BACKGROUND: WHY TAKE ACTION FOR THE URBAN CIRCULAR ECONOMY?

Every single business sector and geography potentially stands to benefit from the circular economy. Cities, however, play a particularly central part in this transformation process, due to the amplifying power of the human concentrations found there. The concept of the circular economy first made its appearance in French law with the Energy Transition Act for Green Growth (17 August 2015), aimed at «moving past the linear business model built around extracting, manufacturing, consuming and disposing, by ushering in a tempered and responsible way of making use of natural resources and primary raw materials». Cutting back the footprint left by cities is thus the major sustainable development challenge facing our societies.

Cities are hotbeds of activity and interaction. They are the driving forces of our economy, providing jobs and services, and can accurately be described as catalysts of creativity and innovation. Nearly 50% of the world’s population (80% in Europe) live in urban environments, which in turn generate more than two-thirds of the world’s GDP. However, they are also the source of dead-end situations, as already-developed or fast-growing societies find themselves inevitably incapable of concurrently doubling their urban growth rates and reducing their environmental footprint (the current environmental footprint per person on the planet is 2.3 ha, which already exceeds the Earth’s capacity level of 1.8 ha). Lastly, the urban environment is the source of 70% of greenhouse gases and most of the waste production on the planet (5.5 tonnes per year and per inhabitant, including 452 kg of household waste).

By 2030, 600 cities across the world - 300 Northern countries and 300 Southern - will be home to two-thirds of the global population and concentrate 60% of the world’s GDP.

WHAT ARE THE MAIN AREAS FOR INNOVATION WHEN IT COMES TO THE CIRCULAR ECONOMY?

The innovative ideas can be classified into 3 main categories:

- **The urban local economy:** It is in urban services that the greatest potential for resources can be found. The local circular economy approach makes it possible to use the waste and refuse from a production cycle, turning it into resources for another cycle, of the same or different nature. Geographic proximity is often a key success factor for production cycles of this kind. With cities and rural areas now located close to one another, there is real opportunity to develop new complementary modes of production.

- **Recycling, re-usage and reuse, eco-design:** circularity in material use and in usages makes it possible to optimise the consumption of natural resources. Circularity, in this case, encompasses all the responses available to companies interested in cutting back their resource consumption (re-use, re-sale, repair, recycling, etc.), but also in taking action upstream, by...
designing products differently, based on analysis of the entire life-cycle and construction operations on the scale of a building, an urban development operation, or an infrastructure, and focusing in particular on looking for alternative sources of material and ways to reduce environmental impact.

► **The ownership economy:** This approach stands in for the sale of services and products: the seller, remaining the product-owner, has more to gain from improved product life cycles. The innovative ideas shown in the pamphlet fact sheets illustrate each category of innovation separately -- but, on the ground, they can be combined or blended.

/// WHAT KINDS OF INNOVATION ARE INVOLVED?

The innovative ideas presented generally combine several different types of innovation.

► **Technological:** solely-technological innovation can be necessary, but is not necessarily the norm, nor the most frequently-chosen type of solution. That being said, the use of new information and communication technologies based on digital is, in most cases, a prerequisite for rolling out and speeding up the spread of the targeted innovations.

► **Economic and legal** to enable the development of new business models and facilitate the integration of urban functions.

► **Organisational** to innovatively bring together players from very different walks of life (companies, local authorities, universities, citizens, etc.) around shared projects to reduce their city’s environmental footprint, reduce raw-material intensiveness to provide the same service at lower environmental cost, by turning the waste from a service or production cycle into a resource for another cycle of a different kind.

Most of these innovative ideas need to be backed up by **behavioural change** on the part of the players involved, first and foremost, the users.

/// WHAT ACTION IS BEING TAKEN IN FRANCE TO SUPPORT THIS INNOVATION?

For many years now, France has designed its public policy to support development and experimentation with innovative techniques for saving raw materials in industrial processes and service provision. In 2016, the following programmes were of note:

► **The Investments for the Future Programme (PIA)** supporting innovation designed with an all-encompassing view of the life cycle;

► **The “Zero Waste Territories” programme** championed by the Ministry of the Environment, which supports and provides assistance to municipalities that have committed to considerably lowering waste generation and developing new avenues for re-use;

► **Mobilising the elected officials and civil society**, for instance by creating the Institute for the Circular Economy, the OREE Association, or ADEME’s support for multiple initiatives on the ground;


Amétyst comprises two distinct treatment lines for:
- Residual household waste from door-to-door collection. This waste is also referred to as the “gray trashcans”.
- The fermentable portion of household and similar types of waste (bio-waste), comprised of purely organic waste. Part of this waste comes from individual households, the remainder originates from other producers such as restaurants, markets, and businesses.

After mechanical sorting, waste is conveyed to eight dedicated digesters. Implementing a process of anaerobic biochemical reactions, these digesters transform part of the organic matter into biogas.

After treatment, the biogas produced by household waste digestion is then transformed by co-generation units into:
- Electricity, which is injected into the network
- Heat, which is used by the plant itself for process needs
- Heat, which is used by SERM for the collective heating and cooling network for the new Grisettes district in Montpellier.

Residual organic matter is then set aside for maturation to produce compost that can be used for farming and landscape development needs, or otherwise stabilized before being transported to a non-dangerous waste disposal site.

**KEY PRODUCTION DATA FOR 2015**
- 18,724 MWh electricity, sold to EDF
- 6,740 MWh thermal power transferred to urban heating network for Grisettes district, etc.
- 2,568 MWh heat consumed for the plant’s own needs.
- Saint Roch clinic connected to the heating network.
- In the long-term, 2,300 apartments in the Grisettes zone will be supplied by Amétyst.

**INNOVATIONS**
- 1st heating network connected to a methanization plant.
- High energy yield, unparalleled with respect to other methanization sites.
- The consistent quantity and quality of produced biogas enables optimal operation of cogeneration engines, with regular delivery of heating for apartments and businesses in the Grisettes zone, a certified eco-district.
The plant implements technologies developed by Vinci Environnement to recycle matter and transform it into energy and compost.

Co-funding by Région Languedoc-Roussillon Midi Pyrénées and ADEME.

RESULTS

2015 was marked by the kick-off of a new public service delegation contract signed with Novergie to operate the Amétyst methanization plant. Major work projects were undertaken successively, totaling about €9.5 million, by the delegated contractor to significantly improve plant production results in the long-term, by over 30,000 tons of standardized compost, and 10,000 tons of solid recovered fuel (SRF).

The work was completed on February 29, 2016, as stipulated in the terms of the public service delegation contract.

At the end of the first few months of service and ramp-up of the new equipment, the production of standardized compost reached 2,800 tons (March 1 to July 31), in compliance with fixed goals, compared to 175 tons of compost produced in 2014.

FINANCIAL ASPECTS OF THE OPERATION

The plant implements technologies developed by Vinci Environnement to recycle matter and transform it into energy and compost.

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KEY FIGURES

- Construction: 86 M€ (pre-tax)
- Operation: 150 M€ over 10 years

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