HOW INNOVATIVE SOLUTIONS HELP VEOLIA TO DRIVE ECOLOGICAL TRANSFORMATION WITH ITS STAKEHOLDERS

Catherine Ricou
Head of Innovation of Veolia

Vig'ileo, Veolia's latest hypervision center for managing the water service of the future - launched by the Métropole Européenne de Lille.

As the Head of Innovation at Veolia, Catherine Ricou is supporting the company to cultivate a culture of innovation in pursuit of ecological transformation. Because of the company's work in strategic domains including water management and technology, waste recycling and local and decarbonised energy management, Veolia is in a privileged position to drive the ecological transformation of its customers and partners, as well as its own. In this article, Catherine Ricou shares real world examples of the innovation solutions that the company is deploying in pursuit of these goals, blending new technologies with innovative business models and processes. These examples, alongside the investments the company is making in fostering innovation internally and externally, can serve as inspiration for many other companies.

Catherine Ricou became Head of Innovation of Veolia in 2022. A graduate from AgroParisTech, Catherine has more than 25 years of experience in the field of environmental management, water, waste and energy recovery, with roles in engineering and operations, and finally strategy and innovation. Since the merger with Suez by Veolia, Catherine has taken responsibility for innovation for the new scope of Veolia to develop solutions tackling challenges including: climate, energy, pollution management and circular economy. Previously, she managed capital planning for water, engineering services and related innovation in the United States for Suez.

INTRODUCTION

As they increasingly recognise the urgency of addressing climate change, scarcity of resources, pollution and loss of biodiversity, companies become strongly motivated by the imperative to address their environmental impacts, including reducing carbon emissions and meeting net zero targets, reducing pollution and building circular loops to reduce resource wastage.

Veolia is in a somewhat unique position. Of course, the company has set its own target to achieve net-zero emissions by 2050, as well as additional targets concerning other major environmental issues. But, thanks to its capabilities with 165 million euros invested in 2022 and 14 R&D centers across the globe, experience and portfolio of innovation – nearly 5,000 patents – we provide in strategic domains including water management and technology, waste recycling and local and decarbonised energy management, Veolia is also set to play a major role in supporting other companies' and jurisdictions' sustainability journeys.

In 2022, the company published its new statement of purpose; declaring that *"We develop and implement locally solutions to depollute our vital resources and preserve them from depletion, solutions to decarbonize our ways of living and producing and adapt them to the consequences of climate change."* The same year, Veolia's actions helped decarbonize their client's activities, and contributed to avoiding 14 $MtCO_2$ being released in the atmosphere and saving 320 million m^3 of water compared to 2019 thanks to reducing network leakages.

In support of our purpose, Veolia has made innovation one of its key assets to achieve ecological transformation. Using a range of innovation approaches combining technologies with new business models, and in collaboration with a wide range of partners and experts, we are pursuing the development of practices that can drive significant carbon reductions and other reductions in environmental harms.

As Head of Innovation at Veolia, I have the honor and responsibility of leading the company's work across major strategic innovation pillars of ecological transformation: decarbonisation, depollution and resources' saving and regeneration.

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Innovation is not the work of one siloed team, but the day to day contribution of all employees including in market, operations, sales and support functions. A crucial part of my team and I's role then, is to create the conditions of ideation, incubation and collaboration for the definition of new projects and the deployment of innovation across our teams. In this article, by sharing examples of projects and approaches that we are pursuing, the mindsets and skill sets we are cultivating in doing so, I hope to illustrate the pace and scale of change that large businesses are pursuing in support of ecological transformation, and the crucial role that innovative companies like Veolia can play in driving wider change through innovation.

THE ECOLOGICAL TRANSFORMATION IS FACING SEVERAL CHALLENGES WHERE INNOVATION CAN PROVIDE SOLUTIONS

While some may argue that new technologies could lead, at the end, to increasing unexpected negative impacts on the environment, it is of the utmost importance to conciliate innovation with clear benefits in terms of energy consumption, raw materials and resources utilization, and waste generation. At Veolia, any new innovation solution and technology is weighted and rated regarding its net contribution to the ecological transformation. This way, we aim at developing meaningful innovation that contributes to regenerate ecosystems that have been damaged and polluted by the extractive and throw-away model of previous decades.

But innovation in the context of ecological transformation is not only a question of technological advancement. Alongside this comes innovations in business models, in notions of value and social equity and accessibility. Water reuse either for municipal markets, agriculture or industrial needs is a clear example. The technologies exist to produce reused water of very high quality. However, the challenge of implementing the innovation relates to social acceptance of reusing water for agriculture, or even more for potable drinking water, on top of defining the overall governance for water usage and competition between uses in the context of water scarcity.

In our work with other companies and public entities, Veolia is deploying a wide range of projects that illustrate and promote these wider forms of change. Next, I will share some of those examples.

DELIVERING A MORE RESPONSIVE APPROACH TO CIRCULAR MATERIALS

The world's current linear economic model, which centers on the unsustainable cycle of "extract, produce, consume, throw away", poses a grave threat to our planet's limited resources and the well-being of its 8 billion inhabitants. While several planetary limits have already been exceeded, addressing this challenge is crucial, especially with the growing adoption of new green technologies, like electric vehicle batteries, wind turbines, and photovoltaic panels, which require substantial amounts of critical materials such as copper, cobalt, nickel, lithium, and rare earths.

Veolia is spearheading efforts to address this challenge. For example, in circularizing the production of electric vehicles batteries; from mechanical recycling to refining lithium and other strategic metals, which has been strongly encouraged in Europe via regulations that promote the re-incorporation of strategic metals in new electric vehicle batteries.

Another example is the company's Plastiloop, the first global integrated platform for circular polymers, that relies on an extensive network of experts and 37 plastic recycling plants around the world. The new offer combines the technological ability to produce high-quality recycled products with a circularized and demand-based business model. This combination of innovations is helping to create purer recycled outputs that not only curb the need for new materials but also reduces pollution sources.

As Samra wastewater treatment plant, Jordan. This plant treats and redistributes wastewater from the capital and the surrounding area. 25% of the country's agricultural water requirements and 12% of global water needs (for domestic use in particular) come from this site.

While the technologies involved are impressive, the most notable innovation is the approach taken. With Plastiloop, Veolia starts with the end product and works with our customers to define the exact qualities and standards their products require, and produce those materials from recycled products. Whereas most recycling processes begin with "let's recycle the waste and find uses for it", here, we ask "let's establish what our clients need, and recycle for that outcome." By taking a similar approach, other businesses can embrace a core principle of circularity; pursuing the highest value re-use of any material in sequence and ensuring it is used, not wasted.

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REMOVING POLLUTANTS MORE EFFECTIVELY AND EFFICIENTLY

Across the globe, the urgency of removing pollutants from the environment is becoming increasingly evident. The Food and Agriculture Organization of the UN paints a concerning picture: roughly 33% of the world's soil is currently degraded, a condition largely attributed to the excessive use of chemical fertilizers. This signifies that the earth's natural capacity to filter out and neutralize pollutants is waning, illustrating the importance of innovative de-pollution initiatives to extract contaminants from the environment.

Water is central to the fight against pollutants in the environment. Where water flows, pollutants go. Hence the importance of detecting pollutants which result from industries, agriculture and our own consumption (pharmaceutical residues, residues of pesticides, microplastics...). Legislators across the globe, and in particular in the EU and US, are taking action to tighten regulation on effluents as well as water quality.

Veolia has placed depollution and addressing new pollutants as a cornerstone of its innovation strategy. Veolia's approach encompasses various pollution types across multiple environments, including soil, air, and water. The company has developed a range of technological solutions; from zero-liquid discharge solutions, reverse osmosis processes and flue gas treatment; for private and public water utilities in addition to strategic industrial markets, across all our geographies, with a large footprint in North America, Australia, Asia, Europe and Middle East.

The challenge that Veolia faces isn't only about developing advanced treatment technologies. These solutions could often come with an increased energy footprint and the need for supplemental chemicals. Recognising the importance of considering these multiple environmental trade-offs and challenges together, we are also turning our innovation towards enhancing the efficacy and efficiency of these processes to minimize secondary environmental impacts.

FROM GRAY TO GREEN INFRASTRUCTURES

Cities around the world are grappling with the dual challenges of increasing urbanization and climate change. With city jurisdictions, Veolia is navigating this challenge by shifting from a gray to a green&gray approach to infrastructure, described by the European Commission as a planned network that blends both natural and semi-natural areas with other environmental elements. Nature Based Solutions have been identified by the IPCC as key green infrastructure solutions for Climate adaptation and Water resilience. Its purpose is twofold: to provide human well being and to give essential ecosystem services to cities thanks to biodiversity. Instead of viewing nature as a challenge, green infrastructure innovations see it as an ally in building resilient, efficient and biodiverse infrastructures and urban ecosystems.

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An example of this transformative approach can be seen in Alicante, Spain. The Urban Flood Park La Marjal, a collaboration between Aguas de Alicante and the Alicante City Council, spans 3.6 hectares. This initiative stemmed from a genuine need : protecting Alicante from severe flooding, while reviving biodiversity and improving health and well being.

The park's design, with green spaces with four Mediterranean native vegetation types and two purpose-built ponds, designed to mimic Mediterranean wetlands, revolves around water retention. Two strategically placed collectors in flood-prone areas harness rainwater, guiding it safely into the ponds. This not only helps combat flooding but provides a sustainable approach to managing water.

Urban Flood Park La Marjal in Alicante, Spain.

And this infrastructure's design logic extends beyond mere water collection. The harvested rainwater isn't left stagnant – using the principle of a circular water management system with a cascade for water oxygenation, and aerators to avoid algae blooms. Excess water is also rerouted to wastewater treatment facilities to be reused for irrigation and city needs.

The park has been proposed and designed by Aguas de Alicante, a 50-50 joint venture between Veolia's Spanish subsidiary and the Alicante Municipality. And operation and maintenance responsibilities are shared between the Alicante City Council (gardening, irrigation systems, landscape design, park cleaning, security, and social activities) and Aguas de Alicante (water quality, algae control, pumps, rainwater inlet control from the lagoons, and ornithological center management).

FROM VOLUME TO VALUE

Veolia is also adapting its business approach to better align with climate change objectives by moving from a "volume to value" model. One of the earth limit boundaries is the Freshwater Use: This boundary concerns the unsustainable use of freshwater resources, particularly in terms of excessive water consumption from rivers and aquifers. Facing the climate adaptation challenge, Veolia is providing Water conservation solutions to ensure the reduction of "volume" of water being used in all the ecosystems, to reduce the risk of Water scarcity.

For example, on May 11, 2023, Veolia renewed a contract to supply water to the Lille metropolitan area for the next ten years. Unique to this contract is a stipulation that the company aims to reduce water consumption by 10% throughout the contract's duration, a first in France. If not met, financial penalties have been agreed upon. As Estelle Brachlianoff, the CEO of the group, pointed out, this contract represents a change in the company's traditional business model, where the focus is now on conservation and value.

To achieve this, Veolia plans to leverage advancements in water management technology. The company will work on limiting water leakage by introducing 5,000 sensors and probes to their network and by renewing close to 12,000 drinking water connections. Another integral feature is the "leak alert" system, which provides remote meter reading capabilities piloted by Vig'iléo, an extension of Veolia's Hubgrade hypervision centers. This system is designed to identify unusual increases in consumption, potentially pointing to leaks, and can provide alerts in as little as 48 hours.

Furthermore, Veolia understands the importance of engaging its consumer base, which numbers 1.2 million in the area. To this end, the company will be providing "consumption coaches" to assist users and developing apps that offer insights into individual water usage alongside an innovative approach for a balanced tariffication. Collaborative efforts are also planned with large-scale water consumers such as businesses, local authorities, and housing managers. Veolia aims to finalize 1,200 water-saving contracts, with the goal of each achieving a 15% reduction in water consumption.

Veolia is particularly proud of this innovative approach, which aligns commercial success with positive outcomes for the environment and communities, and which illustrates the opportunity that many other companies have to adjust their business models to serve people, planet and profit at once.

CULTIVATING AN INNOVATION SPIRIT

INSIDE OUR WALLS

From ideation, to incubation and then industrialization, innovation is about people, talent, discipline, market knowledge, processes, understanding of business models, perseverance, and entrepreneurial spirit. As an organization of more than 220,000 people Veolia needs to create an enabling environment and invest in fostering these features to create an innovation spirit at the company.

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Because innovation is part of their daily missions, it is our duty to train our employees to provide them with all the skills and tools necessary for innovation, alongside an enabling environment in which it can take place. This is the mission statement of the Innovation Academy that Veolia launched in 2022 to boost the innovative mindset and unlock the innovation potential across the group.

In its first year, the Academy has focused in particular on working with business units to develop innovation programs in their territories. Based on these programs, the Academy is working with managers to spread innovation amongst the culture of Veolia and developing supporting tools and training – both for innovation focused staff and to help all employees to identify the role they can play, even when innovation is not formally part of their job description.

Already, innovation is permeating the culture of the company, and gives us confidence in our ability to drive our own transformation and those of our clients in the coming decades.

OUTSIDE OUR WALLS

To give ourselves the means to respond to the urgent need to find new solutions to the ecological crisis solutions to the ecological crisis, Veolia is developing Open Innovation ecosystems. These Open Innovation programs

Electric car battery recycling.

and initiatives enrich or accelerate projects for which in-house knowledge is less or to discover and support new solutions that complement or enrich our own. First and foremost, this means investing in start-up incubators, with which we have forged numerous partnerships around the world.

For these start-ups, like PureControl with which Veolia optimizes energy consumption in Wastewater treatment plants for example, the support of a Group like Veolia often makes it possible to access resources, visibility and credibility. For Veolia, this often means agility and reactivity to address activities that are still considered "niche" but with great potential. Open innovation at Veolia also translates into partnerships with scientific and academic institutions, to help bring to light biological, physical or chemical issues that are still not fully understood, and to accelerate fundamental knowledge.

CONCLUSION

Working with leading thinkers and institutions, including many that have contributed to this FACTS report, I and all of Veolia are motivated by the responsibility and opportunity of putting innovation to work for people and the planet. Pursuing ambitious targets to reduce our own emissions is of course essential. What is most exciting, though, is the potential to be a driving force of the transformation journey of so many other organizations and places, and to do so using what has made this business a success; our capacity to innovate. The examples shared in this article illustrate the combination of technological and business model innovations that are helping us to succeed by supporting our clients' transformations in support of a better planet.

While the nature of our business perhaps places Veolia in a privileged position in terms of the scale of potential impact, the principle of seeing an organization's purpose as being to support others to drive the ecological transformation is one that many businesses can adopt. Achieving this purpose requires a deep investment in the people and practices of the organization to foster an innovation mindset, and it means looking around the corner and outside of your walls to work with others for speed and scale. It means adopting business models that mean your company does well when the planet benefits.