

GOOD DECISIONS ARE BASED ON GOOD DATA

The need for data for informed waste audit decision-making has never been more important, but it pays to get input from those experienced in the area. By Anne Prince



The more categories, the greater the amount of time it will take to do an audit.

Waste feedstocks vary significantly based on factors including socio-demographics, consumption, packaging trends, climatic conditions, seasonality, geographic location and collection system.

These influences make predicting waste stream composition and generation rates, over a 15- to 20-year life span of a waste facility a real challenge.

Waste audits provide an improved understanding of waste profiles that can then inform technology selection and predict system performance that assists in modelling operating costs, revenues and ultimately, gate pricing.

Increasingly critical for any alternative waste treatment (AWT) facility or waste-to-energy (WtE) plant is the need to understand particle size distribution, moisture content and chemical make-up of the residual waste stream.

While sorting waste by size fractions is time consuming, the information gained is invaluable for plant design and equipment selection.

Indicative sample sizes for 95% confidence by material

NGERS category	Sample size for reasonable estimate*
Food	40
Paper and paperboard	110
Garden and green	1,300
Wood	1,800
Textiles	400
Nappies	300
Rubber and leather	4,500
Inert	210
Total domestic waste	-

* In this case, "reasonable estimate" is one where the upper and lower 95% confidence intervals are less than 20% of the estimate itself.

Budget considerations are typically paramount and waste auditing by its nature is labour intensive, so when preparing any scope of works it's imperative to tell respondents "what you need to know".

There are a key number of considerations when undertaking a waste audit. These include confidence interval of data; data; sample size; sample selection; sample collection method; waste categories; visual or physical; method of measurement (weight, volume, count or a combination); particle size distribution; moisture content; and comparative or benchmarking analysis.

Three key steps

The first key step to consider is what sort of waste you have and how accurate you need the data to be. This is influenced by your purpose in collecting the data. Sample size is influenced by whether the sample is homogenous – smaller sample – or heterogeneous, for which you need a larger sample.

Typically, 80–90% confidence interval is reasonable. The table shows the indicative sample size and variability for one council to achieve a 95% confidence interval for each material as required for the nine NGER waste types, based on its current domestic waste profile. Sampling 4500 domestic bins to gain a 95% confidence interval for rubber and leather is not practical or necessary.

If you need a high level of confidence in one or two materials, specify which ones so the entire sample doesn't need to meet such onerous requirements.

Typically, 95% confidence can only be achieved for major waste categories.

The second step is concerned with the need for a representative sample. It should be randomly selected from a typical household, load, day or output.

Ideally, samples should be taken over more than one event. Domestic audits typically occur over five days to include the entire council area, landfill assessments are conducted over five or seven days.

The third key step is to make sure where, how and by whom the samples will be collected – at source or at point of disposal.

Ask yourself if the audit needs to be a visual assessment, with the volumes converted to weight using standard density factors, or by direct weight, count or some combination. How many and what categories are required? The more categories, the greater time taken to audit. In our experience, no more than 30 categories should be considered.

In some cases, sub-sets of data are necessary, such as the proportion of waste that is bagged, the proportion of food waste that is packaged.

For new plant design, size fraction data is invaluable but no more than four size ranges should be specified.

Moisture testing can predict volume-to-weight reductions from any process and chemical analysis of feedstock for WtE facilities is paramount.

WME

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