutions,
California, USA

On YouTube, everyone can take advantage of the knowledge and expertise of millions of people free of charge. A phenomenon that is lost to no one, especially young people. Take 26-year-old Christian Williams, a perfect example of this connected and civically minded, individualistic and humanist generation Y¹, raised in a world of global interaction, mobility and instant transfer. He has chosen YouTube to post his 21 educational modules², each a dozen minutes long, packed with hints and tips for thoroughly preparing the wastewater treatment operator's license exams. In a steady, resonant voice, Christian explains the mysteries of the main mathematical formulae. "I wanted to help out people who aren't able to afford an \$800 preparatory class. It was when I was studying for my grade III certification exam in 2009 that I decided to devote part of my weekends to creating these videos. They explain how to calculate watering rates, pumping rates, weir overflow rates, etc. In short, everything you need to know to be licensed in this sector." What motivated such a spontaneous and generous gesture when it could be a rather time-consuming business? "Not many people realize that life would be impossible without water. Access to good-quality drinking water is undoubtedly one of the biggest challenges for the planet. It's my modest and altruistic contribution to this global issue, in a sector where qualified personnel is a key concern." His videos have already gained over 170,000 views and 750 subscribers... Enough to draw the attention of James Good, executive vice president of VENA, who is fulsome in his praise for the initiative and delighted to have Christian on his team. ■

1- today's 18 to 30-year-olds

2- Accessible with the password CAWastewater





Cyril Carteret

Training manager
Digital Learning Department
Veolia Campus,
Jouy-le-Moutier, France

After “24”, the cult American TV series, discover “90 minutes”... an e-learning module designed using tried-and-tested formulas: “A plot in 28 sequences without any lulls in the action, creating that addictive desire to see what happens next,” reveals its writer-director, Cyril Carteret. On paper, however, the topic seems light years away from entertainment as we know it. The aim is to encourage members of staff to teach themselves how to create Google Sites, powerful interfaces for collaborative project management. How could staff be motivated to master the tool and its many features without drawing on traditional classroom learning? “To teach children new things, you spontaneously take an approach that is both fun and educational. I quite simply applied this premise to adults. It’s what I call adult edutainment.”

To catch people’s attention, Cyril made two firm choices: a concrete, unifying subject as the narrative thread — creating a Google Site for a regional commercial challenge, plus the standpoint of a novice user, totally unfamiliar with the IT environment.

“Then we tweaked the editing of the tutorials¹, which each last a few minutes, to make it like a real 1 ½-hr storyline.” The bet has paid off, because the forty or so staff members who have used this training to date “watched it all in one go.” They then return to the sequences that are useful to them. The price of success: “90 minutes”, which is currently available online in French, will be translated into English by the end of 2014. The Americans are the ones crying out for it! ■

1- Demonstration videos.

United Kingdom

20/21



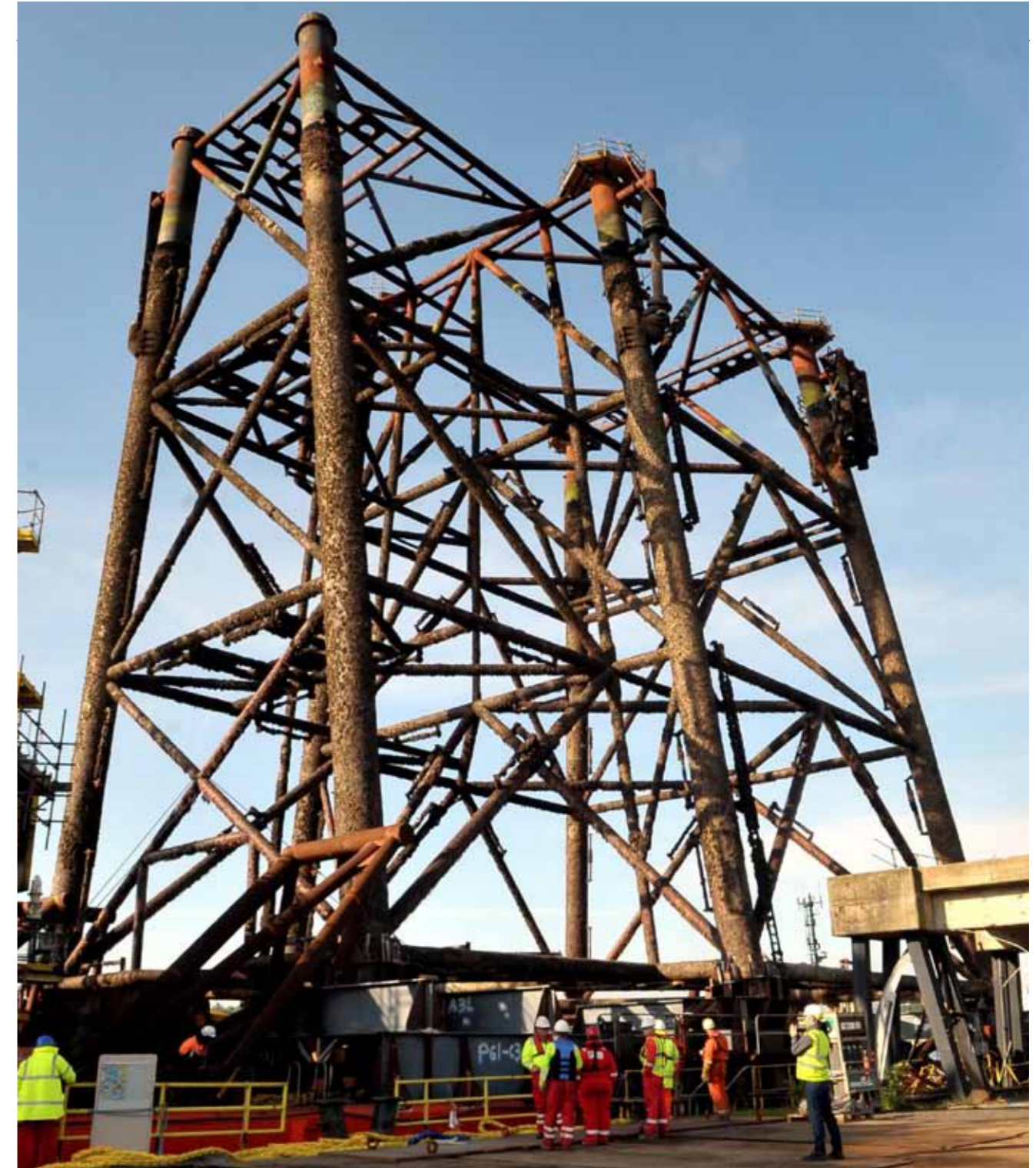
Extreme Recycling

Offshore oil and gas operators work under extreme weather conditions in the North Atlantic Ocean. One of them, the energy giant BP, has embarked on a redeployment plan. It has chosen Veolia to develop projects to reuse and recycle subsea equipment.

In 2011, BP and its partners announced their intention to invest around £3 billion in the redeployment of the Schiehallion and Loyal fields, known as the Quad 204 project. The investment will go into new facilities to extend the productive life of the fields until at least 2035.

To depths of 450 meters

Located some 175 km west of Shetland, the Schiehallion and Loyal oil fields were discovered by BP and its partners in 1993. To date, almost 400 million barrels of oil have been produced since operations began in 1998.



Issue at stake

> To extend the productive life of Schiehallion and Loyal oil fields until at least 2035.

Objectives

- > Meet a 95% reuse and recycling rate for recovered subsea equipment
- > Work in partnership with BP and its contractors

Veolia solution

- > Work with BP to achieve high reuse and recycling levels
- > Partner with local contractors to deliver services

... The harsh environment west of Shetland requires many special engineering considerations to be taken into account to build a viable offshore structure capable of operating under these challenging conditions. Firstly, the water depths of between 350 and 450 meters mean that a traditional fixed platform cannot be used. Instead, a specially designed ship, known as a Floating Production Storage and Offloading (FPSO) vessel, produces oil and gas from the Schiehallion and Loyal fields via an infrastructure anchored to the seabed using mooring lines. It consists of fixed structures on the seabed and flow lines transporting oil and gas to the vessel on the surface.

Reuse as a priority

The Quad 204 project encompasses two major decisions: a brand new FPSO and a major upgrade of the subsea infrastructure. To enable this upgrade, production from the Schiehallion FPSO was suspended at the start of 2013. While the original FPSO is being prepared for sale for reuse, BP has contracted with Veolia to decommission the subsea infrastructure, which cannot be returned to service when the new FPSO arrives on location. With its contractors, BP is beginning offshore work to disconnect the equipment in question, which is subsequently recovered from the seabed to construction vessels and transported to Lerwick on Shetland. BP environment team lead Mairi Dorward confirms that the company intends to manage these waste materials according to the hierarchy set out in 2008's waste framework directive, seeking to reuse it wherever possible and then recycle what cannot be reused. "Veolia was appointed

for this contract because it has previous experience in this type of activity and a network of contacts to manage the recovered material," she explains. "As a global solutions provider, Veolia is also able to share its expertise with BP."

99% of materials reused or recycled

With its partner Peterson, an oil and gas logistics specialist based in Lerwick, Veolia manages the material arriving on shore, of which up to 10,100 metric tons are expected. "Although materials such as the risers are flushed out before they reach us, decontamination may be required. During oil production, naturally occurring radioactive material (NORM) may accumulate, so we have developed a mobile NORM decontamination unit to treat any contaminated material safely," says Ian Williams, Veolia industrial services director for the UK. "We are ultimately reusing or recycling 99% of the material, primarily metals, high-density plastics, rubbers and resins, even though some of them are difficult to recycle. For example, buoyancy modules have been given a new lease of life in renewable wave energy projects and metals go into the scrap metal stream. Not forgetting innovative solutions for other previously difficult-to-recycle materials. For example, rubber is converted into surface materials for children's playgrounds. We have lots of eyes and ears always looking for new opportunities for reuse or recycling," concludes Ian Williams. ■



Ian Williams,

Veolia Industrial Services director for the UK

What is the trickiest part of your work?

"Although our part of the project is onshore at Lerwick, we still face a number of logistical challenges. The weather is pretty unpredictable and that can lead to changes in schedules, particularly the timing of materials arriving. This in turn has an impact on cargo preparation and subsequent transportation from the island to the mainland. So we often have to think about and react quickly to the logistics of storing and processing materials, plus resourcing the operation."

On that note, what expertise do you rely on?

"We use engineers and other decommissioning workers from Shetland; however, we do need expertise from other places. The weather and transportation difficulties mean that we have to work closely with our clients, partners and suppliers to deliver the project on time and most of all to the highest standards of compliance."

Key figures*
 10,100 metric tons
 of materials to be reused or recycled
 5,000 metric tons recovered to date ready for reuse or recycling
 65.3 metric tons reused
 1,344 metric tons recycled
 36 metric tons sent to landfill
 *1st half-year 2014



Mairi Dorward

BP environment team lead

"This project is managed with a view to transferring knowledge to other parts of BP. When this project is finished, we will then share the results and lessons learned with the rest of the company. Other similar projects can see how we have achieved high reuse and recycling rates and apply those lessons to their programs."



Through the partnership with Aker Kvaerner, Peterson SBS (Logistics) and Lerwick Port Authority, Veolia can treat a vast array of subsea equipment.



Offshore: an ocean of opportunities

Since the mid-1960s, exploration of the North Sea basin has led to the development of oil and gas facilities in waters belonging mainly to the UK and Norway, but also to a lesser extent Denmark, Germany and the Netherlands. BP alone has invested more than £35 billion in the North Sea to date and produced over five billion barrels of oil and gas. Along with its partners, the company is investing more than £7 billion in this region over the next five years. Veolia sees huge opportunities in the oil and gas market for both surface and subsea operations over the next 25 years. The Group estimates that the decommissioning market in the North Sea region is worth around £1 billion, while other opportunities exist in similar offshore regions, such as the Gulf of Mexico.



In the 3.0 age

Prague, Warsaw, Pudong

After Warsaw's Heat-Tech Center and Pudong's water management center comes the latest smart center: SWiM, or Prague's Smart Water integrated Management. What do they have in common? Continuous remote control and 24/7 information for users. A closer look at 3.0 systems.

SWiM's implementation in Prague in 2014 could be a remake of the blockbuster "The Matrix"! Dispatchers control every aspect of the water system from the top floor of Pražské vodovody a kanalizace (PVK)'s headquarters. Imagine a monitoring and control center covering the entire water cycle, from the source to the consumer,

including the collection of wastewater. This is SWiM, Prague's fifth-generation water management system: water infrastructure management, production and water consumption monitoring, cost optimization, incident management, scheduling of preventive maintenance and repairs, resource management and information for customers and the general public... it integrates it all! "Thanks to this integration, we have

streamlined the management of the entire water system and accelerated the response to operating incidents. We are also able to detect water leaks and bursts much sooner," points out Petr Mrkos, PVK's CEO. All the same, the most visible feature of the new system is undoubtedly customer communication. "This is the service that our clients will notice immediately. Maps with information about incidents

CONTINUED ON P. 26



SWiM in Prague

Pudong's water management center



Warsaw's Heat-Tech Center



SWiM in Prague, Warsaw's Heat-Tech Center and Pudong's water management center all look to offer urbanites a dialogue, a service and a relationship of trust.

Issue at stake

> Pražské vodovody a kanalizace (PVK), Prague's water infrastructure operator (1.2 million people), and Pražská vodohospodářská společnost (Prague Water Company), the company formed by the network's municipal owner to manage the city's water assets, had to meet the requirements of European standards.

Objectives

- > Increase the efficiency of water processes and optimize costs
- > Inform clients in real time
- > Optimally accelerate response times in emergency or flood situations

Veolia solution

- > Thanks to *Smart Water integrated Management (SWiM)*, PVK has improved access to information, communicates better with its clients and controls the water system more efficiently.
- > The Current Alerts Map, available to clients in the SWiM database, provides progress reports on incident handling.



Petr Žejdlík,

Chairman of the Board,
Prague Water Company



What are the major benefits of SWiM for Prague and its inhabitants?

For the population, the most obvious benefit is access to information. I know from experience that if issues regarding water supplies are explained to people properly and swiftly, most of them will understand. The interconnection between information sources and

modern information channels within SWiM represents a highly efficient communication tool.

Naturally, I am also delighted by the outstanding technical standards of the entire system. Statistics from PKV show that in the short time the system has been running, the average repair time has decreased by some 40 minutes. After discussions with the operator, we would like to use the system incorporating changes currently underway. The idea is to optimize our investments. We particularly value the increased level of protection of critical infrastructure as well as the new crisis management capabilities.

As the main customer, what do you expect in terms of further development of the system?

SWiM demonstrates that system integration is the right path to take. However, while there are a host of modern control systems and software improvements, mutual communication between systems must be developed as fast as the individual systems evolve. Failing that, the efficiency of the entire infrastructure will be compromised.

For us as owners of the water assets, it is vital to make sure that information sources from SWiM are properly connected to the systems that we operate. What I mean, in particular, are two-way information flows in the area of asset recording. Further development of crisis management systems and critical infrastructure protection are also important issues. Having said this, SWiM has the slight weakness of already being a major next-generation upgrade and it will be difficult to put forward a viable and interesting project to develop it much further. We will most likely have to focus on gradual, methodical improvements that might be less obvious, but are no less useful.

Prague, the network in figures*

114,520,000 m³ of drinking water produced
135,892,000 m³ of wastewater treated
3,440 sewerage system incidents
4,717 drinking water system incidents

Drinking water supply system
Length: 3,496 km
Water connections 110,781 over 783 km
Supply points (water meters): 109,439
Water treatment plants: 3
Pumping stations: 49
Water towers: 68 representing 746,404 m³

Sewerage system
Length: 3,637 km
Building sewers: 117,733 over 954 km
Lift stations: 313
Wastewater treatment plants: central plant in Bubeneč + 20 auxiliary plants

*2013

CONTINUED FROM P. 24

and shutdowns, including replacement supply solutions, are already available on our website," he adds. However, SWiM still has a few aces up its sleeve. Prague's water operators are banking on several benefits to come: the time taken to repair incidents will be shorter, water quality will be better monitored, and resources will be planned and allocated more effectively. All factors that will improve management and thus avoid increases in operating costs.

Up and running

It's a mere step from theory to practice, so let's take a look at how SWiM works in real life. An elevator takes us to the top floor of PVK's headquarters in Prague, on Hradecká Street. Preceded by our guide, Petr Mrkos, we pass through the double security check. A glass door opens and we are surprised by the dimness of the vast room, full of computers, an entire wall covered with large-screen monitors displaying real-time information about the water network. With a little imagination, we really could be stepping into "The Matrix"... Eyes glued to the screens, dispatchers monitor and control drinking water distribution and water inflows to water tanks as needed. They also check the status of pumping stations in both the drinking water and sewerage networks. This general check-up is particularly important in times of heavy rain and floods when emergencies occur. In addition, flood plans have been prepared for every possible crisis situation, including a system that gradually shuts off the sewer system if water reaches

CONTINUED ON P. 33



Incident alert: through a SWiM dispatcher's eyes

SWiM has proven remarkably effective at handling incidents. The proof: as soon as PVK is informed about a drop in pressure, either by customers or by the network itself thanks to pressure sensors, the dispatcher starts searching for the area in question via the Geographic Information System. Once the incident has been located, he or she sends out a search patrol to track down the leak or burst.

At 9:40 a.m. someone calls the customer service line to report water flowing in the sector between Moskevská Street and Vršovické Square in Prague. The incident immediately flashes on the SWiM dispatcher's system, too, and they send a patrol to the area. And off we go...

At 10:00 a.m. we get to Vršovické Square. The search patrol is already hard at work. Josef Nešpor, a PVK employee, gives us a short status report: "The incident has not caused a total stoppage, only a pressure drop which reduced water supply on the higher floors of apartment buildings."
At 10:10 a.m. the patrol shuts off the hydrants as an emergency measure to stop the water from leaking onto the street. Once he checks the status, the dispatcher sends out a second team to cordon off the area, make the excavation, repair the pipes and return the area to its original condition. Real-time information is entered in the Geographic Information System, and the website automatically displays the

incident status. Users in the area then receive a text message alert informing them about the situation. In parallel, tank trucks and trailers organize replacement drinking water supplies. The vehicles are all equipped with a GPS system to allow the dispatcher to locate them easily. Once the repair is completed, the relevant operating unit or emergency service informs the dispatcher. The pipes are rinsed and a laboratory analyzes the water. If the water quality is fine, the dispatcher authorizes that the drinking water main be put back into service. The incident is marked as repaired in the system, and clients are informed of the return to normal service.

Pudong: twelve years of innovation



Petr Mrkos,

CEO, Prague Water Supply and Sewerage Company

How have the people of Prague reacted to the new SWiM system?

I was actually surprised by the interest SWiM has aroused, especially on the part of our clients, partners and reporters. Our idea of organizing presentations and tours of the SWiM center has paid off, because people have a better understanding of our activities and a clearer idea of what goes on on a daily basis.

How was SWiM's implementation funded?

The project was co-funded. The water asset management company in Prague (Pražská vodohospodářská společnost) invested in the modernization of infrastructures, while PVK was responsible for information and control systems and data transfer systems. Thanks to excellent coordination between the owner and the operator, money was spent very efficiently. Over some five years of project development, managed by the teams from PVK, the latter injected around €3.5M into telemetry systems and system integration.

In the space of a decade, the water service of Shanghai's financial and commercial hub, Pudong, has become a platform of global expertise, implementing the most innovative technologies to manage drinking water systems.

Continuous growth and performance

In Pudong, Veolia serves over 3.6 million people under a public-private partnership covering the management of the entire drinking water service. This partnership, which is unprecedented in China and has been running since 2002, handles a volume of 1.6 million m³ of water every day. Today, the results can be seen. The joint venture has boosted productivity by increasing plant production capacity, extending the network (+115%), using the most effective treatment technologies, and monitoring 4,470 km of pipelines in real time. Innovation is ongoing. As well as creating a state-of-the-art Water Movement Control Center, Veolia and its partners have established a Personal Digital

Assistant (PDA) Center to ensure efficient network operations and exemplary water quality monitoring provided by a cutting-edge laboratory. All the more impressive given that the population served grew by 1 million at the same time.

Real-time monitoring

Pudong's integrated Water Movement Control Center is equipped with the latest-generation network management tools. It is able to monitor the 34 sectors of the drinking water distribution system 24/7 using 400 measuring instruments that can locate and visualize leaks or pollution. The PDA Center complements this set-up by providing on-site network operators access to 3D views of all the facilities and the relevant technical data in just a few clicks. It constantly interfaces with the operators' PDAs, which stream data on response time, team location, progress photos of maintenance works and emergency management for Veolia customers.



... CONTINUED FROM P. 26
certain levels. All of these operations are controlled from the dispatching room in real time.

Toward "smart networks"

PVK has been managing Prague's water infrastructure since 2001. The entry of a foreign partner like Veolia has helped it to take great strides and make enormous progress over the last thirteen years, especially in terms of modernization, innovation and customer focus. SWiM is the fifth-generation water management system and the outcome of a long process of innovating and implementing state-of-the-art technology. "The groundwork was done by the PVK team, in cooperation with members of Veolia CR's technical department. Not forgetting the Czech water professionals, who are the cream of the crop and for whose assistance we are extremely grateful," acknowledges Philippe Guitard, PVK's chair of the board of directors and Veolia director for Central and Eastern Europe. So what will generation six have in store? PVK is looking to achieve greater autonomy for wastewater treatment plants by drawing on their behavior algorithms. By developing "in-house" programs, numerous processes could be fully automated, with no need for human intervention. This would mean that the plant would control, on its own, the dosage, the inflow of water and water retention, guaranteeing that only top-quality water comes out of the system. The next step, in some ten years, will be artificial intelligence, or more precisely "smart networks." Remote readings of customer data and water quality control systems will see major advances. "And one day we will certainly come to the point where we won't be taking samples, because the network will be fitted with all the necessary sensors; nonetheless, a computer will never be able to do the digging... so there will always be manual work to be done," predicts Petr Mrkos. ■



Warsaw's Heat-Tech Center, a generation ahead

The existence of the Heat-Tech Center in Warsaw, one of the world's very first centers for excellence and research in heating networks, can be explained by the fact that Europe's largest heating network has been installed in the capital since the 1960s. Its current size speaks for itself: it heats an urban area of 136 square kilometers and covers 76% of the city's needs! With approximately 19,000 delivery points (substations) supplying 11,000 GWh of thermal energy per year, it is easy to understand why intelligent management of the entire system is needed. Management is based on a loop of excellence combining engineering and maintenance operations within a continuous technical improvement process.

Intelligence and reliability

Based on two pillars (R&D for over 80% and the rest supported by Veolia's technical support functions), the Heat-Tech Center is currently developing two complementary research projects: one focuses on the intelligent management of

the network and the other on its reliability. On the program: improved network performance for greater energy efficiency and improved ability to capture low-carbon emission energy sources, the use of artificial intelligence for optimized steering and a data management system compatible with the gradual installation of sensors and probes at key points of the infrastructure. With the deployment of real-time data management made possible through the mass of data acquired and processed, the user is informed not only of the condition of the network, but also of any maintenance, emergency or scheduled operations almost instantaneously. With its 15 researchers, HTC aspires to become the leader in heating network research and innovation. By regularly inviting students to come and develop their final year projects and doctoral theses, this world-renowned center has become a major player in the city, making each day a little smarter.

Bra-zil

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The circular economy: a boost for the cellulose industries

In the microregion of Três Lagoas (State of Mato Grosso do Sul), eucalyptus monoculture and cellulose production are experiencing a spectacular boom. Fibria, the largest paper pulp producer in the world, has – together with Veolia – adopted a mineral waste conversion and recovery process.

Following the signature of a contract based on circular economy principles in 2011, Veolia and Fibria have become global benchmarks in the management of waste from the paper pulp (cellulose) industries. The operator is responsible for converting 100% of the mineral waste generated during Fibria's cellulose production process, at both its Jacareí-SP and Três Lagoas-MS plants, into soil

acidity correctives. "The partnership with Veolia has offered us an array of alternatives and different technologies," highlights Paulo Gaia, the general manager at the Jacareí plant.

Virtuous cycle

Using this process for reusing waste, Fibria wins out in several ways.

As well as not having to transport this waste to landfill, the company also makes substantial savings on purchasing limestone. This soil-enriching agent serves to "nourish" the soil of eucalyptus plantations, which are used in paper pulp manufacture. Pierre Casabonnet, Veolia's technical and operations director in Brazil, explains: "This system meets Veolia's priority

CONTINUED ON P. 32 ●●●



Issues at stake

> With tightened discharge standards and strong incentives to reduce harvesting of the resource, Brazilian legislation is forcing the paper industry to take an interest in waste material recovery solutions, the waste-to-energy recovery of its effluents, etc.

> A federal law requires all eucalyptus planters to revitalize a surface area corresponding to at least 20% of that used for industrial purposes.

Objectives

> Reduce by 91.5% the waste from the cellulose production process sent to landfill by 2025.

> Aim for "zero landfill" in the longer term.

> Increase the cellulose production capacity of the Três Lagoas plant, reaching 3 million metric tons.

Veolia solution

> Put in place a process to convert the waste from the cellulose production process into soil acidity corrective.



CONTINUED FROM P 30

strategic goals. It allows us to offer our industrial customers solutions firmly focused on the circular economy. It's a complete cycle: waste is incorporated into the production chain and converted into agricultural inputs at the end of the process."

By pioneering the reuse of solid waste, Fibria ensured its compliance with national legislation long before it was ratified! Today, the company is enjoying the fruits of its partnership with Veolia. In 2013, for example, 26,573 metric tons of waste were reused or recycled at Fibria's Jacareí and Três Lagoas plants, ultimately leading to savings of R\$ 4.25 million (Brazilian real) on the purchase of soil correctives and waste disposal costs.

Satisfied with these positive results and in line with its own "4R" – rethink, reduce, reuse and recycle

– concept, Fibria is determined to reach its goal of reducing waste sent to landfill by 91.5% by 2025.

Sights set on Latin America

To this end, Fibria also intends to reuse its organic waste. Veolia is already looking at solutions, the main idea being to turn it into energy. As has been the case since the partnership began in 2011, Fibria is once again relying on its partner to spearhead this kind of project aimed at reducing its environmental impact. Moreover, thanks to the quality of its services, Veolia has extended its work at the paper pulp company. "We started out with a recyclable waste contract," notes Pierre Casabonnet. "Then we focused on internal logistics, ...



Pierre Casabonnet,
Technical and Operations Director,
Veolia Brazil

What benefits does Fibria gain from the solutions provided by Veolia to reduce its environmental impacts?

Veolia has put in place a process to convert the waste generated from the industrial production process into a new product - soil acidity corrective - which will be used in Fibria's own eucalyptus cultivation. In other words, it is a short waste reuse cycle, which is in line with circular economy principles and combines all the associated environmental, economic and technical benefits, not to mention job creation.

How is organic waste reused?

What we are proposing to Fibria is to work on creating energy from sludge. This sludge is moist waste, which - once processed and converted - will serve as a source of energy that will itself be reused in the cellulose production process.

Are you planning on diversifying and marketing the products produced from the waste?

Selling it is one option, particularly at Três Lagoas where production is set to increase. It is unlikely that Fibria will be able to absorb 100% of its products itself, but we can count on other outlets in the region, including several eucalyptus plantations. The idea is precisely to make products that can be sold.

... before turning to soil correctives. We are now developing projects involving drying out sludge from Fibria's wastewater treatment plant and operating this facility. All of these initiatives have been a resounding success and allowed us to broaden our remit. Bringing all of Veolia's know-how to bear on the client's behalf has consolidated our partnership."

On the strength of its credibility and experience in the cellulose sector, Veolia is planning to expand its scope of action. Solutions have already been presented to a number of industrialists in Latin America, particularly on the Argentinian and Chilean markets. ■



Brazil benefits from the world's fastest eucalyptus production cycle.

Cellulose production in Brazil

With its extremely favorable geographical conditions, the Brazilian cellulose industry is one of the strongest in the world, largely due to its soil quality and the easy adaptability of eucalyptus species. "Brazil has the world's fastest eucalyptus production cycle," explains Pierre Casabonnet. "Here, the process takes six to seven years from when the tree is planted, whereas in Northern Europe, for example, pine tree production cycles last much longer, from 15 to 20 years."

These environmental factors mean that Brazil is extremely well placed and competitive in the world cellulose market. Keen to take advantage of this asset, Fibria aims to increase production at its Três Lagoas plant from 1.3 million to 3 million metric tons. Pierre Casabonnet states: "Along with Veolia, Fibria is exploring solutions for using the excess waste generated by the increased production volume."



Paulo Gaia,
General Manager of Fibria's
Jacareí plant

What has Fibria gained by reusing its waste?

In economic terms, there is a very big return for us. Eliminating transport to landfill has done away with the need to build a new storage facility and thus decreased our investments. We have also reduced our environmental impact, as we no longer need to incinerate our waste. Last but not least, we have replaced the limestone used to treat the soil on our plantations with a corrective manufactured by Veolia, leading to a significant drop in our purchasing costs. In short, we have increased recycling and created jobs.

What are Fibria's aims in terms of reusing waste?

Our long-term goal is "zero landfill." Recycling and reusing waste are therefore extremely important issues for us. They are determining factors in achieving these goals and form an integral part of the company's key sustainability strategy. There are three main facets to this approach. Economic: costs and investments are reduced. Environmental: the waste in the forest plantations we cultivate is reused, offering a more eco-friendly attitude. And finally social: reusing waste ensures the long-term feasibility of the business and therefore promotes job creation in the region. We have come full circle, as it were.



New York

Take a walk on the High Line

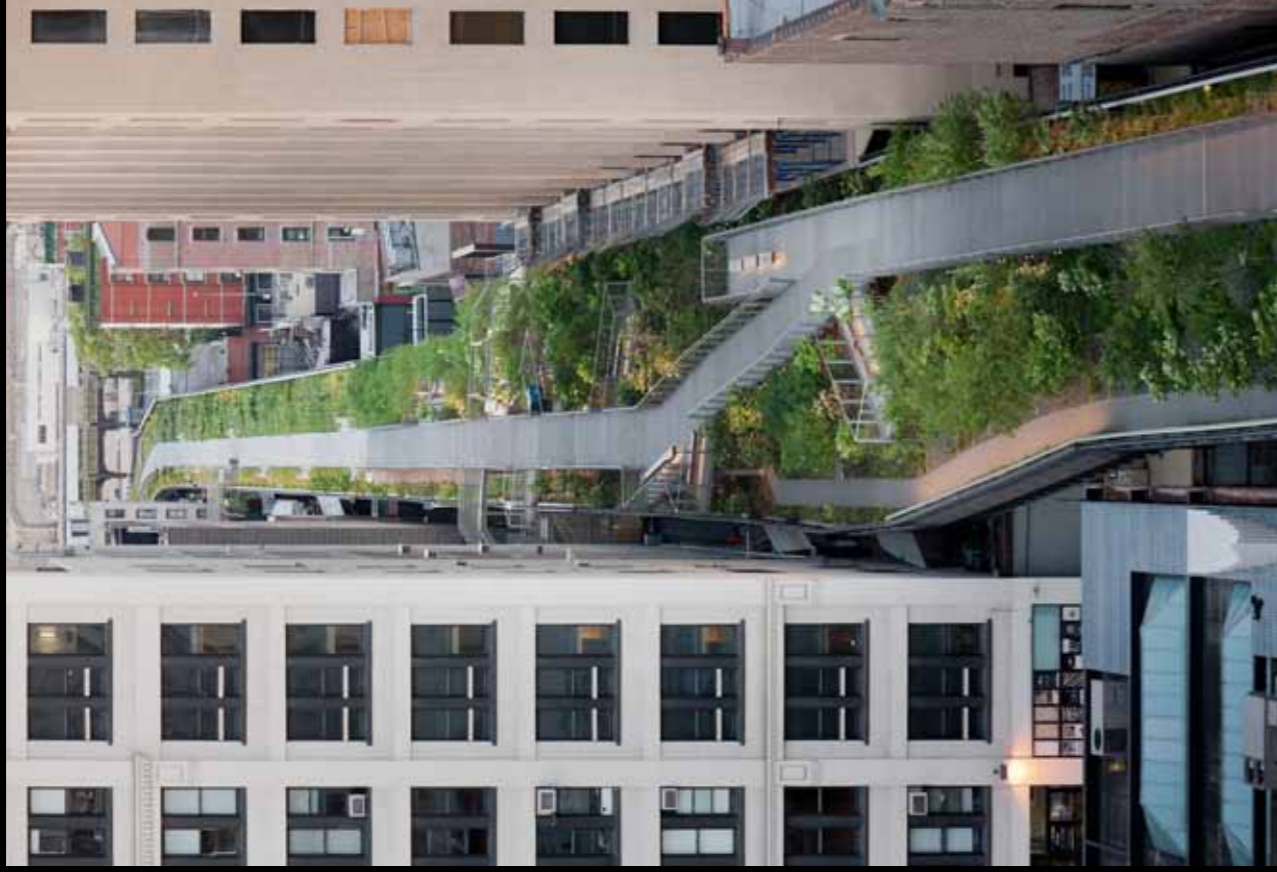
Previously an austere and deserted road, today it is green and buzzing with life. Located at the edge of Manhattan, the suspended walkway owes its metamorphosis into a public space to the perseverance of an organization run by residents of the neighborhood, which succeeded in convincing the city to rehabilitate the old railroad threatened with destruction. The High Line was built in the 1930s and abandoned in the 1980s. The rehabilitation of its

2.3 km sets an example for other city projects. Combining urban challenge, landscaping success and environmental performance in one, the High Line offers New Yorkers a few minutes of escape from the hustle and bustle of the city streets. A moment of tranquility that the photographer Iwan Baan, a past master in the art of capturing human presence in architectural structures, has chosen to show us in a series of snapshots. Strolling horizontally through a vertical city.

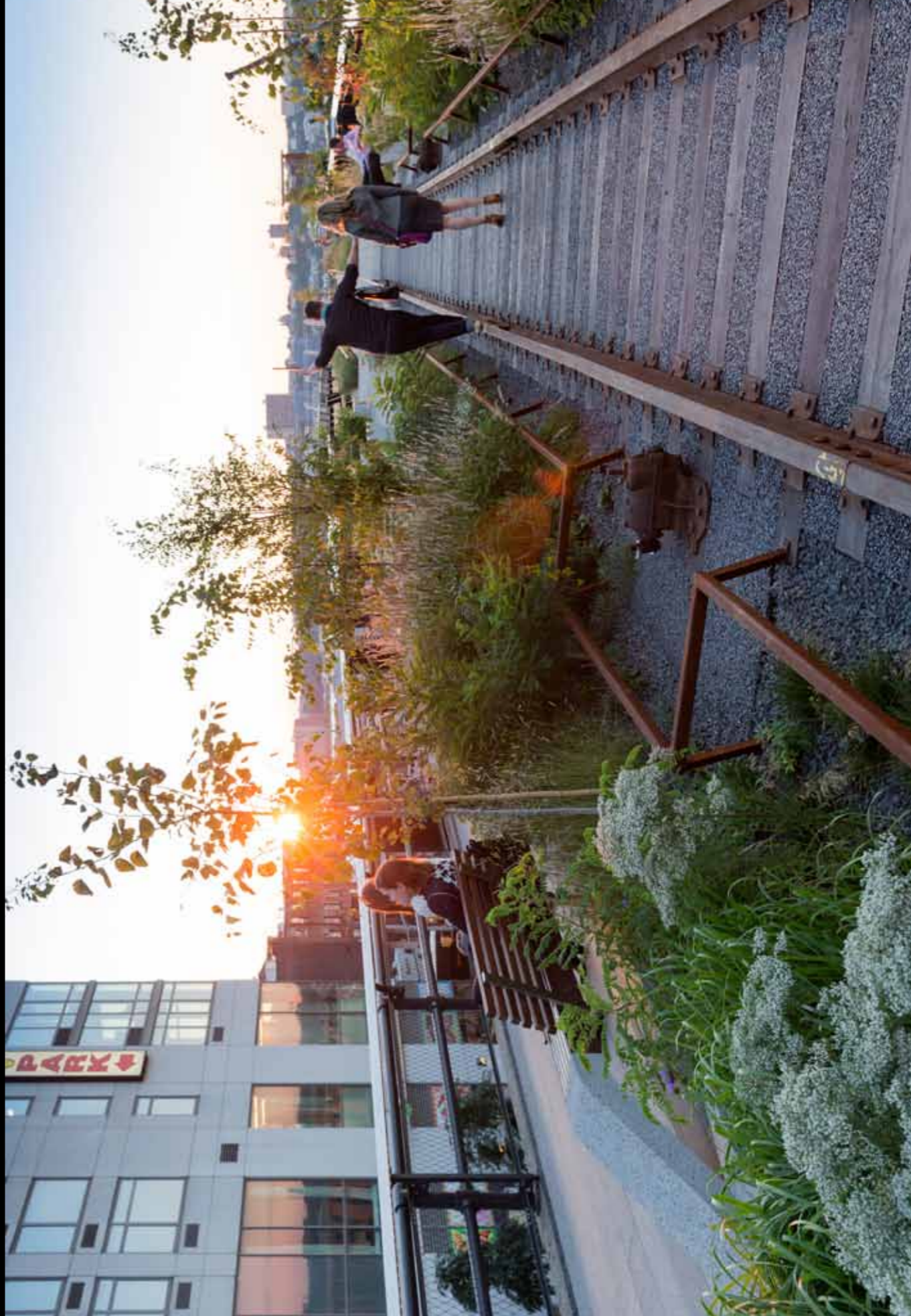


Urban spectacle Overlooking the city, the High Line offers a wide variety of views of the Lower East Side. It even has a small amphitheater. Opposite the tiers is a windowed facade offering an unobstructed view of the spectacle of the streets of Manhattan at all hours.

Respectful choice The deliberately winding route has left rail sections exposed, which are studied with plant species identical to those that grew on the old railroad. Here, endemic is standard and environmental quality exceptional: the coatings used retain up to 80% of rainwater, like a green roof.



Microclimates Every inch of the High Line is designed to offer changes in the landscape depending on soil type and exposure to the wind or sun. It is also a haven for a host of wildlife, including pollinating insects and the entire park helps reduce urban heat island effects throughout the neighborhood.





Iwan Baan's well-populated photography

Human presence is a constant and almost a signature in Iwan Baan's photographs. At first sight this seems entirely normal; yet, when applied to architectural photography, a genre usually dominated by the representation of individual buildings without a soul in sight, the approach

is surprising. "I try to always question the relationship people have with their built environment," remarks the photographer in explanation of his open mind and the attention to detail and movement that he brings to architectural creations. This contrarian approach directly inspired by documentary photography has earned him attention from architecture's top names, including Rem Koolhaas, Herzog & De Meuron, Zaha

Hadid, Toyo Ito and the firm Diller Scofidio + Renfro. It is at the latter's request that the photographer has followed the renovation of the High Line since 2009. Iwan Baan returned to New York in September 2014 to capture its completion for posterity, before flying off to another destination in his race to "capture life" in the architectural heritage of the world.

Bio

Born in 1975 in the Netherlands, Iwan Baan began his career as a documentary photographer.

A meeting with his fellow countryman, Rem Koolhaas, was decisive in directing him toward architectural photography. He soon met with success and became a major figure in this field of photography. Deeply committed to describing how communities take ownership of a habitat and transform it, he also works on personal projects devoted to subjects such as the homes built in an unfinished tower in Caracas or the day-to-day life in a city on the water in Nigeria.

Lost - and found - in the city

The potential
of Smart
Cities to
convert urban
problems to
promise

One second. That's the rate by which global urban population growth is being measured today. And that's not just one person being added to the world's cities every second - it's two. To meet the daunting challenges posed by exploding urbanization, policy makers are increasingly looking to new and emerging technologies. The goal: to create ecologically and economically sustainable "smart cities."

Around the globe, new megacities are being created at a dizzying pace. The portion of the world population living in cities will jump from 50% today to 70% by 2050. Growth is exploding particularly in developing countries, with five million people being added to urban areas each month. The result is unprecedented challenges in areas such as clean water, sanitation, congestion, waste management and energy services. "With the huge pressure on natural resources exerted by three billion people joining the middle class by 2030, we need to adopt more sustainable practices, particularly at the city level where this pressure is magnified," says Veolia's executive vice president, Innovation & Markets, Laurent Auguste. The vulnerability of metro areas like New York to climate change-influenced natural disasters such as Hurricane Sandy underlines their position at the frontlines of the sustainability wars. In the words of Colette Maloney, the European Commission's Head of Unit, Smart Cities and Sustainability, "The battle on energy and climate challenges will be won or lost in cities." A battle to be fought intelligently...

Smarter responses

Smart cities are those in which modern, integrated technology services and infrastructure are applied to respond to social, environmental and economic challenges and improve citizen quality of life. The smart city concept includes using information communications technology (ICT) to optimize resource use and reduce emissions, creating smarter urban transport networks, upgraded water supply and waste disposal and recycling facilities and more efficient ways to light and heat buildings. "Cities that in the past were built on riverbanks are today built along highways. But in the future, they will be built based on optical fiber networks and next-generation infrastructure," said Indian Prime Minister Narendra Modi in announcing a plan to build 100 smart cities. With its expertise in resource conservation, recycling and reuse, Veolia is well positioned to play a major role in the creation of smart cities. A telling statistic: by 2030, it is estimated that nearly half

of the world's population will be living in areas suffering from water stress. Yet, only 5% of water is recycled on a global scale.

Expert role

Major city services providers, born in the industrial age of the mid-19th century, are finding their knowledge and experience highly valued in this new revolution of intelligent city management. "Through our role as operators in the trenches, we understand the reality of how urban systems operate," comments Laurent Auguste. "We've been doing this for years as good engineers, gathering data for our own needs in order to help cities improve their infrastructure and the delivery of water, waste and energy services." He adds that Veolia is today going beyond its traditional operating role by leveraging the collected data and accumulated expertise as elements of its offer. "The array of services we deliver now extends to performance benchmarking, analysis and interpretation of data and consulting services that are accelerating the development of smart cities." Like Veolia, other large companies such as IBM, Cisco and Siemens are working individually or in partnership to help mayors and urban planners throughout the world to implement smart city initiatives. One of the significant emerging challenges is finding ways of pooling and processing data in real time and making it available for the swelling numbers of apps omnipresent on smartphones and

other devices. "The real innovation in smart cities will come from integrating technologies," predicts Colette Maloney.

Shifting the paradigm

Reaching the next level in smart cities development will require new ways of thinking, including about issues like open solutions and open data, according to Colette Maloney. "To transform cities, we need to change how we plan and work and define common ways of collecting, structuring, formatting and ensuring the availability of data, as well as developing horizontal standards that apply across different sectors." Laurent Auguste points out that Veolia is contributing to this paradigm shift by innovating and demonstrating new ways of using data to simplify and improve the management of cities. "It's a new role as important as our traditional focus on the technical or investment demands of inventing better sensors or improving infrastructure. For a company whose mission is Resourcing the World, it's an exciting time of change and opportunity as we tackle the enormous challenges confronting cities - and society." ■

Planning Smarter

Developed for the city of **Santiago de Chile**, at the request of the French government, looking to promote national expertise in sustainable cities, the Sustainable City Simulator represents a visionary tool. A 3D model created by a multidisciplinary French team (architects-urban planners, engineers, service providers, digital modelers), it provides urban stakeholders with a visual portrait of their community and the main concerns it faces now and in the years to come.

By comprehensively scanning the city's "sustainable" performance, the Sustainable City Simulator helps define and assess a city's major issues at stake - as varied as the environment and health, natural resources, social equity, cultural diversity and transportation - benchmarked against similar municipalities. The tool projects how different technology and urban planning choices would impact key

indicators, combining technical information with human-based expert judgment.

For Santiago, the evaluation will form the basis for a simulation to be presented in March 2015, showing a 3D consolidation of the performance generated by the project to cover the central highway running through the city. As co-leader of the consortium with Artélia, Veolia is involved at two important levels, states Veolia director, Eric Lesueur. "Our service technologies can represent a good solution for cities, while our consulting role positions us as a strategic partner." For cities and citizens, the benefits also go beyond a move toward smart cities and better quality of life. "The city of Santiago sees this tool as an important opportunity to share a vision for the city with its citizens, beginning a genuine process of public consultation and engagement."



"The city of Santiago sees this tool as an important opportunity to share a vision for the city with its citizens"

ÉRIC LESUEUR, CEO OF INNOVE,
VEOLIA'S INNOVATION INCUBATOR



"In 2,000 French communities, m2ocity, Veolia's joint venture with the cellphone operator

m2ocity Getting Wired

by Taisei Miura, m2ocity's CEO

Orange, is building open, interoperable machine-to-machine (M2M) networks and ushering in the "Internet of Things" that will define tomorrow's smart cities. Having met its initial goal of the widespread deployment of monitored telecom networks for smart water metering in France, the almost four-

year old business is rapidly expanding into other services and exploring an endless array of new applications. Municipalities will thus have access to better information that improves water distribution, such as the location of leaks and the monitoring of samples taken at washout and fire hydrants. Smart meters, which already serve 10% of French households, allow consumers to better monitor and adapt their consumption as needed to lower their water footprint and expenses. But this may only be the tip of this promising

and emerging market represented by the Internet of things and its smart applications. Over and above smart metering, M2M networks open a myriad of other uses, such as controlling air quality (Ed's note: see p.50) and noise pollution, optimizing waste collection and improving buildings' energy performance. Guiding asthmatics to a city's cleanest air, optimized city parking... We are taking an imaginative approach to our strategic thinking. We want to leverage the advances achieved in France in these areas to play a pathfinder role in connecting tomorrow's smart cities throughout the world."

My building's smarter than your building

In New York, Chicago, Boston and a growing number of U.S. cities, Veolia subsidiary SourceOne is helping commercial property owners recover utility costs, optimize energy use and reduce their facilities' environmental footprint. Its secret weapon goes by the name of EMSys, a web-based energy management system that processes data collected through sub-metering systems that measure tenants' energy usage, as well as water and thermal consumption. Already adopted by prestigious names like One World Trade Center, the New York Port Authority and Vornado Realty Trust, one of the largest owners and managers of commercial real estate in the U.S., EMSys offers a twofold advantage. In addition to accelerating cost recovery for owners and increasing forecasting and budget accuracy, the system enables individual invoicing of tenants based on actual usage, encouraging reduced consumption. Another key benefit for clients like Vornado is the ability to track and optimize a building's energy and water use by comparing it with past performance and that of similar buildings nationwide. This benchmarking provides Vornado, a pioneer in sub-metering, with another source of competitive advantage in being able to demonstrate energy savings and lower environmental impact compared to similar facilities. It also ensures compliance with requirements being adopted by increasing numbers of American cities for energy and water consumption reporting on commercial buildings. "SourceOne's ability to accompany owners throughout the process, from ensuring properties that are correctly metered to counseling clients and their tenants on efficient practices, is helping drive year-on-year growth of 25%," says EVP and COO Michael Byrnes.

In the U.S. city of New London, Connecticut (USA), Veolia's KAPTA™ remote sensors produce real-time intelligence on the safety, quality and condition of the city's drinking water and distribution system. The probes monitor important water parameters, providing data that can cost-effectively improve maintenance programs and chemical treatment processes while alerting operators of potential problems. Website or email: kapta@veolia.com



Combining strengths with IBM

A new partnership with IBM to transform digital technologies in urban services is accelerating the development of Veolia's smart cities activities. The agreement to design and develop a range of innovative solutions to deliver digital services to cities and citizens is nearing completion through "smart water" initiatives in pioneering communities like Lyon, France, (see inset) and Tidworth, UK set to come into operation in early 2015. The challenge is considerable: completely transforming water and sanitation operations, including the implementation of smart networks and performance-based water management systems. Veolia executive vice president, Innovation & Markets Laurent Auguste says the IBM partnership will leverage the two leaders' complementary expertise to enable cities to benefit from the potential offered by the new technologies of information and communication to address environmental and economic issues related to increasing urbanization. "Veolia has unique access to the data and knowledge of how operations actually work in cities. We also are one of the few companies in the world able to bridge the technical silos between water, energy efficiency and management of waste and secondary materials. In addition, our international presence means we can help cities benchmark their performance as part of improving their efficiency. Combined with IBM's core strengths in I/T hardware, software and big data, this creates a powerful force and makes us a key player in the smart cities revolution."



Living in a home with a personal touch, impeccable environmental credentials, near all the local amenities and marked by a spirit of solidarity and cooperation... This is the everyday reality for Veolia Germany's Head of Communications, Matthias Kolbeck, and his family. A foretaste of what the city of the future might look like.

What exactly is the Baugruppe 3XGrün?

Berlin living

Just about three years after moving his family into a prototype building primarily constructed of wood in a tree-lined street in northern Berlin's Pankow neighborhood, Matthias Kolbeck is certain of having made the right choice. "We were looking for a larger but affordable apartment with a garden and green surroundings. Without, however, giving up on the idea of being close to schools and the city center... or on my wish to cycle into work, summer and winter alike!" admits Matthias right away. Hence his decision to apply for the Baugruppe (literally: construction group) 3XGrün, a highly innovative communal living project spearheaded by three young German architects. "Baugruppe is an approach that is booming in Berlin," confirms Matthias. These groups of future owners draw up the eco-design of their home from A to Z supported by a project manager. Over and above the desire

to break free from the budget and architectural constraints imposed by real estate developers, some of these groups co-opt people who share the same values of solidarity and the ability to live together peacefully in a spirit of compromise. "My wife and I met the 3xGrün group several times before we were admitted. Competition was stiff!" he remembers. In their spacious, luminous apartment, the Kolbecks and their two children enjoy this life with a "little something extra" on a daily basis. The carbon-neutral building is "a real little village at the heart of Berlin." Thirteen families share the space, including twenty-two children "who are never alone," says a delighted Matthias. "Several of our neighbors have become friends. We share a lot: the garden, the roof terrace, tools and appliances, even cars! Mutual cooperation really means something to us."

- Beautiful collective housing Pankow is the one-time residential district of the leaders of the former East Germany. Berlin city center 12 minutes away by public transport.
- A prototype building Five residential floors, a 6th-floor terrace and communal gardens. 100- to 200-m² apartments, all with customized layouts.
- Eco-friendly materials
 - Facade: innovative combination of wood and fiber cement sidings, prefabricated in the workshop and assembled on site (one floor built in two weeks)
 - Triple glazing
 - Biomass heating with wood pellets
 - 100% environmentally friendly electricity supplied by BS Energy (Veolia subsidiary)

Find out more
Institute of urban wood construction
www.ifuh.org

EXPLAINER

NACRE: an eco-friendly shipping solution

Last July, the French government launched 34 "industrial renewal" initiatives to develop its industrial sectors and its most promising innovations. These include environmentally friendly ships, which must comply - among other directives - with the Marpol Annex VI regulations for reducing air pollution, applicable from January 1, 2015.

The NACRE (Navire Conduit dans le Respect de l'Environnement - environmentally friendly ship) project, which began in 2009 and was completed in 2013, falls under this government initiative. Its aim: to identify and test integrated, effective and profitable solutions for managing emissions and waste on board ships. Developed within the Atlantic Brittany Marine competitiveness cluster, which approved the project, Nacre is an R&D consortium bringing together industrial groups such as DCNS, Bertin Technologies and Veolia, clients and shipowners such as the French Navy, Genavir and Louis Dreyfus Armateurs, and institutions and research laboratories like IFREMER, EME Vocational Environmental Studies College, ENSTA Bretagne, the National Merchant Navy College and the Institut Pasteur in Lille.

The first stage of the project consisted in defining the impact of the four main waste flows that can be found on a ship: solid, gas, fermentable waste, and black and grey water. A sampling campaign was thus conducted on some fifteen civilian and military ships, followed by quantification of emissions to determine the most harmful to the environment. Once the effluent analyses were completed, a technical evaluation was carried out in view of each partner's expertise and the state of the art. In the field of gas emissions, a number of Veolia's (VERI) multidisciplinary research teams have been involved in characterization campaigns on the gases to be treated, conducted on several types of ships, along with the creation of innovative solutions, the first of which is the No-NOx/SOy process. ■

4

ECOLOGICAL FOOTPRINTS FOR A SHIP

- Non-biodegradable solid waste (DCNS)
- Gas emissions / NOx – nitrogen oxides; SOx – sulfur oxides (Veolia -VERI)
- Fermentable waste (ENSTA Bretagne school of engineering)
- Grey and black water (Bertin Technologies)

1 Non-biodegradable solid waste

Issue at stake

Ban on disposing solid waste, such as plastics, at sea, especially in ECA¹ zones (Emission Control Areas).

Solution

Development of a shredder-pasteurizer that reduces the volume of solid waste by 80% and its weight by 15 to 20%.

Advantages

- No need to use a cold storage room for waste: lower economic impact with regard to ship building and maintenance, lower environmental impact.
- Makes waste inert through pasteurization and simplifies its storage.

Opportunity

The shredder-pasteurizer is sold and installed on board two Italian frigates.

1- To date, ECAs are not the same for each type of pollutant.

- Baltic Sea (for SOx, since 2005)
- North Sea (for SOx, since 2005/2006)
- North America, including most of the United States and Canadian coastlines (for NOx and SOx, since 2010/2012).
- The Caribbean, including Puerto Rico and the U.S. Virgin Islands (for NOx and SOx since 2011/2014).

Source: International Maritime Organization

3 Fermentable waste

Issue at stake

Disposal of (even shredded) waste at sea is no longer permitted (Marpol VI).

Solution

Creation of a prototype for a crew of 100 to 200 that can operate in two modes: stabilization and stabilization/neutralization of fermentable waste. It is also possible to carry out surface sterilization.

The system may be adapted to land, for example in coastal waste treatment plants.

Advantage

Leaktight containment of waste in thermosealed bags, combined with

controlled fermentation, without recourse to a cold room.

Opportunities

On certain seismic research vessels, which are obliged to remain at sea for several months, in areas where the usual treatment of such waste (incineration) is not a possibility.

On passenger ships operating in special areas in which emissions are prohibited, such as the Arctic, Antarctic, etc.

On drilling platforms concentrated in specific areas.

2 Gas emissions

Issues at stake

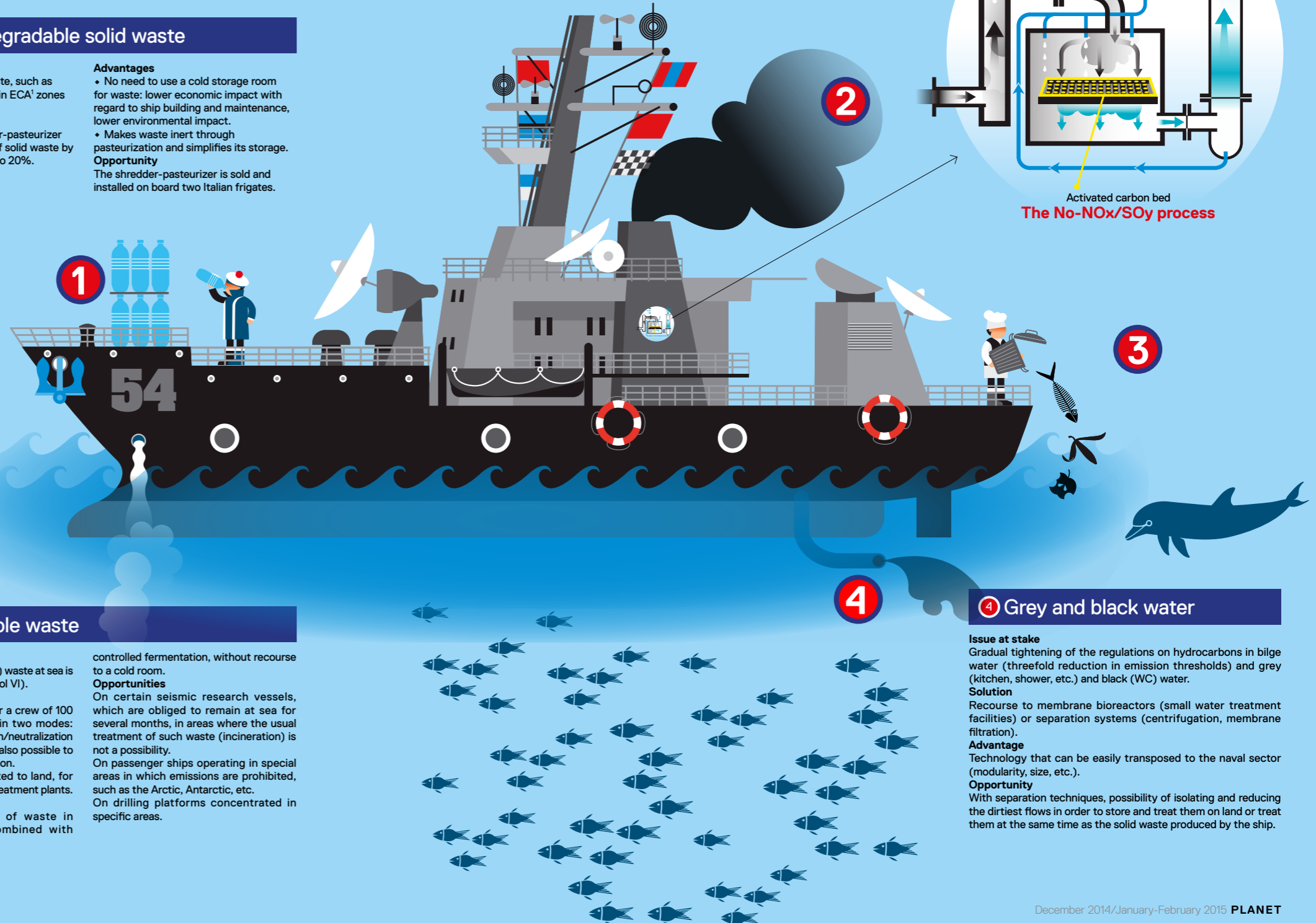
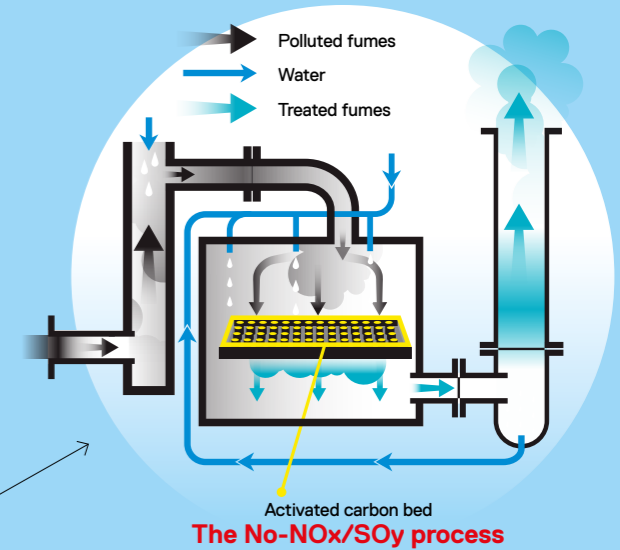
- For NOx, obligation in 2016, at an engine speed of 500 rpm, to reduce emissions to 2.6 g/kWh in ECA¹ (OECD countries).
- For SOx, obligation in 2020 not to exceed 0.5% sulfur content in fuel oil. In the so-called ECA¹ zones, the requirements are even stricter: 0.10% in 2016.

Advantages

- No drop in carbon adsorption efficiency over time.
- Continuous wetting of the carbon by an inexhaustible resource. No on-board reagent.
- Simultaneous treatment of NOx and SOx.

Opportunities

Possible application in other fields of activity such as cogeneration or treating incineration fumes. No-NOx/SOy has been evaluated within the Group for use for an application in cogeneration engines.



Futurist

Measuring atmospheric pollution in urban areas
Eve, the app that breathes



50/51

Analysis of air pollution is now a dimension that is well covered in public policy. However, although the subject is effectively dealt with nationally, local authorities lacked a simple and accessible way to measure ambient air quality in their area. As a sentinel of urban pollution, the Eve application offers to

perform this analysis for neighborhoods, i.e. close to residents and their concerns. Designed by m2ocity (the first telecom operator devoted to communicating objects and a subsidiary of Veolia and Orange), Eve is presented as an "environmental monitoring" solution based on sensors

installed around a city and connected to a web interface by a wireless network architecture. "Thus equipped, a local authority receives reports on the areas it has chosen to target and can, if necessary, decide to act on traffic or make recommendations for pedestrian traffic," explains Camille Loth,

m2ocity Product Manager. Eve not only has the merit of providing accurate information (daily, monthly or yearly, via an expert portal), it is also able to communicate the results in the form of synthetic indicators that can be integrated into municipal websites or mobile applications like Urban Pulse.

Since the service was launched in 2013, several French cities, such as Nice and Montpellier, have expressed their satisfaction with this local civic-minded application, which is a new lever for raising residents' awareness of the quality of the air they breathe.

Greenbee®, a resourceful sensor
The compact, wireless, and easy-to-install communicating sensor fitted in the Eve solution (Azimut Monitoring design) is powered by a

photovoltaic cell making it energy-independent. Currently used to analyze pollution emitted by vehicles, Greenbee® provides information on ozone (O3) and nitrogen oxide (NOx) levels and

will be able to monitor other chemical particles from 2015. Coupled with m2ocity's Adam application, the sensor is also able to measure ambient noise levels.

Event

JANUARY 28-30, 2015, TOKYO, JAPAN

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