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 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 pre-requisite 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;

This project entails recovering waste heat produced by the WtE plant in Halluin (800 GWh per year) during the treatment of municipal waste, superheating water to 120°C, then transporting it more than 20 km to supply the Lille and Roubaix urban heat networks. The project will cost an estimated €60M, and will improve recovery of waste-to-energy in the form of heat as well as develop new heat networks. Work is scheduled to begin in 2018 and will go into effect in 2020.

INNOVATIONS

- An objective to recover 300 GWh per year of waste energy in the form of heat.
- More than 50 MW of power available for urban heat networks, unique in France.
- An “energy highway” of more than 20 km in an urban setting.
- An investment that will lower the cost of waste treatment and will recover sustainable and economical energy for urban heat networks.

STAKEHOLDERS

- This project is above all a concrete illustration of the advantages of expanding the MEL’s competences to the territorial level.
- Before 1 January 2015 and the MATPAM law, the metropolis had jurisdiction over waste management, and towns were responsible for heating networks. The result is that heat waste was only partially recovered in the form of electricity at the WtE site.
- After 1 January 2015, when the MEL took on its new competences, there was an opportunity to recover heat produced in the WtE plant in the metropolis’ urban heat networks.
- The project stakeholders are the MEL, the operators of the WtE plant and the heat networks, the cities, and ADEME for the project funding.

KEY FIGURES

- 300 GWh of waste energy recovered for the heat networks
- More than 20 km of transport networks
- €60M investment over 20 years entirely covered by the sale of heat
IMPLEMENTATION

- A 20 km network of two pipelines (DN 500) will be installed to transport heat at 120°C along a semi-urban and then urban route. Construction and operations will be entrusted to the operator of the municipal waste incineration plant as part of a concession for the modernisation and operation of the plant. This route will need to be adjusted in response to obstacles in its path, such as canals, highways, tramway lines, and the many existing networks. The route will also be chosen based on the development potential for future customers.
- Lastly, a tripartite contract between the MEL, the plant operator, and the operator of the Lille and Roubaix heat network will be established to define the technical and economic conditions for purchasing heat from the WtE plant.

FINANCIAL ASPECTS OF THE PROJECT

- A 20-year investment of €60M, with €50M to develop the energy highway and €10M to modernise the urban heat networks.
- ADEME will provide financial support for this project.

Erwan Lemarchand, the MEL's Energy Director

“This is a major project for the territory demonstrating the advantage of transferring competences to the metropolis: improved waste recovery thanks to oversight of the heat networks, the development of the territory’s renewable energy for the benefit of its inhabitants, and long-term cost control for energy and waste treatment. It’s the proof that a territory can make a concrete contribution to the energy transition.”

RESULTS

- The Hauts-de-France region has some of the highest energy consumption in the county due to its industrial activity, and is also among the lowest producers of renewable energy. The MEL’s Territorial Climate Energy Plan set an ambitious target to produce 3,000 GWh of renewable and recoverable energy for its own consumption by 2020. With this project, 10% of that target will be met.
- This project will also cover 50% of the heating needs of 60,000 equivalent housing units that are now heated by an urban heat network.
- Customers will also benefit from a VAT that is reduced to 5.5%, thus reducing their energy bill.
- Lastly, recovering heat from the WtE plant for the MEL’s heat networks will significantly improve the energy efficiency of the WtE plant with R1 status (used as a reference at the national level, particularly to calculate the TGAP tax, a general tax on polluting activities), which will go from 64% to more than 75%.

Contact:
Erwan LEMARCHAND, Directeur de l’énergie à la MEL (métropole européenne de Lille), elemarchand@lillemetropole.fr