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Landfill mining: new opportunities ahead?

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Historically, the United Kingdom has relied on landfilling as its main method of waste disposal. However, advancements in waste processing technology have led many in the waste management sector to question whether there is an alternative solution that is not only more environmentally sound, but also economically attractive. Many think that this solution exists in the form of landfill mining.

What is landfill mining?

Landfill mining involves the excavation and processing of waste from closed landfill sites or the completed sections of operational landfill sites.

Landfill mining is not a new concept. The first recorded example occurred in 1953 at the Hiriya landfill near Tel Aviv, Israel. The aim of this project was to reclaim fine-particle waste that was rich in minerals and which would improve soil quality at local citrus fruit farms.

During the late 1980s and early 1990s, projects were undertaken at a number of facilities across the United States. Typically, these projects were driven by a desire either to reduce the risk of groundwater contamination arising from closed landfill sites or to increase landfill capacity. More recently, further projects have been undertaken or proposed (typically to recover void capacity) in Germany, Scandinavia, Benelux and Malaysia.

The method used to mine a landfill is strongly influenced by the objectives of the scheme and site-specific characteristics. However, the typical process involves excavating the contents of a landfill cell, separating bulky materials (eg, white goods), sorting the excavated material into manageable stockpiles and then separating soil (used as a cover material during landfilling) from waste using a revolving cylinder or vibrating screens. Further separation of ferrous materials can then be completed using a magnetic separator.

Opportunities

There are a number of potential economic benefits associated with landfill mining:

- Recovery of materials – certain materials that have historically been discarded are now considered valuable, either in their own right or due to their components. For example, the proportion of valuable and recoverable metals found in closed landfill sites (eg, aluminium) can be as high as in some mined ore deposits. Discarded electronics can contain gold, platinum group metals and scarce (and valuable) rare earth metals.
- Waste to energy – some recovered waste streams can be mixed with fresh waste sources and used as a feedstock for the generation of energy for heating and electricity. Waste as a feedstock for energy production can be a valuable commodity. The 'waste to energy' initiative is becoming increasingly popular across Europe, to the extent that some countries (eg, Norway and Sweden) find it necessary to import waste.(1)
- Land value – the potential value of a closed landfill site can be viewed in two ways:
  - Increased disposal capacity – as landfill void space becomes increasingly scarce, the cost of disposal is likely to increase by virtue of simple supply and demand. The increase in void space resulting from the removal of recyclable waste will have direct value to a landfill operator (especially as the excavation

activities may allow for further disposal using improved techniques, which results in a greater volume of waste being disposed of in an equivalent void space when compared to older practices).

- Development potential – given the cost of development land and the size and typical location of many closed landfill sites, the value that can be realised following completion of landfill mining operations could be significant.

Why now?

At present, the commercial prospects for landfill mining remain largely theoretical, as full-scale commercial landfill mining is largely untested.

However, as the prices for commodities that can be recovered and/or generated become more favourable, it seems inevitable that a tipping point is fast approaching that will make the commercial exploitation of such opportunities viable. Indeed, what is understood to be the first full-scale commercial landfill mining project initiated for resource and energy recovery purposes is scheduled to start at the Remo landfill site in Belgium in 2014.

In addition, some governments are keen to assess the potential associated with a future landfill mining industry. The Scottish government, for example, has commissioned a feasibility study in relation to potential landfill mining.

Comment

The ever-increasing demand for available development land means that undeveloped land will always be sought after. Closed landfill sites are often large sites that are located in close proximity to urban areas that would represent attractive development opportunities if it were not for their historical use.

It appears as though the economic tipping point that will make landfill mining viable is fast approaching. Once hands-on experience is gained of commercial landfill mining, the momentum behind such projects in the United Kingdom is likely to increase.

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Endnotes

(1) See newswatch.nationalgeographic.com/2013/01/04/sweden-needs-more-trash/

and www.guardian.co.uk/environment/2013/jun/14/norway-waste-energy.