High-tech and low-cost solutions to handle urban waste

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Low-cost interventions, big data analysis and new regulations on landfills are key factors for the smart management of waste in cities. There are several ongoing studies and trials underway across Europe, with both researchers and city planners looking for efficient solutions.

Rotterdam, The Netherlands, is using big data to improve the logistics of paper and cardboard waste collection. In this project, digital sensors help

ensure there is space inside waste containers and prevent obstructions. "We started in March 2015," says Joost van Maaren, head of Collection and Reuse of Waste in Rotterdam. "At present we check about 250 paper containers. Real-time analysis of data allows us to empty bins when they are about 80% full."

Another example comes from Genoa, Italy, where researchers at the European project R2Cities have drawn up a feasibility study to introduce low-cost innovations to enhance seperated rubbish collection at a social housing estate in a suburb of the city. 1200 residents live in the Lavatrici complex (also known as 'washing machines' in Italian, because of its unique shape).

"The main focus of our project is the retrofitting of four edifices built 40 years ago," says Giorgio Bonvicini, engineer at project paretner D'Appolonia. "But improvement of the waste management system is also an aspect to consider because it contributes to cut CO2 emissions." Since Genoa has not been able to digest its waste in recent years, the material has been transferred to the adjacent Piedmont region, producing extra carbon emissions.

The estimated total cost for the proposed innovations is about €120,000. This could allow savings for €20-22,000 euro per year with a return period of six years.

Project plans include increasing the percentage of door-to-door collections to 72%, compared with the present 30%, and stockpiling wastes at recycling plants to obtain revenue from it. A second phase of the project looks to allocate the organic portion of the waste to a local compost site to avoid transport costs and pollution, then use the organic material in green areas of the city.

Alongside high-tech and low-cost initiatives to improve separated waste

collection and recycling rates, there is also an urgent need to reconsider role and features of landfills to close the lifecycle of materials, while minimising risks to the environment.

"We can't talk about a proper 'circular economy' if we don't understand that we need to create and manage landfills in an authentic sustainable way, because no natural process happens without leaving some remains", says Raffaello Cossu, professor of Environmental Engineering at the University of Padua, Italy, and editor-in-chief of the journal Waste Management.

In a recent editorial, he has been critical of European legislation in this field. "The Landfill Directive doesn't mention environmental sustainability," he says, "No mentions on how the long-term impact of a landfill should be exhausted within the span of one generation. Moreover, the post-operational phase, which follows the closure of a landfill, is addressed only in economical terms."

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