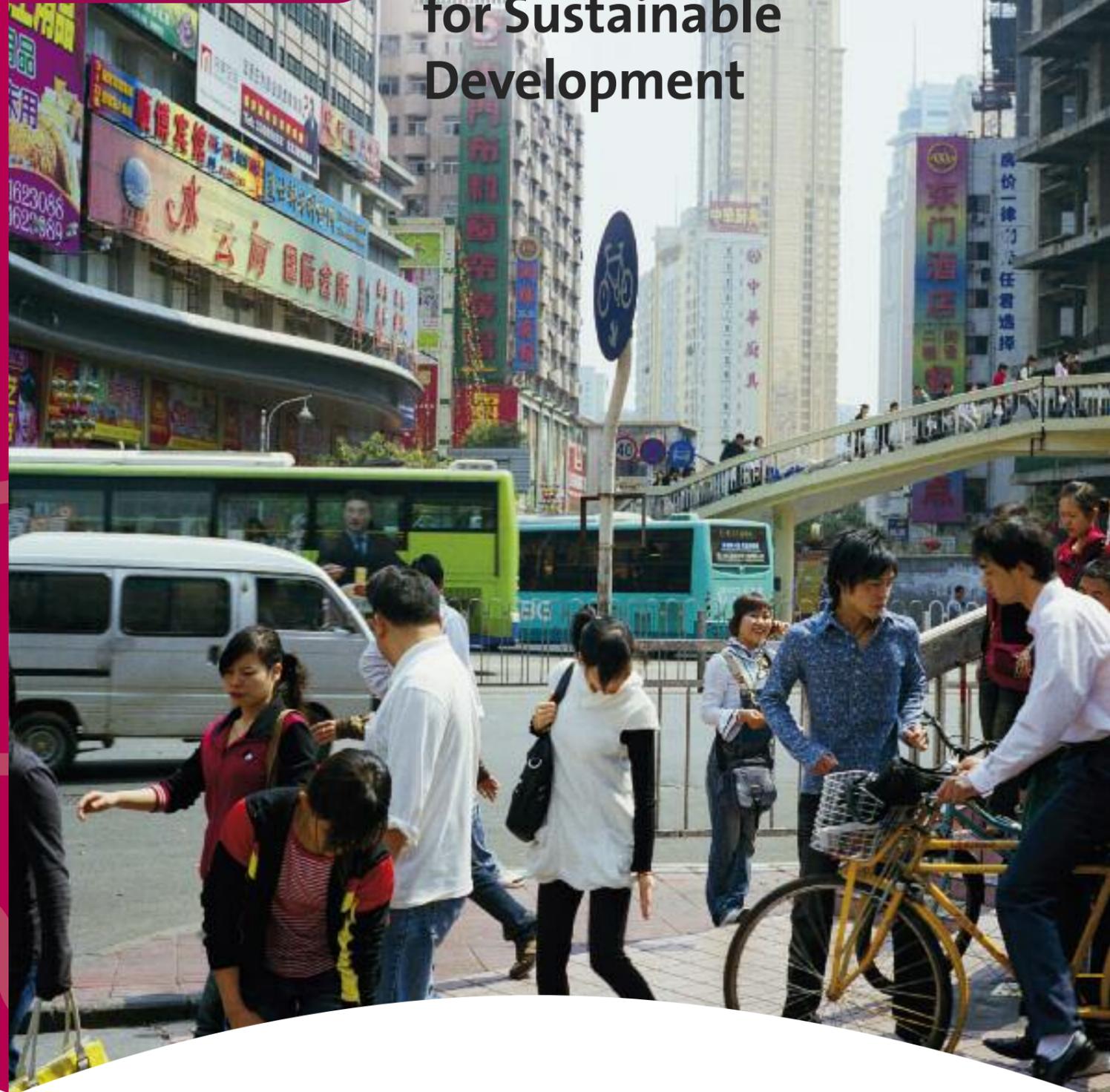


ENVIRONMENT / HEALTH

ENVIRONMENT / HEALTH

ENVIRONMENTAL AND HEALTH PERFORMANCE

Measurable Impacts for Sustainable Development



ANNAPURNA 8000

Veolia Environnement - Research & Innovation
 Communications Department - 36-38, avenue Kléber 75016 Paris, France
 com-recherche.ve@veolia.com - Website: www.veolia.com - Intranet: http://portail.veolia.net - Tel.: +33 (0)1 71 75 05 44
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Veolia Environnement
 36-38, avenue Kléber
 75116 Paris Cedex, France
 Tél. : +33 (0)1 71 75 05 44

www.veolia.com

Research & Innovation



Industrial development, while helping to improve general well-being, generates pollutants that can harm ecosystems and human health. Environmental and health considerations should thus be incorporated in the process as early as possible to ensure greater sustainability.

Veolia Environnement is seeking more effective ways to assess and anticipate the impact of its activities. It's looking to the future, seeking ways to prevent risks from emerging pollutants that could affect its employees, users of its services and residents of its facilities.

At the same time, Veolia Environnement is working to quantify the environmental and health benefits that it provides.

This involves appraising the value of its services based on new standards that transcend the traditional focus on economic performance.



According to France's Environmental Charter, which has constitutional status, "everyone has the right to live in a healthy, balanced environment."



In Tangier, an epidemiological study was conducted from 2004-2009 to determine the health benefits achieved by improving the drinking water supply and sanitation system. A final report and an assessment of the research protocol will be submitted in 2010.

ENVIRONMENTAL AND HEALTH PERFORMANCE



CHALLENGES

PREVENTING FUTURE ENVIRONMENTAL AND HEALTH RISKS

Veolia Environnement must plan ahead for the possible degradation of living environments, including its employee's work settings, the urban environment and ecosystems. In addition to current regulations, which encompass recognized dangers, questions are being raised about the health and environmental effects of new substances, such as fine and ultrafine particles emitted by combustion, nanoparticles from nanotechnologies, drug residue, endocrine disruptors, viruses and new situations, such as climate change, and social anxieties.

R&I must identify and prioritize emerging dangers, decide which Veolia Environnement activities are involved and develop preventive measures.

DEVELOPING ANALYTICAL TOOLS

Veolia Environnement must improve its ability to analyze both physiochemical and microbiological pollutants in order to understand the emerging parameters, prioritize them, and improve the performance of existing methods in terms of precision, cost, ergonomics, rapidity and so on. These tools are designed to expand the array of services provided by Veolia Environnement's Environmental Analysis Center (CAE).

ASSESSING VEOLIA ENVIRONNEMENT'S ENVIRONMENTAL AND HEALTH IMPACTS

We must develop methods for assessing Veolia Environnement's impact on the environment and health. These methods can be used as decision-support tools when designing treatment facilities or for monitoring operations, preparing reports or providing information to local residents afterwards. Our efforts will be based on LCE (life cycle analysis), quantitative and qualitative analyses of health risks, and computer modeling tools.

Summary

Our research efforts take a risk-prevention approach and seek to assess and promote Veolia Environnement's environmental and health-related performance.

THEY MAINLY FOCUS ON:

- Epidemiological studies.
- Studies examining human exposure to pollutants and studies on their impact.
- Development of sampling techniques and analytical methods.
- Development of modeling tools.
- Identification of monetary valuation methods for the positive and negative environmental impacts of Veolia Environnement's activities.

ASSESSING VEOLIA ENVIRONNEMENT'S ENVIRONMENTAL AND HEALTH-RELATED PERFORMANCE

Veolia Environnement appraises the environmental performance of its activities and resources as well as the environmental and health value of the services it provides.

This approach exceeds the conventional criteria of environmental management: it is no longer limited to the organization alone, but now includes its products and services as well, and introduces such criteria as resource-saving measures for energy, water and raw materials and the replacement of dangerous substances. To assess performance, we need to identify the standards on which these criteria are based.

Veolia Environnement's approach also expands the traditional set of economic factors used to determine compensation for Veolia Environnement's businesses (mainly volume delivered or tonnage handled): it seeks to determine the monetary value of its environmental efforts, whether it concerns harm avoided or a direct or indirect benefit. Putting a money value on the services provided by biodiversity is one of our research topics, the same way we appraise the health benefits achieved by providing sanitation or drinking water in developing countries. In this way, we are creating a technical and economic framework for devising future compensation methods for Veolia Environnement.

PROJECT DETAILS

ANTICIPATING CHALLENGES

- Identify the impacts of emerging dangers for our activities and facilities.
Create an organization or systematic approach to understand and prioritize them. Review the status and outlook for each emerging danger. Recommend actions and diffuse information about nanoparticles and ultrafine particles.
- Protect people's health.
Analyze the potential impacts of Veolia Environnement's activities on the health of its employees, residents and users (exposure to disease-causing microorganisms and hydrogen sulfide from the treatment of wastewater and exposure to bioaerosols from wastewater treatment plants, waste composting, etc.). Develop measurement and assessment tools for protection and monitoring of recommendations or nationally or internationally established guidelines.
- Update Veolia Environnement's non-financial reporting.
Anticipate changes in the regulation's requirements or scope of application relating to the dissemination of Veolia Environnement's data, first according to the GHG Protocol, which is used to record a company's greenhouse gas emissions.



ANALYTICAL TOOLS

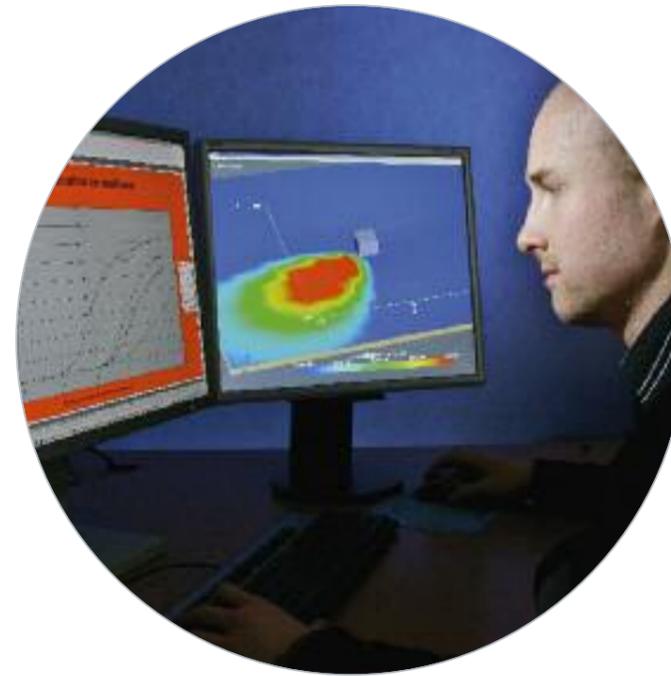
Develop comprehensive analytical frameworks applicable to different settings (air, water, soil, compost, etc.) for viruses, endocrine disruptors, health products and treatments, and dangerous substances to determine bacteriological and disease-causing indicators and analyze gaseous matrices, the quality of swimming water, etc.

ENVIRONMENTAL AND HEALTH IMPACT

- Use a modeling tool for studying the atmospheric dispersion of pollutants (gas, particulate matter, odors).
- Assess processes by examining the life cycle.

ENVIRONMENTAL AND HEALTH-RELATED PERFORMANCE

- Work with the environmental performance department to develop new environmental and health indicators, especially an indicator assessing the performance of drinking water production.
- Anticipate future economic determinants. Develop future compensation, cost and benefit methods for Veolia Environnement by taking into account the new services it is offering as well as the changing environmental economy.
- Continue epidemiological monitoring as part of Veolia Environnement's services in Tangier and Bangladesh with a view to determining the health benefits achieved by building safe sanitation systems and/or by providing higher-quality drinking water as well as advising populations on good hygienic practices.



The tool that R&I developed for modeling the atmospheric dispersion of pollutants simulates emissions from Veolia Environnement's various facilities, including waste-to-energy plants, waste storage facilities, wastewater treatment plants and composting facilities. The researchers are working to implement the tool in the operational departments. They are also continuing to develop the tool so that it can be used on a wider scale, not only for conducting the regulatory studies necessary for obtaining an operating permit, but also for the project design phase, equipment sizing, facility operations and resident outreach.

Interview



Laurence Duyck,
Manager, Environmental and Health-Related
Performance Program

“It's going to be increasingly necessary to include external, environmentally related costs and benefits in the way we operate.”

You're trying to develop future compensation methods for Veolia Environnement. Could you explain why?

« Selling energy savings to building managers and manufacturers, recycling industrial wastewater during the production process, recharging groundwater: all of these new services introduced by Veolia Environnement to save natural resources aren't only attractive for our customers but for the environment as well. So it makes sense to financially capitalize on these services. But how do we compensate ourselves? Who will pay? Based on what economic models? These are the types of questions we're trying to answer. Our evolving services and the environmental economy have become decisive economic factors in charting Veolia Environnement's future compensation system. »

What do you mean by an "environmental economy"?

« Like households, companies will have to increasingly incorporate external, environmentally related costs and benefits in the way they operate. The market barely takes these into account today. Some cost-related examples are the CO₂ emissions certification market

created by the Kyoto Protocol, the revision of the TGAP (French pollution tax), the introduction of a carbon tax and the expansion of producers' responsibility (producers' must manage the social and environmental impact of their activities). Certain countries already mandate compensation for environmental damage and the loss of biodiversity.

From a benefit perspective, Veolia Environnement is working to protect and restore biodiversity through current and future programs, such as managing well fields, ecological engineering and habitat restoration. »

How can you incorporate environmental data in a market economy?

« It's especially important for us to understand the monetary valuation methods relating to our positive and negative environmental impacts and how to apply them to Veolia Environnement's activities.

We have to identify the businesses and operating regions concerned. The goal is to develop an effective way to value our 'eco-economic' costs and benefits. »



Bioaerosols are microorganisms and biological agents transported by liquid or solid particles suspended in the air. Some of them cause diseases, such as colds, asthma and chronic lung diseases. There are no international regulations governing exposure to bioaerosols.

Veolia Environnement is leading a research project on bioaerosols with the aim of protecting the health of its employees, particularly those working in wastewater treatment plants and sorting centers. A literature search for epidemiological studies on the subject was conducted. More in-depth studies are underway to identify the most exposed areas with wastewater treatment plants and to develop preventive measures. Efforts are also being made to standardize tools for analyzing bioaerosols.



Drinking water in Bangladesh

In Bangladesh, underground water resources are naturally contaminated by arsenic. The rural populations who drink this polluted water are exposed to the risk of contracting a serious disease. Veolia Water has joined forces with Grameen Bank, a microcredit institution founded by Muhammad Yunus, winner of the 2006 Nobel Peace Prize,

for the purpose of financing and operating five drinking water production plants. This pilot project, which will serve some 100,000 villagers in central and southern Bangladesh, is based on the social business principle of "neither losses nor dividends."

Monitoring of arsenic levels

The first plant came on stream in June 2009 in Goalmari, which is located about 100 kilometers from Dacca. Water is distributed by a system of storage reservoirs and standpipes, with deliveries to the most remote areas. R&I has launched a study to quantify the health benefits

of providing drinking water to the populations concerned. The change in their contamination level is measured on a sample of 400 people during urine analysis campaigns. At the same time, surveys are being conducted to gain a better understanding of local eating habits.