



CONTROL OF THE FILLING LEVEL OF CONTAINERS



Background (REF:1, 2)

The current effects of a fast-local population increase, large and dense residential areas, tourist increase and a pressing demand for urban environmental protection create a challenge for waste and resource managers. In many cases, the overflowing of the containers is a problem for the municipality. However, in other cases, containers are in places where the filling occurs slower than in other areas which if not controlled, may result in inefficient collection routes. The information about filling level of containers allows waste resource managers to plan optimized collection routes for waste and recyclables collection. Several cities are implementing different tools depending on the available resources. Those tools used are: automatic filling level sensors, monitoring in situ, and citizens' app/website or data collection by truck drivers.

ACTION

Implementation of a system to control filling level of containers, monitor collection rates and improve planning procedures in bring banks (efficient planning)

Examples of good practice implemented

SmartBin Technology in Dublin (Ireland) (REF:3)

Intelligent remote monitoring solutions allow to optimize logistic resources (reducing of collection costs up to 50%). This technology allows to know the filling level of containers, also reducing problems such as over-filling and complaints from citizens.



Figure-1. SmarBin outline implemented in Dublin (Ireland)

The municipality of Dublin has included in its Litter Management Plan 2016-2018, many initiatives including smart bin technologies. Currently, smart bin technologies are being tested through two trials.

In the South East Area, 52 smart bin units have replaced conventional bins on 2 routes. Suitability and new efficiencies are currently being evaluated. This initiative will also be soon implemented in the North West Area.

Increasing Waste Management Efficiency in Rotterdam (Netherlands) (REF:4)

Rotterdam has implemented a pilot case for Paper and Cardboard Waste Fractions with an innovative company in smart waste management and its Dutch partner TWS. The extended use of this waste management data analytics and route planning will help further the city's push towards a circular economy. It consists in the implementation of intelligence and cloud based filling-level monitoring. These sensors continuously monitor the fill level of the containers and are linked to the waste department's project office via cloud servers. Alternatively, smart plans dynamic collection route planning system were operating. Data is collected during the day from all the sensors in the pilot area. Fill levels and fill rates are compared to trend data to predict the future waste collection needs.

"The goals we set for the pilot have been easily surpassed and there are less trucks driving through the city on more efficient routes," Joost van Maaren, Head of Collection and Reuse of Waste at the municipality of Rotterdam, told Cities Today.



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"The technology to monitor fill-levels in waste containers is well understood, however, key to our requirements was a dynamic route planning system. This waste and recyclables management offers one of the only systems that reliably offers both capabilities. This essential development is helping us to eliminate static collection routes and bring a focus on only emptying containers which need servicing."

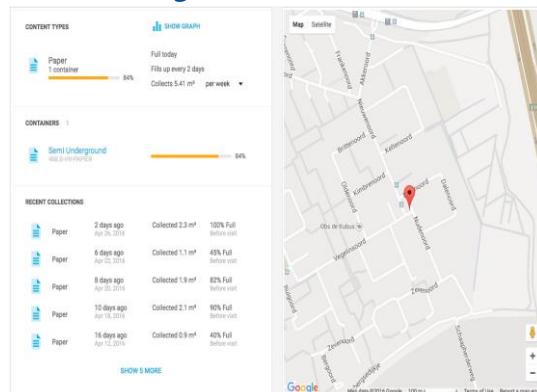


Figure-2. Digital System implemented in Rotterdam (Netherlands). Source: ENEVO

Commenting on the results of the pilot, Joost van Maaren stated, **"We found by monitoring fill rates, we had the opportunity to reduce the number of collection days, we found that we were easily able to meet the target of a 20 percent reduction"**



Keep in mind that... (REF:4,5)

- ⚠ Watch out for vandalism.
- ⚠ It is applicable on bring banks.
- ⚠ The solution cannot prevent overfill of containers during off-hours.



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How to start? (REF: 2,3)

- ▼ Look for a company to help create the best possible solution.
- ▼ Wireless connection is needed.
- ▼ Filling sensors need to be assembled in the container.
- ▼ Train the personnel on how to properly use it.
- ▼ Perform periodic checks to verify proper functioning and periodic maintenance (not very frequent).

Potential Benefits (REF: 2,6, 7)



Waste collection emits less CO ₂	●
Reduction collection cost by optimazing routes and fuel	● ● ●
Operational cosl reduction by up to 35%	●
Real time filling states of containers	● ● ●
Improve goverments-to-citizens communication (city dwellers are given a simple tool for reporting their needs and problems, and municipal workers can respond to them more quickly and efficiently)	● ●
Waste collection service settlement gets easier (the documentation is easily available for both parties: the municipality and the waste collection company)	● ●



References:

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