Waste to Resource:

THE PATHWAY TO ZERO WASTE

esa
scottish
environmental
services
association

Foreword

Scotland's journey towards zero waste relies on further investment in low carbon technologies and improved efficiency in the use of resources and materials. SESA's Members, with a proven track record in delivering cost effective waste management solutions, are ambitious to deliver this green growth by reducing the carbon emissions associated with managing the economy's waste. The use of recycled materials, for example, offsets the requirement for energy intensive manufacture and production of virgin materials, whilst generation of renewable energy from residual waste reduces Scotland's reliance on fossil fuels.

SESA therefore supports the Scottish Government's ambitious targets for zero waste, and the underpinning Waste (Scotland) Regulations. The regulations herald a major step change in the management of Scotland's waste with households, businesses and local authorities all having key roles to play. SESA's Members – as service providers – also have an integral role to play. In partnership with local authorities and commercial customers, our industry can deliver a range of integrated waste management services and infrastructure designed to ensure regulatory compliance.

Key to the successful implementation of zero waste is certainty in national policy objectives; a level playing field which allows our industry to compete fairly; and confidence that the regulations will be enforced proportionately. This report therefore aims to set out our industry's direction of travel – which is closely aligned with zero waste – and identify barriers to growth and how these should be addressed by policy and decision makers to allow our industry to efficiently deliver the Scottish Government's zero waste objectives.

Colin Paterson
Chairman, SESA Executive Committee

Who We Are

The waste and resource management industry has a pivotal role to play in Scotland's transformation from a 'throw away' society to a zero waste society. Major progress towards this goal has been achieved in recent years as the industry reduces its reliance on landfill and modernises its approach towards greater rates of recycling and waste recovery.

SCOTLAND'S PROGRESS TOWARDS A ZERO WASTE SOCIETY RELIES UPON:

- stimulating private sector investment in new waste management facilities
- a more responsive planning system which delivers greater certainty and efficiency
- a more informed debate at the local level on the need and benefits of sustainable waste management
- tougher measures to tackle waste crime

SESA: THE VOICE OF THE INDUSTRY

Representing Scotland's leading waste management companies, SESA speaks on their behalf and:

- lobbies constructively for a policy framework which enables SESA Members to operate profitably and responsibly for the benefit of Scotland's environment
- prepares sector specific good practice
- raises operational standards

THE SECTOR AT A GLANCE

- 2000 new jobs expected to be created by 2015
- 17 million tonnes of waste handled
- 68% reduction in greenhouse gas emissions since 1990
- UK turnover of £11bn

SESA's Members provide essential services to Scotland's households and businesses. It is at this customer interface that we work with local authorities and businesses to further develop more sustainable resource management practices in line with our domestic and European waste obligations. Our industry is increasingly adopting the role of a resource provider, delivering efficiency gains for businesses and carbon savings for the wider economy.

There is a pressing need for new waste management facilities

Higher rates of recycling and waste recovery require progressively more capital intensive infrastructure as waste is diverted from landfill towards other waste treatment options further up the waste hierarchy.

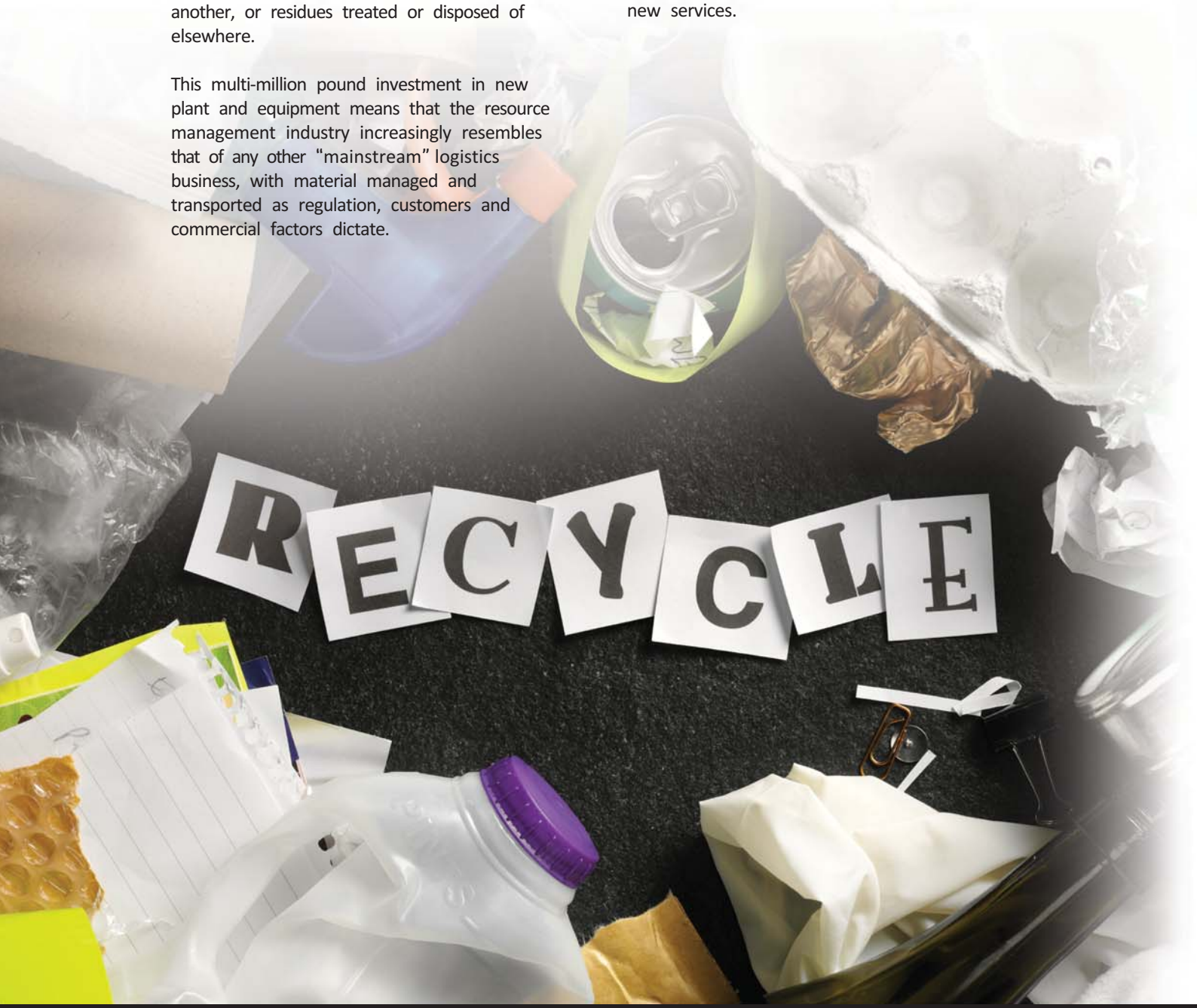
In practice, Scotland requires a network of integrated waste management facilities in which collected waste may be sorted or bulked in one location, recycled material processed in another, or residues treated or disposed of elsewhere.

This multi-million pound investment in new plant and equipment means that the resource management industry increasingly resembles that of any other "mainstream" logistics business, with material managed and transported as regulation, customers and commercial factors dictate.

The consequences of failing to deliver this network of waste management infrastructure could be severe, as the Scottish Government could face EU infraction proceedings for failing to meet its waste law obligations. Infraction proceedings could be followed by fines of up to £500,000 a day.

Waste (Scotland) Regulations place obligations on Scotland's businesses to recycle their waste. Businesses failing to comply with these new legal duties could incur fines for breach of duty of care.

SESA's Members are committed to helping businesses and local authorities avoid these risks, through the investment in waste treatment infrastructure and the provision of new services.



DRIVERS FOR GROWTH

Growth in Scotland's waste management industry is driven by the need to meet domestic and European waste management obligations, as summarised below:

- **Waste Framework Directive:** Scotland's waste policy is largely shaped by the European Waste Framework Directive which specifies that key waste materials such as paper, metal, plastic and glass must be collected separately from the general waste stream.

  The Directive sets out minimum recycling targets to be achieved by 2020 and establishes the waste hierarchy, which aims to increase further still the amount of waste being recycled and recovered, and by preventing and minimising waste at source.
- **Landfill Directive** aims to divert disposal of biodegradable waste in landfill to alternative waste treatment options.
- **Producer Responsibility Directives** require specific waste streams (e.g. packaging, electrical & electronic waste and batteries) to be collected and recycled to defined targets.
- **Landfill tax:** by 2014 the landfill tax will have reached £80/tonne. The landfill tax is beginning to reach a level where it is making alternative waste treatment technologies more economically viable.
- **Zero Waste Plan:** commits Scotland to recycle 70% of all its waste by 2025.
- **Waste (Scotland) Regulations:** implements the objectives of the Zero Waste Plan and requires businesses to ensure the source segregation and separate collection ("requirement to sort") by 2014 of a range of recyclable materials.

  The regulations will ban the landfill of biodegradable material by 2021 and ensure that only residual waste is available for Energy from Waste (EfW).

The benefits of sustainable waste management

- **waste is managed safely**

Scotland produces over 17 million tonnes of waste each year. After all efforts to prevent and reduce as much waste as possible arising in the first place, the key priority is to ensure that our society's waste is managed in such a way to protect human health and the environment. This is achieved by the following means:

- ensuring waste is directed to properly licensed sites for treatment where appropriate safeguards on environmental protection and health are in place and strictly regulated;

- the planning system ensures that waste management development is located in appropriate places and at a suitable distance from sensitive receptors; and

- thorough environmental assessments are carried out on proposed waste management development to ensure potential impacts are addressed and mitigated. Such assessments must be carried out to the satisfaction of regulators before waste management development can proceed.

It is important to stress that SESA's Members provide significant benefits to the environment and to human health by collecting and treating Scotland's waste safely. The industry manages and processes waste to reduce the potential negative impacts which would otherwise be associated with uncontrolled waste.

- **helps tackle climate change**

SESA's Members are strongly committed to reducing greenhouse gas emissions associated with managing the economy's waste carbon. The use of recycled material in new products, both domestically and abroad, offsets the requirement for energy intensive production from virgin materials, whilst the recovery of energy from waste helps to reduce the economy's reliance on fossil fuels.

Driven primarily by the European Landfill Directive, Scotland has reduced the amount of waste it sends to landfill by 70% over the last 15 years. This has helped reduce landfill methane emissions, which in the past were a significant proportion of Scotland's greenhouse gas emissions.

- **delivers energy security**

Faced with volatile energy prices, uncertainties over security of overseas energy supply and the need to reduce our reliance on carbon intensive power stations, Scotland must seek to diversify its sources of energy supply.

Energy from waste (EfW) deploys a range of technologies, ranging from incineration with energy recovery, anaerobic digestion, landfill gas to advanced conversion technologies. Regardless of the technology option, EfW is an essential component of modern waste management infrastructure. Experience from Europe shows that more waste recovery through EfW is entirely compatible with further increases in recycling and, as well as achieving the secondary, but important objective of waste diversion from landfill, it offers an indigenous and secure energy supply.

In 2011, the Scottish Government announced a new target to generate the equivalent of 100% of Scotland's own electricity demand from renewable resources by 2020. Alongside commitments to heat and transport, Scotland has the potential to be one of Europe's leading renewable energy economies.

However, achieving this target in just 8 years will be challenging, particularly as Scotland's current installed renewable energy infrastructure largely provides an intermittent and unpredictable base load (e.g. wind power). To achieve its 100% renewable electricity target, Scotland must stimulate investment in a more diverse range of renewable energy sources, such as EfW, which has an additional benefit over other renewable energy technologies by providing a more reliable electricity base load.

Delivering the Zero Waste Plan: a partnership approach

The Waste (Scotland) Regulations set out the regulatory framework for Scotland's journey towards its ambitious 70% recycling target. The regulations contain a number of key provisions:

- by 2014 businesses will be required to separate dry recyclables (paper, card, glass, metals and plastic) from general waste. By the same date, local authorities would be required to provide households with a dry recyclables collection service. Crucially, the regulations allow flexibility to choose the recycling system which best suits local circumstances, whether this be a co-mingled or a kerbside-sort collection system;

- there is a strong emphasis on separate collection of food waste, with most businesses involved in the handling or retail of food required to present food waste for separate collection from 2014 (and from 2016 for small businesses and households). This requires the roll out of new collection practices and investment in new infrastructure - such as Anaerobic Digestion or In-Vessel Composting - for the treatment of food waste;

- recycling systems should promote high quality recycling. Compost and digestate, for example, would need to meet relevant PAS criteria to count towards recycling targets;

- bans will be imposed from 2014 on the landfill of separately collected recyclable material and food waste, and a further ban on the landfill of biodegradable waste would apply from 2021. This requires considerable investment in new waste recycling infrastructure and waste pre-treatment facilities which can further recover recyclables and reduce the biodegradable content of waste. However, due to the long lead-in times in procuring and commissioning waste management infrastructure, these bans require urgent investment decisions to be made now on alternative waste treatment options.

SESA's Members are willing to work closely with businesses and their local authority partners to develop the most cost effective solutions to achieving Scotland's ambitious recycling targets. In some cases local authority collection practices and costs will need to be considered within the wider, strategic context of the Scottish Government's requirement for high quality recycling and the specification of waste treatment facilities.

scottish environmental services association

How Waste and

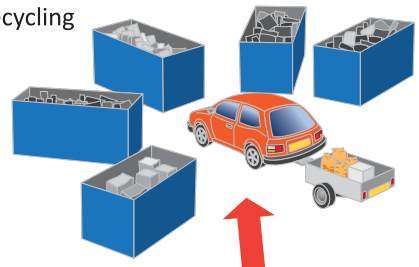
Building colour key:

Houses, offices, factories producing waste

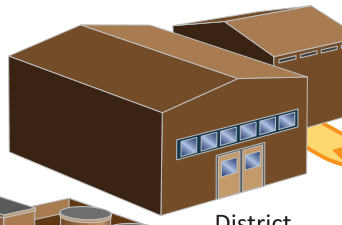
Waste management facility

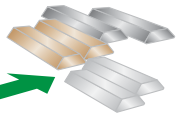
Waste

Processed Output



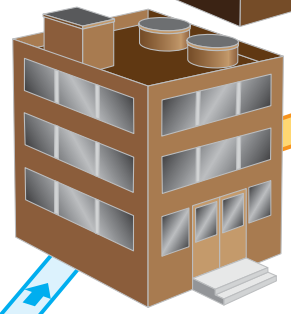
Taken to an HWRC for recycling



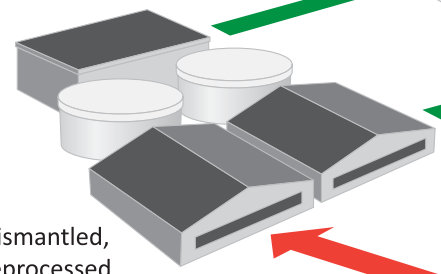


Precious Metals

Materials for Recycling

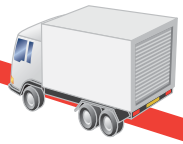


District Heating



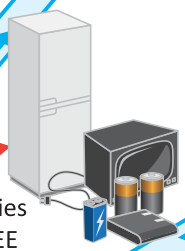
Bulky items

Dismantled, reprocessed and safe disposal



Acronym key:

AD:	Anaerobic Digestion
CLO:	Compost-like Output
EfW:	Energy from Waste
HWRC:	Household Waste & Recycling Centre
IBA:	Incinerator Bottom Ash
IVC:	In-Vessel Composting
RDF:	Refuse Derived Fuel
WEEE:	Waste Electrical & Electronic Equipment

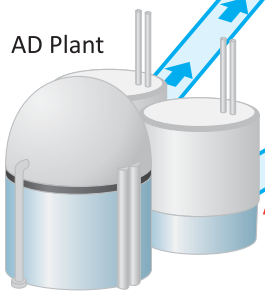


Batteries & WEEE

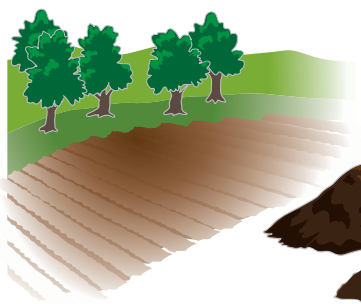
Biogas

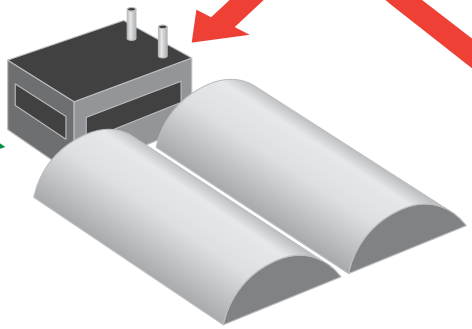
Food Waste

AD Plant



Biogas



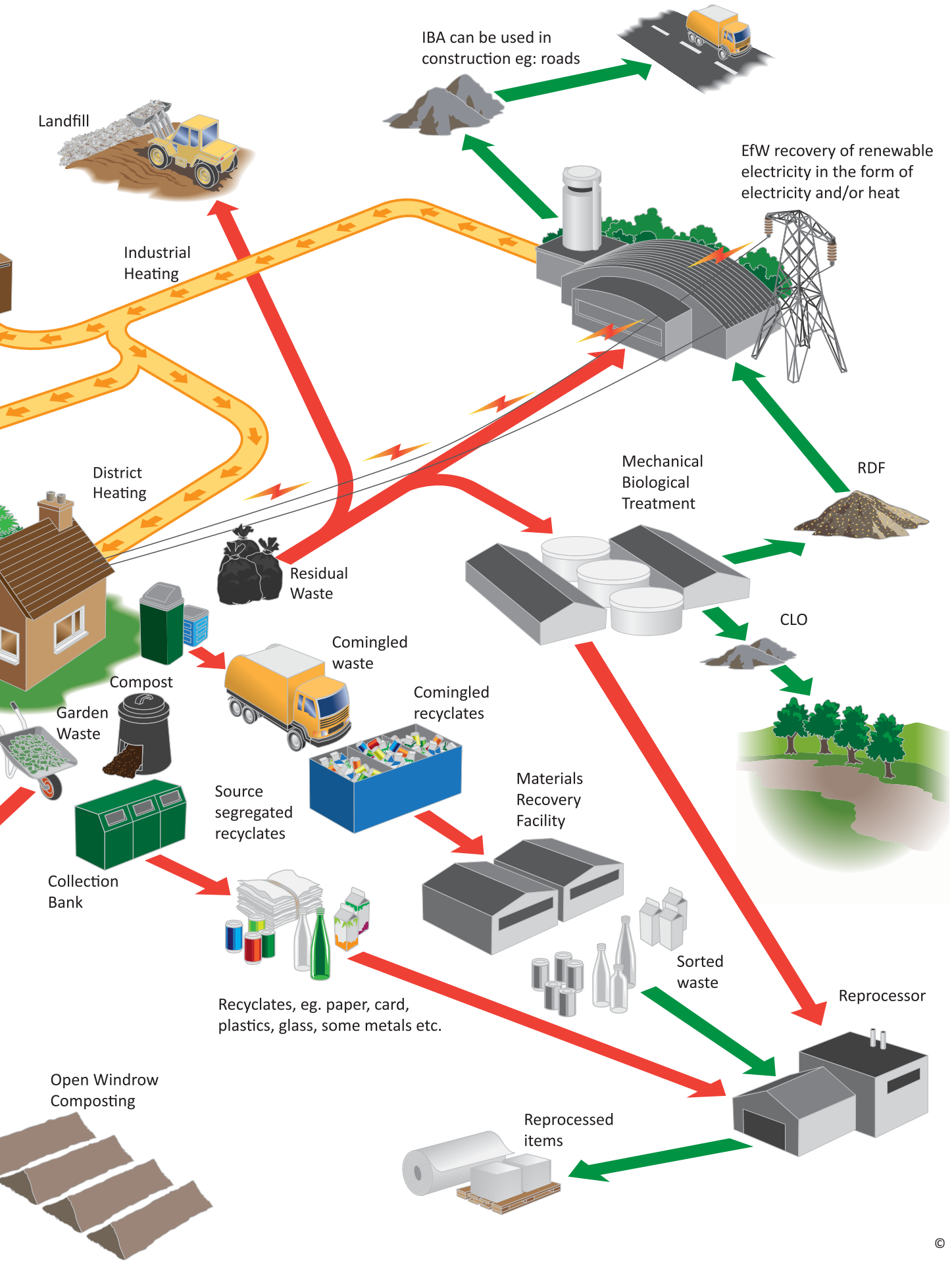


IVC

Biofertiliser & compost

Note: This diagram should be seen as illustrative; some relationships and processes have been simplified/omitted for clarity

Resource Management Works



Delivering the infrastructure: key recommendations

The transition from landfill disposal to an industry which recovers more of the valuable material contained in our waste is well underway. Efforts so far have tended to focus on the provision of local waste collection and primary treatment infrastructure. Of course, much more of this infrastructure is needed to achieve Scotland's ambitious recycling targets. However, this is only half the story, and Scotland also needs strategically located waste treatment facilities for further waste reprocessing or energy recovery.

A £1bn investment is required over the next decade in new waste treatment infrastructure in Scotland. Given constraints on the public purse, private sector investment is key to efficient delivery of integrated waste services and infrastructure. The industry's ability to manage project risk makes it the most efficient way to develop new waste infrastructure, and the competitive tension it provides leads to increased innovation.

For this investment to be realised a number of barriers need to be addressed and the following sections provide some suggestions on how this could be achieved.

1. Speed up the planning system

The primary role of the planning system is to convert aggregate need into local waste management investment opportunities. However, in practice, the planning system has become a major element of project risk for new waste management development.

Planning applications for waste management development are made at significant cost and high financial risk. If the planning risk to development is too great, investment may cease to flow into the waste management sector, with the environmental benefits derived through recovery of energy and materials from the waste stream realised elsewhere in the UK or overseas.

A lack of up to date development plans with adequate provision towards waste management continues to frustrate the industry's investment in new waste management infrastructure. In the absence of up to date plans, development proposals often constitute a *plan departure*, triggering the appeals process.

The Scottish Government can help to address the planning barriers by:

- providing a clear and robust explanation of its waste management objectives, timelines and deliverables
- ensuring expeditious preparation and adoption of local plans with adequate provision towards waste management
- encouraging local authorities to adopt a strategic approach to planning for waste management

> *"we must start to realise that the private sector's resources will be required if we are to deal with Scotland's waste challenges and that that sector has a valuable role to play"*
>
> Richard Lochhead MSP (SP OR 15 September 2011, col 1747)

2. Unlock private sector investment

The industry needs a simple, consistent technology-neutral policy framework, which allows market investment to drive the cost effective delivery of the waste management infrastructure required by Scotland's Zero Waste Plan. However, the procurement process is simply too long and expensive, leading to inefficiencies with much duplication of work by bidders on individual projects and by local authorities on different bids.

What matters to a contractor is being able to secure a long term contract with a local authority partner to enable capital intensive process based infrastructure to be developed. The guaranteed long term waste input to a facility is the critical factor, as in such circumstances waste facilities are more readily financeable.

Closer collaboration between local authorities on a regional basis should be encouraged in the design of waste services and in the procurement of infrastructure. The joint planning and procurement of waste management facilities, with consideration of the optimal size, capacity and location of new facilities would achieve economies of scale and deliver value for money.

Local authorities should:

- actively engage the industry to better understand the range of possible innovations on offer and seek to resolve potential constraints to investment
- improve guidance on the appropriate use of competitive dialogue
- form strategic partnerships with neighbouring authorities to deliver consistency in collection methods and materials to ensure that feedstock delivered to waste treatment facilities can be processed efficiently within the range of plant specification

3. An informed, local debate

Most of us adopt a mindset of 'out of sight, out of mind' when it comes to waste, and so it is unsurprising that many communities are sometimes dubious about hosting waste management infrastructure.

However, this must change, and working closely with the Scottish Government and local authorities, we need an informed debate on the benefits that can be derived from new sustainable waste management infrastructure.

Key to this debate is the role of local councillors who, acting on behalf of their local community, ultimately shape decisions on local waste management requirements.

While SESA and its Members try hard to communicate the benefits of waste infrastructure to the public, in line with the objectives of the Zero Waste Plan, we often face continued, persistent local opposition to new development. Local councillors are often unwilling to be associated with locally unpopular development and seem content to pass the decision making process to the Reporters Unit through appeal.

This has to change: we need local political representatives to inform and shape public opinion, not simply react to it. We are ready to work alongside them to do just that.

SESA's Members are committed to working with communities, both in minimising nuisance from operational sites and engaging in pre-application consultation. In return local councillors should:

- commit to closer liaison with planning officers prior to the submission of applications to committee
- be offered training on the need for sustainable waste management and the various technology options available
- gain more representative information on the actual level of public concern within the wider community associated with a proposed waste management development

> *"we all have a responsibility in our own constituencies to keep things in perspective and ensure that information that we get from others is checked out properly and that the information that we give to constituents is accurate"*
>
> Richard Lochhead MSP (SP OR 15 September 2011, col 1748)

4. Tackle illegal waste activity

Illegal waste activity, ranging from flytipping to organised crime can have a profound effect on the quality of life in local communities. Considerable financial gains can be made by environmental criminals, which directly undermine the legitimate operations of responsible waste managers.

An effective regulatory regime is therefore a key driver for Scotland as it develops a resource efficient economy. Regulations set the standards for how waste should be managed and include sanctions for those who break the rules.

Of course, regulations must be properly enforced if the industry is to have the confidence to invest in the range of new infrastructure which the Zero Waste Plan seeks to deliver. Without greater certainty that there will be zero tolerance of environmental criminals who deliberately flout the rules there will be no market for waste management services.

SESA is determined to see tougher action on those companies and individuals who deliberately flout environmental laws. To this end we are working with SEPA to ensure that SESA Members' intelligence about waste crime is passed to SEPA, and acted upon.

In contrast to environmental criminals, SESA's strictly regulated Members seek to improve the environment by delivering essential public services and environmental compliance for their public and private sector clients. The regulated industry SESA represents is one of the most direct victims of environmental crime.

- SEPA should deliver fair and predictable risk-based regulation

- the Scottish Government should ensure that SEPA is adequately resourced to identify and target lawbreakers

Options for the treatment of residual waste

SESA Members are fully committed to meeting the high recycling targets of Scotland's Zero Waste Plan.

However, there will always be environmental or economic limits to the amount of material that can be extracted from the waste stream for recycling. Even in a zero waste society there must be provision to deal with residual waste – the waste left over after all practical efforts have been made to recycle.

While landfill will remain a viable option for the disposal of some residual waste, Scottish Government policy aims to reduce our reliance on landfill and divert residual waste to alternative treatment options where more of the value contained in residual waste can be extracted.

The treatment of residual waste can broadly fall into four categories, however, all may have a role in Scotland's integrated network of waste management facilities. In fact, more than one of these technologies could be used at different stages to treat residual waste:

- Mechanical Biological Treatment
- Mechanical Heat Treatment
- Energy from Waste
- Advanced Conversion Technologies

Mechanical Biological Treatment (MBT)

MBT can be designed to a wide variety of specifications to suit local circumstances, but generally it involves the mechanical sorting of waste followed by a phase of biological treatment.

The function of MBT varies depending on plant specification but it is predominantly a waste drying and volume reducing process, however, some facilities are designed to further recover recyclable material.

The main output from the drying process is Solid Recovered Fuel (SRF) which can be used as a source of fuel. MBT is therefore often a vital intermediary process for the treatment of waste.

Mechanical Heat Treatment (MHT)

MHT (commonly referred to as autoclaving) can be configured to varying specifications to meet local circumstances. However, it typically involves a mechanical sorting stage before the waste is treated by heat in a pressurised container. The application of heat reduces the volume of waste and allows for the recovery of recyclable material (such as metal and glass).

Once recyclables are removed, a solid residue is produced (Refused Derived Fuel – RDF) which can be used as a fuel to produce heat and electricity.

Energy from Waste

Energy from waste involves the incineration of residual waste to produce renewable energy. Energy from waste can be integrated with combined heat and power (CHP) to improve the efficiency of the energy recovery process and provide electricity and heat to local homes and businesses.

Emissions from the process must comply with strict emission limits which are regulated by SEPA to the same exacting standards as any other thermal treatment process. Metals can be recovered from the ash for recycling, while the ash itself can be turned into aggregate for use in the construction sector.

Advanced Conversion Technologies (ACT)

ACTs typically involve processes such as pyrolysis and gasification to treat either residual waste or RDF produced by other waste treatment processes.

Pyrolysis involves the thermal decomposition of waste under anaerobic conditions, where heat is used to break down waste into its constituent parts. The solid residue and a synthetic gas (syngas) produced can then be used as a fuel to generate electricity or steam.

Gasification is a fairly similar process except the thermal treatment process occurs in the presence of oxygen. The syngas produced can then be burned in a turbine or engine to produce electricity and steam.

scottish environmental services association

Contact Us: Stephen Freeland (SESA Policy Executive), Rid Hollands (Communications Officer)
Scottish Environmental Services Association, 2nd Floor, Excel House, 30 Semple Street, Edinburgh, EH3 8BL.
Telephone: 0131 229 1000 Email: S-Freeland@esauk.org R-Hollands@esauk.org Web: www.esauk.org

PRINTED ON 100% RECYCLED PAPER