

Veolia Institute

Activity Report 2017



ANALYSIS



ANTICIPATION



DIALOGUE

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« To deliver an objective and meaningful contribution to reflections on our possible futures. »

Climate, biodiversity, water resources, air quality, availability of natural resources, demographics – never before has humanity faced such serious threats of its own making. The speed at which balances are shifting raises the question of whether our planet's systems can adapt to the rapidity of environmental change, and whether we humans are able to restrain the impact of our activities on the natural world. The threat of unleashing forces we cannot control looms large in the collective imagination, with the limitless possibilities of robotics and artificial intelligence a particular concern.

But this is also a time of new opportunities, as actions, innovations and collaborative approaches that offer renewed hope emerge in the face of fear and uncertainty. If we are to make positive progress, every single actor – governments, business and civil society – has an overriding duty to explore, anticipate and share their experience and views with the scientific community. This imperative is especially critical for Veolia, a global business driven by a mission to resource the world. This is the task the Veolia Institute has set itself. The issues cited above are at the heart of the Institute's work, in the form of studies, publications and conferences. In 2017, Veolia took a long hard look at the relevance of the Institute as a mechanism capable of anchoring Veolia's strategy and growth in its quest for answers to these essential questions for the future of humanity and the planet we call home.



Dinah Louda
Executive Director

« A twofold mission to observe facts and extrapolate possible futures. »

The assessment resulted in a reaffirmation of the Institute's mission, and a detailed new roadmap for 2018 and 2019 within a very tight budget. The task ahead is to use our extensive network of experts and leverage the benefits of Veolia's experience in the field to deliver an objective and meaningful contribution to reflections on our possible futures. We will also attempt to outline some ways forward to propose to Veolia, its stakeholders and society as a whole, sharing our thinking with partners from the academic world and civil society. This is a viable goal thanks to the unfailing support of the Institute's Foresight Committee, whose role has been fundamental since the Institute was first established. ■■■

The highlight of 2017 was November's conference in Oxford organized with our partner, the Oxford Martin School. It was an event that reflected our twofold mission to observe facts and extrapolate possible futures. The choice of theme, Resource Availability in a Low-Carbon World, the partnership with a world-leading center pioneering research into this field, and the outstanding quality of the speakers combined to make the conference a great success in terms of attracting participants and raising the Institute's profile; details about the event appear later in this report. The conference produced insights into a number of areas essential to the future of the circular economy and materials recycling, helping participants from Veolia to refine their strategic reflections as well as providing them with a platform to showcase some of the company's headline achievements as it sets about resourcing the world.

The second key feature of 2017 was confirmation of the role that our review FACTS Reports plays as a regular reminder of the Institute's ability to explore a critical topic by calling on a wide range of experts, with publication of each issue followed by a colloquium. After 2016's issues on Acceptability of Major Infrastructure Projects and Decentralized Electricity Production in Emerging Economies, the topics selected for 2017 were Smart Cities and Artificial Intelligence and Robotics in the City. The success of our past publications and their colloquium tie-ins has encouraged us to continue to stage similar colloquiums in 2018 in France but also other European countries. The events will center on upcoming issues of FACTS Reports and feature leaders from Veolia alongside external specialists.

The Institute's past achievements are testament to its ability to align its actions with the new roadmap. None of this would have been possible without the dedication of the Institute's team, who worked unstintingly despite the uncertainties that clouded their immediate futures. We extend our heartfelt thanks to Ludivine Houssin, Dany Martin and Monique Fourdrignier for their many years of commitment and service to the Institute. We welcome newcomers Fanny Arnaud and Sophie Soubrier, who will be working alongside Nicolas Renard to continue the Institute's missions. ■



Jean-Pierre Tardieu
Chairman



A unique place among bodies dedicated to future studies of social and environmental issues.



Since its foundation, the Veolia Institute has occupied a unique place among bodies dedicated to future studies of social and environmental issues. Its Foresight Committee, established at the same time as the Institute, has clearly expressed its desire for a research unit able to act as a platform for exchange between, on the one hand, research centers, observers and civil society and, on the other hand, a major corporation that is a global specialist in water, energy and environmental services. The Institute's governance, the objective nature of its work and the fact that its publications are made available to everyone have enabled it to build a first-class international network and acquire convening power, by which I mean a genuine ability to bring together a wide variety of actors and researchers and facilitate collaboration between them. The Foresight Committee has been constant in its expressions of faith and loyal support at every step of the Institute's journey.

In 2017, faced with inevitable budget cuts and in agreement with Veolia's Executive Committee, the Institute's own Board of Directors adopted a new roadmap that focuses resources on specific objectives that, although limited, nonetheless address a number of critical questions for the future of our societies. The ways chosen to share and publish its work will remain faithful to the principles that have guided the Institute since its foundation. The Foresight Committee, at its meetings in June and November 2017, therefore confirmed its support for the Institute and its commitment to working with it. The exceptional quality of the Institute's latest work – the international conference on resource availability in a low-carbon world and its publications on smart cities and artificial intelligence in the city – fully justify the faith our committee has in the Institute's team and in Veolia's desire to ensure its work can continue. ■



Pierre-Marc Johnson
Chair of the Foresight Committee

The Veolia Institute

» The Veolia Institute: a platform for the exploration of social and environmental challenges

The Veolia Institute was founded in 2001 by Veolia to encourage development of forward-looking analyses of themes at the interface of society and the environment. The Institute is an international platform for exchanging and debating ideas and information about current and future changes, with the aim of helping to ensure better preparedness for the world of tomorrow.

A partnership-based collaborative approach:

As a platform for horizontal thinking, the Veolia Institute has built up a network of local, national and international partners that can be divided into two categories:

- **A network of scientific partners** tasked with exploring major themes linked to the Institute's mission;
- **A network of practitioners** whose specific expertise is called on to promote knowledge transfer and sharing of best practices.

The Veolia Institute has an innovative role: to act as a bridge between these networks and Veolia, making constructive contributions to the company while preserving its own independence and scientific rigor. This partnership-based mode of operation has fostered a resolutely collaborative approach.

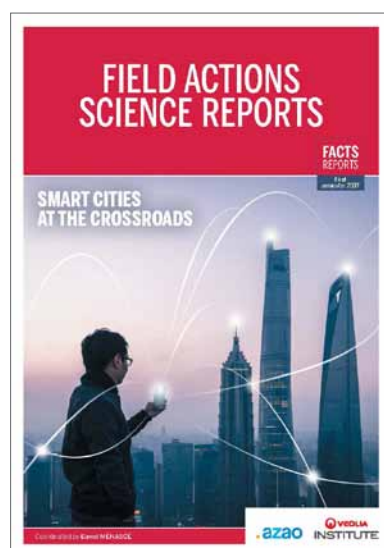
The Institute uses three tools to contribute to public debate and to analyze and understand emerging issues.

- **A program of international conferences**, designed as forums for interdisciplinary exchanges that shed light on key environmental issues. In 2017, the Veolia Institute organized its 10th international conference in partnership with the Oxford Martin School (see page 10). In September 2017, with "la Fabrique de la Cité" (a similar think tank linked to Vinci) the Institute co-organized a colloquium on the concept of resilience at the Cerisy-La-Salle International Cultural Centre.
- **A publication called "FACTS Reports"**, to communicate about and share the expertise and experiences of different actors such as NGOs, entrepreneurs, public authorities, experts, researchers and businesses; the reports examine a given subject from a wide variety of viewpoints.

During 2017, the Institute published two special issues of FACTS Reports, available in French and English: Smart Cities and Artificial Intelligence and Robotics in the City (see page 14).

- **Studies** and workshops designed to explore trends, such as, in 2016 and 2017, the concept of Common Goods and its impact (see page 15).

The Veolia Institute's network of partners, as well as its contributions, publications and conferences, give it credibility and legitimacy as it pursues its mission to tackle global issues at the international level (see page 09).



Social and environmental challenges explored in 2017:

Throughout 2017, the Institute instigated a process of reflection on a series of forward-looking themes at the interface between society and the environment to help ensure better preparedness for the world of tomorrow.

- **Resource accessibility and availability**

The Institute's exploration of this theme culminated in its 10th international conference, organized in partnership with the Oxford Martin School and held on November 2 and 3, 2017.

Preparations for the conference took place in several stages:

- In 2014, a workshop on Strategic Materials and Energy Transition, with a contribution from Olivier Vidal, Research Director for the French National Center for Scientific Research (CNRS) working at the Grenoble Institute of Earth Science.
- In 2016, a seminar on Raw Materials and Market Trends, led by Philippe Chalmin, Professor of economic history at Paris Dauphine University and President and Founder of the Cyclope study group.
- In June 2016, a Foresight Committee meeting on resource availability (see page 08).

- **Resilience**

The Veolia Institute continued to contribute to current studies into the concept of resilience by co-organizing a colloquium in September 2017 at the Cerisy-La-Salle International Cultural Center in partnership with "la Fabrique de la Cité", an urban innovation and future studies think tank set up by the Vinci Group. This work will continue during 2018 as part of preparations for the publication of a special issue of FACTS Reports on the concept of the resilient city (see page 16).

- **Robotics and artificial intelligence, smart cities**

During 2017, the Institute published two special issues of FACTS Reports: **Smart Cities and Artificial Intelligence and Robotics in the City**. As part of the follow-up to these publications, the Veolia Institute and its partners held a series of conference-debates to explore the ideas raised.



These publications follow on from the Foresight Committee meeting that took place in Tokyo in June 2016, attended by experts in robotics and artificial intelligence who discussed concrete applications of these technologies for healthcare and employment, as well as in areas affected by disasters, particularly in Japan (see page 05).

- **Common goods**

The Institute continued to build on the work begun in 2016 to take an in-depth look at the concepts of common goods and the commons. This work primarily involved seven workshops attended by researchers and operational managers from Veolia (see page 15). ■



» Governance open to the world

The Veolia Institute relies on three essential pillars:

- **The operational team**, which runs the Institute's day-to-day operations;
- **The Board of Directors**, which sets out overall policy, and leads and oversees management of the Institute;
- **The Foresight Committee**, which advises the Institute and guides its development.

During 2017, the team comprised five people who ran the Institute's daily affairs. The team suggests areas for study, establishes the broad themes and identifies priority topics and expert partners. It implements action programs,

coordinates the network of contributors and diffuses the results of the Institute's work. This collaborative effort is regularly discussed with the Foresight Committee and approved by the Board of Directors.

The team:



Monique Fourdrignier
Administrative
Assistant



Ludivine Houssin
Director, Programs
and Partnerships



Dinah Louda
Executive Director



Dany Martin
Executive Assistant



Nicolas Renard
Director of Foresight

Emmanuelle Rica and **Azao Consulting** also assisted the Veolia Institute in 2017, contributing in particular to preparing FACTS Reports and the associated conferences.

The Veolia Institute is governed by two bodies: the Board of Directors and the Foresight Committee. The members and complementarity of these two pillars of governance mean that the Institute benefits from an outside perspective to guide its work, while remaining firmly rooted in Veolia's daily realities.

Board of Directors:

The board embodies the Veolia Institute's positioning and the bridges it builds between the private sector, scientific circles and civil society. It is made up of 14 members – including Veolia representatives, members of the Foresight Committee and established outside experts – who deliver balanced governance of the Institute.

Members of the Board of Directors of the Veolia Institute:

- **Laurent Auguste**, Senior Executive Vice President, Development, Innovation and Markets, Veolia
- **François Bertreau**, Chief Operating Officer, Veolia
- **Jean-Pierre Boisivon**, Emeritus Professor at Paris II Panthéon-Assas University, Vice Chair of the Institute
- **Philippe Capron**, Senior Executive Vice President and Chief Financial Officer, Veolia, Treasurer of the Institute
- **Antoine Frérot**, Chairman and CEO, Veolia
- **Paul-Louis Girardot**, Vice Chair of the Institute
- **Olivier Grunberg**, Executive VP and General Secretary of Veolia Water
- **Philippe Guitard**, Senior Executive Vice President, Central & Eastern Europe, Veolia
- **Pierre-Marc Johnson**, international lawyer, former First Minister of Quebec, Chair of the Foresight Committee
- **Helman le Pas de Sécheval**, General Counsel, Veolia
- **Claude Mandil**, former Director General of the International Energy Agency
- **Jean-Pierre Tardieu**, Chair of the Veolia Institute
- **Laurence Tubiana**, President of the European Climate Foundation

The Foresight Committee:

The Foresight Committee embodies the solid scientific foundations of the Institute's programs thanks to the expertise and international reputation of its members. Each partner brings to the committee high-level expertise from a variety of fields, including social and climate sciences, economic sciences and public health.



Harvey Fineberg
President of the Gordon and Betty Moore Foundation,
Former President of the United States Institute of Medicine.



Mamphela Ramphele
Former Managing Director of the World Bank,
Former Vice-Chancellor of the University of Cape Town.



Philippe Kourilsky
Honorary Director General of the Institut Pasteur,
Biologist,
Emeritus Professor at the Collège de France.



Amartya Sen
Economist, Nobel Prize 1998,
Thomas W. Lamont University Professor and Professor of Economics and Philosophy at Harvard University.



Pierre-Marc Johnson
International lawyer,
former First Minister of Quebec,
Chair of the Foresight Committee.



Nicholas Stern
Lord, President of the British Academy,
IG Patel Professor of Economics and Government at the London School of Economics,
Fellow of the Royal Society.

The Foresight Committee guides and steers the work of the Veolia Institute. At the Committee's regular meetings, which began in 2001, it works on expanding the Institute's networks and guiding its forward-looking mission. The Foresight Committee's meetings give the Institute the opportunity to validate ongoing projects, identify new foresight topics, and develop its working areas thanks to the perspective of the participating experts and their in-depth knowledge of their fields.

The Foresight Committee held two meetings in 2017:

- **June 2-4 in Paris:** focusing on the future of hydrocarbons and petrochemicals, exploring the issue of reducing consumption and greenhouse gas emissions. Several issues were raised during the meeting, including changes in oil and gas reserves and the geopolitical impacts, the importance of innovation and the circular economy in the emergence of a model less dependent on fossil fuels, and the development of innovative solutions such as carbon capture and storage.
- **November 3 in Oxford:** this meeting was an opportunity for Foresight Committee members to continue their discussions on resource availability in a low-carbon world, following the conference on this theme co-organized with the Oxford Martin School. It was also a chance to share the Veolia Institute's 2018-19 roadmap with the Committee.

A recognized legitimacy:

For over 15 years, the Veolia Institute has developed an innovative approach that benefits both from Veolia’s hands-on experience and the objective input of its Foresight Committee. This twofold approach has enabled it to become a relevant and legitimate internationally recognized platform for exploring global issues.

In December 2015, the COP21 Paris Climate Conference ratified the Veolia Institute’s status as an Observer NGO under the terms of the United Nations Framework Convention on Climate Change. This decision recognizes the Institute’s legitimacy as a contributor to understanding climate-related issues. The Institute’s status enables it to participate actively at COP summits alongside other parties (governments, negotiators, etc.), be a source of proposals within engaged civil society networks, and contribute to discussions in the run-up to negotiations.



This accreditation comes in addition to others obtained in 2012:

- Member of the Civil Society network of the United Nations Department of Economic and Social Affairs;
- Accreditation as a research organization by the European Commission under its 7th Framework Program for Research.

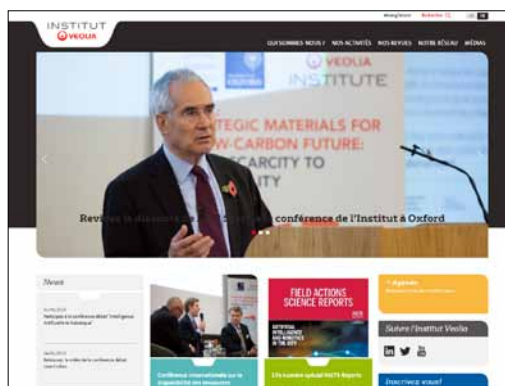


» Availability to all of the Institute’s work

The Veolia Institute seeks to contribute to knowledge dissemination and act as a platform for dialogue, so it makes all its work and publications available freely to all.

To raise the profile of its work and promote it to a wider audience, the Institute enhanced its communication tools in 2017 using a range of channels:

- More readable, dynamic website;
- Dedicated Institute page on the Veolia intranet, to share its findings with the company’s employees across the world;
- Twice-yearly e-newsletter distributed to its international network;
- @InstitutVeolia Twitter account to reach an ever broader audience;
- YouTube channel to convey key messages from its conferences;
- Institute LinkedIn page to spread its news and content to environment professionals.



www.institut.veolia.org



www.youtube.com/user/VeoliaInstitute



[@InstitutVeolia](https://twitter.com/InstitutVeolia)



<https://www.linkedin.com/company/veolia-institute>

The Institute in 2017

»» Resource availability in a low-carbon world

The ties between economic development and resources

Our societies' economic development is dependent on our planet's resources, which have been exploited for decades without their availability being questioned. However, given the scientific community's many warnings about the disruption of the physical and chemical cycles in soil, air and oceans, links between economic development and the use of resources need to be rethought. Prior to the conference held in November 2017, the Veolia Institute devoted three years' work to this complex problem at the interface between questions of society, economic development and environment.

In 2016, the Veolia Institute's Foresight Committee dedicated one of its half-yearly meetings to resource availability and solutions to new needs in this field, such as the circular economy and recycling. This marked a new phase in explorations of a subject crucial to the future of our societies. The meeting was part of the process for preparing the Veolia Institute's 10th international conference, held in late 2017, which was the culmination of the three years of work.

STRATEGIC MATERIALS FOR A LOW-CARBON WORLD: FROM SCARCITY TO AVAILABILITY



10th international conference: high point of 2017

2017 culminated in the organization of **an international conference on November 2 and 3**, in partnership with the Oxford Martin School in the UK. This major event explored the availability of mineral resources in the light of low-carbon transition and the associated issues relating to economics, energy, environment, and geopolitical and governance matters. Extraction of the planet's resources

has tripled over the last 40 years, and is set to double at the very least over coming years as emerging economies continue to grow. We are consuming more resources than the planet can produce. At the same time, transition toward a low-carbon economy may increase the demand for certain resources, minerals in particular.

Concrete solutions

Researchers, public decision-makers at the national and European levels, NGOs and manufacturers from the sectors concerned addressed these issues by sharing their knowledge, experiences and best practices in developed and emerging economies.

- Three main topics** were examined during the event:
- **The impact of the transition to a low-carbon economy on the demand for primary resources;**
 - **Limitations on accessing primary resources;**
 - **Opportunities offered by the circular economy, recycling and resource efficiency that could meet the new needs of a low-carbon world.**



Lord Nicholas Stern, G Patel Professor of Economics and Government at the London School of Economics and a Fellow of the Royal Society, member of the Veolia Institute Foresight Committee, was a keynote speaker during the Oxford's Conference.

Close to 200 delegates and 60 speakers shared two days of exchanges, shining light on the challenges of transitioning to a low-carbon world while maintaining supplies of strategically important materials. Everyone at the conference agreed on the critical importance of greater collaboration between various communities of actors to address this issue which, although still too rarely discussing, highlights the scale of the challenge of transition to a low-carbon model. Lord Stern, a member of the Institute's Foresight Committee, gave a special address to a 500-strong audience. He emphasized the



Antoine Frérot, Chairman and CEO, Veolia, member of the Board of Directors of the Veolia Institute, was a speaker at the conference.

urgency to act on climate change and reframed the conference debates on resource productivity in the context of transition to a low-carbon model.

The key takeaways from the conference were as follows:

1. The demand for materials underlying the low-carbon transition is under-examined and there is a risk that it may cause further scarcities. Some trends, such as urbanization and population growth, mean that the construction, energy and transportation sectors, to name a few, will play key roles in our ability to transition to a low-carbon economy. As Lord Stern explained during his speech, the world economy is likely to double in the next 20 to 30 years. If the new economy is anything like the one we already have, given the lock-in effects, we will not meet the 2°C objective.

2. Basic and specialty materials will face rising demand from sectors key to low-carbon transition, such as construction, energy and transportation. Complexity and vulnerability of products and value chains is increasing, with most of the periodic table now in play. While long-term supply is not often a real risk, short-term shortages due to lack of supply responsiveness is possible, with extremely disruptive impacts on short-cycle industries (such as digital tech). For most of those minerals, as ore grades decline, energy intensity of mining increases and more solid waste is generated to produce the same amount. This is one of the key environmental challenges posed in terms of the extractive industries' licence to operate.

■ ■ ■

3. National and international governance mechanisms are needed for minerals. A dedicated IPCC could produce the research and analytical tools for assessing the impact of low-carbon transition on mineral resources. Policy and incentives at a national and international level have a greater role to play to foster the circular economy.

4. Greater circularity and recycling can improve resource productivity and availability. Greater circularity is needed in product design and material design and it may imply changes in business models to move away from a linear economy that generates waste and consumes resources. Technologies and small-scale initiatives exist to make the case for circular economy but they lack scale.

5. Greater collaboration at all stages of value chains is necessary, especially between manufacturers and recyclers to design recycling facilities that can adapt to changing waste streams (collection, sorting and recycling operators). Manufacturers currently have no incentive to care about products' end of life. Involving them in the recycling process would make them design their products to be more recyclable.

Following the conference, the Veolia Institute posted session summaries and interviews with participants on its website. It also recently released online themed papers on the main topics raised during the conference: economic and cultural aspects of resource availability; promises of the circular economy; and areas for future research. A video of Lord Stern's address is also available on the Institute's website. ■

Prestigious Partnership



Dinah Louda, Veolia Institute Executive Director, and Achim Steiner, UNDP Administrator and former Director of the Oxford Martin School



The Veolia Institute organized its 10th international conference in partnership with Oxford Martin School, a multidisciplinary research center that is part of Oxford University. The school finances innovative research projects on various themes, such as climate change, disease, cybercriminality and inequalities. What these themes have in common is their potential to make considerable impact on future generations, reflecting a long-term approach fully in line with the Veolia Institute's future-thinking vision.

The conference also benefited from financial support from the Prince Albert II of Monaco Foundation.



➤ Resilient cities: prevention and adaptation

The resilience of cities in the face of climate change is a topic at the interface of social and environmental concerns, and an increasingly critical consideration for urban planners. The Veolia Institute has been engaged with this issue for a number of years, seeking to understand emerging new concepts and identify leading international experts and innovative local actors who are putting resilience into action in the field.



From September 19 to 26, 2017, the Institute co-organized a colloquium on resilient cities at the Cerisy-La-Salle International Cultural Center in partnership with Fabrique de la Cité, an urban innovations and future studies think tank set up by the Vinci Group. Researchers, academics, students, artists, businesses and actors from civil society gathered for multi-disciplinary discussions on the theme of Resilient Cities and Territories at the time when news headlines were dominated by reports of devastating hurricanes.

The colloquium offered a chance to explore how cities and territories can increase their capacity to adapt in the face of risks such as climate change, technological breakthroughs, migration and demographic changes, resource management, terrorism, and so on. The proceedings of the colloquium will be published in 2018.

A special issue of FACTS Reports devoted to the concept of the resilient city is also in preparation for publication in 2018. It will analyze the emerging new challenges that cities face and the ways in which they seek to meet them, motivated by preventing risk and delivering long-term sustainability. This publication will feature case studies and opinions from city managers, non-profit citizen networks, businesses, academics, and so on. ■

➤ Smart cities and engaged citizens

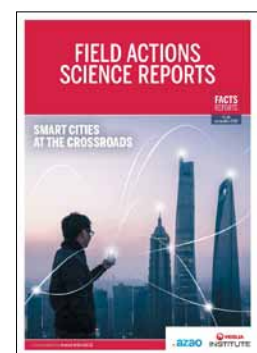
By opening up unprecedented prospects for cities, the digital economy is radically changing the lives of citizens. Smart cities can encompass numerous functions of life in the city – digital technologies offer far more than just optimized infrastructure and services. They contribute more fundamentally to the rapid rise of new ways to live, work and consume in the city. Smart cities hold out the hope of greatly improving people's lives, but they also raise fears.

In 2017, the Veolia Institute published a special issue of FACTS Reports entitled Smart Cities at the Crossroads. Coordinated by David Menascé, professor at the HEC business school and co-founder of Azao Consulting, this issue focused on three major themes: 1) The legitimacy, authority and social impact of smart cities; 2) A holistic approach to smart cities, articulating technology and citizen engagement; 3) Key factors for the successful development of smart cities.

To promote awareness of its publications at the time of publication and beyond, the Veolia Institute held a series

of conferences with the authors and experts, seeking to prolong the debate and enrich discussions on the topics raised.

One such debate, attended by over 100 people, was held on December 19 at Veolia's head office. It provided an opportunity to present the latest FACTS Reports special issue on smart cities and to debate the hopes and fears raised by digital technologies as we seek to re-imagine the cities of tomorrow. The debate looked at choices of economic model, the role of regulators and social impacts. Attendees included David Menascé, Régis Chatellier, Future Studies Manager at CNIL (the French public body in charge of digital privacy), Charles-Edouard Vincent, Founder of the Lulu Dans Ma Rue startup, and Alain Staron, Senior VP Digital Strategy at Veolia. ■



➤ Artificial intelligence and robotics: challenges of a new technological revolution



The speakers at the February 2018 conference on Artificial intelligence and robotics in the city (from left to right): Nicolas Renard, Mathieu Saujot, Nicolas Mialhe, Julien Hendrickx and Claire Falzone.

Artificial intelligence and robotics hold out immense possibilities, but the risks to society are also very real. On the one hand, AI's development is driven by the promise of higher incomes, better living standards and the creation of new jobs. On the other hand, the threat of mass unemployment, loss of personal privacy, possibilities of discrimination and a loosening of public oversight and control are all causes for caution. This makes it vital to get a better understanding of these technologies and the challenges they bring with them – ethical, geopolitical and economic in particular.

In 2017, the Institute published a special issue of FACTS Reports on Artificial Intelligence and Robotics in the City. The goal was to analyze and achieve a better understanding of the impact of the rise of artificial intelligence, especially for cities, and of the larger role AI plays in prediction and anticipation, including an examination of the challenges this poses to policymaking, personal data and city dwellers. The special issue featured an introduction by Dr. Sam Pitroda, credited with laying the foundations of India's telecommunications and technology revolution in the 1980s and a former advisor to the Prime Minister of India on public information infrastructure and innovation.

The issue was published in partnership with The Future Society, a think tank at the Harvard Kennedy School of Government that looks at how this technological revolution is reshaping society.

This issue of FACTS Reports is divided into three sections: 1) Understanding the rise of artificial intelligence; 2) AI in

the city: the age of prediction and anticipation; 3) Will we succeed in making the AI revolution work for everyone?

Following publication of this special issue of FACTS Reports, the Veolia Institute and The Future Society organized a conference-debate in February 2018 on artificial intelligence and robotics. Participants shared views on the threats and opportunities of these technologies and gave some pointers about how best to harness the potential of this technological revolution. The main speakers were:

- Nicolas Mialhe, Co-founder and President of The Future Society at the Harvard Kennedy School
- Mathieu Saujot, Coordinator of the Linking Digital and Ecological Transitions initiative at France's Institute for Sustainable Development and International Relations (IDDRI)
- Claire Falzone, Executive Director, Nova Veolia
- Julien Hendrickx, Professor at the Louvain School of Engineering.

This issue of FACTS Reports and the related conference-debate are follow-ups to the work of the Foresight Committee during its June 2016 meeting in Tokyo. The Veolia Institute called on a number of experts in robotics and artificial intelligence from Europe and Japan to help the committee with its work during the meeting. The goal was to look at applications of these technologies in healthcare and for decontamination of areas affected by nuclear disasters, as well as the ethical and social implications, with a special focus on employment. During its working sessions, the Foresight Committee examined in particular several experiments in Japan. ■

» Thinking about common goods

Already well known to economists, philosophers and political scientists, the concept of common goods has generated a renewed interest in recent years. **The Veolia Institute instigated thinking on this issue in 2016 and 2017, reaching out to researchers interested in this field and to managers from Veolia.**



The first step was to understand the meaning of the common goods concept. For economists, the definition is clear. These are goods whose use or consumption is non-exclusive (every member of a community can and should have access to them), but where there is rivalry between different consumers or users (consumption by one alters or reduces consumption by others). This concept is illustrated in the “tragedy of the commons,” defined by economist Garrett Hardin as the ruin of a community through over-exploitation of a limited resource. This starkly illustrates the need for appropriate governance and public regulation of the way that common goods are exploited, and is one of the core themes of all local and global environmental governance.

Beyond the economic theory, a raft of further theories have emerged based on the common good (in the singular) and the commons as a collective approach to managing scarce resources. A major contribution to thinking in this field was made by the winner of the 2009 Nobel Prize for economics, Elinor Ostrom, who was for several years a member of the editorial committee of SAPIENS, a review then published by the Institute. Some approaches deny the legitimacy of any interventions by private businesses in the management of common goods, while others attempt to set regulatory rules to apply to all actors, whether private or public.

The Institute’s work focuses on moving the debate away from purely doctrinal theories to concentrate on a few fields of particular importance for modern societies and that also impact Veolia’s activities.

The Veolia Institute held a number of workshop sessions during 2016 and 2017 covering different themes:

- **CONCEPTUAL** themes for defining dimensions of common goods and listing the ways it is used today
 - > Workshop 1 – Current thinking on common goods
- **OPERATIONAL** themes using multidisciplinary situations to identify the way common goods are defined, and the impact of these definitions in various areas
 - > Workshop 2 – Common goods and Water
 - > Workshops 3 and 4 – Common goods and Energy
 - > Workshop 5 – Common goods and Business
 - > Workshop 6 – Common goods and Nuclear
 - > Workshop 7 - Common goods and Big Data.

For each of these themes, the research work sought to determine appropriate concepts and data, suggest a framework for the role of business and corporate social responsibility, and identify a handful of concrete areas for further reflection based on experience in the field. A report on this work and its main conclusions is in preparation. ■

Outlook for 2018

The Veolia Institute is embarking on a new phase for 2018-2019, with a well-defined roadmap. It will continue to act as a platform for future thinking on subjects at the interface between environment and society with a range of projects during 2018.

1- A meeting of the Foresight Committee, in October 2018, will be dedicated to the topic of plastic in the oceans.

2- Two issues of FACTS Reports will be published:

Resilient Cities (1st half of 2018)

This issue will be divided into three main sections.

» **The first will seek to analyze the key risks and challenges**, primarily environmental, facing cities and the consequences these may have for their development.

» **The second section will look at the key levers available** to cities to increase resilience to risk and disaster. This will comprise a series of case studies looking at cities in the OECD and emerging economies, identifying best practices and innovative strategies to boost cities' resilience.

» **The final section will pinpoint the conditions** for successfully rolling out urban resilience to cities around the world.



Plastics (2nd half of 2018)

This issue will be divided into three sections.

» **The first will provide context, tracing the history of plastic and its importance to the modern economy.** It will also be an opportunity to present the variety of plastics and their uses as a way of illustrating just how central plastics are to consumer societies.

» **The second section will then look at the value and limitations of plastics**, offering an explanation of their importance to various sectors and presenting effects on human health and the environment, including seas and oceans.

» **The final section will feature contributions on the future of plastics**, looking at a wide range of issues such as the links between plastics and greenhouse gas emissions. It will present civil society initiatives and also explore the impact of regulation on changing uses of plastics.



3- These publications will be followed by conference-debates that will help to highlight the challenges raised.

4- Communication around the Institute's work will continue and intensify, with conferences to examine the issues raised in recently published issues of FACTS Reports. ■

Analysis - Anticipation - Dialogue

Veolia Institute

30 rue Madeleine Vionnet - 93300 Aubervilliers
France

www.institut.veolia.org



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