Lost – and found – in the city

The potential of Smart Cities to convert urban problems to promise

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

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

Smarter responses

Smart cities are those in which modern, integrated technology services and infrastructure are applied to respond to social, environmental and economic challenges and improve citizen quality of life. The smart city concept includes using information communications technology (ICT) to optimize resource use and reduce emissions, creating smarter urban transport networks, upgraded water supply and waste disposal and recycling facilities and more efficient ways to light and heat buildings.

"Cities that in the past were built on riverbanks are today built along highways. But in the future, they will be built based on optical fiber networks and next-generation infrastructure," said Indian Prime Minister Narendra Modi in announcing a plan to build 100 smart cities.

With its expertise in resource conservation, recycling and reuse, Veolia is well positioned to play a major role in the creation of smart cities. A telling statistic: by 2030, it is estimated that nearly half

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

Expert role

Major city services providers, born in the industrial age of the mid-19th century, are finding their knowledge and experience highly valued in this new revolution of intelligent city management. "Through our role as operators in the trenches, we understand the reality of how urban systems operate," comments Laurent Auguste. "We've been doing this for years as good engineers, gathering data for our own needs in order to help cities improve their infrastructure and the delivery of water, waste and energy services." He adds that Veolia is today going beyond its traditional operating role by leveraging the collected data and accumulated expertise as elements of its offer. "The array of services we deliver now extends to performance benchmarking, analysis and interpretation of data and consulting services that are accelerating the development of smart cities."

Like Veolia, other large companies such as IBM, Cisco and Siemens are working individually or in partnership to help mayors and urban planners throughout the world to implement smart city initiatives. One of the significant emerging challenges is finding ways of pooling and processing data in real time and making it available for the swelling numbers of apps omnipresent on smartphones and

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

Shifting the paradigm

Reaching the next level in smart cities development will require new ways of thinking, including about issues like open solutions and open data, according to Colette Maloney. "To transform cities, we need to change how we plan and work and define common ways of collecting, structuring, formatting and ensuring the availability of data, as well as developing horizontal standards that apply across different sectors."

Laurent Auguste points out that Veolia is contributing to this paradigm shift by innovating and demonstrating new ways of using data to simplify and improve the management of cities. "It's a new role as important as our traditional focus on the technical or investment demands of inventing better sensors or improving infrastructure. For a company whose mission is Resourcing the World, it's an exciting time of change and opportunity as we tackle the enormous challenges confronting cities – and society." ■

Planning Smarter

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

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

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

> "The city of Santiago sees this tool as an important opportunity to share a vision for the city with its citizens"
>
> Éric Lesueur, CEO of Innove, Veolia's innovation incubator

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

m2ocity
Getting Wired

by Taïsei Miura, m2ocity's CEO

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

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

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

My building's smarter than your building

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

Combining strengths with IBM

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

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

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

What exactly is the Baugruppe 3XGrün?

Berlin living

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

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

> **Beautiful collective housing**
Pankow is the one-time residential district of the leaders of the former East Germany.
Berlin city center 12 minutes away by public transport.

> **A prototype building**
Five residential floors, a 6th-floor terrace and communal gardens. 100- to 200-m² apartments, all with customized layouts.

> **Eco-friendly materials**
• **Facade:** innovative combination of wood and fiber cement sidings, prefabricated in the workshop and assembled on site (one floor built in two weeks)
• Triple glazing
• **Biomass heating** with wood pellets
• 100% environmentally friendly electricity supplied by BS Energy (Veolia subsidiary)

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