

Segregation of carpets and mattresses from household waste

Nottingham City Council collected 255 tonnes of carpet and 300 tonnes of mattresses in 2012 through its free bulky waste collection service and Household Waste Recycling Centres. These were then reprocessed by Wastecycle alongside other materials to recover metal for recycling and produce refuse derived fuel.



Segregation of mattresses for recycling and recovery: Nottingham, England

This is an example of the collection of post-consumer carpets and mattresses. Items are either collected through bulky waste collections, which are run by Nottingham City Council, or via Nottingham's Household Waste Recycling Centre (HWRC) in Lenton, which is run by Wastecycle.

Key facts

- Organisations: Nottingham City Council and Wastecycle
- Type of business: Local authority and private waste contractor
- Location: Nottingham
- Type of non-textile: Post-consumer carpets and mattresses from domestic sources
- Type of collection: Collection direct from households and from HWRCs
- Tonnes collected per year: 255 tonnes of carpets in 2011/12, expecting 450 tonnes of carpets in 2012/2013. Also 300 tonnes of mattresses.
- Recycling rate (2012): Mattresses (metal) ~50%
- Recovery rate (2012): Carpets 100%, mattresses (textiles) ~50%
- Number of employees: Nottingham City Council have ~10 full time employees working for the Bulky Waste Collection service. Wastecycle staff at HWRC are also involved.

Introduction and background

Nottingham City Council provides a collection service for its residents' waste, while waste contractor Wastecycle processes the waste and runs the sole HWRC site. Nottingham City Council's HWRC, Lenton, has one of the highest diversion rates in the country with 96% of waste either recycled or recovered. Overall Nottingham has a 93% recovery rate for municipal solid waste.

Description of the operation

Carpets and mattresses are collected using two different systems: via bulky waste collections and from Nottingham's HWRC in Lenton.

At Lenton HWRC a separate 40 yard skip is provided for the segregated carpets and mattresses. Mattresses are manually deconstructed on site by staff when time is available. Mattress springs are added to the scrap metal and the remaining textile component is placed with the carpets. Once the skip is filled, the carpets and mattress textiles are transported by Wastecycle to their nearby materials recovery facility just outside the Nottingham City Council boundary.

Nottingham City Council operates its own free bulky waste collection service by appointment. Carpets and mattresses are collected alongside other bulky items such as white goods or furniture by the Council's collection crews and delivered directly to Wastecycle site for sorting and processing. They carry out around 45-50 bulky waste collections per day. Residents can book a collection on the phone or online on the Nottingham City Council website. Residents are encouraged to contact a local charity if the items they want to dispose of are re-usable. Each area of Nottingham has a dedicated collection day in order to group and streamline collections. Residents are instructed to put items at the boundary of their property by 8am on the designated day, rather than the preceding day, to avoid collection difficulties.

When collecting bulky waste the council use two different types of vehicles: 3.5tonne Luton vans and 18 tonne refuse collection vehicles (RCVs). Items of furniture and mattresses are usually collected by the RCVs. The compression system on these vehicles allows for a higher tonnage of mattresses, carpets and furniture to be collected at once.

Mattresses are stripped and the springs are recycled as scrap metal. All remaining materials are then fed through a series of shredders and mixed with other materials to produce refuse derived fuel (RDF). This fuel is a mixture of materials and typically contains about 53% biomass and 15% textiles along with small proportions of paper, card and plastic film. The RDF is used as a direct replacement to coal in cement kilns in England.

Performance/outcomes

- Number of collections/deliveries: 43,358 collection requests in 2012, of which 5,789 included carpets and 10,564 included mattresses.
- Non-clothing textiles collected: 255 tonnes of carpets and 300 tonnes of mattresses in 2012.
- Recycling rate: Mattresses (metals) ~50%
- Recovery rate: Carpets 100%, mattresses (textiles) ~50%

Figure 1 The sign at the entrance of Lenton HWRC, Nottingham



Innovation/good practice

Wastecycle has developed a number of solutions to help minimize how much of the city's waste goes to landfill. Segregating items (including carpets and mattresses) at the point of disposal has helped make Lenton HWRC become one of the best performing HWRCs in the country.

By using 18 tonne RCVs Nottingham City Council has increased the efficiency of its carpet and mattresses collections significantly. Whilst this may not be an appropriate collection method if re-use is an option, it is an effective collection system for bulky waste to produce RDF. Instead of carrying out 25 to 30 collections a day using 3.5 tonne Luton vans, the use of RCV vehicles with compressors allows them to carry out 45 to 50 collections a day.

Description of costs and revenues

A summary of the main annual costs and revenues (detail given where provided).

Costs:

- Collection vehicles: Three 18 tonne RCVs, estimated cost of each second hand vehicle £25,000 (operating over 75 km² area)
- Buildings: None required as mattresses delivered directly to reprocessor
- Dedicated staff: 6 FTE collecting bulky waste using RCVs.
- Fuel use (Estimated £11,000)
- Marketing costs (Estimated £3000)
- Gate fees: £78/tonne

Revenues:

- Sale of RDF

Figure 2 Final RDF product exiting the shredder



Conclusions/key learning points

This example illustrates how low distances between collection point and reprocessor can help make a solution more viable. Bulky waste collections in Nottingham are undertaken over fairly short distances. For carpet and mattress collections the collection efficiency is helped by the onboard compaction which allows for more items to be collected by each vehicle. The location of the Wastecycle site just outside the Nottingham City Council border, allows for low transfer costs. Overall this example illustrates how low distances between collection point and reprocessor can help make a solution more viable.

This case study also demonstrates an example of matching collection methods to end fates for cost effective disposal. Collections for re-use, especially for bulky items, can be more time consuming and expensive than collections using an RCV which can compress the materials, collecting more in one go. As well as reduced collection costs, local authorities may benefit from cost savings by sending their waste for RDF production rather than sending it to landfill. Additionally, using fuel derived from bulky waste as a direct replacement for coal in cement kilns is a more environmentally friendly disposal method than landfill.

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