



Smart bins cut collection costs

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Embedding SIM cards in bins lets them wirelessly transmit to council operators when they are full, making refuse collections far more targeted, cutting costs and CO₂, reports Peter Manolescue. It could spell the end for overflowing bins



Solar-powered compression bins in Seoul. Photograph: Ecube Labs

More than half of the world's population now lives in cities; by 2050 that number is expected to rise to 70 per cent. The continued growth of the global urban population is putting a strain on public services and facilities, with issues such as traffic, pollution and public safety becoming increasingly difficult for local authorities to manage.

Overflowing bins, in particular, can be a health hazard, inviting infestations and the spread of disease if left unmanaged. However, unnecessarily sending refuse collectors to check if bins need emptying before they are full can be a costly waste of time.

Machine-to-machine (M2M) technology is being used to address this. By embedding SIM cards into objects to transmit instructions and information wirelessly in real-time via a secure mobile network, firms such as Ecube Labs and Mic-O-Data have found a way to remotely monitor city bins. Their inventions will not only keep the world's streets cleaner, but reduce the long-term cost and environmental impact of refuse collection.

Solar-powered compression

In Seoul, waste management became a particular problem. With local authorities in the South Korean capital facing pressure on budgets covering residential refuse collection, frustrated homeowners started dumping their household rubbish in public bins. As these began to overflow, residents became increasingly frustrated with the foul odour this was creating on their streets.

Seoul-based Ecube Labs tackled this by developing a bin that contains a solar-powered compressor, as well as M2M-managed network connectivity. This enables the bin to hold four times as much waste. It also allows the local council to remotely monitor the bins and receive notification when they need to be emptied. As a result, the council has cut its waste removal workload by 20% by reducing the number of refuse collection trips. And fewer trips mean less fuel consumption, which is more cost-effective and better for the environment. The reduction in CO₂ emissions created as a result of Ecube's smart bins is comparable to planting 150,000 new trees around Seoul.

It not just public bins that can become a nuisance when they are overfilled. In the Netherlands, local authorities discovered that bins on housing estates across the country were being used as a dumping ground by some residents. Others were not closing them properly, leaving them open to infestation. The authorities needed a way to monitor the residents using and misusing the bins to create better accountability. And they needed to do this on a major scale.

Dutch technology company, Mic-O-Data, worked with 25 local authorities to install 6,000 secure refuse collection points. By embedding M2M SIM cards into the bins, the local authorities can receive daily notifications if any of the bins are getting full and can also be informed if the bins have not been closed properly. Not only can local authorities monitor who is using the bins, and bill where necessary, they can also arrange for full bins to be emptied while empty bins are ignored. This instantly

reduces unnecessary refuse collection trips.

In the Dutch city of Groningen a study was commissioned by Vodafone to measure the effectiveness of Mic-O-Data's smart waste management. The study found that Groningen was making a net saving of almost 30 tonnes of CO₂ per year. It also found that the city had saved an estimated €92,035 in capital expenditure from the reduction in the number of trucks required to collect the rubbish, as well as the resulting reduction in maintenance and fuel costs.

Deterring wasteful rubbish disposal

Monitoring the use of bins is not only an effective method for deterring excessive rubbish dumping, but a smart way of encouraging residents to recycle. This is becoming an increasingly pressing issue for local councils across Europe, where EU directives are calling for a reduction in the volumes of landfilled waste and a rise in the levels of material recovery through recycling.

Although landfill has historically been the preferred method of waste treatment, it is the least desirable due to the environmental impact of methane and other chemicals released into the air. According to the European Commission's Environmental Data Centre on Waste, each person in Europe currently produces an average of half a tonne of potential "secondary raw materials" such as metals, wood, glass, paper and plastics each year. Only 40 per cent of these resources are currently recycled, and in some countries 80 per cent still go to landfill sites.

Smart bins could help councils address this. Using the data captured through sensors in the bins, organisations responsible for refuse collection can analyse waste disposal habits to better understand, encourage and ultimately change consumer behaviours.

Whether waste is reused, recycled or put into landfill sites, it comes at a cost. But as ever more sophisticated technologies enable refuse collectors to cut unnecessary collection trips and make people more accountable, the financial and environmental impact can be reduced.

As these examples show, M2M technology can be a powerful ally for local authorities looking for economical and sustainable ways to meet the waste management pressures of a growing urban population.

Peter Manolescue is M2M global business development manager at Vodafone

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