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WASTE MANAGEMENT WORLD®

JULY-AUGUST 2015

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Official Publication of:
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International Solid Waste Association

GOING DUTCH ON MIXED PLASTICS

Netherlands' Robust Collection and Sorting System Leads to Expansion

**International
Show Preview**
RWM, UK

How Healthy is Your MRF?

At the heart of operations, Material Recovery Facilities (MRFs) play a vitally important part in setting the standard in the recycling chain. How efficiently is yours being run?

Gasification Down Under

With the country's last major solid waste to energy project closing in 2004, drivers in Australia are creating a resurgence for the industry, especially gasification.

Where Next for AD?

Anaerobic Digestion (AD) has grown into an established UK industry, with 200 operational and 500 plants in development. Can collections and feedstock keep up with demand?

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JULY-AUGUST 2015

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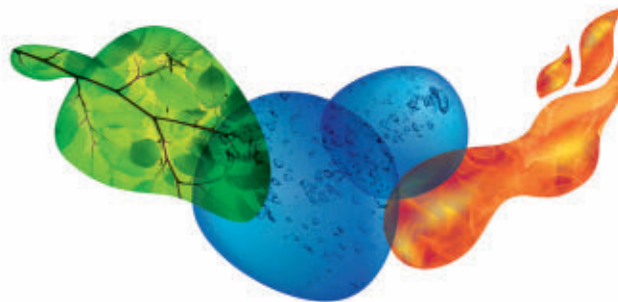
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CONSUMERS SEE RED NOT GREEN

The waste industry may not be as high profile as public sector issues such as education and healthcare but it sure does make people hot around the collar.



Tom Freyberg Chief Editor

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I received an interesting email this week about one of the country's largest waste management firms featuring on a TV programme. Great, you might think – much needed publicity for an underappreciated sector. Yet this programme was called: “Britain Sees Red: Caught on Camera”. As the title might suggest, this show looks at the worrying increase in anger directed at people who work in the public eye.

Collection crews on the Isle of Wight told their stories about encountering angry members of the public. It even featured video clips recorded by crews, documenting not only dangerous driving around collection vehicles but the verbal and physical abuse directed towards them.

At the frontline of the industry, waste collectors represent not only their company but the industry. And with the waste and recycling sectors already classed as some of the most dangerous to work in, they could do without this extra hassle. Sometimes they cannot win: if collections are not made, or are late, the public get angry. If collections are made, the public still get angry!

Yet, this somewhat alarming viewing conflicts with recent findings. A survey conducted by Direct365 found that 94% of UK homes do “some form” of recycling, which compares to 35% of workplaces, which recycled all of their waste. So although households admit to cleaning up their recycling habits, waste collection still angers them.

The UK has come on leaps and bounds in terms of recycling in recent years, especially food waste treatment and anaerobic digestion (read page 24). So I'm interested to see the motive behind the public bursts of anger when they should be pleased with the progress made.

Although this TV programme might not paint the best picture of British public, for waste management firm Biffa which featured on it, they are looking beyond UK shores. As can be read in our leader interview on pages 6-7, CEO Ian Wakelin explains why the international market is attractive and why Biffa is poised for the global expansion.

On the topic of overseas success, be sure to check out our review of the Rotterdam mixed plastics recycling facility (page 8). Currently undergoing a multi-million euro expansion to cope with demand, the project is a great example of how producer responsibility ties in with collections and recycling to create a robust processing chain, independent of the highs and lows of the oil price.

For our waste to energy focus, we take a look at gasification plans underway in Australia (page 18). With the last municipal solid waste to energy plant being closed in 2004 in the country, let's hope these new projects can...ahem...reignite (couldn't help myself with a pun) the market.

Finally, if you are planning on visiting the RWM Show in September, be sure to check out our show preview (page 31) for advice on who and what to see. Enjoy the issue.

Tom Freyberg
Chief Editor



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CIRCULAR ECONOMY: GETTING IT RIGHT

Various groups including ISWA are lobbying to modulate the Circular Economy Package which will be presented by the European Commission.



David Newman President, ISWA



The Circular Economy package debate may seem of little importance outside of Europe but this is not the case. Europe often sets the waste management pace for the future.

The time is fast approaching when the new Circular Economy package will be presented by the European Commission. This debate may seem of little importance outside of Europe but this is not the case. The implications for resource recovery and investments in collection systems and treatment plant, especially for organics, will be of interest to many looking at European markets for investment potential and to trends in waste management globally as Europe often sets the pace for the future.

The EU Parliament, in its ENVI Committee vote on June 17th with 56 votes in favour and five against, already expressed some strong views on how the package should look and invited the Commission to present several policy actions in its package. These were then confirmed in the July 9th vote in the European Parliament plenary session when, however, the UK MEPs and Eurosceptics voted against binding targets.

Among the requests from the Parliament to the Commission are:

- To develop clear and unambiguous definitions and waste prevention measures
- Setting binding waste reduction targets for municipal, commercial and industrial waste to be achieved by 2025
- Setting clear minimum standards for extended producer responsibility requirements to ensure transparency and cost effectiveness of the extended producer responsibility schemes
- Applying the 'pay-as-you-throw-principle' for residual waste combined with mandatory separate collection schemes for paper, metal, plastic, glass and biowaste by 2025 in order to facilitate the high quality of recycling materials
- Introducing separate collection for biowaste by 2020
- Increasing recycling/preparation for re-use targets to at least 70% of municipal solid waste and 80% recycling of packaging waste by 2030, based on the output of recycling facilities
- An obligation for recyclers to report on the "input" quantities of waste going into the sorting plant as well as on the "output" quantity of recyclates coming out of the recycling plants, preventing the reporting of discarded waste (landfilled or incinerated) as recycled waste
- Strictly limiting incineration, with or without energy recovery, by 2025, to non-recyclable and non-biodegradable waste for which incineration is the only available option
- A binding, gradual reduction of all landfilling, implemented in coherence with the requirements for recycling, in three stages (2020, 2025 and 2030), leading to a ban on all landfilling, except for certain hazardous waste and residual waste for which landfilling is the most environmentally sound option
- Introducing fees on landfilling and incineration as well as other articles in the document promoting bio-based and biodegradable packaging for food.

ISWA, while not an interest group, will be discussing the proposal in our annual congress in Antwerp September 7-9th and soon afterwards in a special session in Brussels. It is a chance for the whole European waste industry to meet and attempt to find common ground on the objectives we will all face in the coming decade. www.iswa2015.org

David Newman
President, ISWA

ANALYSIS

MATERIALS FACILITIES QUARTERLY DATA PROVOKES MIXED INDUSTRY RESPONSE

The first set of quarterly data under the Environmental Permitting (England and Wales) Regulations 2014 has been reported by the Waste & Resources Action Programme (WRAP).

The regulations require qualifying materials facilities (MF) to provide quarterly details of the mixed waste tonnage received from each supplier and the output tonnage despatched by four material streams.

As part of this, MFs are also required to take samples of the input and output material so that the average percentage of target, non-target and non-recyclable material can be estimated.

To qualify, facilities must receive 1000 tonnes or more of mixed waste material in four consecutive reporting periods.

In total, 86 out of 90 MFs in England who notified The Regulator (Environment Agency in England and Natural Resources Wales for Wales) submitted quarterly data. In Wales, nine MFs notified and eight submitted data. In England, the total tonnage of material entering the MFs in Q4 2014 was 789,395 tonnes. The MFs provided data based on a total of 6,864 samples totalling 490 tonnes.

Whereas in Wales, the total tonnage of SOM leaving the responding MFs in Q4 2014 was 57,243 tonnes. WRAP warned that "Users should observe caution when attempting to draw conclusions from this initial data" as "this is a new process for MFs to comply with and the initial data suggests some inconsistency in reporting".

David Palmer-Jones, CEO of the recycling & recovery UK division, Suez Environnement, said: "As WRAP has recognised in its commentary to-

day, the data should be taken with a pinch of salt, since it only represents the first quarter under the new sampling regime, which will inevitably take some time to be delivered consistently across the industry.

"While some of the initial data is interesting, we estimate that it will require at least 18 months of consistent input before this body of information paints a true picture of MRF input and output quality across England and Wales."

The Environmental Services Association (ESA) and Resource Association joined in an open call to all "MRF operators that have so far failed to submit data under the MF Regulations to act quickly in the interests of the whole industry to demonstrate compliance and ensure that the objectives of the Regulations – to improve transparency and market knowledge about the quality of input and output from MRFs – is delivered successfully".

Jakob Rindegren, recycling policy advisor at the ESA, said: "A word of caution is therefore needed for anyone trying to draw conclusions from such a limited data set – it will take a number of quarters before much can be said about the data. However, it is important that all sites that should be covered by the regulations are fully compliant."

Ray Georgeson, chief executive of the Resource Association, said: "Clearly, no grand conclusions should be taken from one quarter's worth of data, especially when the early stages of implementation have meant that potentially a significant number of MRFs haven't in fact supplied data and become compliant."

IN BRIEF

MHIEC to modify Hachicho 5 MW WtE plant, Japan

Amachiku Environmental Office Association has contracted Mitsubishi Heavy Industries Environmental & Chemical Engineering (MHIEC) to refurbish a 5 MW waste to energy plant in Yatomi City. MHIEC will revamp three stoker furnace type incinerators.

Partners sought for recycled plastic road initiative

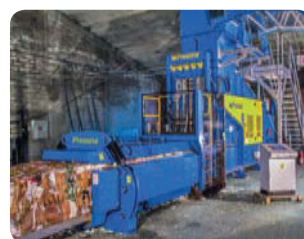
Dutch road construction company KWS Infra has started work on an initiative that would see waste plastics used to construct an alternative to conventional tarmac roads. Called PlasticRoad, the company is looking for partners to collaborate with on the pilot.

Gloucestershire opens AD plant with increased biogas

A £2.3 million anaerobic digestion (AD) plant has been opened in Gloucestershire, UK, by waste management firm Andigestion to treat 34,000 tonnes per year. The firm will collect food waste from 185,000 households in the county.

6 MW target for Australian landfill gas to energy firm

Landfill Gas Industries (LGI) will use a AUS\$10 million investment to install 6 MW of electricity generation across multiple landfill sites in Australia.



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LEADING BIFFA'S INTERNATIONAL EXPANSION



One of Britain's largest recycling and waste management companies, Biffa, has hinted at an international expansion to compete with French multinationals Veolia and Suez Environnement. WMW catches up with CEO Ian Wakelin to find out more.

Waste Management World magazine (WMW): News reports suggest Biffa is gearing up to be taken public in a return to the stock market. Can you tell me more about this and how it would impact operations/finances?

Ian Wakelin, CEO, Biffa (IW): Like any growing and ambitious firm, we are exploring a range of options to support further growth. Initial Public Offering (IPO) is just one of these.

WMW: You have suggested that an international expansion could be on the cards, to compete with the likes of Veolia and Suez Environnement. What would Biffa's approach to the international waste market be compared to the UK and when could this take place?

IW: There is strong potential overseas for Biffa and we undoubtedly have the ability to take our expertise, technology and know-how into international markets. If we did, it would be in markets that are going through the same journey that Western Europe has been through in terms of environmental management and regulation.

In certain countries around the world, they are still just taking waste, tipping it on a field and leaving it to rot. They are working their way through the evolutionary chain and we can help them do that.

I absolutely believe that we will start a small international business over the course of the next 12 to 24 months. It needs to be in places that have started the journey but haven't yet gone a long way.

WMW: Shanks recently blamed "challenging" European markets and market pressure in Benelux for its £18.2m post-tax loss in the year ending March 31 2015.

Does this impact your decision/thinking behind taking Biffa services outside of the UK?

IW: Not at all. Initially it's more to do with opportunities in other countries which are still

heavily reliant on landfill but are behind the UK in some aspects of managing that. Biffa has great expertise and capability in that area. With the decline in landfill and landfill gas yields in the UK it makes sense to look further afield with that skill set and it's a two way thing – people are approaching us because they know of our pedigree in that area, which is great.

WMW: Biffa had some trouble during the recession with a change in ownership in 2013. Can you explain more about this and how you have helped to grow the business again?

IW: Since 2013 we have devised and implemented a turnaround plan for the business which has been highly effective. Over the last two years we have seen significant earnings growth and expansion within each of our divisions, in particular our industrial and commercial collection division, as the largest collector of waste and recyclables from businesses in the UK.

WMW: How has the increasing rate of landfill tax in the UK - £82.60 per ton - affected operations since your time at the helm of Biffa?

IW: The idea of landfill tax was to divert waste from landfill and stimulate investment in recycling, energy recovery and treatment services and facilities. That really started to happen when the tax hit the tipping point of £50-55 tonne around 2011/12.

Biffa was obviously fully aware of those fiscal measures and planned ahead. Indeed, the acquisition of Greenstar – which brought me back to Biffa – was part of that recycling expansion through bringing in more recycling plants and expertise in those markets.

Since then, we've continued to grow that side of the business through further acquisitions, notably Shanks, as well as developing our successful RDF operation for residual waste and also incorporating complementary treatment processes such as contaminated soils recycling, composting and street sweepings waste recycling at some of our landfill sites.

WMW: Biffa is reported to be studying opportunities to develop its own waste to energy plants?

IW: The figures show that in both Europe and the UK, growth in recycling has happened alongside growth in energy from waste so the idea that the former blocks the latter is nonsense – they perform two different and important functions for different waste streams, different markets and different prices. We know that ourselves, being a business active in all those areas.

However, rather than put all of our eggs into one basket, Biffa has developed a flexible approach towards the energy recovery opportunity in residual waste. As there is spare capacity at European CHP plants at present and a capacity shortfall in the UK it makes sense to tap into that so we have developed our RDF production capabilities into a successful low carbon fuel export. This will give our UK waste customers competitive prices for a non-landfill solution until such time as more outlets are available in the UK. However, we have also developed fuel supply agreements to some UK plants and have planning permission for a modern 350 Ktpa WtE facility in Leicestershire.

This gives us a great range of coverage short, medium and long-term, which ultimately also benefits UK waste producers, complementing our recycling services.

WMW: What are your views on the EC's proposed Circular Economy – can it be a game-changer for the industry or a buzzword that will go out of fashion?

IW: This isn't a new concept, it's simply further progress along a path. We'll continue looking at the options and the debate as it rolls out from Europe this year. If it helps address price risks around commodities trading and helps improve markets for secondary raw materials – i.e. the "pull" factors – then yes, it can be a game changer.

However, that largely depends on the will of others, including Government, perhaps through things like making the price of goods made from recycled materials more attractive to increase demand. There has been a lot of focus on environmental definitions of sustainability so far but probably not enough attention paid to economic sustainability. Some people seem to forget that recycling is not like disposal – it needs a customer for the product and a gate fee which covers the collection and the processing.

If recycling can't be done economically it won't survive, however desirable it may be. Unfortunately that's been demonstrated vividly in the UK though closure of some recycling plants on costs grounds – let's learn from that.

WMW: What do you see as the future challenges for the UK waste industry?

IW: Despite the transformation into a cornerstone of the green economy and a business based around logistics, technology and commodities trading, the waste industry is still seen as something of a "Cinderella" industry and still perceived and treated by many as part of the problem, rather than part of the solution.

High profile waste crime cases clearly do not help and certainly need acting on, but in doing it is also important to work with and support the legitimate operators, i.e. those in a position to help deliver the preferred management solutions.

In contrast to the headline-grabbing political issues like housing, education and social care, waste and resources is still also low on the political agenda. A key challenge going forward, therefore, is still the persistent one of changing the perception of the industry to one of exactly that: a key industry, with a story and future of economic development, jobs and providing a vital supporting role in new, sustainable communities.

Talk of regarding waste as resource is nothing new, but the same mind-set needs applying to the industry which deals with it.

This article is on-line.

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ROTTERDAM: THE MIXED PLASTICS HERO?



The plant is due to handle 85,000 tonnes of mixed plastics this year

Now responsible for collecting mixed plastics from over 200 municipalities, SITA Netherlands is expanding its recycling plant in Rotterdam to cope with the additional demand. Being built at 19m in height, the installation combines gravity with modern technology to sort into different streams.

by WMW magazine

The recycled plastics industry has had a tough time recently across Europe. With prices for virgin raw materials falling below those of recyclates, driven down by the plummeting oil price, many companies in the recycling end of plastic waste pipeline have faced financial difficulty.

In April, four European plastic industry associations grouped together in a call to action. Elipso in France, IK in Germany, and the British Plastics Federation and PAFA (Packaging and Films Association) from the UK said that the plastics industry is in danger of "losing credibility" and an urgent restoration of "normal supply is imperative".

In the UK, two high profile plastic processors have been sold to foreign buyers in a bid to rescue operations. In May, London based Closed Loop Recycling was sold to Dubai based investment company, Euro Capital Group. At the

end of 2014, pan-European investor Aurelius also acquired Hemswell-based recycled material reprocessor, ECO Plastics for an undisclosed sum.

The firm operated one of the world's largest and most sophisticated plastic reprocessing plants, capable of sorting 150,000 tonnes of mixed bottles per year.

DUTCH SUCCESS

Yet while the news coming out of the UK's recycled plastics industry might not be positive, elsewhere in Europe other countries are having success.

Located within the Rhine-Meuse-Scheldt river delta at the North Sea, the Netherlands' city of Rotterdam houses a mixed plastics recycling plant that has been successful enough to warrant an expansion. Operated by SITA Netherlands (Suez Environment),



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Six levels of sorting help differentiate and sort the plastics into different streams



the original facility was built in an existing power station building owned by the waste management company. At an investment of €8 million, the company contracted German waste engineering company, S TADLER Engineering, to design and install the plastic sorting operation.

This year the plant is due to handle up to 85,000 tonnes of mixed plastics. This comprises: 45% mixed plastics, 20% film, 5% PET bottles,

10% of PP bottles and 10% of PE bottles, along with aluminium and drink cartons.

The remaining 10% are residues left from the operation, which are sent for thermal treatment at a waste to energy plant. Baled and sorted plastic fractions are sent to reproprocessors in the Netherlands, Germany and Europe.

SITA has also co-founded a new plastics factory – Quality Circular Polymers (QCP) – in

the south of the Netherlands, which produces raw materials from waste plastics for the plastics processing industry.

Plastics received and sorted from the Rotterdam plant will be eventually be sent to QCP to be turned into new consumer products.

"Although we are located at the sea," says Martin Vandertoorn, director of processing at SITA Netherlands, discussing the plant's location to ship plastics. "We don't ship overseas or to Asia. This is due to the producer responsibility system, funded by the producers of plastics. Part of this goes to the collection and part for the sorting and marketing of the materials. Money is only paid out when the recycler receives the material and made the statement/invoice to say he/she has accepted this type/quality of plastics."

He adds: "The disadvantage is that you don't get a market working sphere in trading and treating plastics as we would if we sent the plastics overseas."

"You can get better prices in Asia compared to if we took the bales to small recyclers in Europe. So this is a disadvantage of the market but at least the material is traceable and it's a closed loop."

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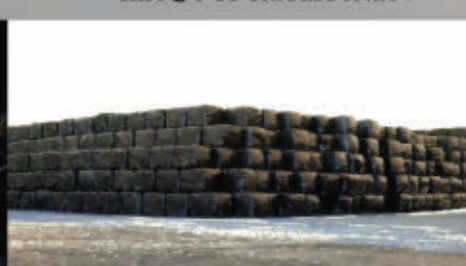
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Some operators in the industry are convinced they can save money by not servicing. We have seen people avoid the necessary maintenance but only go on to suffer problems, which costs them more in the long-run.

sorting the waste for Midwaste and HVC – two organisations that represent 130 municipalities in the west and south of the Netherlands.

A second tender will see the company collect packaging from organisations including Area Cleaning, AVU, Berkel Milieu, Circulus, GAD and ROVA, representing 70 municipalities in the centre and north east of the country. In total there's around 25.5 kilotons of plastic packaging.

In total the new tenders represent SITA Netherlands agreeing to collect and handle 70,000 tonnes of plastic packaging in total from over 200 municipalities.

The tenders came as a result of the Packaging Framework ('Raamovereenkomst Verpakkingen') which stipulated that from January 1, 2015 municipalities were responsible for sorting and (if chosen) the marketing of plastic packaging.

As a result, the Rotterdam sorting plant

capacity has had to be increased to cope with the new contracts, at a further investment cost of €10 million. Unique to the expansion and the first sorting plant is the height of the building: 19m in total with sorting taking place over six levels, taking advantage of gravity.

"For the first part, we had to install a trommel at 13m," says Jeroen Kiebert from STADLER in the Netherlands. "Although that was challenging, as part of the site expansion we are now putting in a machine at 19m."

Trevor Smart from STADLER adds: "It's very rare that we're given a project and told to design a plant with the building to be fitted around it. Normally it's the other way around – here's a building, put a plant into it! Engineering wise, it's not always the most perfect solution but when you have to design a recycling plant into an existing building you have to make the plant fit – it's as simple as that."

HEIGHT ADVANTAGE

When working with traditional Material Reprocessing Facilities (MRFs) over one to two levels, material sorting equipment has to spread out horizontally, in order to allow enough levels of sorting equipment to get down to the required fractions. In Rotterdam, however, rather than going out the project goes up.

"If you have height, we try to maximise it," says Smart. "The premise is to get bags or bales open and get them to a height, and then try and cascade it down from there."

Using a combination of conveyors, Tomra NIR optical sorting equipment, ballistic separators, trommels and wind shifters, films and fractions are sorted, with 2D and 3D fractions being separated. Despite multiple high tech sensors, a small team of manual staff are still required to hand-pick and sort fractions.

During WMW's tour of the facility, it was



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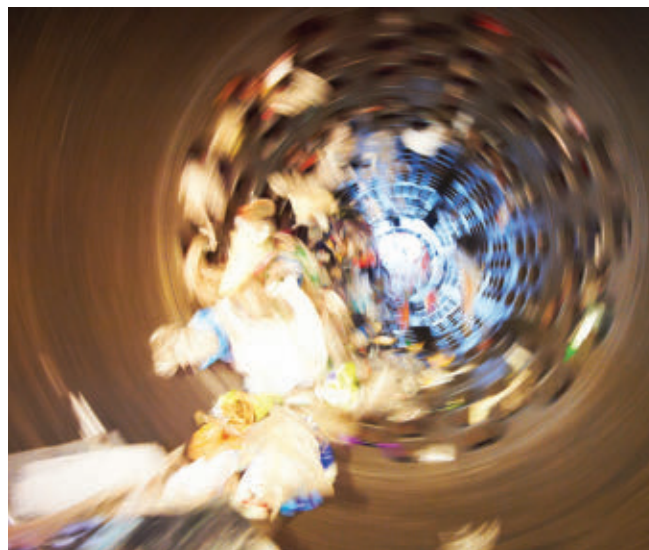


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With more and more collection schemes and materials being collected, the industry's changed. PET is where the market is... HDPE is great in the UK but not so much in Europe.



Overview of municipalities in NL which SITA will sort plastic household waste

currently closed down for servicing and maintenance, which the STADLER team couldn't commend quickly enough.

"Some operators in the industry are convinced they can save money by not servicing," says Kiebert. "We have seen people avoid the necessary maintenance but only go on to suffer problems, which costs them more in the long-run."

PUBLIC EDUCATION/QUALITY

Four years into operating the first stage of the facility and I'm interested in how and if the quality of input material has changed. After

all, dealing with mixed plastics packaging by its very nature is a tricky material. Engagement with the public is surely key to make sure the right materials continue to be put out for collection?

"We don't work with a yes list but we work with a no list," says SITA's Vandertoorn. "We clearly state what you cannot put in the bin and it is clear that residents cannot put in non-packaging waste, meaning toys, clothes or things like that. Then we exclude hazardous waste. We also have a mascot – we call him Plastic Hero. The system is called Plastic Heroes – people can go to a website, paid for by the system itself, and can read and can see what can and can't be put out for collection."

For the site expansion, STADLER has again been contracted for this work, scheduled to take between 12-14 weeks.

Behind Netherlands' first mixed plastics recycling plant and with four major UK plastic sorting plant installations under its belt, does the German company believe mixed plastics recycling holds the future for the company?

"With more collection schemes and materials being collected, the industry's changed," says Smart. "The DST plants we built in Germany just wanted to sort PET. The difference now are the different grades of PET – pots, tubs and trays. PET is really where the market is. HDPE

is great in the UK but they don't use that much in Europe."

INTERNATIONAL EXPANSION

With installations in Europe to Australia, STADLER is looking to expand to the Middle East and Asian markets.

"Price, legislation and government initiatives – it's a combination of those three drivers and economics that drives the waste industry," says Smart. "When the ingredients reach a critical mass and come together we look to get involved. We're currently looking at the Middle East, Singapore, Malaysia and Hong Kong."

With the Rotterdam site expansion due to be finished shortly, the plant is a great example of the waste management industry's ability to design a system around existing infrastructure. Modern technology works in tandem with gravity to sort mixed plastics into the required streams. The producer responsibility scheme and funding means the operation and end markets for the plastics are not as vulnerable to the highs and lows of the oil market, as has been the case in the UK market.

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MRF operators are encouraged to trial different settings to test and determine optimum parameters for the specific mix of infeed materials being processed

HOW HEALTHY IS YOUR MRF?

Often at the heart of recycling operations, Material Recovery Facilities (MRFs) play an important role in setting the standard and recovering valuable resources for reprocessing. But are you getting the most out of your sorting facility?

by Simon Wilkinson

Materials Recovery Facilities (MRFs) play a pivotal role in the circular economy by recovering valuable resources for reprocessing. Perhaps the most widely-known types of these process plants are involved in sorting post-consumer kerbside mixed dry recyclables, such as paper, glass and mixed plastics.

The key factor uniting MRFs is that they often large-scale, expensive assets which can tend to run with low efficiencies, with the potential to become a huge drain on financial resources if they are not properly monitored, measured, reported and acted upon.

The concepts and benefits to be gained by accurate measurement, systematic monitoring and rigorous quality control linked with stringent process management systems can be equally beneficial across any type of MRF.

So how do you make a recovery and recycling plant work better, regardless of where in the world your facility is located?

For new MRFs, incorporating 'future-proof' design concepts into the layout and operating principles is necessary if managers are to improve product quality and maximise profits from these expensive investments.

Planning for expansion, predicting and responding to likely changes in feed composition and installing reliable management information systems are all essential elements for ensuring a MRF can meet future waste management and processing challenges.

Clever and efficient process design from the outset enables a plant to take account of the specification and mix of waste materials changing over time, which is important because waste composition can change quite rapidly over time.

Building in expansion space for additional units in the future, such as longer and wider conveyors with enough room to add extra sorting systems, means MRF managers don't have to completely change their plant layout.

Product quality is a key issue for the waste recovery sector and, especially for the paper recycling industry. With most paper collected via kerbside comingled systems, there's much greater pressure on primary sorting MRF operators to keep other waste materials, such as plastics, out of their paper product streams to ensure high quality output and value for the processing mills. Consistent infeed sorting is vital in this industry as any contaminants can create problems in the pulping process.

It is worth taking the time to study the composition of the infeed, for this is the 'lifeblood' of the entire operation. What is its true composition and by how much does this vary? In-depth analysis of infeed material composition and future trends will aid plant design and layout, and help to plan for and cope with future challenges, such as increased complexity of waste products and more material types being collected for sorting.

Plant machinery should be optimised to ensure it is operating as efficiently as possible



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To future-proof MRFs, managers should try and predict potential changes in feedstock

and to meet the particular requirements of the facility. It is important to not necessarily accept the standard settings on processing equipment; MRF operators are encouraged to trial different settings to test and determine the optimum parameters for the specific mix of infeed materials being processed. These fairly small-scale, low-cost improvements and adjustments can make a significant difference to a plant's efficiency.

Large scale process plants must be designed for flexibility and require close management.

New technological developments should be welcomed – they will be needed one day! In this fast moving technical process field, plants which are five years old can easily look outdated and become uncompetitive on throughput rate, productive yield and sorting capability.

Monitor, measure, report and act – the importance of these four actions cannot be over-emphasised enough. Knowing what to monitor and how to measure it is key; then making sure the data is captured and reported back in a way that is meaningful is an essential

management concept. Getting the right people and skills mix in the team is another key factor for success.

Excellent process management systems are critical in MRFs; if you have a multi-million pound, dollar or euro investment in a complex sorting process it is worth investing in good quality training for all personnel to ensure that they are confident and knowledgeable about the most effective ways of monitoring, managing and controlling complex process plant. We are now in a 'new era' where qualified process engineers need to be designing and operating technically-advanced materials resource recovery plants.

Implementing a rigorous sampling regime is an essential requirement for achieving optimum quality assurance and efficiency from your MRF operation.

In England and Wales new regulations were introduced in October 2014 requiring MRFs processing more than 1,000 tonnes of mixed waste per year to test their feed materials and their output products. These results must be reported to the Environment Agency (for MRFs in England) or to Natural Resources Wales (for MRFs in Wales).

Whatever the scale of a MRF, any sample has to be taken with due regard for the size of this sample and the accuracy of the results derived from it.

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When drawing the samples, it is important to take the right number of randomly selected items. This 'N' is the number which drives all of the subsequent statistics derived from this particular sample. Because it's N that dictates what is a sensible sample size, N also sets the confidence level of how well a small sample truly represents the overall 'population' – and crucially, it's N which sets the error margin that can be expected either side of the final result.

It is worrying that on so many occasions we see people writing down a sample test

result with 3 or 4 decimal places, eg: 'plastic = 76.2345%'. We would argue that it is more statistically rigorous and realistic to see reported sampling results expressed as 'the plastic composition is probably 80%, plus or minus 5% and with a 95% confidence level based on the measured sample size of N number of items.

Any MRF operator interested in improving their efficiency and output quality should contact the experts who understand the statistics, techniques and practicalities of good sampling practice, then install what equipment

they need and train their staff to do the job correctly.

Then they'll be looking at major benefits for their business as they'll have better knowledge of what's going on in their operations. The benefits in terms of value that they sell to their customers will also be greater because they can offer known and measured products.

In the end, good MRF management is about good technical process management practices. The waste processing industry is, to some extent, still in its infancy.

In some quarters, there is a lack of knowledge and management culture that is needed to drive the high volume, intensively-technical capital investment in the processing and recovery of waste materials.

Bringing about that change in the old culture to that of an industry driven by professional processing engineers is still going to be a long haul, but one that's worth taking on because of the ultimate economic and, just as importantly, environmental benefits.

Simon Wilkinson is principal engineer at Axion Consulting. For more information, email: info@axionconsulting.co.uk.

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A rigorous sampling regime is essential to achieve quality assurance from a MRF operation



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GASIFICATION TO REIGNITE WTE IN AUSTRALIA

Although the country's last major solid waste to energy project closed in 2004, drivers in Australia are creating a resurgence for the industry. New Energy's AUS\$180 million East Rockingham gasification plant is set for operation in 2017.

by Miles Mason

Energy has been produced from waste (WtE) in Australia for many years in various forms. This includes landfill gas capture and electricity conversion, biogas capture and electricity conversion at sewage treatment plants, bioenergy projects utilising waste from agriculture and co-firing of wood wastes and other liquid wastes at coal fired power stations and cement kilns. There are also several small-scale incinerators in the country destroying medical and hazardous waste. However, these generally do not have any energy recovery.

Visy operates a 120,000 tpa (tonnes per annum) WtE facility at Coolaroo in Victoria using waste from its paper recycling process. A SITA-ResourceCo joint venture prepares a process-engineered fuel from commercial waste streams (capacity 150,000 tpa) that is used in Adelaide Brighton's cement kiln.

However, there has not been a dedicated major solid mixed waste WtE project in the country since early 2000 when the Brightstar (SWERF) project was developed at Wollongong. This project closed in 2004.

Recent regulatory changes in many states, including rising landfill disposal costs and increasing power prices, have made the commercial drivers for WtE plants more viable.

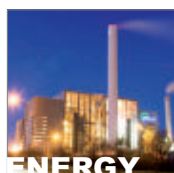
The Western Australian Environment Protection Authority (WA EPA) has approved or recommended approval for four major WtE projects (> 100,000 tpa processing capacity) with the first ministerial approval in May 2013 for New Energy Corporation's facility in Port Hedland.

The WA EPA also released a health impact study that showed that waste to energy plants do not cause adverse health impacts. The New South Wales EPA released its WtE policy in early 2014 and there are now two major projects going through planning and several other projects at pre-feasibility stage in that state.

Prior to the release of the draft policy, the regulatory framework in New South Wales essentially banned mixed waste from being used as a fuel. Whereas the environmental protection authorities in South Australia, New South Wales and Victoria have or are developing WtE policies/guidelines, the other states assess

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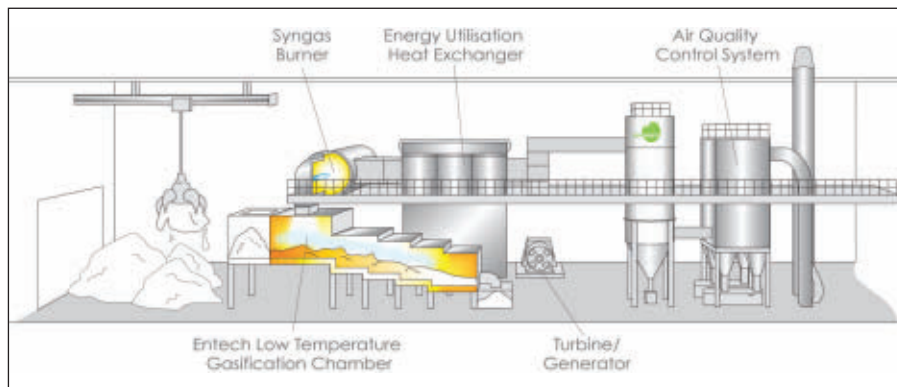
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for waste management, but it's a piece of the puzzle and will help to get landfill diversion rates to the State targets.

TECHNOLOGY OVERVIEW

The gasification system used by New Energy is a patented technology developed in Australia by Entech Renewable Energy Systems over the last 20 years.

Waste residuals are heated for 16-24 hours at 875 degrees Celsius. With a 15-30% of stoichiometric ratio of oxygen, up to 95% of the waste mass could be converted from its solid to gaseous form of a raw syngas. This syngas is then burnt to produce steam to generate electrical energy.

This design is a two-stage oxidation process, which does a lot to reduce baseline emissions before scrubbing and reduces the risk of poor emissions. One of the key decisions behind the process was the slow burn system. The process doesn't create fly ash, as the solids require minimal pre-processing, just enough to be able to fit into large hopper that is over 1m in diameter.

The process is not a fluidised bed and there is an inert ash out the back end which will initially be disposed at an inert landfill but after satisfaction of regulators can be utilised in construction materials. This lack of

projects on a case-by-case basis. Looking forward, there appears to be a bright future for the WtE industry. Higher landfill gate fees are making these projects more viable despite wholesale electricity prices being fairly modest.

There is strong support within communities and government for maximising resource use and minimising disposal of resources to landfill. Regulatory changes and greater awareness of the established safety record of modern WtE plants are leading to more favourable government and community attitudes.

However, significant industry risks remain, including long lead times (three to seven years) to develop projects; securing long-term waste contracts and power purchase agreements and

the location of plants in metro centres.

EAST ROCKINGHAM MRF & WTE FACILITY

New Energy's AUS\$180 million East Rockingham Facility has been in development for four years with a recent Ministerial sign off. The 200,000 tonne per year project is due to commence construction in late 2015 with operations in late 2017, eventually set to power 22,000 homes.

In regard to the feedstock for the plant, the company is deliberately trying to be the step between recycling and landfilling, with all waste that is gasified having gone through recycling operations either on a third party site or at the facility. Gasification is not the only solution



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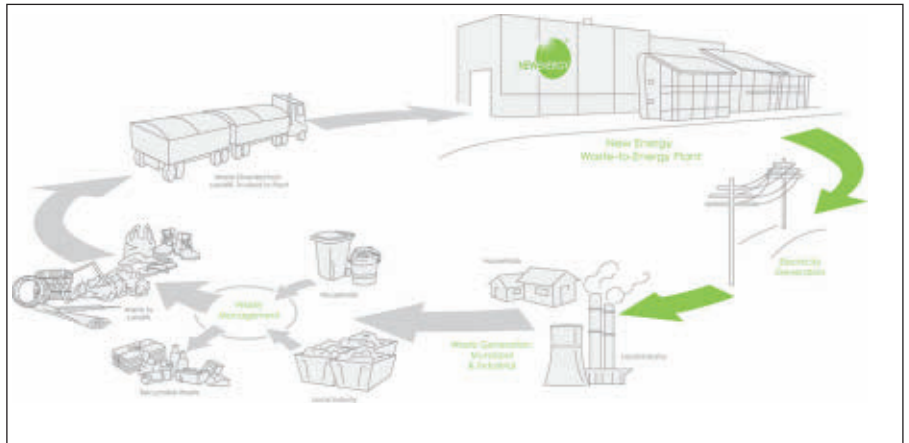
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particulate matter greatly reduces the likelihood of halogenated volatile organic compounds (VOCs) and polyaromatic hydrocarbons (PAHs) forming in the heated atmosphere of the gasifier.

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- This results in the syngas being a relatively clean gas that's available for immediate utilisation without further refining or treatment
- The feedstock of the gasification process is subjected to regular churning and stoking by the ENTECH Churning, Stoking & Distribution System (patent applied for) so as to expose all matter to the actual gasification process.



- Feedstock is processed over a period of around 16-24 hours to ensure complete gasification.

The syngas produced by the WtGas system is fired to power boilers and like devices to produce steam and/or electricity.

After firing the off-gas is subjected to cleansing via an air quality control system, with resulting emissions complying with and exceeding worldwide emission regulatory requirements.

By treating waste that would otherwise be going to landfill, the project will generate renewable energy to supply back to the grid

or directly to industry, not only providing a valued resource to the local area in the form of electricity, heat or cooling, but also providing a sustainable solution to waste management practices and working towards "Zero Landfill".

Miles Mason is business development manager at New Energy. For more information on the projects, visit: www.newenergycorp.au

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COWI served as general consultant for Bergen Regional Waste Company in Norway in the construction of a new 15 tonnes/hour WtE unit

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ANAEROBIC DIGESTION

Where Next for the UK?

Anaerobic Digestion (AD) has grown into an established UK industry in a short time, with over 200 operational plants and 500 in development. Is the market in danger of plateauing or is there still room for development? Is there enough feedstock to warrant additional facilities?

by Lucy Hopwood

The past few years have seen the UK Anaerobic Digestion (AD) industry grow from an emerging market to an established industry. In May 2010 the new Government at the time published their Coalition Agreement, in which they mentioned AD as a particular area of interest and committed to putting measures in place to "...stimulate a huge increase in energy from waste through anaerobic digestion".

What followed was an interesting process; the development of a joint industry-Government strategy and action plan, outlining 56 actions to overcome barriers and stimulate uptake. After three years the latest progress report suggests the majority have been successfully delivered. During this time, the number of operational plants has almost quadrupled from the baseline of 54 plants reported in the Strategy.

The rapid recent growth is largely down to an attractive package of Government incentives, combined with simpler and more effective regulation and more scalable technical solutions. The long-term financial security offered by incentives, guaranteed for 20 years, has given investors and businesses the confidence to invest in AD and other renewable energy

technologies. AD benefits from incentives for renewable electricity production, through Feed-In-Tariffs (FITs), the Renewables Obligation (RO) or Contracts for Difference (CfD), and for heat through the Renewable Heat Incentive (RHI).

FITs, which were introduced in 2010 to encourage small-scale (<5MWe) renewable electricity generation, support all electricity generated, whether used on site, exported to the national grid or a local transmission system. For larger scale electricity generators (>5MWe), the RO or CfDs are available, the latter replacing the RO as it closes to new plants in 2017.

As an alternative, AD plants are able to upgrade the biogas to remove carbon dioxide and other gases, generating biomethane which can then be injected into the gas grid. This option can also receive the Renewable Heat Incentive (RHI); the first scheme of its kind in the world.

CURRENT MARKET SITUATION

There are now over 200 operational AD plants in the UK, with more than half focussed on agricultural wastes, residues and crop feedstock, and the remainder being fed with non-agricultural waste. With a further 500 in the

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development pipeline, the sector appears to be rapidly expanding and maturing.

In the last year alone, an impressive 50 new plants were commissioned and more than 200 new plants entered the development pipeline. Meanwhile, total installed capacity of the sector has increased from 127MWe to 168MWe, now providing electricity for around 350,000 UK homes.

A particular highlight of recent years is how the biomethane-to-grid (BtG) market has flourished; only two plants were operational when the AD Strategy was published, yet 16 new plants came online last year, to bring the total to 21 operational plants, with a further 30 in development and expected to complete this year.

Over the past 12 months the industry has faced severe tariff cuts under the support schemes' cost-control mechanisms. This has affected small- and medium-scale electricity plants and BtG facilities the most. In the FIT scheme, the tariff scale differential is reducing – small-scale support has reduced by over 30% since April 2014, making the economics marginal for all but a few projects.

At the same time the biomethane sector faced a tariff review late last year, with a new tiered tariff system being introduced in February. Between the review and the new tariffs being



available, the first biomethane injection tariff depression was triggered as a result of rapid deployment during the tariff review, with the expectation the new scheme would be less favourable. As a result a wave of plants rushed to commission before the first tariff reduction on 31st December 2014.

The new tariff structure was welcomed however, and despite a stalling in the first quarter of this year, the rate of deployment picked up again. As a consequence of the peak in deployment in December 2014 and a resultant overspend of the budget, depression

has again been triggered and is likely to continue each quarter until the end of the current scheme in March 2016. This is currently hampering development plans somewhat.

IS THE FEED MIX CHANGING?

Operational plants currently require 636,000 tonnes per annum (tpa) of manure or slurry, 1,249,000 tpa of crops, 1,993,000 tpa of food waste, 229,000 tpa of crop waste and 1,209,000 tpa of other waste feedstocks.

Future developments will significantly increase demand for all of these major

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feedstocks of a projected 50-60% each, except for food wastes for which expected growth is significantly lower.

There is concern about food waste availability with suggestions that we're rapidly closing the waste treatment capacity gap.

However, the figures suggest otherwise. Only two million tonnes of the reported 16 million tonnes of food waste generated every year in the UK is currently treated through AD – add to this that treated through other technologies and there still remains over 10 million tonnes of untreated food waste. The issue isn't availability, it is accessibility. Without additional policy measures or separation and collection infrastructure in place this situation is unlikely to change.

Meanwhile, the use of agricultural wastes remains small; over 90 million tonnes of manures and slurries are generated each year, but fewer than one million tonnes are currently treated through AD. This isn't an accessibility challenge, it's a financial one.

Despite the emphasis being on waste, there are clearly barriers hampering its use and crops are still an essential part of the feedstock mix; often as a supplementary feedstock to improve process stability, improve feedstock security and reduce financial risk. If all proposed plants go ahead, we estimate the amount of land needed

to serve the AD industry would be around 1% of UK arable land. However, it is unlikely all developments will finalise, with an attrition rate typically in excess of 50% and a quarter of developments being in Northern Ireland.

Overall, the emphasis of development is moving from large centralised waste-fed facilities to smaller "on-site" facilities located on farms or food manufacturing sites, where feedstock is more secure and consistent.

In autumn 2015, all non-waste feedstocks will have to meet sustainability criteria, where generators will have to demonstrate a minimum of 60% GHG savings against fossil fuel and meet specified land criteria, to qualify for RO and RHI incentives, which may further increase the competition for wastes and residues.

INTERNATIONAL INTEREST

There is a huge interest from German AD developers trying to break into the growing UK market, as the German industry is becoming saturated with almost 10,000 facilities already installed. There is also a cap on new operations (100 MWe/year) and decreasing financial support from the German Government, as vast amounts of land are used to grow maize to feed AD plants in Germany. In comparison, the UK AD sector is relatively small scale, and is still expanding. Over recent months the most

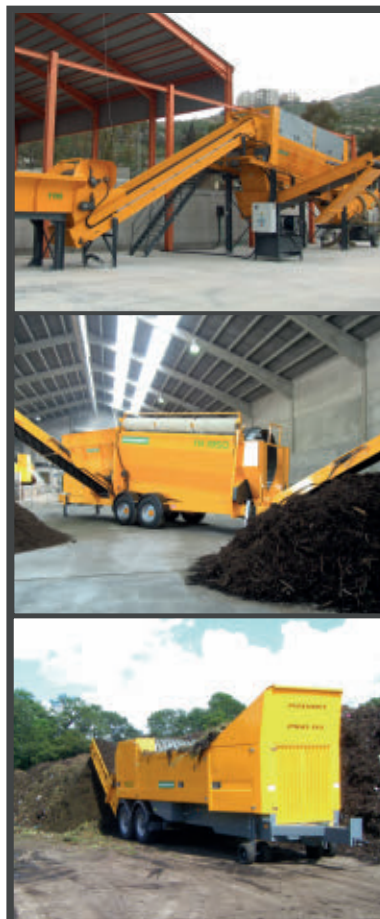
positive and encouraging response has come from the biomethane sector where the number of plants has increased more than four-fold as a result of RHI support. The pipeline remains strong but there's a lot of uncertainty in the industry at present. Frequent tariff degeneration in the RHI and FITs, only in part due to the success of the industry, has reduced tariffs below economic levels for many developers. In parallel the FIT scheme is going through a scheduled full review with a significant overspend to address, and the RHI budget post April 2016 still remains uncertain.

As an industry we wait to see what the future holds and at present that future is entirely in the hands of the new Government. It is possible the industry could have a future with no subsidies but a great deal of innovation and progress is still required to make plants better, faster and cheaper.

Lucy Hopwood is lead consultant on bioenergy & AD at international consultancy NNFCC. NNFCC's second annual AD Deployment in the UK report was published in April 2015.

This article is on-line.

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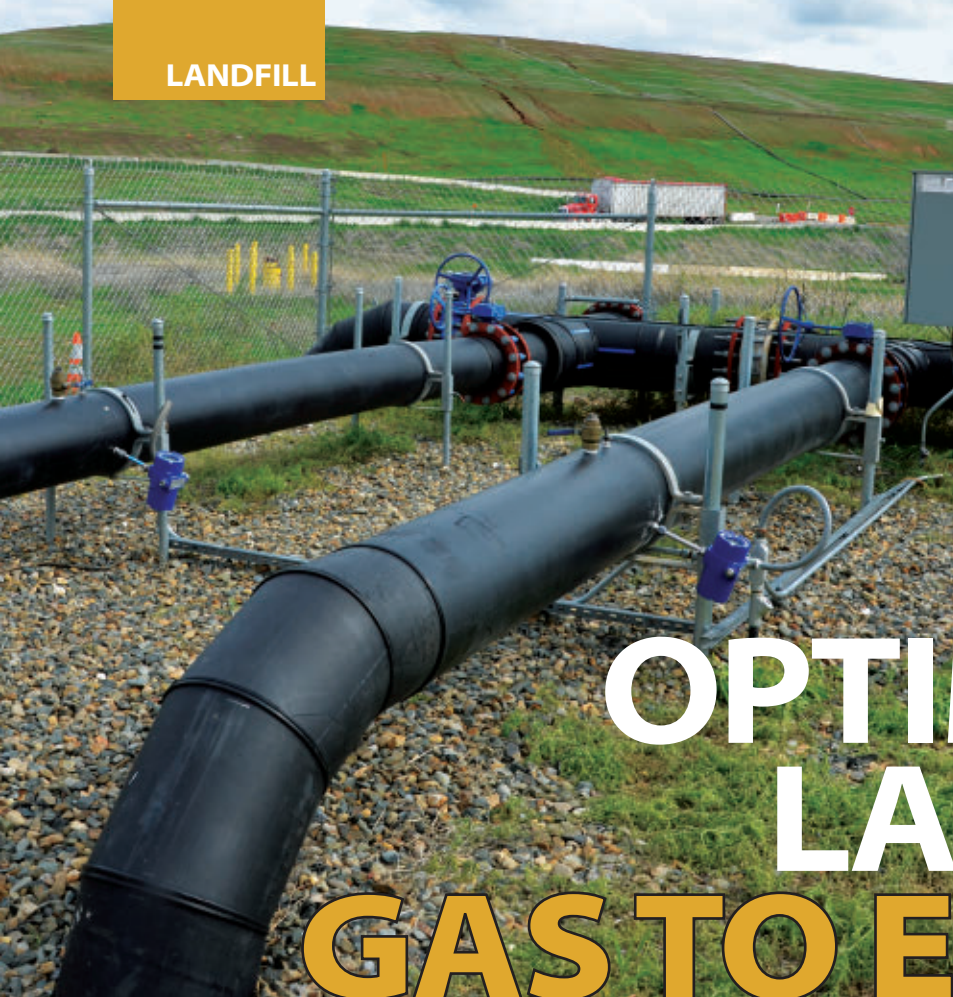


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OPTIMISING LANDFILL GAS TO ENERGY

There are now over 600 landfill gas projects in the US and many more planned. Facing unpredictable moisture levels, landfill operators have to provide accurate monitoring data. Using the example of the Kiefer landfill in Sacramento, this article discusses why accurate gas flow monitoring is vitally important.

by Robert Morpeth & Tom Setlif

Waste to energy, better known as landfill gas (LFG) to energy projects, first appeared in the 1970s but the concept was slow to gain prominence until the 1990s. Several factors have helped spur the growth of LFG energy projects, including the availability of tax credits and enactment of regulatory requirements and an awareness of methane emissions related to climate change.

Currently there are 645 projects in the US, generating an estimated 16 billion kilowatt hours and 100 billion cubic feet of LFG annually, and at least 440 more sites are available to develop LFG projects.

The Environmental Protection Agency's (EPA) rule related to landfills (Air Quality Standard Permit for Municipal Solid Waste Landfills) includes a subpart related to the definition of landfill gas treatment systems and methods for reducing landfill gas emissions. Additionally, most landfills in California are required to follow the Landfill Methane Rule (LMR), which requires using a gas flow meter for measuring methane gas.

CASE STUDY - KIEFER LANDFILL

The Kiefer Landfill outside of Sacramento is part of the Sacramento County Department of Waste Management and Recycling (DWMR), which is part of the Sacramento Municipal Utility District (SMUD). The Kiefer Landfill opened in 1999 and

currently occupies 305 acres. It is permitted up to 660 acres within the 1,084 acre site. Vertical well pipes are inserted to about 15 feet above the bottom liner to collect the landfill gas.

When the landfill was opened its gas-to-energy plant that collects biogas also came online. The biogas fuels five 4200-horsepower reciprocating engines (Caterpillar 3616) that run 24/7 under full load.

Each engine uses about 1,100 cubic ft/minute of biogas fuel, with any excess sent to the flare. The five engines produce 15 MW of electricity (enough electricity to power about 8,900 homes in the Sacramento area), most of which is sold to SMUD. All five engines are operated by Aria Energy.

Originally, only standard thermal flow meters were installed at the plant – one on each of the two main collection lines and one on each flare. The flow meters were installed during the summer and worked as expected. The quality and volume of landfill gas during summer months is lower because more air is introduced into the flow as the ground cracks, limiting how hard the vacuum pumps can pull.

During winter months, the landfill gas cools down to about 20 degrees and more moisture occurs in the flow stream, which causes standard flow meters to produce inaccurate readings.

The standard thermal meters were replaced with the Kurz 454FTB-WGF, the first thermal flow meter designed for condensing gas



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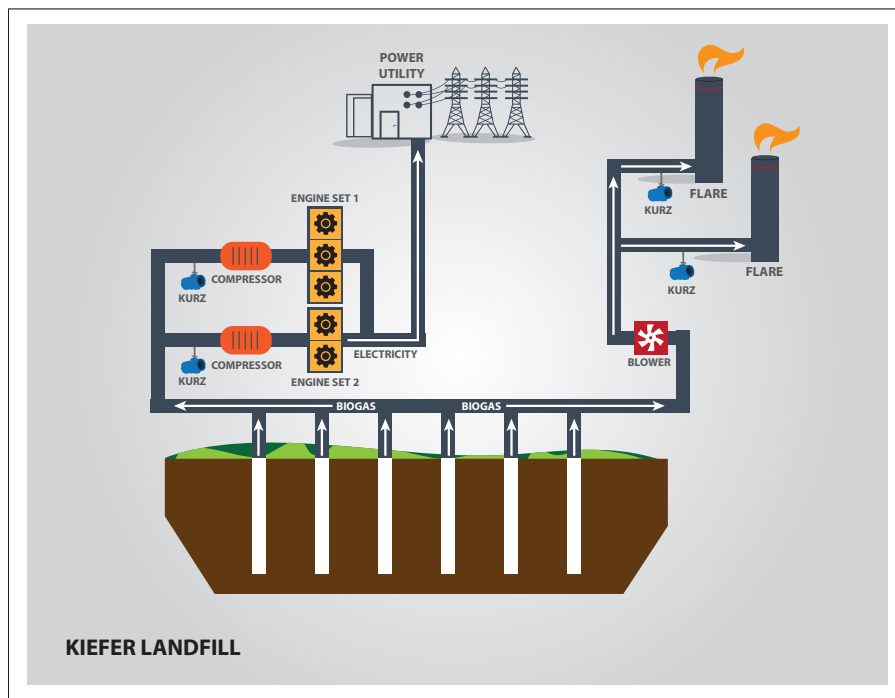
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applications. Reading errors caused by daily and seasonal temperature and weather variations were eliminated, improving fuel flow reliability and flaring accountability. The wide range of environmental and biological systems within a landfill (and the complex nature of its content) makes biogas production within the landfill

difficult to predict and control. Unpredictable moisture levels caused by leachate, rain, temperature and humidity create condensing gas flows that wreak havoc with most instrumentation systems and confuse system measurements. The Kiefer Landfill is using a new generation of Kurz thermal sensors capable of

supporting their regulatory requirements for monitoring biogas production and use, and to provide control information to maximise energy capture.

Incorrect data not only reduces the effectiveness of energy harvesting systems by redirecting biogas from energy production to flaring, but distorts data that landfill operators are required to monitor and report.

Using landfill energy projects that are optimised by accurate biogas and flare measurements is the most effective way to reduce the negative environmental impact associated with landfill emissions. Moreover, with the carbon trading market expanding, municipalities can turn carbon credits into a revenue stream.

For example, a landfill that reduces one ton of methane emissions earns the same credit as reducing 20 tons of CO₂, and this can turn into tens of thousands of dollars when traded.

Robert Morpeth is senior staff writer and Tom Setlif is director of international sales at Kurz Instruments, which manufactures thermal mass flow transmitters.

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WHY CHATTING RUBBISH AT RWM ISN'T A WASTE

The waste and resource management sector in the UK offers strong opportunities for investment, with international attention focused on the commercial and industrial (C&I) waste market. We take a look at what visitors can expect from the RWM show in September.

Businesses from around the globe are seizing the opportunity to recover value from the annual 4.0 to 7.7 million tonnes of C&I waste currently disposed of to landfill in the UK. Ample room for growth also exists for energy recovery since the UK exported 2.37 million tonnes of refuse derived fuel to neighbouring European countries last year.

Organised by i2i Events Group in partnership with the Chartered Institution of Wastes Management, RWM 2015 takes place at the National Exhibition Centre (NEC) in Birmingham, England from 15 to 17 September. The show has established itself on an international footing: last year one in ten attendees was from outside the UK. The draw of RWM is undeniably its critical mass – with the entire sector under one roof it's the event not to be missed.

Last year saw more exhibitors doing business at the show than ever before – with many companies taking orders on their stands at the NEC. In addition, record numbers of waste producers and local authorities were

in attendance to source new suppliers and equipment.

Exhibitors benefit from showcasing to 13,000 visitors, and a record number of international companies have registered for RWM 2015. The event is attracting new as well as regular international exhibitors, including companies from Austria, Germany, Italy, Japan, Portugal, and the United States.

CIRCULAR ECONOMY

Karl Falkenberg, environment director general of the European Commission is one of many notable speakers at RWM 2015. Falkenberg, who has played a pivotal role in drafting both the original and revised Circular Economy proposals, will address RWM delegates with his keynote speech.

Undoubtedly the crucial focus for this year, any new European legislation will impact not only upon the waste and resource management sector, but also on the manufacturing, retail, transport, agricultural and services sectors. Representatives from across these industries



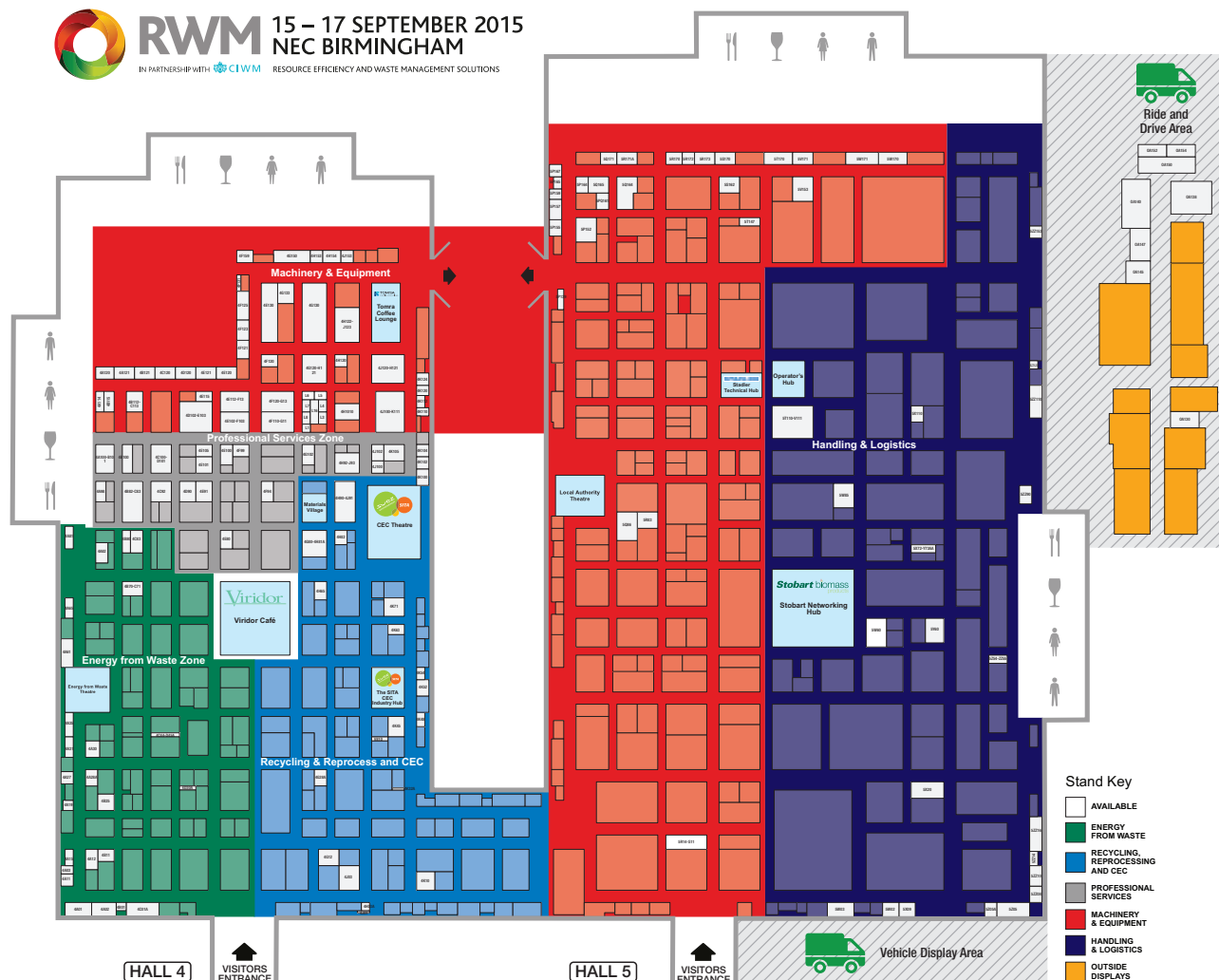
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will be discussing the proposed measures for production and consumption, strengthening markets for secondary raw materials and enabling factors for the circular economy.

The far-reaching implications of the new Circular Economy package will be debated at length and Helga Vanthournout, engagement manager at McKinsey will add to the debate with proposals for an environmental strategy for a circular economy.

WASTE TO ENERGY

The Energy from Waste Theatre will be equally inspiring, with a range of speakers exploring the challenges and opportunities within this crucial part of the sector. With most municipal waste in the UK now being handled through long-term

contracts, the focus for waste to energy (WtE) infrastructure is increasingly on more local, smaller facilities. This means that technologies such as gasification and anaerobic digestion are likely to be popular with investors, as they can be built and expanded on a modular basis.

Industry leaders from the UK and Europe will debate these issues as well as policy, government support and investor confidence in thermal treatment technologies. Among the speakers confirmed are Dominic Noel-Johnson, vice president of the UK Green Investment Bank; and Birger Lauersen, manager of international affairs for the Danish District Heating Association.

Mitsubishi Electric, sponsor of the Energy from Waste Theatre, will be displaying its solutions for the power industry in the WtE

halls. For more than 35 years Mitsubishi Electric has been one of the leading suppliers for the WtE industry, and owners, constructors and WtE plant related suppliers are invited to share Mitsubishi Electric's experience, knowledge, technologies and future vision.

For more information about RWM 2015, the UK's largest and best-established event for resource efficiency and waste management, 15-17 September, visit www.rwmexhibition.com, call +44 (0)203 033 2049 or email info@rwmexhibition.com.

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TAKING WTE TECHNOLOGY FURTHER WITH COPENHILL



Copenhagen's new waste-to-energy plant, Amager Bakke / Copenhill, combines the latest in technology and architectural innovation to lead the way to a future. It is a multi-purpose plant that provides energy, waste treatment and a local architectural attraction.

It is safe to say that waste to energy plants are not usually known for being tourist attractions. But this is all set to change when Amager Resource Center's new plant, Copenhill, opens for operation in 2017.

Once open, ski enthusiasts will be able to zip down the roof of a building that will be designed with the local community in mind when it comes to supplying energy, waste treatment and fun. That is because Copenhill will consist not only of bold, visually appealing architecture, but a functional artificial ski slope, as well.

The plant sets itself apart in terms of environmental considerations, energy production and its working environment. It is also located near the airport and just five kilometers from Copenhagen's Town Hall Square, so Copenhill is not just an industrial installation but a landmark of the Danish capital, as well.

Copenhill uses more than 100% of the fuel's energy content, has a 28% electrical efficiency rate, reduces sulfur emissions by 99.5% and minimises NOx emissions to a tenth, compared to the old plant.

When Copenhagen residents come to enjoy in the architecture or try out the ski slope, they will be able to breathe freely without having to worry about inhaling harmful fumes from the fully operational plant, which will still treat some 400,000 tons of waste produced by over a half million inhabitants of the five municipalities that own the project.

Beyond the minimal emission of harmful fumes contained in the flue gas, the high degree of energy recovery is one of the main reasons why the plant's state-of-the-art technology is tough to compete with on the environmental front. Copenhill will operate with steam data as high as 440 degrees and 70 bars, which provides a high level of electrical efficiency.

The ever innovative technology of the DynaGrate® will be installed at the Copenhill plant. DynaGrate is unique in its fuel flexibility, optimized combustion and minimal maintenance cost.

The mechanical design of the DynaGrate is developed in response to the general waste

to energy plant vulnerability to e.g. metal contents in waste. Today, plant operation is not interrupted by melting metals.

Further, the mechanical break-up of the waste layer on the grate results in thorough agitation and superior combustion conditions. The water-cooling system allows high heating values that are vital to fuel flexibility. Together, the water-cooling and mechanics result in high plant efficiency and excellent burnout of the waste, evident for example from very low TOC values (around 0.2%) in bottom ash.

The DynaGrate reduces maintenance cost because the entire cooling system is well integrated and protected in the steel shaft. There are no sensitive hose connections inside the furnace. Damages due to grate siftings, melting tin, aluminium, and the like are efficiently prevented. The driving mechanism is situated outside the furnace which means that the mechanism is not exposed to an aggressive environment and offers easy access for maintenance.

Finally, the mechanical set-up secures that movable grate parts are not in contact, thereby reducing wear and tear of the grate.

www.volund.dk

ISWA MEMBERS

ISWA offers the following membership categories: National Members, Organisation Members, Individual Members and Online Members. In total ISWA has more than 1,300 Members from close to 100 countries. The National Members are non-profit waste management associations representing the waste management sector in a particular country. Generally, these associations have members from both private and public entities. Through the National Members, ISWA's network reaches out to more than 100,000 waste management professionals all over the world. Organisation Members are public or private organisations and companies working in or associated with the field of waste management which, depending on the annual dues paid, are subdivided into Platinum, Gold and Silver Members. Below please find a full listing of all current ISWA National and Organisation Members. To learn more about the multitude of benefits which come with an ISWA Platinum, Gold or Silver Membership please visit our website www.iswa.org.

Natinional Members

Argentina

ARS - Asociación para el Estudio de Residuos Sólidos
www.ars.org.ar

Australia

WMAA - Waste Management Association of Australia
www.wmaa.asn.au

Austria

ISWA Austria
www.iswa.at

Belgium

INTERAFVAL
www.vvsg.be

Bosnia and Herzegovina

BASWA - Bosnian Solid Waste Association

Brazil

ABRELPE - Associação Brasileira de Empresas de Limpeza Pública e Resíduos Especiais
www.abrelpe.org.br

Canada

SWANA (CAN) - Solid Waste Association of North America
www.swana.org

Chile

AEPA - Asociación de Empresas y Profesionales para el Medio Ambiente
www.aepa.cl

China

CAUES - China Association of Urban Environmental Sanitation
www.caues.org

Croatia

CROWMA - Croatian Waste Management Association
www.hugo.com.hr

Denmark

DAKOFA
www.dakofa.dk

Finland

JHY - JÄTEHUOLTOTYHDISTYS RY
www.jatehuoltotyhdists.fi

France

ASTEE - Association Scientifique et Technique pour l'Eau et l'Environnement
www.astee.org

Germany

Förderverein VKU - Förderverein VKU Abfallwirtschaft und Stadtreinigung VKS e.V.
www.vku.de/abfallwirtschaft.html

Greece

HSWMA - Hellenic Solid Waste Management Association
www.eedsa.gr

Hungary

FKF Nonprofit Zrt.
www.fkf.hu

Iceland

FENUR - Fagræð um endurnýtingu og úrgang
www.fenur.is

India

ICWM - Institute of Chartered Waste Managers
www.icwm.ac.in

Indonesia

InSWA - Indonesian Solid Waste Association
www.inswa.or.id

Israel

DRAT - Dan Region Association of Towns - Sanitation & Waste Disposal
www.hirija.co.il

Italy

ATIA - ISWA Italia
www.atiaiswa.it

Japan

JWMA - Japan Waste Management Association
www.jwma-tokyo.or.jp

Korea, Rep.

KSWM - Korea Society of Waste Management
www.kswm.or.kr

Latvia

LASA - Waste Management Association of Latvia
www.lasa.lv

Macedonia

MaSWA - Macedonian Solid Waste Association
www.maswa.org

Malaysia

WMAM - Waste Management Association of Malaysia
www.wmam.org

Moldova

MOLDSWA - National Association of Republic of Moldova for Solid Waste
www.moldswa.md

Netherlands

N.V.R.D.
www.nvrd.nl

New Zealand

WasteMINZ
www.wasteminz.org.nz

Nigeria

WAMASON - Waste Management Society of Nigeria
www.wamason.org

Norway

Avfall Norge
www.avfallnorge.no

Portugal

APESB - Associação Portuguesa de Engenharia Sanitária e Ambiental
www.apesb.org

Romania

ARS - Romanian Association of Solid Waste Management
www.salubritatea.ro

Serbia

SeSWA - Serbian Solid Waste Association
www.seswa-srbija.com

Singapore

WMRAS - Waste Management and Recycling Association of Singapore
www.wmras.org.sg

Spain

ATEGRUS
www.ategrus.org
 Avfall Sverige
www.avfallsverige.se

Switzerland

ISWA CH - ISWA-Switzerland Secretariat
www.hz-inova.com

Turkey

Turkish National Committee on Solid Wastes
www.boun.edu.tr

United Kingdom

CIWM - The Chartered Institution of Waste Management
www.ciwm.co.uk

United States

SWANA (USA) - Solid Waste Association of North America
www.swana.org

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ARA AG
www.ara.at

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MA48 - City of Vienna
www.wien.gv.at/umwelt/ma48

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EXPRA - Extended Producer Responsibility Alliance aisbl
www.expra.eu

France

Veolia Environnement
www.veolia.com

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Messe München GmbH
www.ifat.de

Reclay Holding GmbH
www.reclay-group.com

REMONDIS Electorecycling GmbH
www.remondis-electorecycling.de

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Rimini Fiera SpA
www.riminifiera.it

Oman

be'ah - Oman Environmental Services Holding Company (S.A.O.C)
www.beah.om

Saudi Arabia

Riyadh Municipality
www.alriyadh.gov.sa/en/Pages/default.aspx

Switzerland

CSARL - Caterpillar S.A.R.L.
www.cat.com

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Bra - Benito Roggio ambiental
www.bra.com.ar

CEAMSE - Coordinación Ecologica Area Metropolitana Sociedad del Estado
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Austria

Österreichischer Städtebund
www.staedtebund.gv.at

Austria

WKU - Wiener Kommunal-UmweltschutzprojektgesmbH
www.wku.at

Azerbaijan

Tamiz Shahr JSC
www.tamizshahar.az

Belgium

Fost Plus asbl
www.fostplus.be

ISVAG - Intercommunale voor Slib en Vuilverwijdering Antwerpse Gemeenten
www.isvag.be

KSBE - Keppel Seghers
www.keppelsegthers.com

Chile

KDM Empresas
www.kdm.cl

Denmark

OWMC - Odense Waste Management Company LTD
www.odensewaste.com

RAMBOLL
www.ramboll.com

Vestforbrænding I/S
www.vestford.dk

France

CNIM - Constructions Industrielles de la Méditerranée
www.cnim.com/en/index.aspx

SUEZ environnement
www.suez-environnement.fr

VINCI Environnement
www.vinci-environnement.com

Germany

Doosan Lentjes GmbH
www.doosanlentjes.com

MARTIN GmbH
www.martingmbh.de

Stadtreinigung Hamburg
www.srh.de

Steinmüller Babcock Environment
GmbH
www.steinmueller-babcock.com

Greece

D-Waste Ltd
www.d-waste.com

Hungary

KSZGYSZ - Association of Environmental
Enterprises
www.kszgyisz.hu

NWMD - National Waste Management
Directorate
www.szelektivinfo.hu

Work of the Public Sanitation
Association
www.koztegy.hu

Italy

AMSA S.p.A.
www.amsa.it

ASM Prato
www.asmprato.it

Catanzaro Costruzioni srl
www.catanzarocostruzioni.it

CONAI - Consorzio Nazionale Imballaggi
www.conai.org

Federambiente
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Herambiente S.p.A.
www.gruppohera.it

Montello S.p.A.
www.montello-spa.it

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Turboden
www.turboden.eu

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DOWA ECO-SYSTEM CO., LTD.
www.dowa-eco.co.jp/en/

Macedonia

KHS - Communal Hygiene Public
Enterprise - Skopje
www.khigiena.com.mk

Netherlands

AEB Amsterdam
www.aebamsterdam.com

Portugal

EGF S.A. - Empresa Geral do Fomento
S.A.
www.egf.pt

Romania

ERA - Eco-Rom Ambalaje
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Klarwin
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www.bmlfuw.gv.at

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www.umweltschutzanlagen.at

Scholz Austria GmbH
www.scholz-austria.at

UV & P GmbH
www.uvp.at

Vienna University of Technology
www.tuwien.ac.at

VÖEB - Verband Österreichischer
Entsorgungsbetriebe
www.voeb.at

Wien Energie GmbH
www.wienenergie.at

WKW - Wirtschaftskammer
Wien, Fachgruppe Abfall- und
Abwasserwirtschaft
www.wko.at

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www.wienenergie.at

Canada

WRsE - Waste RE-solution Edmonton
www.waste-resolutions.com

China

Environmental Protection Dept.
www.epd.gov.hk/epd

Colombia

EPM - Grupo EPM
www.epm.com.co

Denmark

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City of Copenhagen
www.kk.dk/affald

Kara/Noveren
karanoveren.dk

Finland

Ab Stormossen Oy
www.stormossen.fi

Ekokem Oyj
www.ekokem.fi

HSY Helsinki Region Environmental
Services Authority
www.hsy.fi

JLY - Finnish Solid Waste Association
www.jly.fi

Marimatic Oy
marimatic.com

Tana Oy
www.tana.fi

TRSWM - Tampere Regional S.W.M.
www.pirkanmaan-jatehuolto.fi

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IMERYS - Imerys S.A.
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www.cewep.eu

Dr. Born - Dr. Ermel GmbH - Engineers -
www.born-ermel.de

Ghana

Accra Plastic Waste
Management Project

WLCL - Waste Landfills Company
Limited
www.wastelandfill.com.gh

Greece

ANTIPOLLUTION SA
www.antipollution.gr

HRA - Hellenic Recycling Agency
www.eoan.gr

RAACM - Regional Association of Solid
Waste Management Agencies of Central
Macedonia
www.waste-management.gr

SABO SA
www.sabo.gr

SORPA
www.sorpa.is

Iceland

SORPA
www.sorpa.is

India

TERI - The Energy and
Resources Institute
www.teriin.org

Italy

Amut Ecotech
www.amut.it

AVA - Alto Vicentino Ambiente srl
www.altovicentinoambiente.it

CLIR S.p.A.
www.clir.it

Conveco SRL
www.conveco.com

FARID INDUSTRIE S.p.A.
www.farid.it

Newster Group
www.newstergroup.com

Sorain Cecchini Tecno srl
www.sctecno.com

Japan

JEFMA - Japan Environmental Facilities
Manufacturers Association
www.jefma.or.jp

NSENGI - Nippon Steel and Sumikin
Engineering Co., Ltd.
www.eng.nssmc.com/english/

Takuma Co. Ltd
http://www.takuma.co.jp/english/

Kazakhstan

KazWaste - Kazakhstan Waste
Management Association
www.kaz-waste.kz

Luxembourg

European Investment Bank
http://www.eib.org/?lang=en

Malta

WasteServ Malta - WasteServ Malta Ltd.
www.wasteservmalta.com

Netherlands

DNV GL - Energy, KEMA Nederland B.V.
www.dnvgl.com

Nigeria

D Nigeria Limited
www.dnigeria.com

Inex Cleaners Ltd [Env.Services]

Nigeria

WPL - Waste-Point Limited
www.wastepoint.com.ng

Zitadel Limited
www.zitadelgroup.com

Norway

City of Oslo Renovasjonsetaten
www.renovasjonsetaten.oslo.kommune.no

COWI Norway
cowi.no

EGE - Oslo - City of Oslo, Waste-to-
energy Agency
www.energigjenvinningsetaten.oslo.kommune.no

Energis
www.energis.com

Returkraft AS
www.returkraft.no

RIR IKS - Romsdalshalvøya
Interkommunale
Renovasjonsselskap IKS
www.rir.no

Peru

Kanay S.A.C
www.kanay.com.pe

Portugal

AMTRES
EFACEC Engenharia e Sistemas S.A.
www.efacec.com

EGSRA - Associação de Empresas
Gestoras de Sistemas de Resíduos
www.egsra.pt

Lipor - Serviço Intermunicipalizado de
Gestão de Resíduos do Grande Porto
www.lipor.pt

MUSAMI - Operações Municipais do
Ambiente, Empresa Intermunicipal do
Ambiente
www.musami.pt

Tratolixo, EIM
www.tratolixo.pt

Romania

EURITEH
www.euriteh.ro

I.G.P. SRL - Iridex Group Plastic SRL
www.iridexplastic.ro

TNE - TeamNet Engineering
www.teamnet.ro

Russia

ES - Eco-System
www.eco-system.ru

Green-G Limited Liability Company
www.green-g.net

Interregional Association of Waste
Management Operators
www.szso.ru

NPP "NWT Bureau" - Non-profit
partnership "National waste treatment
bureau"

Saudi Arabia

averda
www.averda.com

Serbia

SEKOPAK
www.sekopak.com

Spain

ANEPMA - Asociación Nacional de
Empresas Públicas de Medio Ambiente
www.anepma.es

ATHISA
www.athisa.es

Sacyr Industrial S.L.U.
www.sacyr.com

Sweden

Envac AB
www.envac.se

Götaverken Miljö AB
www.gmab.se

IVL Swedish Environmental
Research Institute
www.ivl.se

Närab - Norra Åsbo
Renhållningsaktiebolag
www.narab.se

Pilum AB
www.pilum.se

SP - Technical Research Institute
of Sweden
www.sp.se

VA Syd
www.vasyd.se

VAFAB Miljö AB
www.vafabmiljo.se

Switzerland

ERZ - Entsorgung + Recycling Zürich
www.stadt-zuerich.ch/internet/erz/

TBF + Partner AG
www.tbf.ch

Taiwan

SETM - Sustainable Environmental
Technology and Management Co., Ltd
www.sustainable.com.tw

Thailand

TechnoBiz Group
www.technobiz-asia.com

Turkey

ALPLER MEDİKAL VE SAĞLIK
TİCARET LTD ŞTİ
www.alplermedikal.com

CEVKO Environmental Protection
and Packaging Waste Recovery and
Recycling Trust
www.cevko.org.tr

GEKSANDER - Geri Kazanım Sanayicileri
Derneği
www.geksander.org

ISPET Petrochemical Ind.Trd.Inc.
www.ispet.net

United Kingdom

CDEnviro Ltd
www.cdenviro.com

CWM UCLan - Centre for Waste
Management University of Central
Lancashire
www.uclan.ac.uk/cwm

United States

DSWA - Delaware Solid Waste Authority
www.dswa.com

PLDW - Pannone Lopes Devereaux &
West LLC
www.pldw.com

SCS Engineers
scsengineers.com



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E4tech (CH)
EHS Data Ltd (UK)
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Euroheat & Power (BE)
Fichtner GmbH & Co KG (DE)
IE expo (CN)
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Integrated Receivable and Payable Processing/CTP Solutions (US)
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Yachiyo Engineering Co Ltd - YEC (JP)

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Psychsoftpc (US)
zGRIP (US)

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Ridewell Suspensions (US)
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Silent Drive Inc (US)
Superior Tank Co Inc (US)
Thurman Scale (US)
Transportation Safety Apparel - TSA (US)
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Vulcan On-Board Scales (US)
Wastequip LLC (US)
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CONTAMINATED SITES

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IE expo (CN)
Ormitek Ltd (IL)
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TerraConsult Ltd (UK)
Wasteconsult International (DE)

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MENART (BE)
QED Environmental Systems Inc (US)
TSI Enquip Inc (US)

DEMOLITION WASTES AND FIRE RESIDUES

CONSULTANCY

Advanced Alternative Energy Corp (US)
CalRecovery Inc (US)
COWI A/S (DK)
Darley & Associates (UK)
Eurowaste Srl (IT)
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International Solid Waste Association - ISWA (DK)
SEDA Umwelttechnik GmbH (AT)
TOMRA Sorting AS (formerly TITECH AS) (NO)
WIH Resource Group Inc (US)

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Doosan Infracore Construction Equipment America (US)
Doppstadt Calbe GmbH (DE)
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Eriez Magnetics Europe Ltd (UK)
Goudsmit Magnetic Systems BV (NL)
Haas Recycling-Systems GmbH (DE)



HAMMEL Recyclingtechnik GmbH (DE)

HARTL Crusher (AT)
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TOMRA Sorting AS (formerly TITECH AS) (NO)

OPERATOR

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DOMESTIC AND HOUSEHOLD WASTES

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Darley & Associates (UK)
Fichtner GmbH & Co KG (DE)
Institute of Information Technology Inc - IIT (US)
Mailhem Ikos Environment Pvt Ltd (formerly Mailhem Engineers Pvt Ltd) (IN)
PTF Haeusser GmbH (DE)
PyroGenesis Canada Inc (CA)
Ramboll (DK)
RESA Fichtner Group (ES)

Reverse Vending Corp Ltd (UK)
RJM Associates (US)
TOMRA Sorting AS (formerly TITECH AS) (NO)
Wasteconsult International (DE)
Woodbridge International (US)
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Mailhem Ikos Environment Pvt Ltd (formerly Mailhem Engineers Pvt Ltd) (IN)



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UNTHA Shredding Technology (AT)
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Euroheat & Power (BE)
Ozonator Industries Ltd (CA)
Solid Waste Association of North America - SWANA (US)

FIXATION AND SOLIDIFICATION

CONSULTANCY

Cristal (US)
LAB Geodur (CH)
Orमितek Ltd (IL)
PTF Haeusser GmbH (DE)
RESA Fichtner Group (ES)
Roberto Zimmerman Environmental Engineering Ltd (IL)

MANUFACTURER

AVC Specialists Inc (US)
BHS-Sonthofen GmbH (DE)



BOMAG GmbH (DE)

IMTEK I NoOdor.com (US)
Jackson & Associates Inc (US)
PTF Haeusser GmbH (DE)
SWECO (US)

HAZARDOUS, CLINICAL AND HOSPITAL WASTES

CONSULTANCY

Barr Engineering Co (US)
Black Liquor Recovery Boilers Service Ltd/Cazane de Regenerare Service Srl (RO)
COWI A/S (DK)
Eurowaste Srl (IT)
IE expo (CN)
International Solid Waste Association - ISWA (DK)
Mil-tek UK Recycling & Waste Solutions (UK)
Nationale Reststoffenbeurs (NL)
Orमितek Ltd (IL)
PTF Haeusser GmbH (DE)
PyroGenesis Canada Inc (CA)
RH Energy Ltd (UK)
Roger M Douglass Ltd (UK)
TEI Consulting and Environmental Engineering (IT)
TerraConsult Ltd (UK)
UNTHA Shredding Technology (AT)
WIH Resource Group Inc (US)
Woodbridge International (US)

CONTRACTOR

All Waste Matters Ltd (UK)
Black Liquor Recovery Boilers Service Ltd/Cazane de Regenerare Service Srl (RO)
Countrystyle Recycling Ltd (UK)
Tradebe UK (UK)
UNTHA Shredding Technology (AT)
Wastedge (UK)

DISTRIBUTOR OR AGENT

Aerosolv Can Recycling (Europe) (NL)
NIRAFON Eurosud Srl - NIRAEUS (IT)
Tioga Pipe Supply Co Inc (US)
Vecoplan AG (DE)

MANUFACTURER

AGRU Kunststofftechnik GmbH (AT)
American Pulverizer Co (US)
ANDRITZ MeWa GmbH (DE)
Benlee Inc (US)
Bioscience Inc (US)
Börger GmbH (DE)
Boskel Nigeria Ltd (NG)
Caterpillar SARL (CH)
CurTec UK Ltd (UK)
Durabac (CA)
EMGroup BV (NL)
HEMCO Corp (US)
IMTEK I NoOdor.com (US)
Industrial and Environmental Concepts Inc (US)
Lindner-Recyclingtech GmbH (AT)
Mil-tek UK Recycling & Waste Solutions (UK)
NIRAFON Eurosud Srl - NIRAEUS (IT)
Ozonator Industries Ltd (CA)
Parini Srl (IT)
ProMation Engineering Inc (US)
SINERGA SA (CH)
SSI Shredding Systems Inc (US)
Steritool Inc (US)
Tecam Group (ES)
Tenmat Ltd (UK)
TSI Equip Inc (US)
Tufpak Inc (US)
UNTHA Shredding Technology (AT)
Vecoplan AG (DE)
Zweve Environment (BE)

OPERATOR

All Waste Matters Ltd (UK)
Boskel Nigeria Ltd (NG)
Dublix Engineering A/S (DK)

EnviroServ Waste Management Ltd (ZA)
Toxfree Australia Pty Ltd (AU)
Tradebe UK (UK)
Wastedge (UK)

R&D

EMGroup BV (NL)
Ozonator Industries Ltd (CA)
Toxfree Australia Pty Ltd (AU)
UNTHA Shredding Technology (AT)

HEALTH AND SAFETY AND ENVIRONMENTAL RISK ASSESSMENT

CONSULTANCY

Barr Engineering Co (US)
CalRecovery Inc (US)
Dunn Service Group Inc (US)
Environmental Leverage Inc (US)
Eurowaste Srl (IT)
Fichtner GmbH & Co KG (DE)
Global Training Solutions Inc (CA)
Impact Technical Services Ltd (UK)
Orमितek Ltd (IL)
Red Acoustics Ltd (UK)
RJM Associates (US)
TEI Consulting and Environmental Engineering (IT)
TerraConsult Ltd (UK)

CONTRACTOR

Dunn Service Group Inc (US)
Impact Technical Services Ltd (UK)
RR Projects (IE)

DISTRIBUTOR OR AGENT

Car Recycling Systems CRS BV (NL)
Control Analytics Inc (US)
Eureka Dry Tech Auto Dry Box (TW)
Global Sensor Systems Inc (CA)
Nexteq LLC (US)
Safety Vision (US)

MANUFACTURER

Bioscience Inc (US)
CBG Technologies (US)
ClearDrain (US)
Columbia Weather Systems Inc (US)
Control Analytics Inc (US)
Global Sensor Systems Inc (CA)
GreCon Inc (US)
HEMCO Corp (US)
Impact Technical Services Ltd (UK)
IMTEK I NoOdor.com (US)
Industrial and Environmental Concepts Inc (US)
INTEC Video Systems Inc (US)
Integrated Visual Data Technology Inc (CA)
K-Sun Corp (US)
Maryn International Ltd (CA)
Nova Analytical Systems Inc (US)
Ozonator Industries Ltd (CA)
Psychsoftpc (US)
RONCO Canada (CA)
Safety Vision (US)
Steritool Inc (US)
Technidea Corp/ZIPLEVEL (US)
Tech Products Inc (US)
Tenmat Ltd (UK)
TSI Equip Inc (US)
zGRIP (US)

INDUSTRIAL WASTE MANAGEMENT

CONSULTANCY

Advanced Cryogenics Ltd (US)
Barr Engineering Co (US)
Black Liquor Recovery Boilers Service Ltd/Cazane de Regenerare Service Srl (RO)
Cepheus Group (FR)
Cristal (US)
Darley & Associates (UK)
DeTect Inc (US)
E4tech (CH)
Environmental Leverage Inc (US)
ESI Inc of Tennessee (US)

Eurowaste Srl (IT)
Hurst Boiler & Welding Co Inc (US)
Hydro-Thermal Corp (US)
International Solid Waste Association - ISWA (DK)
Klean Industries Inc (CA)
Mil-tek UK Recycling & Waste Solutions (UK)
Nationale Reststoffenbeurs (NL)
Ornitek Ltd (IL)
ProSim Inc (US)
PyroGenesis Canada Inc (CA)
Ramboll (DK)
Rastrac (US)
Reverse Vending Corp Ltd (UK)
Roberto Zimmermann Environmental Engineering Ltd (IL)
Rockwell Automation Inc (US)
Tecam Group (ES)
TEI Consulting and Environmental Engineering (IT)
TerraConsult Ltd (UK)
TOMRA Sorting AS (formerly TITECH AS) (NO)
UNTHA Shredding Technology (AT)
Viking Equipment Finance (US)
WIH Resource Group Inc (US)
Woodbridge International (US)

CONTRACTOR

ADI Systems Inc (CA)
Akten-ex GmbH & Co KG (DE)
AKW Apparate + Verfahren GmbH (DE)
Babcock & Wilcox Volund (DK)
Black Liquor Recovery Boilers Service Ltd/Cazane de Regenerare Service Srl (RO)
Boskel Nigeria Ltd (NG)
Countrystyle Recycling Ltd (UK)
Dynamic Systems Inc (US)
ESI Inc of Tennessee (US)
Hurst Boiler & Welding Co Inc (US)
KMW Energy Inc (CA)
LAB Geodur (CH)
Nippon Steel & Sumiken Engineering Co (DE)
Toricelli Srl (IT)
Tradebe UK (UK)
Wastedge (UK)

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The BMI Group (UK)
BRT Recycling Technologie GmbH (DE)
Carlos Bertsch Srl (AR)
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Evergreen Midwest Co (US)
Golden Eagle Technologies LLC (US)
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NIRAFON Eurosd Srl - NIRAEUS (IT)
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Stadler America LLC (US)
Tioga Pipe Supply Co Inc (US)
Vecoplan AG (DE)

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AGRU Kunststofftechnik GmbH (AT)
Airoflex Equipment (US)
Akten-ex GmbH & Co KG (DE)
AKW Apparate + Verfahren GmbH (DE)
Albutt Ltd (UK)
American Pulverizer Co (US)
ANDRITZ Gouda BV (NL)
ANDRITZ MeWa GmbH (DE)
Aquatech International Corp (US)
AUT Anlagen- und Umwelttechnologie GmbH (DE)
AVC Specialists Inc (US)
Barker Products-BP Lifts (US)
Benlee Inc (US)
BHS-Sonthofen GmbH (DE)
Binder + Co AG (AT)
Bioscience Inc (US)
The BMI Group (UK)
Boerger Pumps Asia Pte Ltd (SG)
Börger GmbH (DE)
Boskel Nigeria Ltd (NG)
BRT Recycling Technologie GmbH (DE)
Car Recycling Systems CRS BV (NL)
CBG Technologies (US)
Container Components Europe Ltd (UK)
Cross Wrap Ltd (FI)
CurTec UK Ltd (UK)

Doppstadt Calbe GmbH (DE)
Dover Conveyor Inc (US)
Durabac (CA)
ECO Green Equipment (US)
EMGroup BV (NL)
Eriez Magnetics Europe Ltd (UK)
Fairbanks Scales (US)
FCI-Fluid Components International (US)
Flexus Balasystem AB (SE)
Gas Compressors Ltd (UK)
Goudsmiit Magnetic Systems BV (NL)
Haas Recycling-Systems GmbH (DE)
HAMMEL Recyclingtechnik GmbH (DE)
Harris/IPS Balers (US)
HARTL Crusher (AT)
Heil Environmental (US)
HEMCO Corp (US)
Herbold Meckesheim USA (US)
HSM GmbH + Co KG (DE)
HUBER SE (HUBER Technology) (DE)
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Hydrasep Inc (US)
Hydro-Thermal Corp (US)
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Industrial and Environmental Concepts Inc (US)
In-Situ Inc (US)
Jeffrey Rader (US)
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Komptech GmbH (AT)
Kyte Centrifuge Sales & Consulting (US)
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Lindner-Recyclingtech GmbH (AT)
Magnetic Div Global Equipment Mktg Inc (US)
MENART (BE)
Metso Denmark A/S (DK)
Mil-tek UK Recycling & Waste Solutions (UK)
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Niagara Wet Surface Air Coolers (US)
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Orkel Compaction AS (NO)
Parini Srl (IT)
Pick Heaters Inc (US)
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Psychsoftpc (US)
QED Environmental Systems Inc (US)
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Schumann Tank & Stahlbau GmbH (DE)
SEDA Umwelttechnik GmbH (AT)
Sesotec GmbH (DE)
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SRS Crisafulli Inc (US)
SSI Shredding Systems Inc (US)
Stadler America LLC (US)
Stork Turbo Blading (US)
Superior Tank Co Inc (US)
SWECO (US)
Tana Oy (FI)
Tecam Group (ES)
Tenmat Ltd (UK)
Thurman Scale (US)
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Twin City Fan & Blower (US)
Umicore Precious Metals Refining (BE)
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UWT (UK) Ltd (UK)
Vecoplan AG (DE)
Vulcan On-Board Scales (US)
Warren & Baerg Manufacturing Inc (US)
Wastequip LLC (US)
Wolf Material Handling Systems (US)

Industrial and Environmental Concepts Inc (US)
In-Situ Inc (US)
Jeffrey Rader (US)
Koch Membrane Systems Inc (US)
Komptech GmbH (AT)
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MENART (BE)
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Mil-tek UK Recycling & Waste Solutions (UK)
National Conveyors Co Inc (US)
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Vecoplan AG (DE)
Vulcan On-Board Scales (US)
Warren & Baerg Manufacturing Inc (US)
Wastequip LLC (US)
Wolf Material Handling Systems (US)

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Tradebe UK (UK)
Wastedge (UK)

R&D

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EMGroup BV (NL)
Etudes Chimiques et Physiques - ECP (FR)
UNTHA Shredding Technology (AT)

LANDFILL AND DEEP WELLS

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Carter Jonas LLP (UK)
COWI A/S (DK)
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ET Environmental / Alternative Fuel Systems (US)
Eurowaste Srl (IT)
Fichtner GmbH & Co KG (DE)
LAB Geodur (CH)
Olympic Wire and Equipment Inc (US)
Ornitek Ltd (IL)
RESA Fichtner Group (ES)
Wasteconsult International (DE)
Woodbridge International (US)
Yachiyo Engineering Co Ltd - YEC (JP)

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BOMAG GmbH (DE)

ET Environmental / Alternative Fuel Systems (US)
Ingvar Ingrids AB (SE)

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BioFuture Ltd (IE)
Bioscience Inc (US)
Capstone Turbine Corp (US)
Caterpillar SARL (CH)
Chemviron Carbon (BE)
Continental Biomass Industries Inc - CBI (US)
Doosan Infracore Construction Equipment America (US)
Durabac (CA)
ECO Green Equipment (US)
EPI Environmental Products Inc (US)
Fairbanks Scales (US)
FCI-Fluid Components International (US)
Flexus Balasystem AB (SE)
Gas Compressors Ltd (UK)
Gas Measurement Instruments (GMI) (UK)
Harris/IPS Balers (US)
HUBER SE (HUBER Technology) (DE)
Industrial and Environmental Concepts Inc (US)
In-Situ Inc (US)
JCB Sales Ltd (UK)
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Measurement Technology Ltd (UK)
Metso Denmark A/S (DK)
Nova Analytical Systems Inc (US)
Odotech Inc (CA)
O Kay Engineering Services Ltd (UK)
Olympic Wire and Equipment Inc (US)
Psychsoftpc (US)
QED Environmental Systems Inc (US)
SSI Shredding Systems Inc (US)
Technidea Corp/ZIPLEVEL (US)
Thurman Scale (US)
Volvo Construction Equipment (US)
Zweva Environment (BE)

MATERIALS RECYCLING AND UTILISATION

CONSULTANCY

Advanced Cryogenics Ltd (US)
Alpha Biogreen Sdn Bhd (MY)

Andela Products (US)
Eggersmann Anlagenbau BACKHUS GmbH (DE)
BTA International GmbH (DE)
CalRecovery Inc (US)
Cepheus Group (FR)
COWI A/S (DK)
ET Environmental / Alternative Fuel Systems (US)
Herbold Meckesheim USA (US)
IE expo (CN)
Impact Technical Services Ltd (UK)
Keppel Seghers Belgium (BE)
Klean Industries Inc (CA)
Nationale Reststoffenbeurs (NL)
Olympic Wire and Equipment Inc (US)
packIQ (US)
Proweps Envirotec GmbH (DE)
Ramboll (DK)
RESA Fichtner Group (ES)
Reverse Logistics Group Americas (US)
RJM Associates (US)
Roberto Zimmermann Environmental Engineering Ltd (IL)
SEDA Umwelttechnik GmbH (AT)
TOMRA Sorting AS (formerly TITECH AS) (NO)
TXO Systems Ltd (UK)
Viking Equipment Finance (US)
Wasteconsult International (DE)
WIH Resource Group Inc (US)
Woodbridge International (US)
Yachiyo Engineering Co Ltd - YEC (JP)

CONTRACTOR

All Waste Matters Ltd (UK)
Countrystyle Recycling Ltd (UK)
ET Environmental / Alternative Fuel Systems (US)
GICOM BV (NL)
iWasteNot Systems (CA)
Keppel Seghers Belgium (BE)
Klean Industries Inc (CA)
Komplet Italia Srl (IT)
Olympic Wire and Equipment Inc (US)
Reverse Logistics Group Americas (US)
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TXO Systems Ltd (UK)
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AUT Anlagen- und Umwelttechnologie GmbH (DE)
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BRT Recycling Technologie GmbH (DE)
Contec GmbH, Bad Honnef (DE)
Engineering Services (Bridgend) Ltd (UK)
Eureka Dry Tech Auto Dry Box (TW)
Evergreen Midwest Co (US)
Golden Eagle Technologies LLC (US)
Heil Environmental (US)
LIFT & COMPACTORS MEXICO SA de CV (MX)
Proweps Envirotec GmbH (DE)
REDWAVE (AT)
Reverse Logistics Group Americas (US)
Stadler America LLC (US)
Tire Service Equipment Manufacturing Co Inc (US)
Vecoplan AG (DE)

MANUFACTURER

Advanced Recycling Systems Ltd (UK)
AGRU Kunststofftechnik GmbH (AT)
Akten-ex GmbH & Co KG (DE)
Albutt Ltd (UK)
Alpha Biogreen Sdn Bhd (MY)
American Pulverizer Co (US)
Ameri-Shred Corp (US)
Andela Products (US)
ANDRITZ MeWa GmbH (DE)
ARJES GmbH (DE)
AUT Anlagen- und Umwelttechnologie GmbH (DE)
Eggersmann Anlagenbau BACKHUS GmbH (DE)
Barker Products-BP Lifts (US)
Benlee Inc (US)
BHS-Sonthofen GmbH (DE)
Binder + Co AG (AT)
BioFuture Ltd (IE)
The BMI Group (UK)
Boerger Pumps Asia Pte Ltd (SG)
Bollegraaf Recycling Machinery (NL)
BRT Recycling Technologie GmbH (DE)
BTA International GmbH (DE)

Bulk Handling Systems - BHS (US)
 Car Recycling Systems CRS BV (NL)
 Caterpillar SARL (CH)
 CBG Technologies (US)
 Columbus McKinnon Corp (US)
 Container Components Europe Ltd (UK)
 Contec GmbH, Bad Honnef (DE)
 Continental Biomass Industries Inc - CBI (US)
 Crane Equipment Manufacturing Corp (US)
 Cross Wrap Ltd (FI)
 Doosan Infracore Construction Equipment America (US)
 Doppstadt Calbe GmbH (DE)
 Dover Conveyor Inc (US)
 Durabac (CA)
 ECO Green Equipment (US)
 Engineering Services (Bridgend) Ltd (UK)
 Eriez Magnetics Europe Ltd (UK)
 Flexus Balaystern AB (SE)
 GICOM BV (NL)
 Goudsmit Magnetic Systems BV (NL)
 Green Machine LLC (US)
 Haas Recycling-Systems GmbH (DE)



HAMMEL Recyclingtechnik GmbH (DE)

Hardy Process Solutions (US)
 Harris/IPS Balers (US)
 Heil Environmental (US)
 Herbold Meckesheim USA (US)
 HSM GmbH + Co KG (DE)
 HUBER SE (HUBER Technology) (DE)
 Impact Technical Services Ltd (UK)
 Jackson & Associates Inc (US)
 JCB Sales Ltd (UK)
 Jeffrey Rader (US)
 Keppel Seghers Belgium (BE)
 Klean Industries Inc (CA)
 Koch Membrane Systems Inc (US)
 Komplet Italia Srl (IT)
 Komptech GmbH (AT)
 Kyte Centrifuge Sales & Consulting (US)
 LAB Geodur (CH)
 Leaffield Environmental (UK)
 Legacy Building Solutions (US)
 LIFT & COMPACTORS MEXICO SA de CV (MX)
 Lindner-Recyclingtech GmbH (AT)
 Macpresse Europa Srl (IT)
 Magnetic Div Global Equipment Mktg Inc (US)
 Mayfran International BV (NL)
 MENART (BE)
 Mil-tek UK Recycling & Waste Solutions (UK)
 Nova Analytical Systems Inc (US)
 O Kay Engineering Services Ltd (UK)
 Olympic Wire and Equipment Inc (US)
 Orenda Automation Technologies Inc (CA)
 Orkel Compaction AS (NO)
 packIQ (US)
 Parini Srl (IT)
 Presona AB (SE)
 Previero N Srl (IT)
 Proweps Envirotec GmbH (DE)
 REDWAVE (AT)
 Rentec NV (BE)
 Retech Recycling Technology REDOMA AB (SE)
 Reverse Logistics Group Americas (US)
 Fritz Schäfer GmbH (DE)
 SEDA Umwelttechnik GmbH (AT)
 Sesotec GmbH (DE)
 SSI Shredding Systems Inc (US)
 Stadler America LLC (US)
 Stork Turbo Blading (US)
 Sutco Recyclingtechnik (DE)
 SWECO (US)
 Tana Oy (FI)
 Tire Service Equipment Manufacturing Co Inc (US)
 TOMRA Sorting AS (formerly TITECH AS) (NO)
 Umicore Precious Metals Refining (BE)
 UNTHA Shredding Technology (AT)
 UWT (UK) Ltd (UK)
 Valmet Corp (FI)
 Vecoplan AG (DE)
 Volvo Construction Equipment (US)
 Vulcan On-Board Scales (US)

Warren & Baerg Manufacturing Inc (US)
 Wolf Material Handling Systems (US)

OPERATOR

All Waste Matters Ltd (UK)
 Andela Products (US)
 Keppel Seghers Belgium (BE)
 Klean Industries Inc (CA)
 Omex Environmental Ltd (UK)
 Reverse Logistics Group Americas (US)

R&D

Alpha Biogreen Sdn Bhd (MY)
 Andela Products (US)
 Car Recycling Systems CRS BV (NL)
 Continental Biomass Industries Inc - CBI (US)
 Keppel Seghers Belgium (BE)
 REDWAVE (AT)
 UNTHA Shredding Technology (AT)

MONITORING, INSTRUMENTATION AND CONTROL

CONSULTANCY

Aqualogy (UK)
 Barr Engineering Co (US)
 EHS Data Ltd (UK)
 Eurowaste Srl (IT)
 Global Monitoring (US)
 Hurst Boiler & Welding Co Inc (US)
 IE expo (CN)
 Ramboll (DK)
 Rastrac (US)
 Red Acoustics Ltd (UK)
 Roberto Zimmerman Environmental Engineering Ltd (IL)
 Rockwell Automation Inc (US)
 STC POWER Srl (IT)
 TerraConsult Ltd (UK)

CONTRACTOR

Aqualogy (UK)
 Global Monitoring (US)
 Hurst Boiler & Welding Co Inc (US)
 Ingvar Ingrid AB (SE)
 Instrumentjenesten A/S - ITAS (NO)

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 In-Situ Inc (US)
 Nexteq LLC (US)
 Odotech Inc (CA)
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 AVC Specialists Inc (US)
 Balmac Inc (US)
 Bioscience Inc (US)
 Carlos Bertschi Srl (AR)
 Columbia Weather Systems Inc (US)
 Control Analytics Inc (US)
 Delphi Automotive LLP (US)
 Detcon (US)
 FCI-Fluid Components International (US)
 Gas Measurement Instruments (GMI) (UK)
 Global Monitoring (US)
 GreCon Inc (US)
 Hans von Mangoldt Reactors (US)
 Hardy Process Solutions (US)
 Hurst Boiler & Welding Co Inc (US)
 In-Situ Inc (US)
 Instrumentjenesten A/S - ITAS (NO)
 INTEC Video Systems Inc (US)
 Integrated Visual Data Technology Inc (CA)
 Jackson & Associates Inc (US)
 Lenox Instrument Co (US)
 Lincoln Lubrication Systems (US)
 Macro Sensors (US)
 MCG Surge Protection (US)
 Measurement Technology Ltd (UK)
 Metrix Instrument Co (US)
 Mobile Awareness (US)
 MoistTech Corp (US)
 Nova Analytical Systems Inc (US)

Odotech Inc (CA)
 Oldham SAS (FR)
 Optacon AG (DE)
 PANalytical BV (NL)
 PCE Instruments UK Ltd (UK)
 Psychsoftpc (US)
 QED Environmental Systems Inc (US)
 RDS Technology Ltd (UK)
 Sporian Microsystems Inc (US)
 S-Products Inc (US)
 Technidea Corp/ZIPLEVEL (US)
 Universal Instruments Manufacturing Co Pvt Ltd (IN)
 UWT (UK) Ltd (UK)
 Valmet Corp (FI)
 Vulcan On-Board Scales (US)

OPERATOR

Global Monitoring (US)
 Omex Environmental Ltd (UK)
 Roberto Zimmerman Environmental Engineering Ltd (IL)

R&D

Etudes Chimiques et Physiques - ECP (FR)
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 Mobile Awareness (US)
 Optacon AG (DE)
 Sporian Microsystems Inc (US)
 Sysmatec (CH)

OTHER

MISCELLANEOUS

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 Advanced Recycling Systems Ltd (UK)
 AGRU Kunststofftechnik GmbH (AT)
 Airoflex Equipment (US)
 Akten-ex GmbH & Co KG (DE)
 Albutt Ltd (UK)
 AMECO USA (US)
 Babaco Alarm Systems Inc (US)
 Baldwin Filters (US)
 Barker Products-BP Lifts (US)
 Bedford Reinforced Plastics (US)
 Bentonite Performance Minerals LLC (US)
 Betonblock (NL)
 Binder + Co AG (AT)
 Binsfeld Engineering Inc (US)



BOMAG GmbH (DE)

BRT Recycling Technologie GmbH (DE)
 Canyonwest Cases (US)
 Cepheus Group (FR)
 Chemviron Carbon (BE)
 Clary Corp (US)
 Columbia Weather Systems Inc (US)
 DeTect Inc (US)
 Dynamic Systems Inc (US)
 ECO Green Equipment (US)
 Elektrim Motors (US)
 Engineering Services (Bridgend) Ltd (UK)
 ET Environmental / Alternative Fuel Systems (US)
 Euroka Dry Tech Auto Dry Box (TW)
 Euroheat & Power (BE)
 European Compost Network ECN eV (DE)
 Global Sensor Systems Inc (CA)
 Goudsmit Magnetic Systems BV (NL)
 Green Machine LLC (US)
 Greenshine New Energy LLC (US)
 Haas Recycling-Systems GmbH (DE)
 Impact Technical Services Ltd (UK)
 INTEC Video Systems Inc (US)
 Integrated Receivable and Payable Processing/CTP Solutions (US)
 International Generator Technical Community (US)
 International Solid Waste Association - ISWA (DK)
 IRT Integrated Rectifier Technologies Inc (CA)
 iWasteNot Systems (CA)
 K-Sun Corp (US)

Legacy Building Solutions (US)
 Lincoln Lubrication Systems (US)
 MCG Surge Protection (US)
 Nord-Lock Inc (US)
 Omex Environmental Ltd (UK)
 PANalytical BV (NL)
 Parini Srl (IT)
 PennWell Marketing Solutions (US)
 ProMation Engineering Inc (US)
 Quality Two-Way Radios (US)
 Rastrac (US)
 Reelcraft Industries Inc (US)
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 Roger M Douglass Ltd (UK)
 Safety Vision (US)
 SAS Global Corp (US)
 Security Engineered Machinery (SEM) (US)
 Sesotec GmbH (DE)
 Stork Turbo Blading (US)
 SWECO (US)
 Tecam Group (ES)
 Technidea Corp/ZIPLEVEL (US)
 Tech Products Inc (US)
 Trimble (US)
 Valutech Inc (CA)
 Volvo Construction Equipment (US)
 Waterloo Industries (US)
 Woodbridge International (US)
 Zweva Environment (BE)

SOFTWARE FOR SWM

CONSULTANCY

Aschl Compost Software (AT)
 ATHOS Unternehmensberatung GmbH (DE)
 Cepheus Group (FR)
 EHS Data Ltd (UK)
 Flowlens (UK)
 Institute of Information Technology Inc - IIT (US)
 Integrated Receivable and Payable Processing/CTP Solutions (US)
 naus (AU)
 ProSim Inc (US)
 Rastrac (US)
 Rockwell Automation Inc (US)
 TRUX Route Management Systems Inc (CA)

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 Institute of Information Technology Inc - IIT (US)
 Paradigm Software LLC (US)
 Rastrac (US)
 Sysmatec (CH)
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 Flowlens (UK)
 iWasteNot Systems (CA)
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 Flowlens (UK)
 Global Training Solutions Inc (CA)
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Wastedge (UK)

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Flowlens (UK)
Institute of Information Technology Inc - IIT (US)
Mobile Awareness (US)
naus (AU)
Sysmatec (CH)
TRUX Route Management Systems Inc (CA)

WASTE AVOIDANCE AND MINIMISATION

CONSULTANCY

EHS Data Ltd (UK)
Eurowaste Srl (IT)
Fichtner GmbH & Co KG (DE)
International Solid Waste Association - ISWA (DK)
Klean Industries Inc (CA)
Mil-tek UK Recycling & Waste Solutions (UK)
Nationale Reststoffenbeurs (NL)
Olympic Wire and Equipment Inc (US)
packIQ (US)
RESA Fichtner Group (ES)
Reverse Logistics Group Americas (US)
RJM Associates (US)
TEI Consulting and Environmental Engineering (IT)
TerraConsult Ltd (UK)
Yachiyo Engineering Co Ltd - YEC (JP)

CONTRACTOR

Countrystyle Recycling Ltd (UK)
RDC (UK)
Reverse Logistics Group Americas (US)

DISTRIBUTOR OR AGENT

Aerosolv Can Recycling (Europe) (NL)
Car Recycling Systems CRS BV (NL)
Eco-Infrastructure Solutions LLC (US)
Eureka Dry Tech Auto Dry Box (TW)

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Akten-ex GmbH & Co KG (DE)
Ameri-Shred Corp (US)
AVC Specialists Inc (US)
Bentonite Performance Minerals LLC (US)
Bollegraaf Recycling Machinery (NL)
CBG Technologies (US)
Columbus McKinnon Corp (US)
Continental Biomass Industries Inc - CBI (US)
Crane Equipment Manufacturing Corp (US)
ECO Green Equipment (US)
EHS Data Ltd (UK)
Engineering Services (Bridgend) Ltd (UK)
Flexus Balasystem AB (SE)
Green Machine LLC (US)
HAMMEL Recyclingtechnik GmbH (DE)
HSM GmbH + Co KG (DE)
Hydrasap Inc (US)
iWasteNot Systems (CA)
Komptech GmbH (AT)
Kyte Centrifuge Sales & Consulting (US)
Leaffield Environmental (UK)
Lindner-Recyclingtech GmbH (AT)
Macpresse Europa Srl (IT)
Mil-tek UK Recycling & Waste Solutions (UK)
Niagara Wet Surface Air Coolers (US)
Orkel Compaction AS (NO)
packIQ (US)
Parini Srl (IT)
Fritz Schäfer GmbH (DE)
SEDA Umwelttechnik GmbH (AT)
SSI Shredding Systems Inc (US)
SWECO (US)
Tretan Trading Ltd (CA)
Warren & Baerg Manufacturing Inc (US)
Wastequip LLC (US)

OPERATOR

EnviroServ Waste Management Ltd (ZA)
iWasteNot Systems (CA)
Omex Environmental Ltd (UK)
RDC (UK)

R&D

CalRecovery Inc (US)
Car Recycling Systems CRS BV (NL)
Continental Biomass Industries Inc - CBI (US)
EHS Data Ltd (UK)

WASTE-TO-ENERGY AND THERMAL TREATMENT

CONSULTANCY

Advanced Alternative Energy Corp (US)
Advanced Cryogenics Ltd (US)
Airoflex Equipment (US)
Aqualogy (UK)
Bioenergy Australia (AU)
Black Liquor Recovery Boilers Service Ltd/Cazane de
Regenerare Service Srl (RO)
Brandis Ltd (UK)
BSS (Beijing) Environmental Equipment Co Ltd (CN)
BTA International GmbH (DE)
CalRecovery Inc (US)
Continental Biomass Industries Inc - CBI (US)
Conversion And Resource Evaluation Ltd (UK)
COWI A/S (DK)
Darley & Associates (UK)
Dublix Engineering A/S (DK)
E4tech (CH)
EMGroup BV (NL)
ENC POWER Lda (PT)
Energy Developments & Resources P/L (AU)
Environmental Leverage Inc (US)
ESI Inc of Tennessee (US)
Euroheat & Power (BE)
European Compost Network ECN eV (DE)
Eurowaste Srl (IT)
Fichtner GmbH & Co KG (DE)
Grameen Shakti (BD)
Hydro-Thermal Corp (US)
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KMW Energy Inc (CA)
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CONTRACTOR

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BSS (Beijing) Environmental Equipment Co Ltd (CN)
Countrystyle Recycling Ltd (UK)
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Valutech Inc (CA)
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Klean Industries Inc (CA)
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Lindner-Recyclingtech GmbH (AT)
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UNTHA Shredding Technology (AT)
UWT (UK) Ltd (UK)
Valmet Corp (FI)
Vecoplan AG (DE)
Warren & Baerg Manufacturing Inc (US)
Water Recycle Group Australia Pty Ltd (AU)
Wolf Material Handling Systems (US)
WT Energy SpA (IT)

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EMGroup BV (NL)
Euroheat & Power (BE)
Grameen Shakti (BD)
Hydro-Thermal Corp (US)
MET Motoren und Energietechnik GmbH (DE)
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UNTHA Shredding Technology (AT)

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ABITEC sro

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scottr@abmequip.com, www.abmequip.com

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systems@adi.ca, www.adisystemsinc.com

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lblevins@aaecorp.com, www.aaecorp.com

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rushing@terranova.net,
www.carbondioxideconsultants.com

Advanced Recycling Systems Ltd

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sales@ars-eds.co.uk, www.ars-eds.co.uk

Aerosolv Can Recycling (Europe)

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+31 26 3830156, europe@aerosolv.com,
www.aerosolv.com

Aerovent

Minneapolis, MN, USA, +1 763 551 7600,
aerovent_sales@aerovent.com,
www.aerovent.com

Agro-Biogenics (Clean-Tech) Pvt Ltd

Bangalore, Karnataka, India,
+91 80 32214314, pvhramani@yahoo.com,
www.agrobiogenicscleantechpvtltd.com

AGRU Kunststofftechnik GmbH

Bad Hall, Austria, +43 7258 790 0,
office@agru.at, www.agru.at

Airoflex Equipment

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sales@airoflexequipment.com,
www.airoflexequipment.com

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AKW Apparate + Verfahren GmbH

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info@allwastematters.co.uk,
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www.alstom.com/power/industry

Alturdyne Power Systems

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ANDRITZ Gouda BV

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+31 18 2623723, gouda@andritz.com,
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ANDRITZ MeWa GmbH

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info.mewa@andritz.com,
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Develops and builds shredding/crushing
machines and turnkey recycling plants.
The main focus is processing of
electrical/electronic scrap, metal composite
materials, domestic and industrial waste,
tyres, oil filters, and organic waste for biogas
plants.

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ARJES GmbH

Leimbach, Germany, +49 3695 85855 0,
info@arjes.de, www.arjes.de
Offers individual shredder solutions for the
processing of various recycling materials.

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AUT Anlagen- und Umwelttechnologie GmbH

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Babaco Alarm Systems Inc

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Babcock & Wilcox Vølund

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bwv@volund.dk, www.volund.dk
Supplies equipment and technologies
designed to convert household waste and
biomass into thermal energy.

Eggersmann Anlagenbau BACKHUS GmbH

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Baldwin Filters

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www.baldwinfilter.com

Balmac Inc

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Barker Products-BP Lifts

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roy@bplifts.net, www.bplifts.net

Barr Engineering Co

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www.barr.com

Bedford Reinforced Plastics

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www.bhs-sonthofen.de

Binder + Co AG

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office@binder-co.at, www.binder-co.com

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BioFuture Ltd

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Bollegraaf Recycling Machinery

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+31 596 654333, info@bollegraaf.com,
www.bollegraaf.com
Manufactures sorting and waste compaction
systems, balers and conveyors.



BOMAG GmbH
Boppard, Germany, +49 6742 1000,
info@bomag.com, www.bomag.com
Manufactures refuse compactors from
2–55 metric tonnes in operating weight.
Models feature premium tooth and wheel
system with two scraper bars per wheel.

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+49 2862 91 03 0, info@boerger.de,
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BOSNER

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Car Recycling Systems CRS BV

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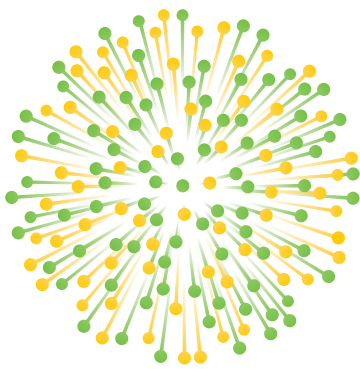
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