The evolving UK waste market

Since the introduction of the landfill tax by the UK government in October 1996, the demand for processing waste into an alternative fuel (AF) has significantly increased, diverting waste from unsustainable landfill options. While the UK still sends 12Mt of waste to landfill, there remains a surplus of non-recyclable waste without a home. Andusia Recovered Fuels takes a look at the waste-derived fuels (WDFs) market and its potential to supply solid recovered fuels to the cement industry.

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In the UK the key driver for exporting waste are the high, and annually increasing, landfill taxes (see Figure 1). The current tax rate, since 1 April 2018, is GBP88.95 (US$113.46)/t, which is expected to increase to GBP94.15/t in 2020. Therefore, it is more cost effective for waste producers to pay companies such as waste exporter Andusia Recovered Fuels to take waste away.

The second driver to export waste is enery-from-waste (EfW) plant capacity. Although a small share of the UK's waste is incinerated locally, in one of 40 local EfW facilities and 12 cement plants, there is still an excess of waste with nowhere to go but landfill, unless it is exported elsewhere. Since it was established in 2012, Andusia has exported over 1Mt, working with leading EfW and integrated cement plants throughout Europe.

In the UK grades of waste-derived fuels (WDFs) are classed as refuse-derived fuel (RDF) or solid recovered fuel (SRF).

RDF vs SRF

Initially, all UK waste goes through a sorting process in material recycling facilities (MRFs). Waste is separated by different processing steps, a combination of automated and manual sorting. Recyclable material as well as non-combustible metal and glass is removed through screening, trommels and magnets. The remaining waste is then shredded to produce RDF or SRF (see Figure 2).

The most-common grade of WDFs exported from the UK is RDF, which consists of municipal and commercial waste. It typically has a calorific value (CV) of 8-14MJ/kg and fraction size of 300mm.

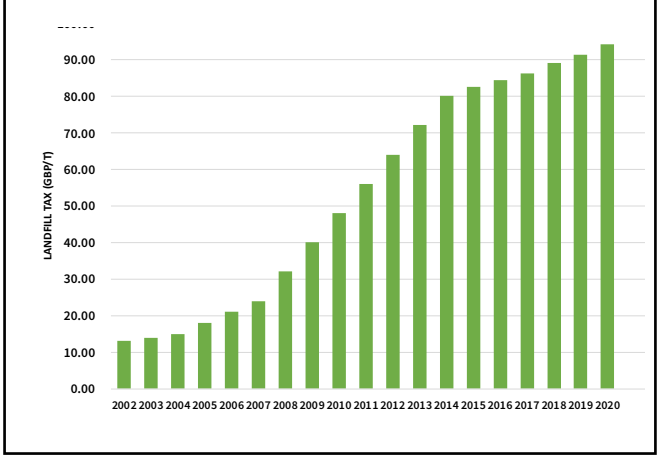
In 2017 around 3,200,788t of RDF was exported to EfW plants across Europe. High gate fees are paid to these incineration plants and waste that once would have been delivered to UK landfill sites is being incinerated to provide energy in the form of electricity and heat for both industry and households. To give an example, one tonne of RDF can power a family home for an entire year.

An additional method of waste disposal is incineration of SRF, a higher-quality alternative to RDF that replaces costly fossil fuels such as petcoke and coal. SRF is mainly produced from commercial waste such as paper, card and plastic. The waste goes through additional processing to improve the quality and CV. It is more refined, shredded into a textured 'flock', with a CV of 18MJ/kg and fraction size of 30mm. There is a cost associated with this extra handling, but the end product is cheaper per tonne to dispose of.

The amount of plastic in SRF is directly related to the CV of the fuel, with the higher the share of plastic resulting in a higher CV.

The use of SRF in cement plants diverts such waste away from increasingly full and expensive landfill sites

Figure 1: landfill taxes continue to increase in the UK



Different types of SRF

There are two main grades for cement SRF, dependent on where in the cement plant they are used:

- SRF suitable for use in the precalciner
- SRF suitable for use in the main burner.

It is important to distinguish between these grades, as the prices and specifications of the grades will be subtly different. In the precalciner of the cement plant, temperatures required (850-900˚C) are much lower than in the main part of the kiln. Therefore, fuels with lower CVs can be used.

Figure 2: solid recovered fuel

Figure 3: SRF pellets

The temperatures in the main burner are much higher than in the precalciner (1450-1800˚C). As the fuel is considerably more critical to cement chemistry, a higher grade is required. In addition, it will be blown through lances directly into the main flame and as a result, its size and moisture level will need to be closely monitored and controlled to avoid blockages.

SRF can also be pelletised (see Figure 3). This type may have been dried slightly and shredded smaller, but the waste material has not been changed significantly. Such pellets have a higher CV and are easier to handle, although the costs of producing an SRF pellet is significant. There are only a small number of cement plants in the world currently accepting SRF pellets and it is up to the cement company to weigh up if the additional costs outweigh the perceived advantages.

While quality is a big concern for the cement industry, many cement plants are under strict financial constraints. Therefore, some cement plants choose a lower-grade SRF, perhaps with either a large shred size or lower CV. However, for the SRF producer the economics are different and they can offer to pay the cement plant more. This area of the market also expands the number of waste producers that are able to produce this material, leading to a wider number of suppliers and a larger catchment of material.

Waste plastics

Finally, with the recent changes in China, which has banned certain imports of waste plastics, a new potential fuel for the cement industry has been created: waste plastics. While this material quite often requires further processing, it has an excellent CV and low contamination rate. Waste plastics may be a short-term solution for many cement plants, as increased recycling options are expected to become available in the future, but for the next 1-2 years this crude waste fuel is available in the market.

The waste-to-fuel market used to consist of specialist producers. However, with drivers such as increasing landfill taxes, waste producers have had to react and offer more choice. Choice is good for cement kilns, but they need to be vigilant as quality is still important.

The input material, processing capabilities and management are all key factors in the quality of SRF. Thankfully, due to an increase in recycling rates and improved segregation of wastes, producing a quality SRF is much more achievable. Although, with quality, often comes a higher price tag.

Exporting SRF from the UK

For many cement plants, local sources of SRF are often the primary target, but these volumes may not be straightforward to secure in some locations due to low landfill prices and/or a lack of treatment infrastructure to produce SRF.

The export of waste is highly regulated, but waste exporter Andusia (see box story) has the knowledge and expertise to ensure a smooth process. Logistics is at the heart of Andusia's business and is a vital element to ensure a bespoke and full supply chain solution. The company's logistics team works closely with a number of dependable hauliers to provide a reliable and cost-effective service. Andusia also uses a zero-carbon solution by using backhaul transportation as well as arranging all trans-frontier shipment (TFS) applications and compliance documents.

Andusia's services contribute to less waste being sent to expensive landfill sites as alternative options, such as co-processing in cement kilns, are now more within reach of cement producers that not only wish to comply with CO_2 emission regulations but also value sustainable and cost-effective cement production. ■

About Andusia Recovered Fuels

Andusia Recovered Fuels Ltd was established in 2012 when the RDF export market was in its infancy. Since then, the company has become one of the UK's largest independent exporters, offering a full and flexible supply chain solution for collecting and delivering RDF and SRF from UK producers. Recently the company announced its operation in the hazardous waste market.

Due to Andusia's long-standing relationships, the SRF supplier is able to pool resources from a number of major UK waste management companies and reach into Europe. Last year it exported its first consignment of SRF to a Mediterranean plant. Andusia Director, Mark Terrell, said; "As Andusia diversifies into other forms of recovered fuels exported to Europe and also within the UK, we hope this further demonstrates how knowledgeable our business and the Andusia team is."