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Procurement of solar powered, compacting litter bins (Dun Laoghaire-Rathdown County Council, Ireland)

Background


Image: Dun Laoghaire-Rathdown County Council

Dun Laoghaire Rathdown (DLR) County Council is responsible for the south-east region of County Dublin. DLR County Council is located between the outer southern suburbs of Dublin City and the Dublin/Wicklow Mountains on the east coast of Ireland. The area covers approximately 127 square kilometres and has a population of around 206,000. The administrative capital is the seafront town of Dun Laoghaire. As part of its County Development Plan 2010 - 2016, DLR set out the County Council's targets as regards land use and its policy in terms of controlling development. The principal goals of the Development Plan were to seek development in a balanced and environmentally sustainable manner while retaining and enhancing both the quality and character of the county's physical environment. This included buildings, the public realm, amenity spaces and natural heritage.

Procurement objectives

Between 2009 and 2014, as a result of the economic downturn, the budget of DLR County Council was reduced by 25% and staffing levels by 17%. As a result, the County Council had to take a serious look at its services, and identify how to provide the same services as previously with a reduced workforce. It was noted by the litter bin emptying crews that they were often visiting bins on their route that did not require emptying. This resulted in the inefficient use of available resources in the operation of the fleet.

Following the consideration of various options, it was decided that the use of solar powered compacting litter bins could allow for a similar level of service to be provided despite the reduction in fleet costs and staff numbers. This option also had the added benefit of reducing the organisation's energy consumption as fuel consumption would be reduced due to the reduction in the number of trips.

DLR County Council purchased 20 such bins and installed these bins in key locations for a trial period. The trial proved successful and as a result, a procurement process was undertaken using an open tender process, which was advertised in the Official Journal of the European Union. The request for tender was published in April 2014.

Criteria used

Subject matter of the contract: DLR County Council set out to procure an off-the-shelf, intelligent, public waste system, composed of a network of solar powered compacting litter bins. The system was required to have a management console showing real time data information of the units with a view to reducing unnecessary collections and optimising resource usage.

Selection criteria:
As part of the selection process the tenderers were asked to submit the following information in relation to environmental aspects:

- A copy of any Environmental Management Certification that they and any envisaged supply chain member or consortium member holds, e.g. ISO or equivalent standard. If they did not have any certification, they had to detail how their organisation complies with environmental legislation.

Technical specifications:

- To allow for future reviews of the waste collection service and further improvements in energy and resource efficiencies, the system must cater for historical analysis across the entire deployment of individual units.
- The system must allow for remote monitoring of the units to allow for real-time data on the fullness level, to allow for optimum routes to be prepared.
- Due to the requirement for the units to compact the waste to reduce visits by emptying crews and record real-time fullness levels for scheduling work, each unit must be capable of operating from a self-contained renewable energy source.

Results

One offer was received in response to this tender. 401 bins were purchased as part of the procurement process. The purchase cost, maintenance and the software licence over a five year period will cost €1.8 million (excluding VAT). This cost includes the initial purchase cost, five years of maintenance and a five year software license.

The litter bin stock was reduced from slightly over 500 litter bins to 421 solar powered compacting litter bins, however, the capacity of the system has increased from approximately 45,000 litres to over 250,000 litres. Using the web-based application to monitor real-time levels of waste in the new units, the number of litter bins visited during a working day has been reduced by over 85%. This upgrade of the litter bins throughout the county has resulted in a reduction of 75% in fleet costs and 60% in staff numbers.

An added benefit of these new compacting litter bins is that, as the opening of the bin is sealed and as the bin will be emptied as required, overflowing litter bins, which were a serious litter generator in themselves, will reduce dramatically, resulting in reduced street sweeping requirements.

The solar compacting bin consists of a solar panel, which powers a 12V battery, which in turns provides the power for an internal compactor. There are two volume sensors within the bin and when the waste reaches a certain level, the sensors trigger the compactor. This compaction mechanism exerts 5.3kN of force, increasing the bin's effective capacity to a minimum of 606 litres, which is between six and eight times greater than the litter bins previously used by DLR. The battery is kept charged by the solar panel. The battery reserve lasts for approximately three weeks. Wireless technology-enabled units report their status into a dashboard that gives waste management and administration insights for monitoring and route optimisation.

There are also companion recycling units available on the market that allow cities to collect single-stream or separated recyclable materials in public spaces. DLR will install such a three-bin system in three locations with heavy pedestrian traffic in the coming weeks to see if waste is segregated correctly. The three bins will be for general litter, plastic bottles and paper/tetrapaks. DLR has noticed that the main litter in these locations is currently plastic bottles and disposable coffee cups.

Due to the requirement for the units to compact the waste to reduce visits by emptying crews, and record real-time fullness levels for scheduling work, each unit must be capable of operating from a self-contained renewable energy source.

The most economically advantageous tender was calculated in terms of:

- Pricing - 60%
- Programme for delivery of the goods/services - 10%
- Warranty and maintenance service regime to be provided - 20%
- Information technology system - 10%

With the improvement in efficiencies and the reduction in fleet size, this project has had the added benefit of reducing the organisation's energy consumption by the equivalent of 85,000kWh annually or 8,125 litres of diesel (worth in today's markets approx. €10,000).

Environmental impacts

With the improvement in efficiencies and the reduction in the fleet size, this project has had the added benefit of reducing the organisation's energy consumption by the equivalent of 85,000kWh annually, or 8,125 litres of diesel (approximately €10,000) as a result of reduced fuel consumption.

As there has been a notable reduction in overflowing litter since the solar bins have been installed, the attractiveness of local areas has increased and there is a reduced need for DLR County Council to clean these areas as regularly as previously.

Furthermore, given the reduced number of journeys made by waste vehicles, this particular procurement has also resulted in reduced greenhouse gases emissions, non-renewable resources (as a result of consuming 8,125 litres less diesel), local air pollution and noise pollution.

Lessons learned

As part of the trial period, it was observed that as the openings of the compacting litter bins were larger than the traditional bins, this lead to an increase in the amount of dumping of domestic and commercial waste. To reduce the potential occurence of illegal dumping, the bins were modified to restrict the size of their opening. This restriction resulted in reduced levels of illegal dumping, and these modifications were included as an added feature during the procurement stage.

Most of the project costs were incurred in the initial purchase of the units, however the value is in the operation over a period of time. It is important that such a system is trialed to ensure that the units are compatible with existing operations, prior to making a substantial investment that will only pay a number of years later.

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