

PLANET

#july 2015



Forum

How do you generate innovation?

Frontline

United States, France...
Better solutions,
better future

Gallery

Solar Impulse,
Bright spark

Explainer

VIA, innovation
accelerator

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An e-source of hot water



Antoine Frérot
Chairman and CEO
of Veolia

April 13th World Water Forum

in Korea. What should the response be to increasing water stress that, according to the United Nations, could affect two thirds of the world's population by 2025? This was one of the major topics of this Forum held in Seoul and Daegu. In a context of increasingly scarce fresh water resources, only innovation allows us to do more with less. Yes, there are alternatives to increasing withdrawals from rivers and aquifers. Solutions include combating water loss in public and private networks, water savings, recycling wastewater, and refilling the groundwater table by infiltration or injection, to name just a few. Every time we invent or perfect cutting-edge technologies or solutions with our customers, like in Rialto, California and for Thames Water in the UK, we encourage them to be shared more rapidly. Whenever political will, good governance and top-level expertise combine, water shortages are not a foregone conclusion. It's up to all of us to continue to work together to develop solutions.

April 22 In Paris, Veolia's annual shareholder's meeting.

To my mind, this meeting is essential. It is an opportunity to give a report to all the Group's shareholders about the year's work and the way in which we meet the needs of our customers, and through them, the major challenges of the modern age: accelerated urbanization, the increasing scarcity of natural resources, the growing needs of the global population, the degradation of the environment, etc. It is also the place where fundamental decisions are made in terms of governance, including recent changes to Veolia's board of directors highlighted by the proportion of women on our board now reaching a third. What's more, our board now welcomes two employees, a Frenchman and a Czech, the latter's presence making Veolia one of the few CAC 40 organizations to enjoy the support of a foreign executive director. Veolia therefore

THE POST

joins a small circle of companies heading toward parity, keen to grant staff a genuine right to expression and participation in strategic decisions. It is good for our main governing body - the board of directors - to reflect the rich diversity of Veolia's stakeholders as much as possible, especially given their contributions to the company's success.

May 21 At UNESCO headquarters, the Business & Climate Summit.

Mankind is able to create a low-carbon economy. Not only is it able, but it must in order to stabilize the 2°C temperature rise and prevent irreversible climate imbalances. Veolia deploys many solutions for municipal and industrial customers - recovering unavoidable energy, energy from organic waste, using forest biomass, producing secondary raw materials from waste (which emits much less CO₂ than the incessant extraction of new raw materials from nature), and reinforcing energy efficiency. In my view, we must urgently reduce methane emissions, which over the past 20 years have accounted for 40% of the total greenhouse gas emissions, i.e. as much as carbon dioxide itself! This priority is due to both pragmatism (it is easier and less expensive to capture methane than CO₂) and the extent of its pollution in our atmosphere. However, none of the many solutions that have proven their effectiveness in reducing greenhouse gas emissions can be implemented on a widespread basis without a solid and stable carbon price being established at a sufficiently high level of around €30-40 per metric ton of CO₂, so that polluting the atmosphere finally costs more than cleaning it up! Without a financial incentive, we will never win the climate battle; with one, we can still be victorious.

CONTRIBUTORS



Editor-in-chief Scott Edwards

Senior Vice President Communications
Veolia North America

From the early human discovery of fire to a new "flying machine" powered strictly by the sun (and featured in this issue), human innovation continues to propel us forward. Thomas Edison, that great inventor of so many things - the phonograph, incandescent lightbulb and motion pictures, to name a few - said he would find out what the world needed and try to invent it. In this age of ideas, information, technology and public-private cooperation, this process is happening somewhere on our planet every second of every day.

It's indeed heart-pounding to think how far and how fast technology and human innovation are moving. As the environmental industry increasingly intersects with innovation, we'll see even bolder ideas ahead. Who will be the environment's Da Vinci, Marie Curie or Mark Zuckerberg? Or will it be teams of people - many Da Vinci's working in collaboration? What will they bring us?

Whatever the future, I'll not be surprised if my global colleagues and our clients are quietly behind key ideas that make the world a better, more livable place. Happy reading and innovating.

Also in this issue

Emily Reichert Founder and CEO of Greentown Labs, Boston

Deeply committed to innovation, Emily founded the largest clean-tech incubator in the United States in 2011. An MIT graduate, she has held a variety of posts in the fields of R&D, business development and operations. As Director of Business Operations at the Warner Babcock Institute for Green Chemistry from 2008 to 2011, she helped transform this start-up into a sustainable R&D company by reducing the impact of chemical products on the environment.



Francis Demange Photojournalist

This initially self-taught photographer very soon turned to photojournalism, joining the Gamma agency in 1992. His work is constantly evolving and reflects a transition from pure news to magazine contributions, in which Francis devotes all his talents to exceptional subjects. From the collapse of the Soviet Union to tsunamis, aerospace to the depths of the jungle, hospital-acquired infections to human and scientific adventures, people are always the focus of his lens. People as a reflection of their environment.



April Kelly Director of the OpX program, New York City's Department of Environmental Protection (DEP)

With some ten years' experience in the water and wastewater sector, notably at the Water and Sewer Commission in Springfield, Massachusetts, April is today responsible for implementing operational excellence in New York's DEP. Holding a BA in Environmental Planning and Geography from the University of Maine and an MS in Geosciences from the University of Massachusetts, she has made the continuous improvement of water and wastewater operations the guiding thread of her career.



event

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[HTTP://WWW.UN.ORG/FR/MILLENNIUMGOALS/BEYOND2015](http://www.un.org/fr/millenniumgoals/beyond2015)

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CURRENTS



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You broke it, who pays?

Will the owner of the Pacific Ocean please step forward? Although the importance of ecosystems and biodiversity to human existence is almost universally recognized, the question of how damaged ecosystems can be restored - and by whom - is far from answered. Determining responsibility, fostering cooperative remedies, summoning political will...all were among the aspects explored at an international conference at the National Academy of Sciences in Washington, cosponsored by the Veolia Institute. Examples such as the U.S.-Mexico Transborder Restoration partnership or mangrove rehabilitation in Indonesia demonstrate innovative approaches to achieving sustainability.



Sounding the alarm on water quality

As many as 1 in 3 people may be exposed to a high water pollution risk by 2050 according to a white paper published by the International Food Policy Research Institute and Veolia titled "The murky future of global water quality." The unprecedented global study projects the impact of continued nitrogen and phosphorus loading into the world's water bodies based on different economic and climate change scenarios. The study found the world on a path toward rapidly deteriorating water quality levels even under the most optimistic assumptions. The greatest impacts on human health, economic development and ecosystems will be in lower income countries where pollution levels are already alarmingly high. The study calls for increased international cooperation on sustainable urban, industrial and agricultural solutions to address the looming crisis.



Message to cities

Cities need to make major investments and enact more efficient pricing and taxation systems to finance the modernization of their water systems and meet current and future resource challenges. That's the message delivered by the OECD in its report, "Water and cities: ensuring sustainable futures," released during the 7th World Water Forum. The report says local conditions should be taken into account when implementing disruptive technologies and solutions.



Over three billion web surfers!

The number of web users surpassed the three billion mark as of the end of last year according to Internet World Stats. The figure of 3,035,749,340 users represents 42.3% of the world population and a rate of growth of 741% between 2000 and 2014. The region with the largest portion of total users is Asia with 45.7%. Its 2000-2014 growth rate of 1,112.7%, however, lags behind the Middle East's 3,303.8% and Africa's 6,498.6%.

Nepal: rapid response by Veolia

Within 48 hours of the first of Nepal's deadly earthquakes, an emergency response team formed jointly by the NGOs Solidarités International and Médecins du Monde was on its way to Kathmandu in an airplane chartered by the French Foreign Ministry's emergency unit. The next day, a cargo of 3.15 metric tons of equipment followed. This included water treatment equipment provided by the Veolia Foundation - an Aquaforce 500 unit capable of supplying 15l of drinking water per person per day to a population of between 500 and 2,000 - and its storage. The aim is to supply the mobile health centers in the Sindhupalchowk district and north-west Kathmandu, where the epicenter of the earthquake occurred. "Water is the first priority, even before food," says Solidarités International logistics specialist Christopher Chamagne.

Telex

e-waste: a \$52 billion opportunity A record amount of 41.8 million metric tons of electrical and electronic equipment (EEE*) or "e-waste" was discarded worldwide in 2014, according to a report by the United Nations University. The UN think tank said that less than one-sixth of the material appears to have been properly recycled. The report estimated the value of discarded e-waste at \$52 billion while warning against the health effects of toxins present, including lead, mercury, cadmium, chromium and CFCs. *EEE — essentially, any device with a battery or an electric cord

Liquid asset: Oceans valued at \$24 trillion The world's oceans generate \$2.5 trillion in goods and services annually says a new report by WWF, Boston Consulting Group and the Global Change Institute, enough to rank as the 7th-largest economy globally. In "Reviving the Ocean Economy," the total value of the oceans is estimated at \$24 trillion, based on direct resource outputs such as fisheries, trade and transport. The figure is conservative as it omits difficult-to-measure contributors like wind energy. "More sustainable management and investment are urgently needed to protect the valuable planetary asset from man-made and natural threats," say the authors.

CURRENTS



Sorting it out

In the Czech Republic, Veolia has implemented a new environmentally responsible approach for treating obsolete electronics and electrical equipment. The company recently partnered with non-profit association Trianon, which sorts and recycles the material. In addition to protecting the environment, the solution creates jobs for people with disabilities and helps reduce the region's high rate of unemployment.



Frugal innovation: doing better with less

The eco-friendly Renault Logan sedan, originally launched as a low-cost offer in emerging markets, was such a huge hit with consumers, it led to the new Dacia line of entry-level vehicles that have become Western Europe's fastest growing brand. It's one of the best-known examples of the disruptive growth strategy known as "frugal innovation," combining reduced use of scarce resources with higher value, better quality, more affordable products. Other examples: Unilever's sustainability actions to reduce energy consumption and eliminate waste generation at its 500 plants worldwide, retailer Auchan's crowdsourcing of product development ideas from customers, and Accor's Planet21 strategy of implementing sustainable hospitality at its hotels worldwide.

Plastic is drastic

More than 200 kg of plastic waste are dumped into the world's oceans and seas. Not per day. Not per hour. Per second. At the crossroads of geographic, socio-economic and cultural zones, the Mediterranean Basin offers a concentrated view of the global threat. Stakeholders from 10 Mediterranean nations met in March to identify practical, sustained actions to reduce plastic waste streams entering and impacting the sea's marine environment. The Veolia Foundation was a conference sponsor. Source: UNEP



Forget me(thane) not

As the world's nations prepare to gather in Paris at year-end to consider solutions to limit greenhouse gas emissions*, an increasing number of voices want to make sure that an often overlooked, but still damaging greenhouse gas isn't forgotten: methane. The primary component of natural gas, while shorter-lived, can be initially far more devastating to the climate than CO₂ because of how effectively it absorbs heat and warms the atmosphere. The Veolia Institute is helping to organize a November pre-conference to call attention to measures to control methane emissions from sources such as agriculture, oil and gas and landfills.

*COP21 will be held Nov. 30 - Dec. 11

That innovative VIBE

Innovative ideas that can positively impact Veolia's efficiency, productivity, quality and competitiveness were in the spotlight for the company's "VIBE 2015" challenge. Selected from among 41 Veolia projects worldwide, the winners were: ENVIOS - reducing use of chemical reagents in wastewater treatment plants, from Hydrex in North America; THaMAPAS - recovering energy and nutrients in wastewater treatment plants, from Veolia Germany; WemSys, an IT platform for collecting, integrating, analyzing and visualizing water and energy usage data, from North America. Three winners were awarded innovation investment funds to develop and commercialize their projects within Veolia.

Telex

The largest independent biomass power plant in Ireland (County Mayo), owned by Mayo Renewable Power, will be operated by Veolia for a 15-year period as part of a €450-million contract.

A major player in fertilizer production in China, the firm LiuGuo Chemical has chosen Veolia to modernize its industrial effluent treatment facilities in the province of Anhui. The new €60-million contract follows a previous €30-million contract awarded in 2012 for operating wastewater treatment facilities for a 20-year period.



"Innovation distinguishes between a leader and a follower."

Steve Jobs (1955-2011)
("The Innovation Secrets of Steve Jobs," 2001)





Big splash

Veolia has been awarded an eight-year contract to manage drinking water for more than 1 million people in 62 municipalities of the Lille metropolitan area. Veolia's proposal emphasizes smart solutions to ensure water quality and reduce network leaks as well as providing for graduated residential pricing, workforce integration opportunities and support for accelerated development of innovative projects. The €450-million water contract is one of the biggest ever in France.



Social enterprise incubator

Good relationships with local communities, participation in the economic and social development of regions, operations based on long-term contracts, a public service mission: Veolia's areas of expertise represent a fertile ground for innovation, especially in the field of the circular economy. This is further enriched by close partnerships established with social players on the ground, such as Élise (a paper collection and recycling social integration enterprise) or PIMMS (Multi-Service Mediation & Information Points) in France, and Grameen Veolia Water in Bangladesh. Having decided to structure and boost the visibility and reproducibility of this approach, Veolia launched a social entrepreneurship incubator process late last year. The idea? To offer a platform where social partners come to coach young start-ups with a budding idea or an emerging business. On the program: entrepreneurship training, connection to the industrial and financial ecosystem, market targeting, creation of an economic model, etc. The first social start-ups will be chosen beginning in September 2015, following requests for proposals launched initially in Mexico (Mexico City) and France (Lyon). Through its subsidiary Innove, Veolia sees itself as a catalyst and facilitator, with the key intention of making its areas of expertise available to start-ups. It is backed by solid partners, including social entrepreneurship specialists such as Ashoka, the leading global network of social entrepreneurs, and the French management school ESSEC's Institute for Innovation and Social Entrepreneurship (IIES), along with local authorities firmly committed to social and economic development.

Big results in The Big Easy

Perfect environmental compliance, \$35 million in savings and new partnerships with local economically disadvantaged companies helped Veolia win a 10-year, \$122-million agreement to continue managing New Orleans' two wastewater treatment plants. Veolia has been delivering services in "The Big Easy" since 1992 and delivered an all-out response to support the city in the wake of Hurricane Katrina. Most recently, the company has been working with Tulane University to convert degraded urban wetlands into a cypress forest.



Telex

As part of its ambitious modernization program, the government of Guinea-Conakry is looking to develop, improve and reinforce the capacities and quality of the country's energy infrastructures. In this context, Veolia has won a four-year performance contract worth €11.3 million to provide energy management services to Électricité de Guinée (EDG).



Trusted expert

Korea Hydro & Nuclear Power Co has awarded a three-year contract to Veolia to supply water and provide wastewater treatment services at Kori Division, South Korea's largest nuclear power plant. The eight-reactor facility supplies more than a third of the country's nuclear capacity, enough to meet the electricity needs of eight million people. The contract reflects recognition of Veolia's water treatment and safety expertise at nuclear plants, demonstrated through the company's significant contracts in France and Japan.

TOP 10 MOST INNOVATIVE COUNTRIES IN THE WORLD

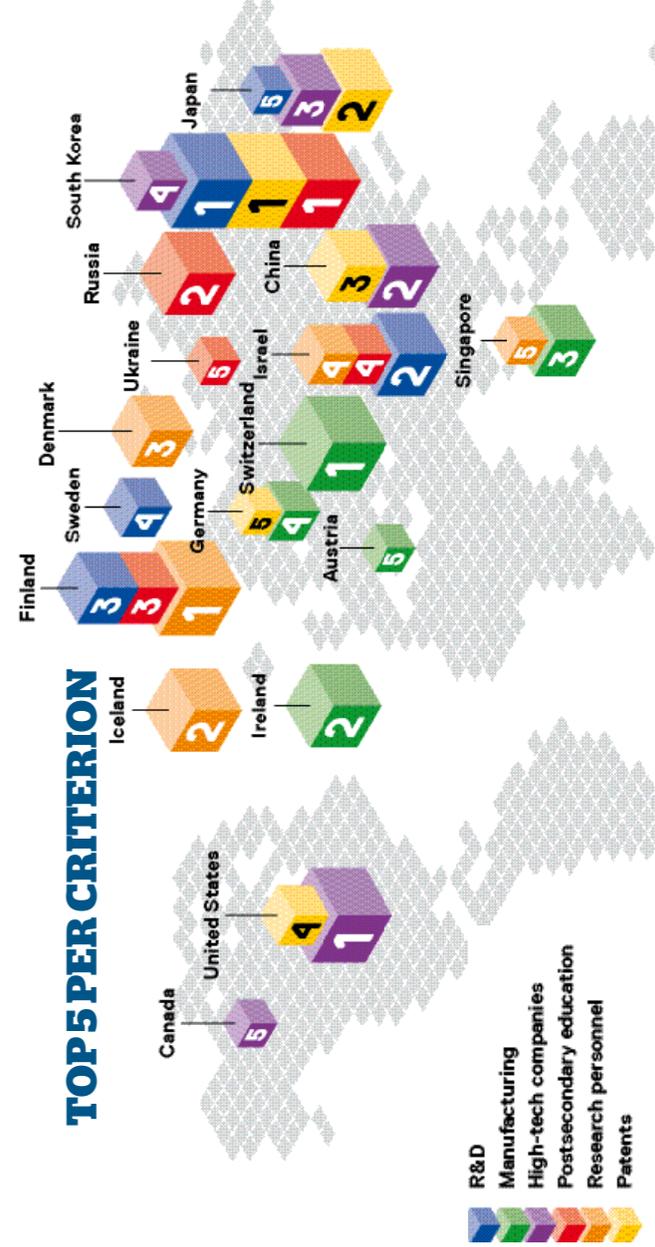


Bloomberg 2015 With the publication of its ranking of the most innovative countries in the world every year since 2007, Bloomberg has identified a global formula for innovation that companies and governments will be able to reproduce. Based on the innovation quotient of over 200 regions and sovereign states, Bloomberg's Top 10 list is featured opposite. South Korea heads the list while the United States drops to sixth place (it was first in 2013). In the Top 50, China arrives in 22nd position. However, the assessment has ignored an important but hard-to-quantify item of data: government regulations, which can accelerate or hinder the adoption of new ideas. A new challenge to be met!

Methodology

The ranking is based on each country's innovative capacity. It was obtained on the basis of six parameters: R&D expenditure as a % of GDP • manufacturing value-added per capita • number of high-tech companies • % of secondary graduates in higher education • professionals in research per 1 million population • number of patents filed per 1 million population and per \$1M devoted to R&D.

TOP 5 PER CRITERION



e-Bloomberg data filed from the World Intellectual Property Organization, United States Patent and Trademark Office, the World Intellectual Property Organization, and UNESCO. bloomberg.com/ics/2015-innovative-countries

How do you generate innovation?

Emily Reichert and Laurent Auguste share their views.

In a society of knowledge in which the number of patents filed is a measure of future wealth, the currency of companies lies in their ability to generate innovation. Not only in terms of technology, but also from an organizational and managerial point of view. We take a closer look.

12/13



Emily Reichert
CEO of Greentown Labs

An MIT graduate and a 2014 winner of the “Women to Watch” award (Boston Business Journal), in 2011 she founded what she calls “the largest cleantech incubator in the United States” in Cambridge, MA. Now located in Somerville, Greentown Labs has grown to host 46 enterprises, with the equivalent of 170 full-time posts and 95 interns.



Laurent Auguste
Veolia Executive Vice President,
Innovation & Markets

A graduate of the Ecole Centrale de Lyon engineering school, he began his career with Veolia as an area manager in Béthune (France), and opened an office in Shanghai, before overseeing the North America business. At the head of the Innovation and Markets division since 2013, his role is to develop the Group’s marketing and steer R&D to accelerate the development of Veolia’s activities and business models.

In your view and taking into account your experience, what is your definition of innovation?

Emily Reichert / Innovation creates a solution that does not exist. It requires a completely new way of looking at the problem. An innovator moves beyond the traditional status quo and today’s perceived boundaries; he/she sees a solution that we haven’t imagined yet. At Greentown Labs, I see entrepreneurs going into the unknown, pioneering approaches to address the world’s most significant energy and environmental challenges. Altaeros Energies is a start-up in our labs developing high altitude wind turbines - turbines encased in helium balloons that float 1 km above the earth’s surface - to provide reliable and inexpensive power to island nations and remote locations that currently rely entirely on diesel fuel.

Laurent Auguste / Innovation is above all about making possible something that seemed impossible. Starting with the needs on the ground, it’s about discovering solutions that will allow you to overcome or get round obstacles. In the world in which we live, these obstacles are, for example, the challenge of population growth and the decline in natural resources. Innovation is essential in fulfilling our mission of “resourcing the world.”

What do we mean when we say something is innovative or that a company or individual is innovative?

E. R. / The entrepreneurs I see around me every day at Greentown Labs embody innovation - they embody a near child-like curiosity and do not see or accept boundaries. Rather they borrow ideas and adapt them from other fields. Innovative companies re-invent themselves constantly, which is a very hard thing to do, since they are disrupting a current product or service and risk complete failure. As companies grow from start-ups to mature organizations, it becomes important to preserve some of the start-up mentality, the risk-taking that occurs when founders are starting out and have little to lose.

“Openness is key to innovation. From an infrastructure perspective, this means openness of physical space to encourage and maximize advantageous collisions.”

Emily Reichert

“Innovation is above all about making possible something that seemed impossible”

Laurent Auguste

L. A. / For a company, it means being completely open to the world, having a free spirit. It also means being driven by a passion, an energy, a long-term determination to find new solutions for the world. You must also accept mistakes and failures, because they are part of the discovery process. However, innovation doesn’t stop at coming up with good ideas. To innovate, it is not enough to have the best technologies. Through industrialization and distribution know-how, you must be able to transform them into tangible accomplishments that work and have an impact. A great deal of the innovation that counts is found in the smart use of technologies along with the ability to cause change. Innovative Internet companies’ success was very much based on the possibilities offered by the technological leaps achieved. In Veolia’s sectors of activity, we must also be attentive to paradigm shifts in behavior and business models – such as the service economy, which champions a different use of resources.

What are the right ingredients for innovation?

E. R. / Openness is key to innovation. From an infrastructure perspective, this means openness of physical space to encourage and maximize advantageous “collisions.” From a cultural perspective, it means openness in the work environment to encourage collaboration and new ideas. Finally, an openness to the possibility of failure must be part of the mix as well.

L. A. / To find new ideas and new ways of doing things, you must first of all have a certain humility to try to see the changing world. You must then be willing to move away from a silo mentality and break free from the technical or structural constraints in which we are often trapped. New areas of innovation and the highest potential are found in the interface between environments (industry, cities, organizations, etc.) and sectors of activity. We have to try them out in order to bring them to light. This is why at Veolia we initially encourage extremely well-defined projects restricted to a small scope, where they can be tested up against the reality on the ground before being validated and rolled out on a wider scale. ●●●

••• **Innovation is traditionally viewed as the major engine for growth. In spite of the numerous Silicon Valley success stories, some experts like Peter Thiel or Max Levchin, co-founders of PayPal, think innovation in the world today is actually “between dire straits and dead.” What do you think of this provocative assertion?**

E. R. / What concerns me most is the lack of focus on the big problems of our day, where innovation is needed most critically. We need to incentivize our best and brightest science, engineering, and business graduates to take this tougher, but more rewarding path. At Greentown Labs, we have created a supportive, collaborative environment to enable like-minded, passionate entrepreneurs to innovate on a scale that truly has a global impact. One of our member companies, Promethean Power Systems, is a start-up that created the world’s first milk chilling system for reliable use in intermittent power situations, such as in rural villages in India. This system is now installed in nearly 100 Indian villages, enabling farmers to decrease harmful bacteria and increase milk sales. It is just one of many examples of what can be achieved.

L. A. / I agree with Emily that we need to focus on the big problems and big opportunities. And I’m glad Thiel and Levchin argued their point. Our world often needs a wake-up call and I think that was their goal... to issue a challenge, to get people to stop and think.

Why are innovation efforts sometimes sluggish or ineffective? (What stops them and why?)

E. R. / At Greentown Labs, we work with many large corporations seeking to become involved with open innovation and learn from the culture created by our start-up community. Resistance to change, lack of openness, and an inability to take risks are key barriers to innovation that we encounter. While there is currently a trend toward open innovation at the C-level, the not-invented-here mentality continues to be a challenge on the frontlines. In my career, I have worked with many large companies in which new ideas were routinely shot down because they were “tried 20 years ago.” Other issues

include not having the right infrastructure in place to support, nurture, and test new ideas; often incentives and rewards are tied to existing products or services.

L. A. / The most complicated thing in terms of innovation is managing the emergence of ideas phases, in which you are sowing so to speak, and the harvest phases, which require you to choose between projects. At Veolia, which has a decentralized organization in touch with local realities, we must do all we can to bring the best practices and the best ideas to light, both internally and externally. This spirit of openness governs our Open Innovation program, the Veolia Innovation Accelerator (see page 48). Likewise, we have launched - initially in Lyon and Mexico - social enterprise incubators that, we hope, will spread worldwide, using the unique network represented by Veolia as a springboard. We are taking a long-term view, adopting a consistent, persevering approach.

What is the importance of management, leadership and strategy in innovative processes?

E. R. / I don’t believe innovation can be managed; by nature, creating a process and deliverables necessarily sets boundaries on what is possible. Leadership that creates innovation allows the space and time for it to occur; it requires getting out of the way and enabling risk-taking to happen. And being accepting, as a leader, of a certain amount of failure, is essential. I believe leadership in innovation should define desired outcomes and enable employees to get there with support and guidance.

Innovation is also a “human resource question” and a question of motivation. What kind of incentives can be put in place in order to retain the most productive researchers / innovators?

L. A. / Of course, there must be incentives for innovators, but to my mind an inventor’s greatest satisfaction comes from the pleasure of seeing their ideas transformed into a tangible reality. What could be better than seeing one of your ideas coming to the fore and making a significant impact? •••

“Resistance to change, lack of openness, and an inability to take risks are key barriers to innovation that we encounter.”

Emily Reichert

“I really believe in the power of interactions between different environments and areas of activity outside the traditional boundaries.”

Laurent Auguste



... **E. R.** / Generally, the most productive innovators need the space, support and flexibility in their work environment to innovate. Among other things, this means being able to: offer opportunities to interact with other innovators in an unconstrained way; compensate employees for the risks they take, in addition to the milestones they hit; create an environment where failure is acceptable, and is expected as an outcome; place employees in alternative environments to the cubicle, such as within start-up incubators, as a reward or incentive for out-of-the-box thinking; offer "Google time" a specific carve-out of time to work on new ideas without punishment or pushback.

What do you think will be the biggest innovation in the next 10, or even 50 years?

E. R. / Our relationship with energy is going to change over the next 50 years. We are already moving toward a much better understanding of energy use in our homes and businesses, and today energy efficiency is the low-hanging fruit. I truly feel the biggest, most impactful innovations of the future will be how we create, distribute, use, and store energy. It is an exciting field to be working in, with nearly limitless opportunities for both incremental and truly disruptive innovation. At Greentown Labs, we are building a global innovation center to be an active part of creating this future and defining the conversation.

L. A. / I really believe in the power of interactions between different environments and areas of activity outside the traditional boundaries. There are vast resources to be found in these in-between spaces and emerging areas. In this respect, there are obvious interactions between the water, energy and raw materials sectors. This perspective sheds light on Veolia's reorganization with a view to moving beyond each of its traditional business areas through cross-sector interaction. ■



An incubator dedicated to energy

> Greentown Labs is an incubator which enables entrepreneurs to solve the big energy problem that the world is facing due to these two challenges: a growing global population and the scarcity of resources required to meet this expanding demand. "New ways of producing and consuming energy are necessary to address this problem while minimizing further damage to our environment," says Emily Reichert, CEO of Greentown Labs. "We believe entrepreneurs are capable of innovating and inventing solutions to address this challenge with access to the right tools, resources, networks and support." Located in Somerville, MA, just 3.5 miles from downtown Boston, Greentown Labs offers 33,000 sq. ft. of prototyping lab and co-located office space, a shared machine shop and electronics shop, immersion in a growing community of energy and clean technology entrepreneurs, and on-site events and programs designed to enable start-ups to rapidly grow their networks and their companies.



AUGUST 23-28, STOCKHOLM (SWEDEN)

WORLD WATER WEEK

WATER FOR DEVELOPMENT!

THIS IS THE THEME OF THE 2015 CONFERENCE DEDICATED TO SUSTAINABLE DEVELOPMENT GOALS. THIS ANNUAL EVENT OFFERS A CHANCE TO DISCUSS AND DEBATE TECHNICAL, POLITICAL AND SCIENTIFIC QUESTIONS LINKED TO MANAGING THE RESOURCE.



[HTTP://WWW.WORLDWATERWEEK.ORG/](http://www.worldwaterweek.org/)

For Valentine, learning the job involves a keen sense of openness to others. Her appetite for a challenge and zeal for seizing opportunities make her a bankable asset in the budding “collaborative generation.”

Above and beyond

Meeting Veolia employees from all over the world.

Valentine Motosso

Development Operations Officer
Société d'Énergie et d'Eau du
Gabon (SEEG)
Libreville, Gabon

Openness, organization and versatility: these are qualities that Valentine, who is part of the Pangeo program, knows how to make good use of. Recruited in May 2014 by SEEG to assist in the development of this Veolia subsidiary, our 26-year-old engineer unhesitatingly dove into her first assignment: creating partnerships with energy producers. The aim is to diversify the sources of electricity production using Gabon's own resources. The country offers a high potential for alternative energy such as biomass and hydropower, which matches Valentine's keen interest in smart energy management solutions. She immediately backed a local project to generate electricity using surplus industrial production – stearin – that is now in the development stage. Valentine's manager very quickly spotted this flair for establishing and promoting contacts: “Valentine is particularly motivated to support projects,” confirms Jean-Paul Camus, SEEG's Managing Director. She would soon use her listening and interpersonal skills in a new field: communication. Shortly after her arrival, she was entrusted with structuring and monitoring an internal “Performance plan,” the fruit of thirty-six initiatives by the company's staff. “It's up to me to group together and present a wide variety of often technical projects in accessible language,” she points out. Thorough and dynamic, Valentine is bringing a fresh perspective to the company. And a few months later... she was also appointed Safety correspondent for Gabon. A third responsibility that today makes her the contact person for Veolia's Safety Division. This includes protecting SEEG's agents and sites by supporting the implementation of basic precautions. “Discovering Veolia's sectors of activity from a different angle makes me realize, through their commitment, just how essential it is to protect energy and water resources,” she states, delighted to be able to combine learning and pleasure, as she had promised herself at the beginning of her stay in Gabon. She has kept her word. ■



PANGEO was created as a way of recruiting young talents, developing their skills within one of our subsidiaries abroad before finally integrating them into our Group upon completion of their assignment.
www.pangeo.veolia.com



New York

If we can make it there...



Facilitating change at one of the world's largest water utilities

Through its innovative Peer Performance Solutions model (performance-based and project management assistance contract), Veolia is partnering with cities across North America to improve services, reduce costs and promote change management. Nowhere are the challenges - and demonstrated rewards - more outsized than in The Big Apple.



Issue at stake

> New York City is looking to optimize the performance of its water and wastewater services, improve productivity and reduce costs.

Objective

> Help the City's Department of Environmental Protection (DEP) meet its goal to become the "safest, most efficient, cost-effective, resilient and transparent water utility in the nation."

Veolia Solution

> Pioneering performance-based partnership (PPS contract), working side-by-side with DEP employees to identify improvements.
> To date, the PPS contract model has delivered \$98 million in annual recurring cash benefits from identified improvements.

As the City of New York

prepares to enter its fifth century, those responsible for keeping its aging infrastructure running are showing a readiness to experiment through innovative approaches. New York's Department of Environmental Protection (DEP) has pioneered a first-of-its-kind collaborative public-private partnership, joining with

Veolia to launch the "OpX" (Operational Excellence) initiative aimed at improving operations of the city's huge water distribution and wastewater treatment systems. OpX is based on Veolia's "Peer Performance Solutions" (PPS) model, which merges the worlds of consulting with traditional operations and maintenance roles. The client, DEP, retains its workforce, full operational decision-making and responsibility for the utility's performance and compliance. Veolia works as a collaborative peer with DEP, making expert recommendations and sharing accountability for performance improvements - with its pay tied to their successful implementation. Basing most of Veolia's compensation on performance and actual results, what the

company calls "putting skin in the game," limits the community's risk and ensures that savings are quantified and captured. Strong results from the New York OpX program and the win-win character of the novel approach are rapidly attracting attention elsewhere: PPS contracts are already in place in five of North America's 50 largest cities*.

Big questions

Such outside-the-box thinking wasn't universally embraced in New York at the outset, says DEP First Deputy Commissioner Steve Lawitts. "Our frontline people have considerable experience and some were initially skeptical about the need to bring someone in from the outside." The performance-based approach and new role also meant some adjustments for Veolia, according to Gerald FitzGibbon, PE, who leads Veolia's efforts with DEP. "We were confident that we could identify improvement opportunities, but as this was the first PPS partnership of this size and complexity, we needed to learn how to work through the details of implementation with our client. New York was something of a test case for us."

Key figures

- 9 million residents served
- 836,000 water and wastewater ratepayers
- 6,000 DEP employees
- 19 reservoirs and 3 controlled lakes
- 1 billion gallons of high-quality drinking water per day
- 1.2 billion gallons of wastewater treated per day
- \$3.8 billion - DEP annual capital investments and operating budget
- \$17 billion - DEP capital plan FY 2015 through FY 2025

Talk about starting at the top. The city's water and wastewater systems are among the world's largest and most complex. Nearly 7,000 miles of drinking water mains and over 7,500 miles of sewer lines are required to meet the daily needs of nine million inhabitants. New York's drinking water, world-renowned for its quality, is supplied through a network of ...



"Our frontline people have considerable experience and some were initially skeptical about the need to bring someone in from the outside."

Steve Lawitts

Chief Financial Officer, New York City Department of Environmental Protection



In Brooklyn, Newtown Creek is the largest of New York City's 14 wastewater treatment plants.



... reservoirs and lakes that covers 2,000 square miles and stretches 125 miles from the metropolis. Does 1.2 billion gallons of wastewater seem like a lot? That's what the city's 14 municipal WWTPs treat every day. "Here, everything we talk about is in billions," says OpX Director April Kelly, contrasting the city with mid-sized municipalities such as Springfield, Massachusetts, where she worked prior to coming to New York. "There, we provided 30 million gallons of water per day. That's only 1.5 times the amount that passes through the Delaware Aqueduct in one hour," she says, referring to the 85-mile subterranean passage – and world's longest continuous tunnel – that supplies half of New York's water from upstate reservoirs.

Sleeves rolled up

With DEP and Veolia teams working together collaboratively, the OpX program has paid off handsomely. It focused on a broad range of objectives, including efficient use of resources and materials, enhanced workforce effectiveness, improved revenue collection, strengthening DEP's support services and fostering development of a data-driven, metrics-based performance culture. April Kelly credits the Veolia team's approach of working side-by-side with DEP employees to overcoming much of the initial resistance. "Whatever the problem we were facing at a plant, dewatering say, the Veolia person would roll up their sleeves and say to their counterpart, 'Let's go take a look.' It's hard to be defensive when you see that someone is genuinely there to work alongside you to try to find answers, not tell you what to do." She says the OpX theme – "The best can always do better" – recognizes that even

OpX in action

- 87 initiatives in water and wastewater treatment, metering and procurement
- \$98 million: annual recurring cash benefit of identified improvements
- 10.8% targeted annual savings (as % of 2011 budget)
- 15 years: Fiscal 2016 rate increase (2.97%) lowest since 2001

OpX in phases

- The New York City OpX program is a 4.5-year partnership between DEP and Veolia
- Phase 1 (6 months): Nov. 2011 – May 2012
 - Operational analysis across DEP's facilities and back-office
 - Identification of >100 potential savings initiatives
 - Implementation of quick-wins
- Phase 2 (4 years): July 2012 - June 2016
 - Implementation of ~90 initiatives across the entire agency
 - Efficiency savings and revenue generation
 - Performance-based contract between DEP and Veolia

The OpX theme - 'The best can always do better' - recognizes that even those who are excellent at what they do can always learn and improve.

those who are excellent at what they do can always learn and improve. "DEP is a world leader and our teams take justifiable pride in their work. As a global company, Veolia was able to suggest ideas they had seen work somewhere else that we were able to then blend with our teams' local expertise and know-how to produce maximum results."

Enduring results, rave reviews

With one year left in the four-and-a-half-year OpX program, Veolia and DEP have already identified a series of measures that will produce recurring annual operating savings and additional

revenue of more than \$100 million, well in excess of DEP's original expectations. Steve Lawitts says the value of the partners' combined expertise can be seen through initiatives such as the targeted replacement of 26,000 large water meters, which is generating considerable financial benefits for the program. "We had already put together and started to contract for a large meter replacement program but when Veolia came in, they showed us how to do it much more efficiently, targeting meter models that tend to under-record so that we could replace them soonest and maximize revenues." In the program's final year, the focus is on increasing DEP's sustainability, meaning ensuring that it will carry on the things it has done with Veolia once its partner's team has departed. "Through OpX, we have increased accountability and information sharing so that everyone working at a plant can see the performance toward achieving its goals," says Steve Lawitts. "With Veolia's help, we've instituted performance reviews and instilled a consciousness regarding our objectives, how we measure progress and how we adapt if a measure is not performing as planned. These benefits will last far beyond our program with Veolia. To say we've gotten our money's worth from the

arrangement is an understatement." In addition to being reallocated to meet urgent needs, savings from OpX have helped enable DEP to propose three consecutive years of declining water rate increases. Next year's 2.97% increase is the lowest in 15 years, even while major investments go forward to address urgent needs. The OpX results have begun to attract attention from other New York agencies interested in DEP successes such as improved purchasing and strategic sourcing. Utility officials from other cities also have asked DEP for more information on the program. (A recent joint OpX-Veolia industry conference presentation was entitled "The city where meters never sleep.") Perhaps the greatest validation of OpX's success comes from the city itself: in July 2014, the program was up in lights on the Mayor of New York's website, part of an effort to showcase and encourage similar innovative actions by city agencies to achieve savings and improve processes. Start spreading the news. ■

<http://www1.nyc.gov/site/forward/innovations/projects.page>

*New York, Winnipeg, Manitoba; Washington, D.C.; DeKalb County, Georgia; Pittsburgh; Akron, Ohio; Los Angeles.

Chile

Imagine all the people



If a picture is worth a thousand words, how incalculable must be the value of a three-dimensional portrait of an entire city, projected 20 years into the future and visually representing key quality of life indicators?

Want to imagine

life in your city's future based on evolutions in commuter traffic patterns, water consumption and the use of urban green zones? Take a close look (see page 29) at the computer-generated, multi-colored polygonal shapes provided by an innovative 3D digital platform¹ created by a team of French companies². It's purpose? Help officials and city planners improve how they make - and

communicate - urban decisions. The 3D Sustainable City Simulator is a geographic information system constructed with mountains of never-before-collated municipal public and private data that can be used to compare the effects of technology and planning choices on key indicators. Beyond its capacity to model and visualize tomorrow's cities, the true innovation may be its potential to change how



Issue at stake

> Facilitate urban planning decisions.

Objectives

> Improve forecasting and optimize the effects of complex urban planning decisions.
> Help build citizen understanding of consequences and the importance of involvement in choices.

Veolia Solution

> The 3D simulator - "Santiago Des3aDo" - piloted in Santiago, Chile, presents the implications of planning choices, improving decision-making and increasing citizen engagement.



Partners

“The simulator presents the most innovative urban solutions in terms of infrastructure and equipment services, as well as their benefits for improving how a city runs and operates and, more generally, its living environment. It’s also a real showcase for the French sustainable city offering, gleaned from companies throughout the project, based on a call for solutions made on the Internet.”

Éric Lesueur
CEO, 2EI@Veolia

“Global cities now have both a method and an optimized offer to become frugal, efficient and pleasant.”

Laurent Vigneau
Director of the Regional Development and Mobility Department
Artelia

“Santiago Des3aDo is an all-in-one tool combining an overall vision of objectives and targeted geographic or themed actions.”

Antonio Frausto
architect/town planner
Arte Charpentier

“The city of Santiago has chosen to apply the simulator to the project to cover the urban highway that cuts the city in two and creates a social and economic divide.”

Mariano Efron
architect
AS.Architecture-Studio

“Santiago Des3aDo is a real technological feat. We produced millions of 3D data files, then we combined this information for all those involved in the project. We viewed it in real time to showcase a French sustainable city solution.”

Laurent Bouillot
Chairman and CEO of Siradel

••• decisions are made that shape the lives of those who live in them.

Viva mañana

The simulator was unveiled this spring before a diverse assembly of municipal, regional and national officials in Santiago, Chile, where its development has been piloted. The demonstration portrayed the impacts and benefits of different approaches for an actual project proposed by the city: a proposal that would construct a surface across the Pan American highway, which cuts

a channel through and divides the historical city center. The 3D tool enables choices to be viewed in terms of their effect on 11 key indicators³. Under the indicator “urban density,” for example, population placement and construction are represented through map displays that show the current situation as well as how each would change if various technical solutions were implemented. The impacts of installing light rail or bike sharing on Santiago’s mobility or of instituting a waste or water recycling system compare the city’s performance before and after

Key figures

- 120 meetings between French and Chilean teams
- 100 indicators calculated
- 33 km² of buildings in 3D
- 25,000 polygons (3D information units)
- 80 potential solutions integrated

Figures from “Santiago Des3aDo” simulation project

adoption of each option. Also available: benchmarking performance against other comparably sized cities.

Transforming vision

The practical benefits of the interactive planning tool are multi-fold. Santiago’s city officials and planners are now able to clearly chart how different combinations of choices would affect the urban landscape. How would increased greenery in the city center affect water supplies? What would urban consolidation mean for traffic patterns and building energy

consumption? What is the optimum strategy to renew the center city’s urban fabric, increase real estate values and even combat social inequality? Santiago’s leaders have their sights set even higher, seeing in the platform a means to revolutionize dialogue with the metropolitan area’s seven million citizens. As part of an overall campaign to increase public engagement and consultation, citizens will be able to access the simulator on the city’s website, enabling them to see for 3D information derived from their city’s diagnosis. By bringing together all of the information on potential projects in a

universally accessible and understandable format, the 3D simulator contributes to transparency and greater public understanding. ■

1- This tool is the result of a commission by the French Ministry of Foreign Trade, under the aegis of Vivapolis, with a view to promoting the export of French know-how regarding sustainable cities.
2- 3D Sustainable City Simulator partner companies: Artelia, Veolia, AS.Architecture-Studio, Arte Charpentier Architectes and Siradel
3- the 11 key indicators: Density, Cultural identity, Economy and employment, Living environment, Natural hazards, Nature in town, Resources, Mobility, Security, Urban well-being, Connectivity

FRONTLINE



A few tweets from Carolina Toha, mayor of Santiago, during the Santiago Des3aDo simulator presentation seminar on April 21, 2015.



Carolina Toha
@carolinatoha

Cover the central highway, now seen as a barrier, and make it a city park, a new central area offering high-quality public spaces.



Carolina Toha
@carolinatoha

The Vespucio west project will be underground. It would be unacceptable to have a trench that divides districts. For the same reason, the central highway must be covered.



Carolina Toha
@carolinatoha

The north gate, where the central highway and the Mapocho River meet, would be transformed into a new urban hub with services and public spaces.



Carolina Toha
@carolinatoha

As the 3D simulator results are revealed to us, we are measuring the impact on the city of covering the highway with an urban park.

Solar Impulse

Bright spark

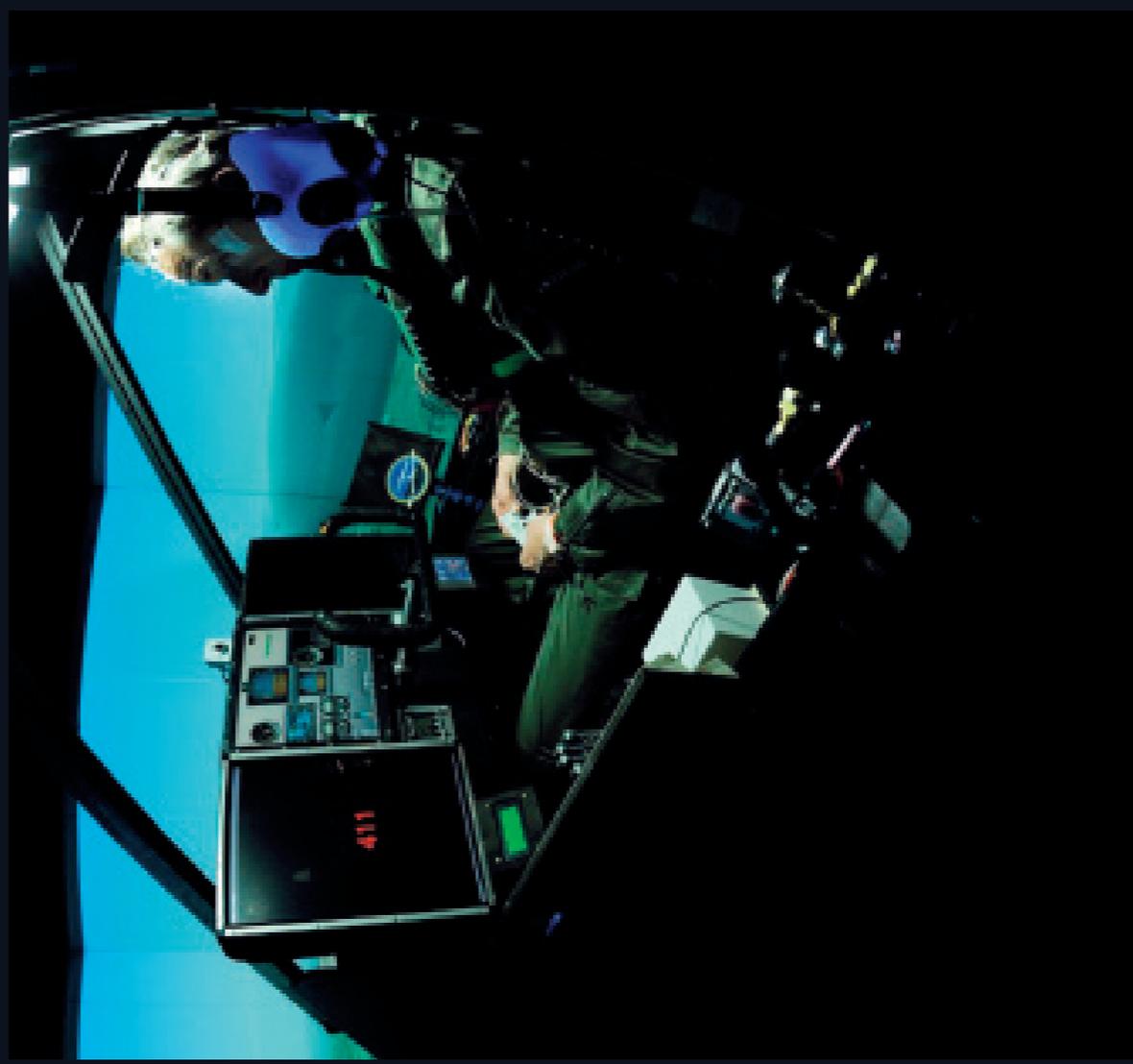
At an altitude of 8,500 meters, Solar Impulse is posing a challenge to fossil fuels despite its flimsy silhouette: this giant bird, barely heavier than a car and consuming as little energy as a scooter, cuts through the air with no other “fuel” than the electricity accumulated by its solar batteries. The brainchild of the Swiss scientist-adventurer Bertrand Piccard, who became

famous with his non-stop round-the-world hot air balloon flight, Solar Impulse is the first solar plane capable of flying at night. This feat of endurance is the product of combined innovations that have enabled Solar Impulse 1, and then 2, to set a string of records. The photojournalist Francis Demange has captured them for posterity, from the maiden flights to the round-

the-world tour begun last March by Bertrand Piccard and pilot André Borschberg. Could an exploit of this kind, made possible by combining clean technologies and renewable energies, pave the way for new aeronautical applications? Time will tell. In the meantime, Solar Impulse is brilliantly proving that the resources of the human mind are inexhaustible.



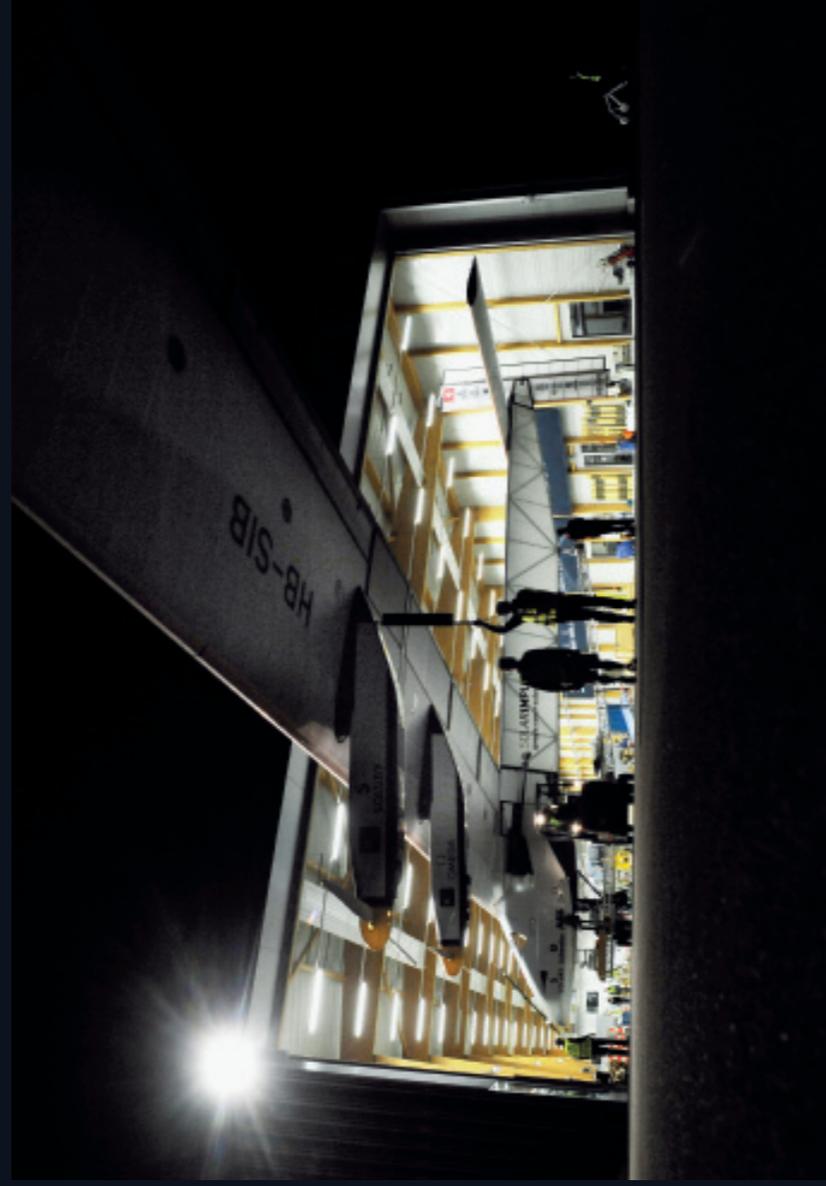
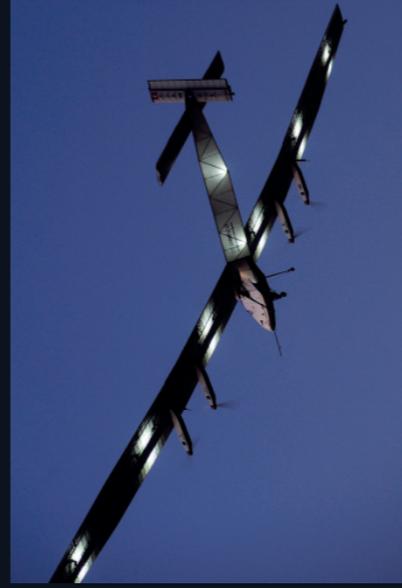
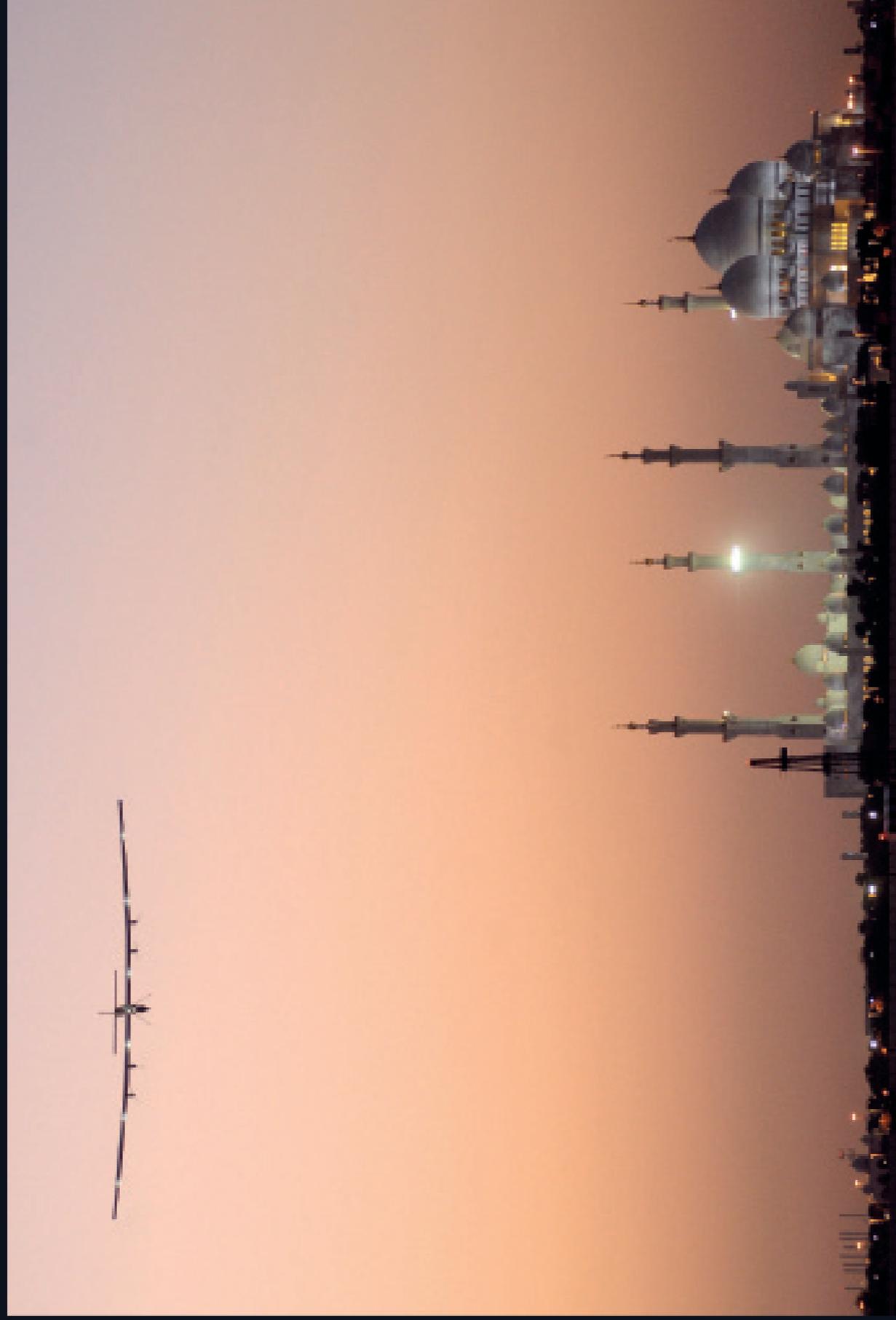
Sun lover July 7, 2010. The wings covered in 12,000 photovoltaic cells, the plane is one with the sun. When the latter disappears, batteries will power four electric motors. After 26 hours, Solar Impulse will have proven that perpetual flight is possible, without the slightest drop of fossil fuel.



High-flying preparations The "solar army" gathered in Payerne (Switzerland), just before the departure for Abu Dhabi, where the 35,000-km round-the-world trip will begin and end. Each item of the pilots' equipment has been custom-designed, with the same exacting standards as the analyses and tests performed in an unpressurized cabin simulator. Learn more: www.solarimpulse.com



High-tech bird The translucent fuselage of the single seater is crafted in carbon sheets lighter than paper. An asset in terms of energy, the plane's low weight requires constant vigilance on the part of the pilot, who must anticipate the machine's significant inertia when making each of his maneuvers.



Francis Demange, framing a vision

Solar Impulse is also the story of the meeting of two enthusiasts: Bertrand Piccard, a psychiatrist and descendant of a line of explorers, and Francis Demange, a photojournalist with a thirst for great human and scientific adventures. In 2003, the model of a revolutionary plane was presented by its designer in Geneva. The photographer was present. "I immediately offered my photography services to this

visionary who had set himself the challenge of achieving the impossible," he remembers. The takeoff of the Solar Impulse project coincided with Francis' move into freelancing, after spending seventeen years with the Gamma agency. Invited to cover Solar Impulse's progress, he seized this chance of freedom, living the adventure in his own style, spontaneously and simply, merely drawing on his self-taught skills to control the exposure, aperture and composition. In the secret of a hangar, on the tarmac or in full flight, Solar Impulse is revealed

through his lens. Immersed in the adventure, Francis Demange displays boundless energy and endurance devoted to the project: "During a simulated 72-hour flight that André Borschberg performed to analyze his resistance and concentration, I took photos every ten hours... The gradual effects of fatigue can be seen." Since then, Francis' images have regularly placed this exceptional airplane in the spotlight. The photographer is committed to supporting the technological, environmental and human challenge represented by Solar Impulse right to the end.

Bio

Since his beginnings in photojournalism, Francis Demange has chased down exceptional subjects. A witness to the collapse of the Soviet Union and Biosphère 2 experiences such as Alain Thébaud's Hydroptère exploits, he is guided by his ever-alert eye and curiosity. Keen to place humans at the center of his work, he prioritizes listening and observation before pressing the shutter. He is a regular contributor to French weeklies such as "Paris Match," "VSD," and "Le Figaro Magazine" and a number of European publications. www.francisdemange.net



Better solutions, better future

In addition to addressing specific ecological needs, **innovation** can also **inspire** new ways of **thinking** about problems big and small. Can a virtuous circle of **new ideas** unlock solutions to the planet's most urgent challenges...today and **tomorrow?**

Climate change.

Urbanization. Water resource degradation. Deforestation. Natural resource depletion. Loss of biodiversity. If anything is as sobering as the list of serious environmental challenges threatening the planet, it is their seeming intractability. Forge agreement among the world's nations to reduce greenhouse gas emissions in an effort to limit global temperature increases to 2°C? Devise strategies for sustainable cities in which 7 out of 10 humans will reside by 2050? Ensure access to clean, safe water to the one billion people who lack it today?

Increasing recognition of the human and economic toll of ecological negligence is spurring action by policymakers, businesses and communities. New industries and markets are emerging and innovation is spawning green technologies able to clean, recycle, dispose and prevent. Yet, questions remain: Have global environmental challenges become so big and complex, they defy our ability to solve them? How indeed do we as

“We are observing the evolution of circular business models as leading companies drive innovation across product design, development of product-to-service approaches and new materials recovery methods.”

ELLEN MACARTHUR,
FOUNDER OF THE ELLEN MACARTHUR FOUNDATION.



Creative director of the company Bionic Yarn, the singer Pharrell Williams has teamed up with the jeans brand G-Star RAW to launch a capsule collection christened “RAW for the Oceans” created using recycled materials straight from the ocean. The yarns and fabrics obtained from plastic bottle fibers produce premium denim.

humans come together to find and implement collective solutions to the planet's ills?

Opening minds

Innovative technologies clearly have a role to play. Inventive minds are finding ways to ensure that water, energy and waste resources are recaptured, repurposed and, where used, used responsibly. Grammy winner Pharrell Williams' Bionic Yarn textile company's “RAW for the Oceans” collection features denim products made with recycled plastic recovered from the oceans (while consuming less water in their manufacture). Technology enables the cellulose content of previously landfilled corn crop residue to be converted into advanced biofuels. Southwest Airlines produces bags, shoes and balls from 80,000 recycled leather aircraft seats. “We are observing the evolution of circular business models as leading companies drive innovation across product design, development of product-to-service

...



Toward zero waste

Innovation and new ideas in waste management are proliferating fast – and none too soon. The World Bank estimates that solid waste generation will more than triple by 2100 to exceed 11 million tons per day. In response to the crushing physical and economic burdens, cities and companies are looking for partners that can help them find answers and meet ambitious environmental objectives.

Disappearing fast are the days when waste service contracts were organized by kilograms of garbage removed. In fact, waste itself is disappearing, now often viewed as a source of energy or secondary raw materials. Also changing is the role of the waste services company. Increasingly an originator of innovative solutions, companies are partnering

with customers to create shared value and help them achieve strategic priorities. “The new challenges and constraints faced by our customers have meant reinventing our role,” says Pascal Peslerbe, who directs Veolia's Environmental Services business in France. “Increasingly, our customers are asking us to work with them directly in finding ways to solve problems and achieve specific policy outcomes.” One example is industrial customer Danone, which is seeking Veolia's support in implementing its environmental circular economy policy of converting 100% of its on-site waste into energy or secondary raw materials. “Danone shares their goals with us for reducing the

environmental footprint of their products, such as plastic water bottles or yogurt pots,” says Pascal Peslerbe. “We then work collaboratively with their teams to turn waste into supply streams of secondary raw materials for their production processes. Our respective organizations interact at several different levels, including day-to-day operations, manufacturing, procurement and corporate strategy. It's transformed our role from service provider to that of a creative partner.” He says relationships also are changing with municipal customers. “We now offer communities a mix of options that in France we call ‘New Collect,’ that address the wide array of challenges they face. We work with

them to understand their priorities and custom-design and implement a mix of initiatives that meet their needs.” Examples of options include voluntary collection strategies, zero-emission vehicle waste collection in city centers, tire recycling or installing a logistics center to optimize transportation and handling of materials. “The transformation in our role is reflected in our contracts, which are increasingly performance-based and place the emphasis on using our expertise to create solutions for all types of customers,” says Pascal Peslerbe. His own title reflects the refocused priorities: Director for Commerce, Value and Innovation.

... approaches and new materials recovery methods," says Ellen MacArthur, founder of the Ellen MacArthur Foundation. Beyond meeting specific environmental problems head-on, these and countless other new technology developments generate further benefits by stimulating additional ideas. Innovation - literally, introducing something new - opens the way for rethinking old problems, challenging assumptions and changing behaviors. For instance, a wastewater treatment facility managed by Veolia in Gresham, Oregon, (USA) has essentially become an energy-producing facility exporting energy back to the local utility. The plant generates more energy than it consumes, using naturally occurring methane and solar energy to produce power and

reduce energy costs. Technology-inspired fresh thinking is leading to startling new proposals for creating value. In Beijing, IBM is working with city officials to monitor air emissions and define a comprehensive approach to air quality management, using a combination of cognitive computing, optical sensor technologies, data from meteorological satellites and local air quality monitoring stations. Visual maps will chart the source and strength of atmospheric pollutants days in advance and down to the street level, enabling targeted actions such as limiting traffic or alerting local residents in advance about air quality issues. One of the more highly visible examples of the

transportation technology revolution, Google's self-driving car, promises dramatic gains in fuel use and greenhouse gas emissions - not to mention fewer accidents. "We can now rely on immense processing power and advanced sensors that would not have been possible only a few years ago. And while it will still take time before we see self-driving cars everywhere on our streets, over a million auto fatalities per year worldwide make this a risk worth taking ... it is possible to create the technology that allows people to lead healthier, happier lives," says Google co-founder Sergey Brin. Incubators, cross-fertilization, disruptive change, crowd-sourcing, Big Data and open innovation are among the

watchwords accompanying sweeping change in virtually every facet of human life.

Innovative relationships

Such wide-open thinking is also shifting traditional roles in many industries, including for environmental services companies. Faced with the backdrop of massive environmental challenges, customers are looking for innovative solutions that anticipate their evolving needs for years to come. The result is a transformation from the bricks-and-mortar-based supply of water, energy and waste management services to something much more strategic: providing expert counsel.



"IBM is investing in more than 100 emerging market countries, helping to build IT infrastructures in support of economic growth, develop strategic industries and respond to accelerating urbanization," says IBM CEO Virginia Rometty. "We are enabling more effective and sustainable growth for these nations and their people, while also creating value for IBM and our investors." In Veolia's case, it means applying its Peer Performance Solutions model on behalf of municipal clients like the city of New York (see Frontline article page 20) to improve water services and cut costs. Through its energy advisory services, the company also supports cities and building owners in analyzing data, optimizing their energy mix, monitoring use, reducing consumption and implementing smart systems. Meanwhile, the replacement of volume with value as the relevant measure in waste services reflects the

new emphasis on recycling, recovery and reuse (see page 43). Across all areas, the demand is for experience, know-how and a strategic approach to understanding the customer's perspective. As in other industries, the evolution is also changing the value proposition. Traditional guaranteed service agreements are giving way to incentive-based performance contracts - which, in turn, fuels further development of innovative solutions.

Taking on Mission Impossible

The flurry of innovative activity and its impact on mindsets and relationships may hold out hope for the daunting macro-challenges facing the planet. Solving the extraordinary environmental challenges of our time requires new approaches that involve challenging the status ...

A wastewater treatment facility managed by Veolia in Oregon (USA) uses naturally occurring methane and solar energy to produce power and reduce energy costs.



Interview with April Kelly

Director of the OpX program, New York City's Department of Environmental Protection (DEP)

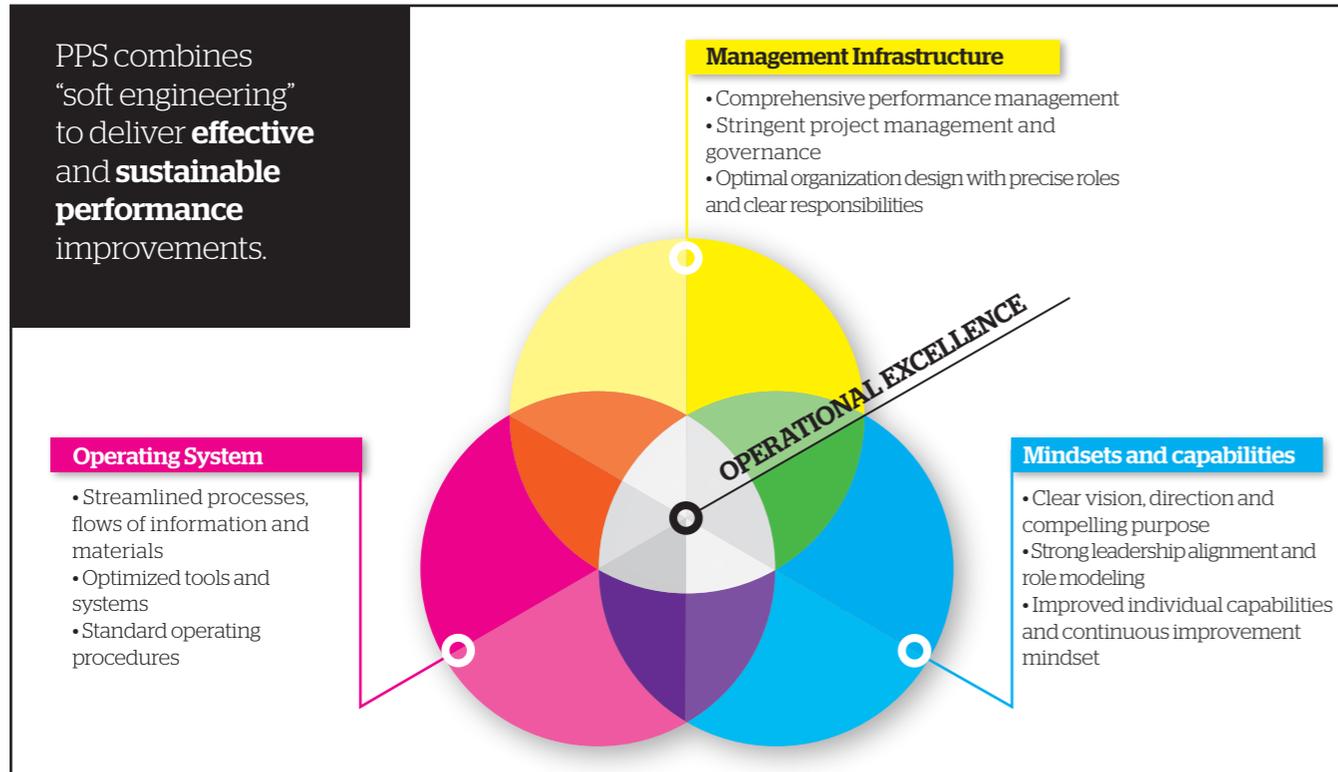
"Openness to trying new approaches"

In what ways has DEP's partnership with Veolia been innovative?

The contract under which we entered into a peer relationship with a private company was in itself innovative. Veolia lives and works alongside us and makes recommendations based on their worldwide expertise, while DEP retains decision-making authority. The partnership's performance-based compensation is also novel, with its low financial risk for DEP and Veolia sharing the savings and additional revenue generated. In addition, the systematic approach to implementing initiatives and the best management practices we have instituted under OpX have increased our openness to trying new approaches, which will help to foster innovation in the future.

Are there other lasting impacts?

One of the program's most important contributions has been increasing the engagement of our teams. Veolia organized workshops for our employees designed to surface and explore their ideas for improvement and translate them into actions that then produced tangible results. In helping turn some of the initial skeptics into believers that they could influence the process, it has created a dynamic for continuous improvement. We are implementing strategies to sustain this through initiatives such as organizational development, coaching and manager training programs.



••• quo, rethinking traditional relationships and finding new ways to foster cooperative approaches between nations. And, why not? The trend toward stratospheric ozone depletion has been reversed. The Millennium Goal of

halving the proportion of the population without sustainable access to safe drinking water and basic sanitation was achieved ahead of schedule. Conservation and other sustainable practices continue to take hold around

the world. In 1963, a young American President called upon his country to commit to a new era of space exploration and innovation: "We choose to go to the moon in this decade and do the other things, not

because they are easy, but because they are hard..." Is it today unimaginable that our capacity for innovation will yet enable us to find tomorrow's solutions to the environmental challenges we face? Anything's possible. ■

The new Google Car boasts a host of sensors and artificial intelligence, including a laser remote detection system, radars, camera, receiver, etc. The prototypes do not have a steering wheel, accelerator or brake pedals. However, these devices will be fitted to self-driving vehicles traveling on California's public roads this summer!



46/47

Cleaner home, safer home

In New York City, the success of a Veolia-supported program to recycle harmful household products, already one of the world's largest, has led it to double in size.

The NYC SAFE (Solvents, Automotive, Flammables and Electronics) Disposal events, administered by the New York City Department of Sanitation, encourage residents to bring items such as pesticides, cleaning agents, mercury thermostats, paint, motor oil, electronics and medications.

"New Yorkers line up on foot and in their cars and even take taxis to drop off their harmful household products," explains Richard Johnsen, Special Services Manager, Veolia North America.

"Most of these materials are found in just about anyone's home and can be recycled, recovered or reclaimed. For instance, liquid wastes can be blended for fuel and energy recovery at our North American solvent recovery facilities. This is infinitely better than risking potential hazards to children and pets or possibly polluting the environment. There's a great reward in seeing people's faces as they drop off their material, knowing they've done the right thing."

The innovative practice is spreading around the world. In the U.S. alone, Veolia has helped over 2,500 communities organize, promote and implement harmful household products collection programs.

Community



In a country like the Czech Republic, where raising environmental awareness is a relatively recent concern, education is not an empty word for Miroslav Petr. In the role of enthusiastic volunteer, this Veolia dispatcher is committed to passing on his green expertise in schools in Eastern Bohemia.

At the environment school

Miroslav Petr is convinced that "altruism is a character trait of Homo sapiens." A motto that this highly active fiftysomething follows to the letter, devoting most of his free time to leading conferences among elementary and high school pupils. Water treatment, from its production to its distribution, the role of bees, the protection of resources, the problem of transport, etc. These themes are addressed in the classroom or on the ground by Miroslav and a dozen volunteers from the Society For Sustainable Life. Active since 1992, this 500 member-strong association supports protecting nature and raising awareness of sustainable development through seminars, conferences, excursions and a cinema festival, organized during European Mobility Week.

Initiated over ten years ago within the framework of the association that Miroslav chairs in Eastern Bohemia, this educational tour benefits from a grant from the MiniGrants program. The €2,000 received annually allows it to reach a growing number of young minds, with more resources devoted to circulating educational media, organization and logistics. Accordingly, last year 30 conferences were held for 900 pupils. The Society For Sustainable Life project also owes its success to its founder's devotion. Conscious since his childhood of man's impact on the environment, this natural volunteer is driven by an infectious passion: during the Open House events organized at Veolia, where he has worked for over 20 years at the helm of the drinking water central dispatching service, he is often the first to guide young visitors!

MiniGrants, maxi-involvement

Created by the Veolia Foundation in the Czech Republic, MiniGrants supports charitable initiatives put forward by Veolia employees.

Through this grants program, 4% of Veolia's staff in the Czech Republic have become involved in volunteer work.

Volunteering reveals the company's richness: it demonstrates the diversity of internal commitments and the involvement of a socially responsible service provider.

Since 2008, MiniGrants has supported 883 projects, to the sum of €824,000.

EXPLAINER

Open innovation, at the root of good ideas

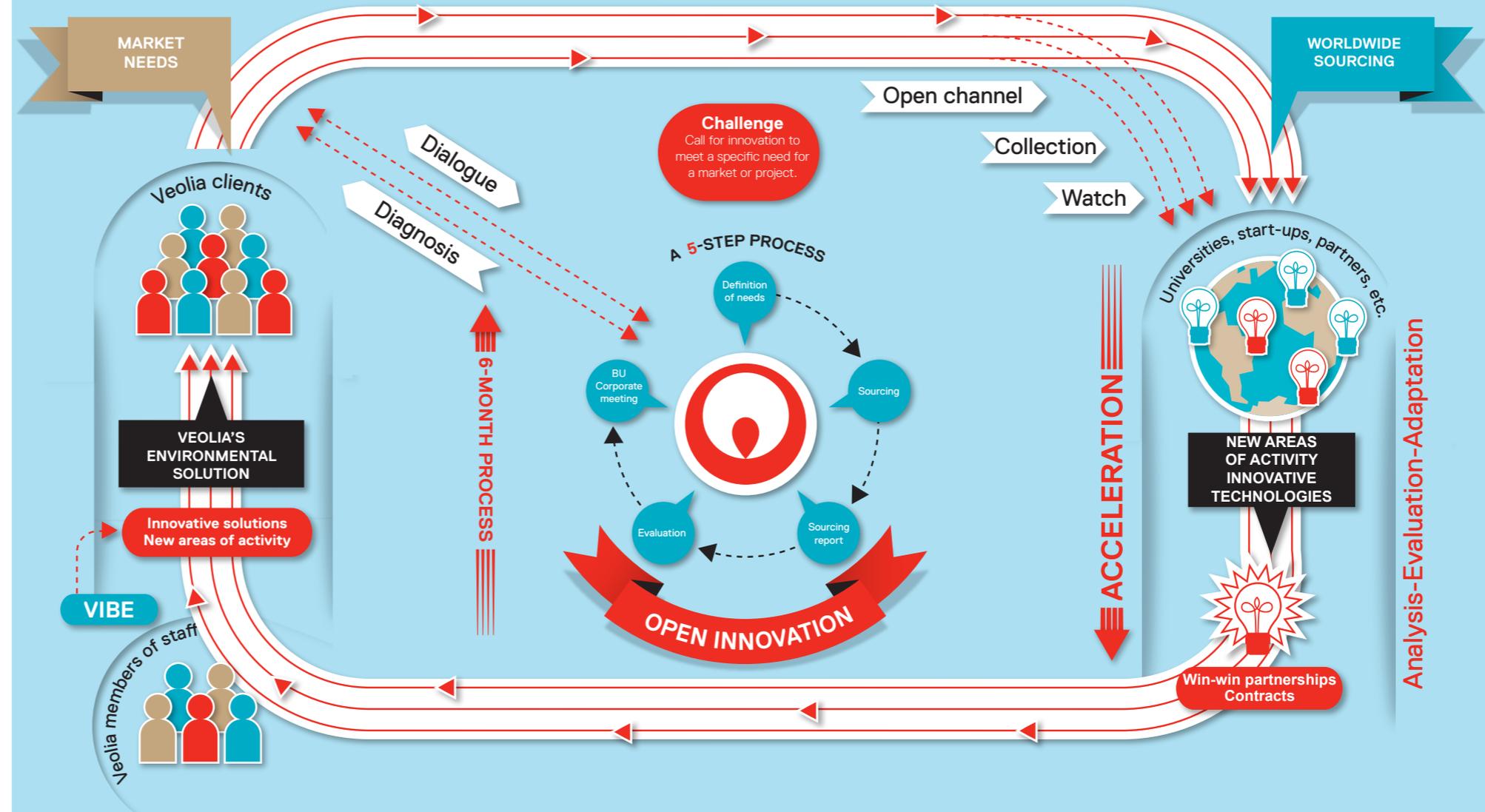
Open innovation's strength lies in detecting, evaluating and integrating external solutions of the future to enrich the Group's offering. From this perspective, Veolia Innovation Accelerator (VIA) facilitates exchanges and encourages cooperation with start-ups in different areas, such as cleantech, digital and biotech. It represents an opportunity for Veolia to harness external innovation that will reinforce its expertise and for budding companies to gain access to the Group's vast markets.

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By their very nature, the innovations that change the world or advance science are initially silent and hidden. If they are to come to the fore, you need to have good radars to identify and then test them. Within the Veolia group, an open innovation process christened Veolia Innovation Accelerator (VIA) spots and tests these innovations from start-ups, SMEs and intermediate-sized enterprises, particularly those delivering an extra bonus from an environmental point of view. Since 2011, 500 proposals have been submitted to VIA. Two open innovation approaches have been put in place. A so-called opportunistic – or open channel – approach allows any external

company to suggest a solution to Veolia of their own accord. And a more targeted approach, in which Veolia expresses a need via a call for external solutions among a highly varied network of incubators, databases, public bodies, and investors, among others. In this case, the Group can source actors on the ground capable of providing added-value solutions. Start-ups with innovative and economically viable solutions are able to respond to the challenge set via a dedicated platform (www.via.veolia.com). After a six-month period of sourcing and evaluation by Veolia's operational teams, covering both technical and commercial aspects, their solutions may – depending on the level of maturity and industrial demand – lead to win-win partnerships. ■

VIA, innovati on accelerator



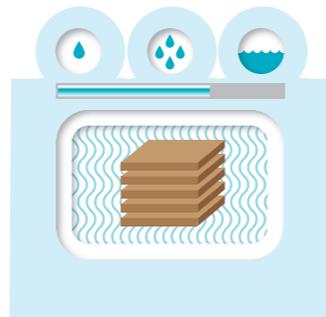
Riding on the back of VIA's success, the Group has developed an internal innovation network – Veolia Innovation Booster (VIBE) – dedicated to participatory innovation on the part of employees.

SENFIT, REAL-TIME MEASUREMENT

A start-up selected by Nordic Innovation Accelerator (VIA's representative for Scandinavia) in 2014 as part of VIA's "Moisture measurement" call for innovations, Senfit has developed a solution for continuously measuring the moisture in a biomass flow. It boasts the advantage that the measurement takes place in real time, without having to resort to a control laboratory.

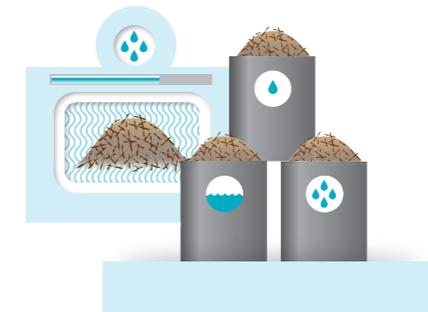
LAB PHASE

Senfit devices for measuring the moisture in wood use the same technology as microwave ovens, whose power largely depends on the proportion of water contained in a substance. The measurement's effectiveness is determined by the sensitivity of high-performance sensors that adapt to variations in the temperature, density and weight of the substance measured.



EXPERT PHASE

Senfit's microwave technology can potentially be used to measure the moisture in a large number of materials across a host of industrial fields using organic matter: homogenates, compost, fermentable waste. This is, for example, true of biomass power plants, whose productivity depends on the moisture content observed.

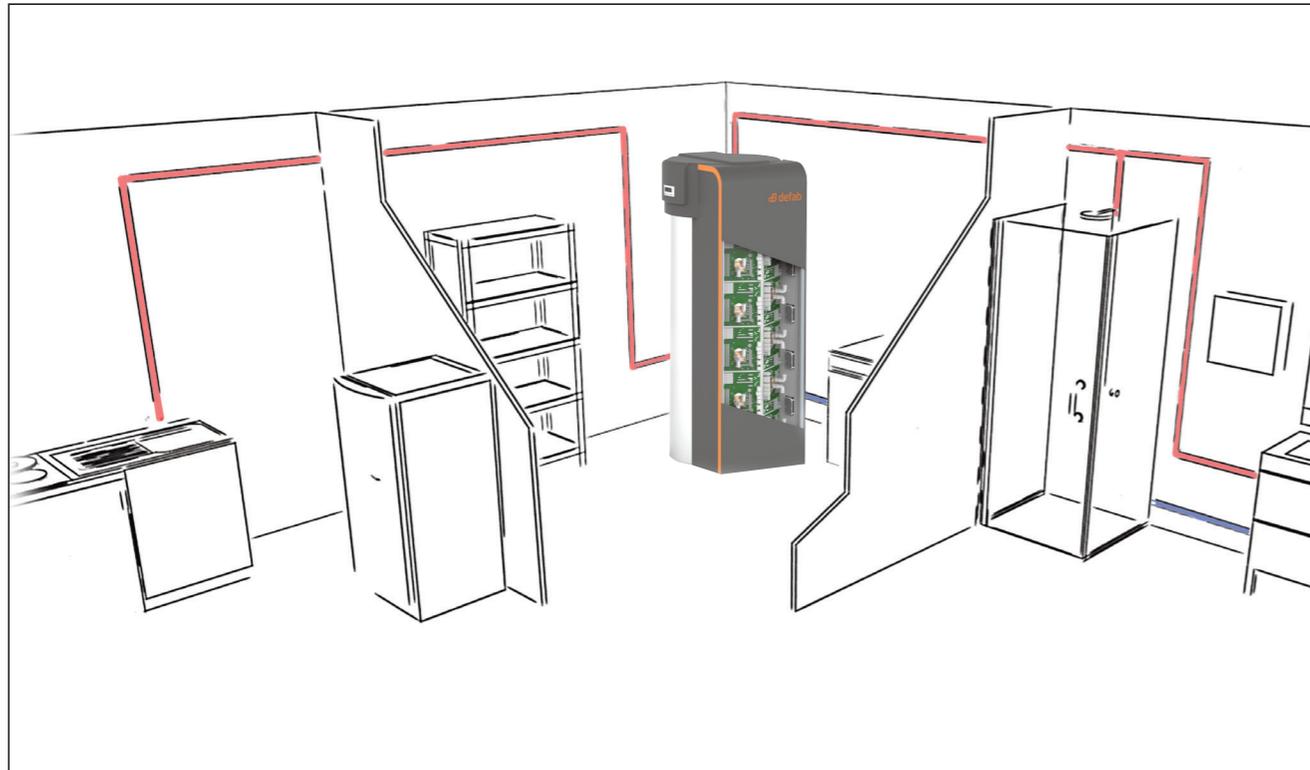


DEPLOYMENT PHASE

This technology will be tested on a Veolia site. The intended aim is to optimize the biomass boilers' performance by improving the burner adjustment according to the actual moisture observed.



PUT ON THE MARKET



An e-source of hot water

What do you get when you equip an electric hot water tank with a computer unit? Hot water produced using green, cost-efficient energy!

Defab, the company behind this unexpected combination, has come up with a concept that draws on the energy generated by microprocessor activity to power a hot water tank via a heat exchanger. Basing

its offer on energy solutions for the home, the young French start-up is targeting two quite distinct markets with this innovative equipment. As its director, Thomas Garnier, points out, “our heating solution is aimed at major hot water consumers such as communal housing, hospitals, the hotel industry, etc. The resources for the computer units with which the

hot water tanks are equipped are available for hire by companies, manufacturers and research laboratories via our online platform.” Half-boiler, half-data center, Defab’s patented system looks to be both cost-efficient and environmentally friendly. As the “waste heat” is directly recovered, without loss or additional running costs, this virtuous innovation

should prove to be remarkably efficient: “Unlike a data center, our IT infrastructure especially makes it possible to forgo a highly energy-consuming cooling circuit*, because the heat generated is transferred to the water heater,” adds Benjamin Laplane, the co-founder and technical manager. “This kind of efficiency gain allows us to hire our distributed

computing platform at a highly competitive rate, as well as to cover the electricity bill of users of our water heater system.” Although it has only been bubbling with activity for a year now, Defab is already getting ready to finalize a preindustrial prototype and is working on canvassing customers and partners, with a view to commercialization in early 2016.

* As a point of reference, a 10,000-m² data center consumes as much electricity as a medium-sized town of 50,000 inhabitants, generating major CO₂ emissions.

JUNE 28 - JULY 1, BOSTON, USA
IDEA'S 106TH ANNUAL CONFERENCE
AND TRADE SHOW

EXPLORATION OF BEST PRACTICES IN TERMS OF ENERGY DEVELOPMENT AND MANAGEMENT IN THE FIELDS OF HEALTHCARE, DRAWING FROM LOCAL OPERATIONS.
[HTTP://WWW.IDEA2015.ORG/](http://www.idea2015.org/)



AUGUST 18-19, PENANG, MALAYSIA
5TH INTERNATIONAL CONFERENCE
ON ENVIRONMENT (ICENV 2015)

THIS CONFERENCE WILL OFFER AN IN-DEPTH REVIEW OF THE IMPLEMENTATION OF GREEN TECHNOLOGIES. RESEARCHERS, ENGINEERS, EDUCATORS AND STUDENTS FROM ALL AROUND THE WORLD WILL COME TO SHARE THEIR FINDINGS.
[HTTP://CHEMICAL.ENG.USM.MY/ICENV2015/](http://chemical.eng.usm.my/icenv2015/)

JULY 7-10, UNESCO, PARIS
INTERNATIONAL SCIENTIFIC CONFERENCE
"OUR COMMON FUTURE UNDER CLIMATE CHANGE"

THE LAST FORUM ON CLIMATE QUESTIONS BEFORE THE 2015 PARIS CLIMATE CONFERENCE. FOR THE LATEST SHARED STATE OF SCIENTIFIC KNOWLEDGE FOLLOWING THE PUBLICATION OF THE IPCC REPORTS.
[HTTP://WWW.COMMONFUTURE-PARIS2015.ORG/](http://www.commonfuture-paris2015.org/)



SEPTEMBER 7-9, BASEL
5TH WORLD SUSTAINABILITY FORUM

THIS FORUM WILL DISCUSS REDUCING INEQUALITIES WORLDWIDE, SUCH AS POVERTY, FAMINE AND INFANT MORTALITY, AND ADVOCATE THE NEED FOR BETTER EDUCATION FOR GIRLS AND UNIVERSAL ACCESS TO BOTH ESSENTIAL RESOURCES AND DIGITAL TECHNOLOGIES.
[HTTP://SCIFORUM.NET/CONFERENCE/WSF-5](http://sciforum.net/conference/wsf-5)

Event

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