

Sustainable waste
management?



It depends which
way you look at it.

A QUESTION OF BALANCE

FOREWORD

As we enter a new century, the UK Government has pledged to put sustainable development “at the heart of all its policies.”^{Ref. 1} In everyday language, this means pursuing economic policies which won't compromise the social or environmental needs of future generations.

At present our small island uses up more natural resources and produces more waste than our fair global share. So how can we manage our waste better? The Government's answer is contained in its recently published sustainable waste strategy, a 20 year policy blueprint, which aims to reduce both the volume of natural resources our society consumes and the volume of materials we discard as waste.

The strategy's main task is to comply with the EU Directive on the Landfilling of Waste which will force a massive shift away from traditional landfill disposal towards more re-use, recycling and energy recovery of waste materials. Biffa believes the directive presents both a great challenge and a great opportunity. Seizing the challenge could bring the UK major benefits in terms of jobs, technology leads and new export markets. Getting it wrong could constrain economic growth by introducing inflexible systems (by 2020), which are incapable of dealing with fast changing needs thereafter.

Within this report, 'A Question of Balance', we present our own vision of a sustainable waste strategy, based on 80 years of experience as an integrated waste management business. We firmly believe that sustainable management of resources is achievable - with the right balance of technologies, regulation and environmental taxes. Yet there is a danger of getting the balance wrong, on four main counts:

- Through the lack of an integrated, comprehensive nationwide waste data collection system.
- Through an absence of co-ordinated policy making across different government departments.
- By favouring a 'quick fix' solution, namely up to 165 new, large scale incinerators, to divert waste from landfill.
- By burdening businesses with waste related taxes and recycling obligations, without imposing reciprocal recycling obligations on the individual householder.

There are, of course, neither easy nor absolute solutions to what is a very complex national picture. No single constituency (central or local Government, the waste industry, business, individual citizens or technologists) can alone deliver the integrated solutions required. If we are to deliver genuine sustainability to future generations, then all these key players, ourselves included, must work together on a common agenda. If we are to succeed, the uncontrolled squandering of natural resources must become “as unacceptable in the public mind as drinking and driving is today.”^{Ref. 28}

We hope you find our suggestions stimulating and useful.



Martin J Bettington,
Managing Director.



OBJECTIVES

'A Question of Balance' is the fourth in our Biffa Book series which aims to address the issues of the constantly evolving challenge of waste management in Britain today. Its aims are:

- To inform the debate on how the UK can develop a more ecologically sound approach to managing natural resources and waste products.
- To respond to the Government's proposed waste strategy for 2000-2020.
- To promote dialogue with other key stakeholders, including industry, local and Central Government and the European Commission.
- To inform and involve the wider public in the national waste debate.

To access all four Biffa Books and to give us your feedback, please visit our interactive website at www.biffa.co.uk.

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This is a very short timescale. Yet the gulf between standing on the verge of a transformation, and making it happen remains huge. Around 65% of all controlled waste generated in England and Wales is still sent to landfill; we recycle only a quarter as much as other European nations; and our throwaway society is producing an estimated 3% more household waste every year.^{Ref. 1} These statistics not only add up to a vast waste of re-usable natural resources. They also underline the huge challenge involved in shifting public opinion and behaviour towards a more conservation based approach to waste.

This report, 'A Question of Balance', suggests how the challenge can be met. It incorporates both Biffa's detailed response to the Government's proposed waste strategy and our views on how best to divert waste from landfill to meet the European deadline. It also lays out the choices facing politicians, society and industry as we attempt to reform the UK's outdated waste policies and practices.

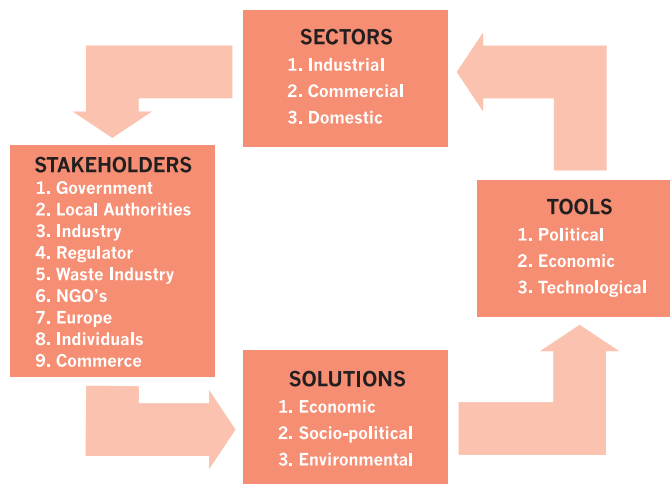


Fig 2. The Sustainable Waste Cycle

The graphic above explains how the pieces in the complicated waste management jigsaw fit together. It highlights the interdependent relationships between the three waste producing sectors - industry, commerce and domestic households - the key stakeholders which regulate and operate the waste management trade and the political, economic and technological solutions which will drive change. On page 12, 'Striking The Right Balance', we examine these solutions in detail and identify the barriers in their way.

The strategies we propose throughout this report mirror Biffa's own journey of development, from a family business, into one of the largest integrated waste management companies in the UK and Belgium. Our aim is to simplify, for a wide audience, the complex issues facing our industry at this critical crossroads in its history.



PAST LESSONS, FUTURE CHOICES

A BRIEF HISTORY OF WASTE

Historically most waste produced in the UK has been sent to landfill, primarily in former quarries. The practice was largely unregulated until concern over uncontrolled tipping forced the introduction of the Deposit of Poisonous Waste Act 1972 and the Control of Pollution Act 1974. Since then, the industry has been increasingly tightly controlled. The science of landfill has also advanced dramatically, with high engineering and operational standards providing effective environmental protection.

As the cheapest option, the practice of burying waste was largely unchallenged until 1990 when the concept of the waste disposal hierarchy was developed. This promotes reduction of waste as the best option, then re-use and recycling, with disposal the last resort. Nine years on, however, we recover only 8%^{Ref. 119a} of the 27 million tonnes of household waste produced every year in England and Wales and only half the 60 million tonnes generated by commerce and industry.^{Ref. 1} Around 65% of all wastes are sent to landfill;^{Ref. 1} most of the remainder is burned in municipal incinerators.

In June 1998, the current government published 'Less Waste, More Value', a waste strategy consultation paper which pledged to enforce the waste hierarchy by boosting recycling and energy recovery facilities, promoting waste minimisation and expanding green taxation. This was superseded in 1999 by the draft waste strategy 'A Way With Waste', which leans heavily towards incineration as the central plank of waste recovery policy over the next 20 years.

The Government's thinking has evolved against a background of heated Europe-wide debate over the relative environmental merits of landfill, incineration and recycling. In 1997, environment minister Michael Meacher argued that landfill with energy recovery "in many cases... would represent a more sustainable solution than transporting waste to an incinerator."^{Ref. 11} Two years later, the Government declared its confidence that tight controls on modern incinerators adequately protected human health and the environment and that they had an "important role to play" in a sustainable waste management system.^{Ref. 1}

Two factors have contributed to this policy shift. First, pressure from other European Union countries, particularly France, many of which have invested heavily in energy from waste plants. Second, anxiety in Whitehall that the landfill directive's waste diversion targets would not be met without building large incinerators to process very high volumes of material. However, public concern in Britain about pollution from incinerators is spreading to the Continent. In late 1999, the French Government tightened emission consents for the country's older energy from waste plants.^{Ref. 39, 40}



GOVERNMENT MILESTONES/TARGETS VS. BIFFA MILESTONES

	GOVERNMENT MILESTONES/GOVERNMENT TARGETS	BIFFA MILESTONES
1990	<p>1990: 90% of non-hazardous UK waste sent to landfill.</p> <p>1990: Conservative Government adopts the waste hierarchy - reduce, re-use, recover, dispose.</p> <p>1990: Introduction of Environmental Protection Act.</p>	<p>1990: Bans landfilling of liquid wastes.</p> <p>1993: Bans landfilling of whole tyres, radioactive and clinical wastes.</p> <p>1993: Bans landfilling of fluorescent tubes.</p> <p>1993: Biffa produce - 'Waste: Somebody Else's Problem?'</p> <p>1994: Sets up a detailed inventory of all waste for disposal.</p> <p>1994: Partnership with SCA Recycling, involving a guaranteed market for reprocessing the vast majority of cardboard collected by Biffa.</p>
1995	<p>1995: Conservative administration embraces waste hierarchy-reduce, re-use, recover, dispose.</p> <p>1996: Waste Framework Directive, introduced in the UK through the waste management licensing regulations, 1996.</p> <p>1996: Hazardous Waste Directive, introduced in the UK through the special waste regulations 1996.</p> <p>1996: Introduction of Landfill Tax.</p> <p>1996: Making Waste Work published by the Conservative Government.</p> <p>1997: Introduction of Packaging Waste Regulations.</p> <p>1998: 'Less Waste, More Value', waste consultation document, published by the Labour Government.</p> <p>1999: 'A Way With Waste', draft waste strategy, published by the Labour Government.</p>	<p>1995: Redhill becomes the first UK landfill site to receive ISO14000 registration.</p> <p>1995: Biffa produce - 'Waste: A Game of Snakes & Ladders?'</p> <p>1996: Redhill landfill site becomes the first in Europe to be registered under the European Community Eco Management and Audit Scheme (EMAS).</p> <p>1996: Launches Newbury household recycling scheme, one of the UK's Biggest.</p> <p>1997: Launches Biffaward with landfill tax revenues.</p> <p>1997: Launches UK's first integrated waste collection system, (under Private Finance Initiative) Isle of Wight.</p> <p>1997: Biffa produce - 'Great Britain Plc'.</p> <p>1997: Launches BiffPack compliance scheme.</p> <p>1998: Launches first national pub glass recycling collection service.</p> <p>1998: Biffa first waste company to publish independent environmental report.</p> <p>1999: Biffaward exceeds £10 million in donations to environmental projects.</p> <p>1999: Isle of Wight achieves 40% recovery.</p> <p>1999: Development of treatment solutions as alternatives to landfill.</p> <p>1999: First annual awards ceremony to recognise the success of projects funded through the Landfill Tax credits scheme.</p>
2000	<p>2000: Further consultation on how to implement the Landfill Directive targets.</p> <p>2000: Implementation of IPPC Directive due.</p> <p>2000: Government due to publish a sustainable waste strategy for 2000-2020</p> <p>2001: Implementation of EU Landfill Directive.</p> <p>2002: Incineration Directive effective on new plants.</p> <p>2003: Ban landfilling of whole tyres (shredded tyres by 2006).</p> <p>2004: Wholesale review of Landfill Tax.</p> <p>2004: End Life Vehicle Directive.</p> <p>2004: WEEE Directive.</p>	<p>2000: Biffa produce - 'A Question of Balance'.</p> <p>2001: Biffaward exceeds £20m (cumulative)</p>
2005	<p>2005: Recover 40% of municipal waste, recycle or compost 25% of household waste (put back from 2000).</p> <p>2005: Recycle or compost 25% of household waste (put back from 2000).</p> <p>2005: Incineration Directive applied to all plants.</p>	
2010	<p>2010: Programme well under way to build up to 165 new incinerators, and up to 500 new recovery and composting facilities by 2015.</p> <p>2010: Recover 45% of municipal waste, recycle or compost 30% of household waste.</p>	
2014	<p>2014: Reduce municipal waste landfilled to 35% of 1995 levels (Landfill Directive).</p>	



WHICH FUTURE? 2000-2010

To meet the targets listed on the previous page, the Government will have to create the conditions in the next few years to foster a huge shift from landfill to alternative ways of managing waste. In doing so, it faces a fundamental choice between two paths. The first involves replacing ubiquitous landfills with another large-scale nationwide solution. As recycling is still a fledgling national industry with under-developed markets, there is only one obvious candidate: high volume energy from waste plants. These would rely on secondary landfills to dispose of ashes and pollution abatement residues.

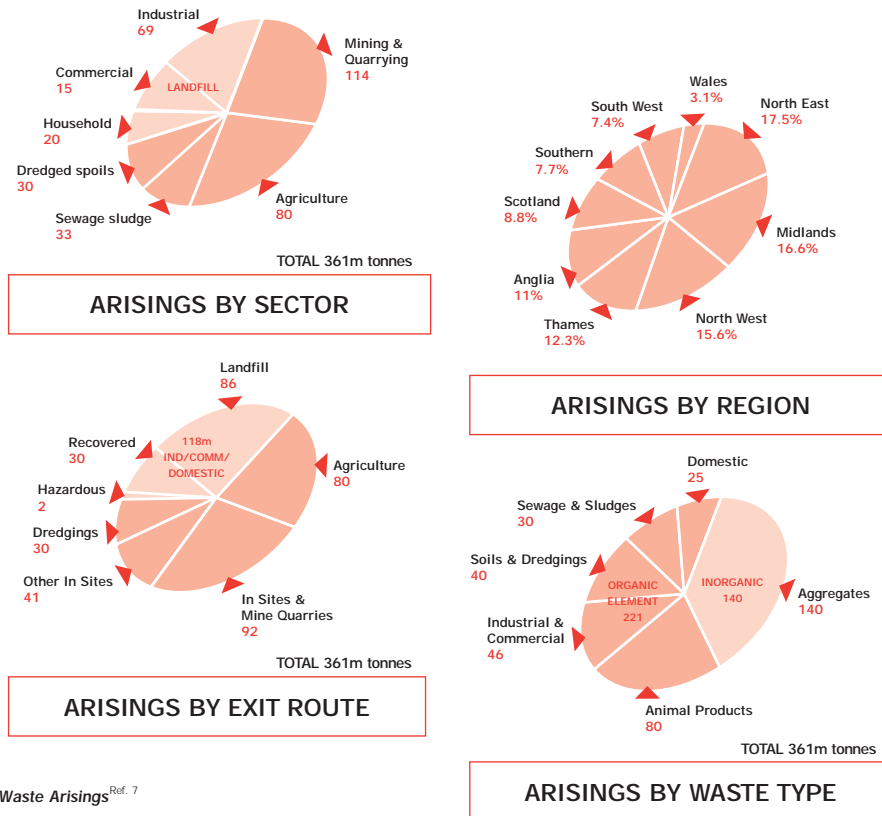


Fig 3. Waste Arisings^{Ref. 7}

The second path places more emphasis on waste minimisation and recovery programmes such as composting and waste digestion. Again, these methods would be backed up by landfilling of remaining wastes and treatment residues, as well as a modest increase in energy from waste plants. At the same time, the Government would encourage a major shift towards more re-use of natural materials. This would be achieved through the use of financial sticks and carrots aimed primarily at product manufacturers, suppliers and retailers. The second path is favoured by environmentalists - and by Biffa.

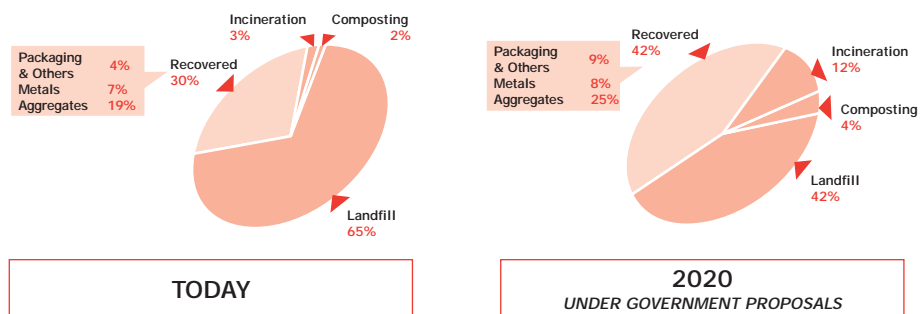


Whichever path is chosen, however, underground disposal will continue to play an important supporting role. No country in the world manages its waste without some landfill. Biffa's best estimate is that landfill volumes will fall to a minimum of 35 million tonnes by 2020 from 85 million today. Any further reduction will probably not be cost-effective or practicable, either in environmental or economic terms.

THE GOVERNMENT APPROACH

In attempting to meet the stringent terms of the EU Landfill Directive, with its narrow focus on household waste, the Government is favouring the first of the two paths. The key points of its draft waste strategy, 'A Way With Waste', published by the Department of Environment, Transport and the Regions in June 1999, include:

- A significant rise in energy from waste plants.
- A substantial increase in recycling facilities.
- A range of financial measures and new regulations to reduce waste creation.



1. NOTE: Assumed that minimisation offsets tonnage growth.
2. NOTE: High estimated incineration may be 20 million tonnes depending on DETR collection 'mix' used.

Fig 4. Waste Inputs Today vs Waste Inputs in 2020 (under current Government proposal)^{Ref. 1}

In essence, Whitehall proposes to tip the balance away from dominance by landfill to dominance by high temperature energy from waste plants. In 1999 there were only twelve large municipal solid waste incinerators in the UK with a total capacity of 3 million tonnes. The Government suggests that 165 more, with an average capacity of 200,000 tonnes, will be needed by 2015. It also plans a lesser boost to recycling facilities, envisaging 100-200 new materials recovery plants, with an average capacity of 50,000 tonnes and 150-300 composting plants, with an average capacity of 20,000 tonnes.^{Ref. 1} However these figures are not, as yet, statutory targets.



BIFFA SIGNPOSTS

Founded in 1919, Biffa Waste Services is one of the UK's largest integrated waste management companies. We manage waste for over 30,000 industrial and commercial customers and 18 local authorities and operate 29 landfill sites nationwide. We also have substantial waste treatment and recycling capabilities and run the UK's second largest packaging waste compliance scheme. (For more information see the Biffa Environmental Report 1998 or visit our website at www.biffa.co.uk).

Biffa welcomes the Government's commitment to a sustainable waste management strategy. However, we find 'A Way With Waste' disappointingly long on philosophy and short on concrete, integrated policies. In the next chapter, we set out our own stall for the future. Below, we offer a critique of the Government's approach. Our main concerns are as follows:

- Over reliance on large scale, high volume incinerators which could skew the market against re-use and recycling.
- Inadequate emphasis on supply chain reform, producer responsibility and product redesign to meet the primary goals of waste reduction and recovery.
- Failure to tackle consumer behaviour by requiring householders to participate in waste recycling and recovery schemes.
- Failure to progress a reliable national waste database.

THE CHALLENGE FOR GOVERNMENT

As a company at the heart of the waste debate, we readily accept that landfill's historic role is declining. Unlike other objectors, we also accept that the risks of pollution from large scale incineration plants can be minimised, through efficient temperature control and the use of sophisticated air pollution removal equipment.

Nevertheless, we fear that the sheer scale of the Government's proposed shift to energy from waste plants threatens to tip the scales too far one way. In common with organisations such as Friends of the Earth, we believe mandatory recycling targets for businesses and households would be a more environmentally acceptable option.

Our view is that a proliferation of energy from waste plants, will do nothing to accelerate the true drivers for increasing a product's sustainability throughout its life, namely eco-friendly design by manufacturers, less use of toxic substances and higher rates of material recovery and re-use. It will also do little to enhance pressure on the makers and suppliers of goods to reduce the amount of waste they produce and increase the amount they recycle. Instead, by providing a simplistic, end of pipe solution, we believe a large incinerator building programme would act as a brake on the use of more innovative green technologies.



So what is the right way to meet the UK's waste management commitments? The answer for Government is not to repeat the mistakes of the 1970's by building costly white elephants, but instead to develop a regulatory framework which supports flexible, integrated waste management systems tailored to local needs. How would this work in practice? We believe our pioneering Isle of Wight operation, featured below, presents a good model for the way ahead.

ISLE OF WIGHT - AN INTEGRATED MODEL

Island Waste, a Biffa subsidiary, operates the UK's first integrated household waste collection, recycling and disposal service on the Isle of Wight. Around 40% of municipal rubbish is recovered by recycling glass, paper and aluminium and by the conversion of waste into energy at a small 43,500 tonne incineration plant. The electricity produced is enough to continuously power 500 homes. The island's households also separate garden and food waste which Island Waste composts, using innovative Canadian technology. The material takes about three weeks to process and after it matures can be sold as a soil conditioner.^{Ref. 157}

Large incinerators require a steady and very high volume of waste to be cost effective. This means they cannot readily respond to fluctuations in local need. We believe that smaller, selectively targeted, energy from waste plants of less than 40,000 tonne capacity, have a greater future role. As in the Isle of Wight, such plants could work effectively alongside waste minimisation, recycling and composting schemes to extract the greatest possible environmental gain. In particular, they will play a useful role in recovering energy to power homes from unrecyclable waste such as contaminated materials.

This kind of mixed approach may be more complex for central and local Government to administer across the country. But we believe it would be better to deliver a waste management framework which is truly sustainable, publicly acceptable and offers the best long term structure for our industry.

THE CHALLENGE FOR THE WASTE INDUSTRY

In 1992, the largest five waste companies commanded 16% of the market, by 1999 the top 5 had increased their market share to 31% (see Fig 12 p18). To meet the challenges in the decade ahead, large waste companies which have traditionally relied upon landfill, will have a stark choice. They will need to broaden themselves into fully integrated waste management companies, offering recycling, recovery and waste minimisation as well as disposal services. Or alternatively, to specialise in core areas of activity. A fully integrated waste management offering will involve:

- Operating across all three waste sectors - industrial, commercial and domestic.
- Operating throughout the supply chain - collecting, treating and disposing of waste.
- Operating in national or regional partnerships with the major reprocessing companies which recycle paper, glass, plastic and other materials.
- Recognising the importance of innovative technologies for waste separation, sorting and treatment processes.
- Operating across regions large enough to provide reasonable economies of scale while still being responsive to local needs.



STRIKING THE RIGHT BALANCE

THE SUSTAINABILITY CHALLENGE

Simply put, sustainable development means ensuring a better quality of life for everyone, both today and for future generations. But translating this philosophy into concrete Government policy and industry practice, generally involves a complex balancing act between often competing interests within societies. And the waste management arena is no exception.

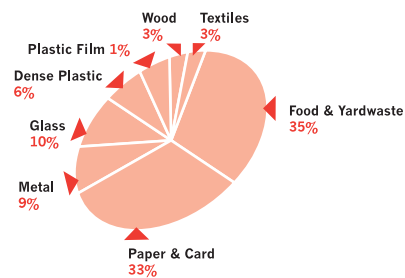


Fig 5. Composition of Municipal Solid Waste (MSW)^{Ref. 80,109,110}

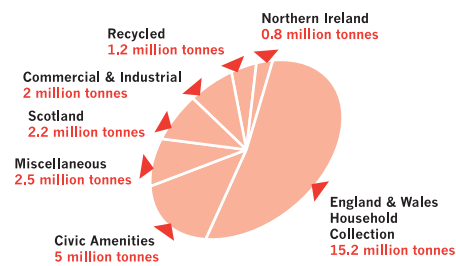


Fig 6. UK Municipal Arisings^{Ref. 80,109,110}

The UK Government defines sustainable waste management as:

...using material resources efficiently, to cut down on the amount of waste we produce. And where waste is produced, dealing with it in a way that actively contributes to the economic, social and environmental goals of sustainable development.^{Ref. 1}

However, producing a waste management policy which meets these three goals - sometimes termed the 'sustainability tripod' - is fraught with difficulty. Social progress to date, for example, has meant more waste generated as people eat more take-away foods and buy more easy-to-use throwaway goods such as disposable nappies. With more families comprising working couples, the economy has also benefited with the boom in service industries catering to an increasingly affluent public. But, on the other side of the scale the UK's use of natural resources has accelerated dramatically to fuel our consumer society.



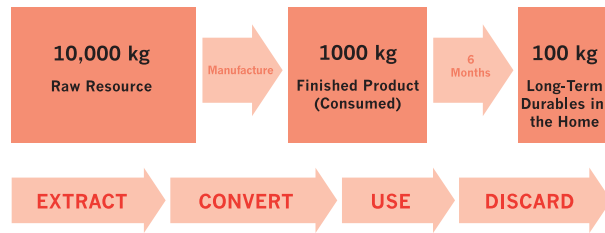


Fig 7. Linear Waste of Resource - Today (per capita-UK, per year) see also Fig 9a p.16

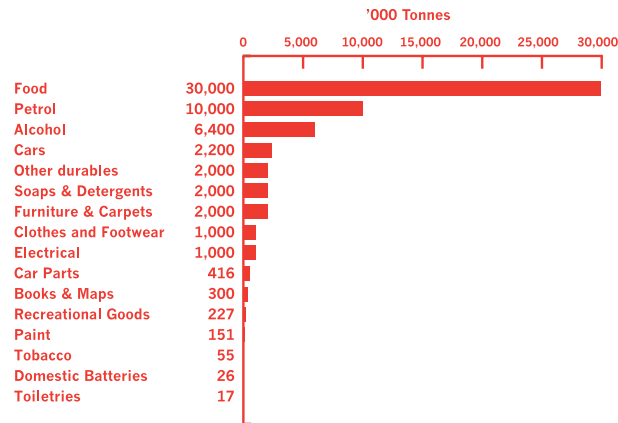


Fig 8. Annual Personal Consumption (Total = 60 million tonnes)

UNSUSTAINABLE TODAY

At present, waste management in this country clearly falls far short of the sustainability criteria. It takes around 10 tonnes (10,000kg) of raw materials to deliver one tonne of finished product to the consumer. Of that tonne as little as 100kg is left six months after purchase - the remaining 90% is discarded as waste (solid and gaseous). Landfill space is becoming scarce in parts of our highly populated areas, with Kent set to run out of identified options by 2001.^{Ref. 1} Yet if waste volumes continue to rise unchecked, Britain will need nearly twice as many waste management facilities by 2020 as it had in 1999.^{Ref. 1}

The over-riding challenge for all of us involved in managing waste, is to change the way all sectors of society think about and treat natural resources; to foster a new behavioural culture based on conserving rather than discarding products made up of finite natural resources. True sustainability is not simply about making end of pipe waste management sustainable, recycling waste rather than dumping it in a hole or incinerating it. Some suggest we revisit the self-sufficiency values of previous generations who habitually re-used materials several times over, rather than throw them away. It is also about redefining the whole way we put products together in the first place.



SUSTAINABLE TOMORROW?

The scenario outlined on the previous page, is not a problem peculiar to Britain, but is faced by modern consumer nations worldwide. In recent decades, Western governments have become increasingly aware of the inefficiencies in our profligate resource-based economies. In response, a wide variety of instruments - technological, political, and financial - have been developed. Together, these instruments should be capable of producing a workable resource management framework which balances each leg of the sustainability tripod without toppling it over. Unless the right, complementary balance between environmental taxes, targets and technologies is achieved, the goal of sustainable resource use will remain elusive.

PROGRESSIVE INDUSTRIAL EVOLUTION

On a global scale, two complementary principles are likely to provide the key to sustainable waste policy and practice. Both involve manufacturers taking action to reduce waste at every stage of the supply chain, from digging raw materials out of the earth to dismantling a radio, oven or children's toy at the end of its life.

The first principle is cradle-to-grave management. In a nutshell, this obliges manufacturers to ensure that a product's life cycle is as resource efficient as possible. Methods include using more recyclable materials and making products more durable and less toxic. (Ultimately to replace today's linear progression of useful products to largely useless waste, with a cycle of sustainable best practice.)

The second key principle is producer responsibility. Whenever we purchase something, a pair of trousers, say, or a new television, we take it for granted that someone else further along the supply chain will dispose of it. In the same way, the companies who make or sell the millions of products available to the modern consumer have little incentive to reduce the amount of hazardous or non-recyclable materials they contain - because they are not liable for their ultimate disposal.

Many governments now recognise that such a profligate approach to natural resources is environmentally unsustainable. In Western countries there is a trend towards making manufacturers responsible for the costs generated throughout a product's life cycle - including final disposal. To offset these new liabilities, manufacturers are encouraged to add the costs on to a product's purchase price.



Producer Responsibility arguably acts as a stronger lever towards sustainability than any other single measure. It will force entire industries fundamentally to re-assess how their goods are designed, put together, packaged and disposed of. Some major corporations are already taking a lead in redefining their products. Xerox, for example, use reclaimed material from old photocopiers and other equipment as raw material for new machines. BP now presents itself as a company which leases a service - energy, rather than extracting and selling a physical product - oil.

In the decades ahead, these two international trends, backed by green taxes and incentives, will help to drive a new industrial revolution. As the graphic below demonstrates, conserving scarce natural resources will become the new holy grail in an increasingly environmental and energy conscious world.

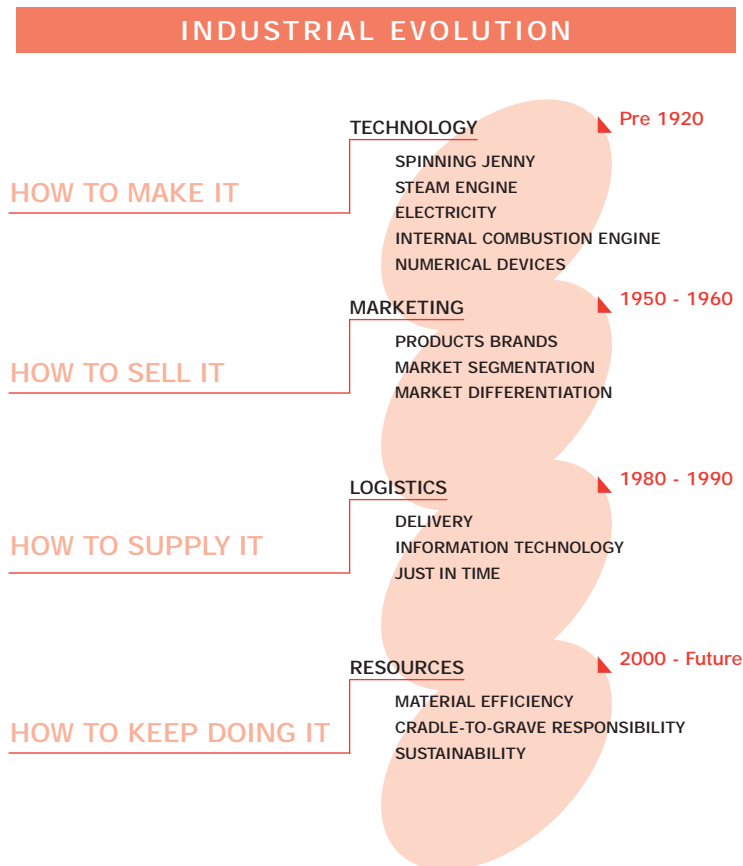


Fig 8a. Stages of industrial evolution



BIFFA'S WAY WITH WASTE. A 20:20 VISION.

In the UK, the history of managing discarded products and materials has evolved piecemeal, often in response to European directives or to scandals involving hazardous or toxic wastes. All that must now change. To comply with the Landfill Directive, we need to adopt a much more comprehensive and long term approach which sends clear messages to waste generators, from individual citizens to large corporations. The solutions are complex, but at their heart Biffa believes there are three simple areas for action:

- Acquiring Knowledge.
- Allocating Responsibility.
- Integrating Policy.

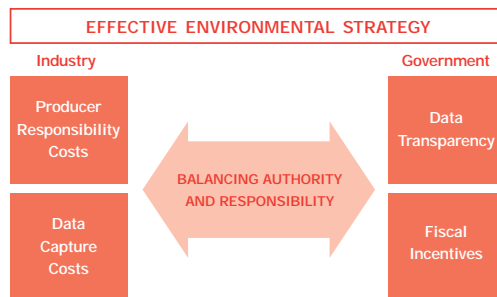


Fig 9. Effective Environmental Strategy

KNOWLEDGE

As we enter the 21st century, there is still no reliable national database on the volume and types of waste the UK produces. We face a plethora of legal commitments to reduce this country's waste output, as the Milestones section demonstrates on page 7. Yet how can we measure our performance if we don't know from where we are starting? In addition, without an agreed framework for collecting and reporting on environmental data in a consistent and understandable way, how can we reliably monitor progress on reducing and diverting waste?

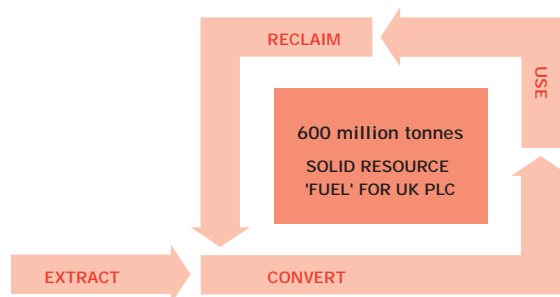


Fig 9a. Circular Re-Use of Resources - 2020^{Ref. 95, 107, 105}



The Government's lack of urgency on this vital subject is hard to fathom. A National Waste Classification Scheme was developed in 1995/6, but remains unimplemented in 2000. For our part, Biffa keeps a detailed inventory of all waste for disposal, classified under 180 categories. In Great Britain Plc, published in 1997, we produced what remains the only comprehensive record of waste emissions to air, water and soil on a region-by-region basis for Great Britain Plc.

A common data collection system, however, is only the first step. Watertight methods for classifying and sharing data for point sources must also be developed so that policy makers can make sense of the trends they reveal. Biffa also believes that such data should be available to a wide audience, with communities able to access a detailed breakdown of local waste generation and how it impacts on the air, water and soil. We believe the Internet offers immense opportunities for public dialogue and would happily pass on information on our own environmental data in the interests of informed debate. This is currently an integral function of the Biffa website.

RESPONSIBILITY

The radical concept known as Producer Responsibility or Integrated Product Policy, outlined in the previous chapter, will allocate liability for a product's eventual disposal among manufacturers, suppliers and retailers. Within the European Union, it has already been applied to the packaging industry which must now recycle a large percentage of packaging waste. (See also Economic Evolution.) Similar rules will soon apply to the makers of cars, electrical and electronic goods and batteries.^{Ref. 39}

Key Product Directive Dates	
1996	Hazardous Wastes
1996	Batteries
1997	Packaging
2001	Landfill Directive
2002	Incineration
2003	Whole Used Tyres
2004	Household Special Wastes
2004	End Life Vehicles
2004	Electrical & Electronic Goods
2005	Composting

Fig 10. Timetable for Producer Responsibility^{Ref. 37, 138, 41}

Producer Responsibility will play a vital role in persuading industry to adopt cleaner technologies and in reducing the amount of waste we generate. But it also presents an enormous challenge to the UK's business community. In the future, manufacturers will have to provide customers with information on how to return products for safe disposal, alongside their operating instructions. On the positive side, they will continue to 'own' these scrap materials once collected and will be able to sell them on or re-use the components themselves to make new products.



Biffa believes Producer Responsibility is a vital tool for achieving sustainable waste management. But if it is to work, without harming the UK economy, then government and industry must work out how to meet two key challenges:

- How best to manage these new responsibilities to keep costs down. Should they be taken on by individual companies or shared by an entire manufacturing sector?
- How to offset the costs of meeting new recycling obligations without raising prices so far that they damage companies operating in a very competitive global market?

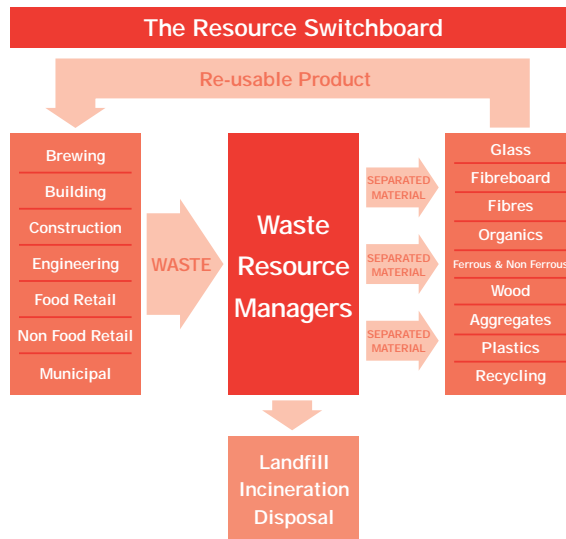


Fig 11. Waste to Resource Reallocation

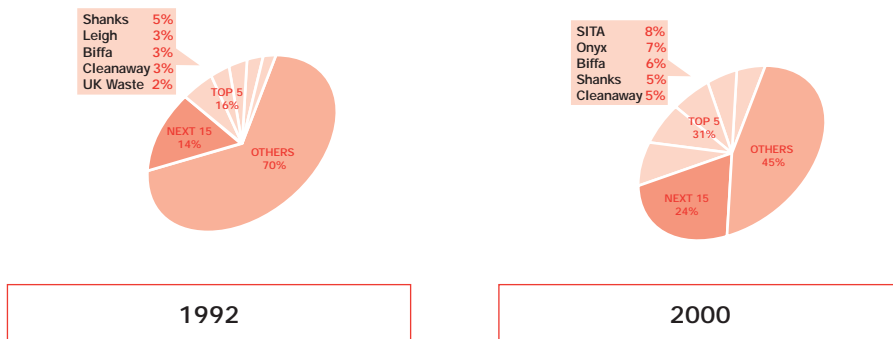


Fig 12. Convergence in the waste industry, 1992 - 1999 (Source: Biffa)

If we get the formula right, Producer Responsibility will help to create an economy in which natural materials are conserved rather than squandered and waste management companies are transformed into resource management businesses (see Fig 11).



INTEGRATING POLICY

Biffa believes the Government must act decisively as a catalyst for change. It alone can impose the regulations and taxes and offer the incentives, which will encourage industries and consumers to adopt a greener approach to waste.

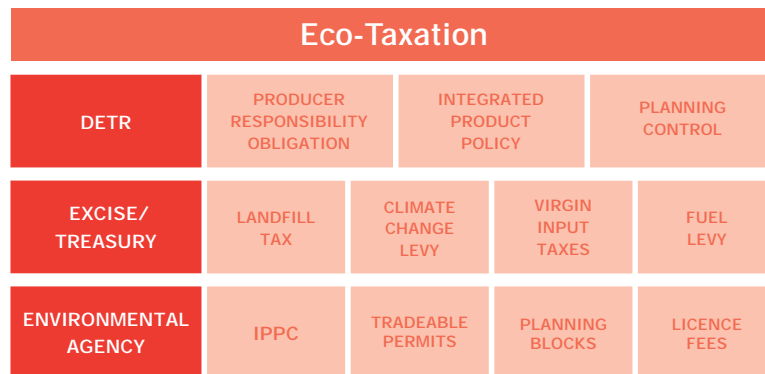


Fig 13. Eco-Taxation Balance

The Government already employs a range of financial ‘sticks and carrots’ to this end, but so far with little success. The problem is that these instruments are often blunted by being applied across industry, rather than tailored to particular sectors creating specific environmental impacts. Industry, commerce and domestic households produce different waste materials in different volumes and with different treatment and disposal needs. Yet all too often, waste management solutions (technologies, taxes and regulations) are not targeted separately according to each sector’s needs.

The result is that British industries and waste management companies are confronted with piecemeal legislation and conflicting targets as they try to develop coherent waste management programmes. Greater sharing of expertise between Government and those delivering practical solutions on the ground would help improve this situation. But the key change required is more co-ordinated policymaking within Government itself.

At present the Treasury, Environment Agency, Department of Trade & Industry (DTI) and Department of the Environment, Transport and the Regions (DETR) often appear to pursue separate waste policy agendas. While the DETR favours regulation and targets, for example, the DTI fears these may adversely impact upon competitiveness of UK businesses.

Biffa is particularly concerned that ‘A Way With Waste’ appears to be based on thinking within the Department of Trade and Industry - not Government as a whole. As a result there are crucial gaps in policy where presumably it has not been possible to reach a consensus across Whitehall. In particular, the strategy remains silent on two key questions. First, who will pay to meet the Landfill Directive’s targets on diverting waste from landfill? Second, should recycling targets for industry and households be mandatory or merely aspirational?



POLITICAL EVOLUTION

Politicians in the UK and Europe are driving the shift towards sustainable waste management in three main ways:

- European Union and national regulation.
- Raising public awareness.
- Local planning policies.

To make the difficult choices ahead and drive through change on the scale required, it is vital that they all speak with one voice. In the UK, this is not yet the case. At a national level, as we highlighted in the previous chapter, government departments appear to be pursuing different, sometimes conflicting, waste policy agendas. Local authorities, too, present a less than united front.

Some are pursuing a proactive sustainability agenda, involving households and businesses in wide ranging waste reduction and recycling programmes. Others prefer a 'business as usual' approach, based around large scale landfill or energy from waste plants. As these are the people who have to make sustainable waste practice work, a greater cross-fertilisation of ideas and co-ordination of action is essential. So too, is the support of the waste industry in delivering solutions on the ground and of the individual citizen. We must all do our bit to reduce our own personal waste mountain.

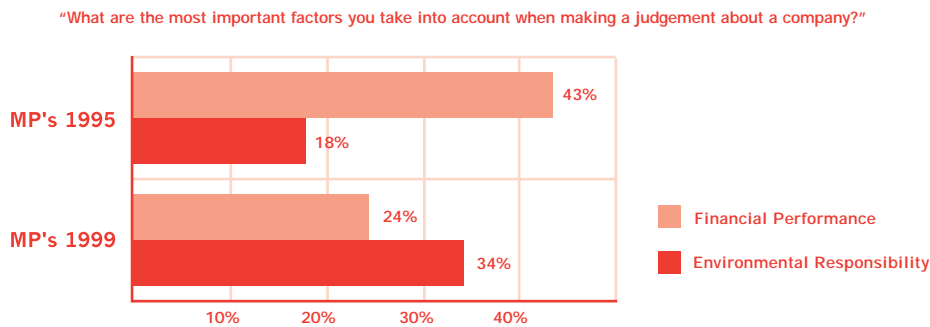


Fig 14. The Changing Priorities of MPs^{Ref. 126}

REGULATION

The UK Government and European Commission place great emphasis on regulation in achieving sustainable waste management. Biffa takes issue with this approach. We believe that, in a growing global market economy (for consumer goods) the first step should be to use prices to encourage businesses and households to conserve rather than generate waste. In practice, this would mean introducing a system of target based fiscal penalties and incentives. Examples might include fines for local authorities producing excessive amounts of rubbish and tax breaks for recyclable content products (such as packaging, clothes and toys), and for new, sustainable technologies. If such price based measures failed, regulations could be introduced to give businesses and local authorities an extra push in the right direction.

Politicians at all levels need to be careful not to overplay the regulatory card. If too much of a burden is heaped upon industry, unemployment is likely to result. This is especially true of industries which rely heavily on exploiting raw materials, such as construction.



LANDFILL DIRECTIVE

The EU Landfill Directive is a 'fait accompli' of heavy handed and, we believe, outdated regulations. As intended, it will force change for the better, in the management of biodegradable municipal waste across the continent. In turn, this will help reduce emissions of methane, a potent greenhouse gas. Yet, by focusing on household waste, it may also skew attention away from the commercial and industrial sectors which produce three times as much waste material. In 'A Way With Waste', the Government also gives no indication as to which industry sectors will bear the potentially crippling costs of meeting the obligations listed below:

Main Landfill Directive Requirements^{Ref. 138}

- By 2001 - ban co-disposal of hazardous and non-hazardous wastes; require separate landfill for hazardous, non-hazardous and inert wastes.
- By 2001 - ban landfilling of liquid wastes, infectious clinical wastes and most hazardous wastes (e.g. explosive, highly flammable).
- By 2003 - ban landfilling of whole used tyres and by 2006, of shredded tyres.
- By 2003 - to have in place a national waste strategy.
- By 2014 - reduce biodegradable municipal waste to landfill to 35% of the 1995 volume.

Producer Responsibility Obligations are the second major regulatory stick which Europe is wielding to help convert consumerist societies into conservationist societies. Biffa believes such initiatives are crucial for achieving sustainable waste management as long as the regulations are applied in a way which works in the marketplace. On page 25, (Producer Responsibility: The Way Ahead) we describe how lessons on achieving the right formula must be learned from the US.

A third option, not yet widely used, is for the UK unilaterally to ban hazardous materials from landfill where facilities with reprocessing technologies exist within a reasonable distance. Biffa believes such bans could be developed fairly quickly for pesticides, household hazardous wastes, fluorescent tubes, electrical and electronic goods. However, affected industries would first need time to assess how to absorb the extra costs imposed on them. Government could play its part by using revenue from 'green' taxes to offset some of the burden.



AWARENESS RAISING

We in the UK have a cavalier attitude to waste. We do not want either landfills or incinerators on our doorsteps. Yet, whilst many of our European neighbours have accepted laws which require them to sort household waste into separate recycling boxes, most of us simply throw everything in the dustbin.

There is undoubtedly a lack of easy access to recycling facilities in many parts of the country. But there is also a more fundamental need - to galvanise individual citizens into a new mindset where waste minimisation and recycling becomes second nature in both the home and the workplace. We believe the Government's current approach, relying entirely on people's voluntary goodwill, is simply inadequate for the task.

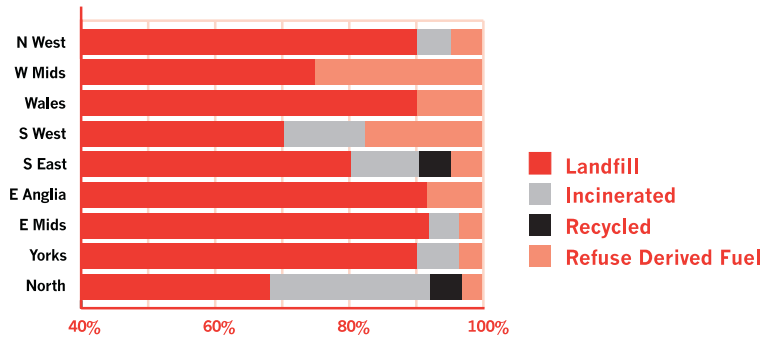
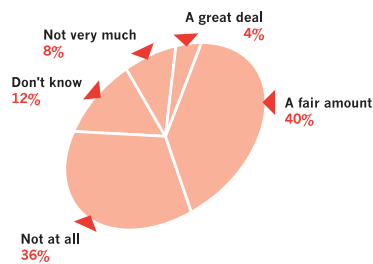


Fig 15. Regional Variation in Municipal End-Life Treatment^{Ref. 161}



“There is a lot of talk at the moment about sustainability. That is, encouraging companies to balance society's current needs, without compromising the needs of future generations. To what extent do you believe businesses are currently doing this?”

Fig 16. Is UK Business Looking After the Future?^{Ref. 126}

In 'A Way With Waste', the Government raises the prospect of aspirational household waste reduction targets. Earlier proposals to consider an extra charge on individuals or families which throw out excessive amounts of rubbish, appear to have been shelved. It is essential that people identify with local efforts to recycle and reduce waste, rather than continue to view the contents of their dustbin as a remote problem. One way of doing this - and of boosting recycling rates - might be to introduce charging, with exemptions for poorer families. Government may need to consider a legal requirement on householders to take part in local authority door-to-door recycling collection schemes.



We would also like to see the Government work more closely with environmental groups in the common cause of promoting re-use and recycling. The 'Doing Your Bit' TV advertising campaign is a good, high profile start. But a more community based approach is clearly needed if the 'waste not, want not' message is to have a lasting effect. British environmental groups have five million members whom they could help to target. In our own experience, public enthusiasm is the key ingredient to making household collections work. On the Isle of Wight, for example, where landfill space is scarce, conserving waste materials is now a matter of strong local pride.

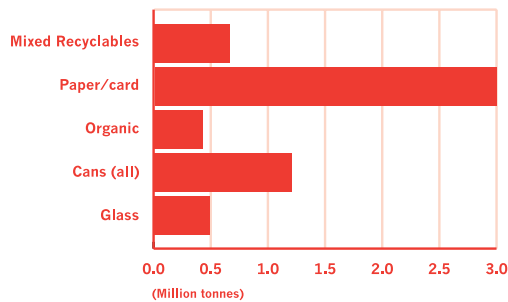


Fig 17. Current Kerbside Recycling^{Ref. 160}

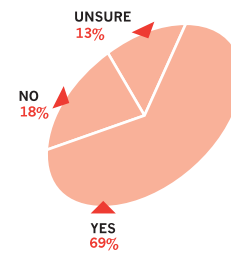


Fig 17a. Local Authority Attitude to Unitary Waste Responsibility^{Ref. 161}

PLANNING POLICIES

'A Way With Waste' urges planning authorities to develop a clearer vision of how to provide waste management facilities which meet sustainability objectives and are properly co-ordinated with new housing, shopping and business developments. It also urges closer co-ordination with the Environment Agency to ensure that planning and waste licence conditions gel together. New planning guidance, published in late 1999, made local authority waste plans the key blueprints for delivering integrated waste management programmes. Biffa believes that both the waste industry and local communities must be fully involved if this system is to be workable and successful. The Government's plans to boost incineration, in particular, may run into difficulties with public opposition at the planning stage.

The new planning policy also tightened the rules on regional self sufficiency in waste management. The aim is to reduce the substantial amount of pollution generated by long distance transportation for disposal or recovery.



ECONOMIC EVOLUTION

How best to use financial sticks and carrots to promote sustainable practice is perhaps the most contentious of all the major decisions which lie ahead. Some measures, notably the landfill tax and mandatory recycling of packaging waste are already in place. Others such as a climate change levy are on the way. Still others, including pesticide and virgin materials taxes, and penalties for failing to meet mandatory recycled content are on the Treasury drawing board. There are three main approaches to using costs and prices to trigger greener behaviour by society:

- Environmental Taxes.
- Producer Responsibility Obligations.
- Boosting Recycling Markets.

ENVIRONMENTAL TAXES

The landfill tax, introduced in 1996 as a levy on waste management companies, was the UK's first 'green' tax. Its highest rate was raised from £7 to £10 per tonne in 1998 and is set to rise to £15 by 2004. Under the Landfill Tax Credit Scheme, landfill operators can channel 20% of the tax raised into environmental projects.

The Government believes that landfill tax works well, and it will not be reviewed substantially until 2004. Overall, landfill volumes have fallen by 20%. Our analysis however reveals that the tax's real impact has been limited. While waste volumes sent to landfill in the highest tax band have fallen by around a tenth, the volume of tax-exempt contaminated soils and building rubble has fallen by 30%. Customs and Excise data reveals that much of this waste has been diverted from well regulated landfill sites into poorly controlled golf courses, amenity centres and farms where it is used to lay driveways and paths or left on site in a different location.

Landfill tax credits have been very useful at a micro level - Biffaward has so far funded £13 million worth of projects around the country. However, given the evidence above, we believe the main aim of the tax, in relation to diversion, is not being adequately met. Conversely, the Environmental Bodies initiative has generally been hailed as a substantial success in supporting the work of the voluntary sector.

The second major tax to affect the waste industry will be the proposed energy tax or climate change levy. Under the Kyoto Protocol, the UK has a legal commitment to cut its greenhouse gas emissions by 12.5% by 2012. All waste management options, other than reduction or re-use, involve the release of some greenhouse gases, with methane emissions from landfill the major culprit. Proposals to extend green taxes to cover quarrying stone and other virgin materials such as pulp and fibreboard are under scrutiny by the Treasury.^{Ref. 46}



Raising billions of pounds of extra revenue in this way - by taxing harmful emissions and the use of raw materials - is a tempting path for any Government to follow. Yet, as with too much regulation, too many cross cutting green taxes could be counter productive. We believe they could conflict, for example, with the Government's broader policy of economic stability by triggering job losses and inflation.

Biffa would prefer new taxes to be introduced only if industry sectors fail to meet sustainability targets through a combination of voluntary action and producer responsibility obligations. We would strongly support an independent Green Tax Commission to advise the Government, as recommended by the Environmental Audit Select Committee within the House of Commons.

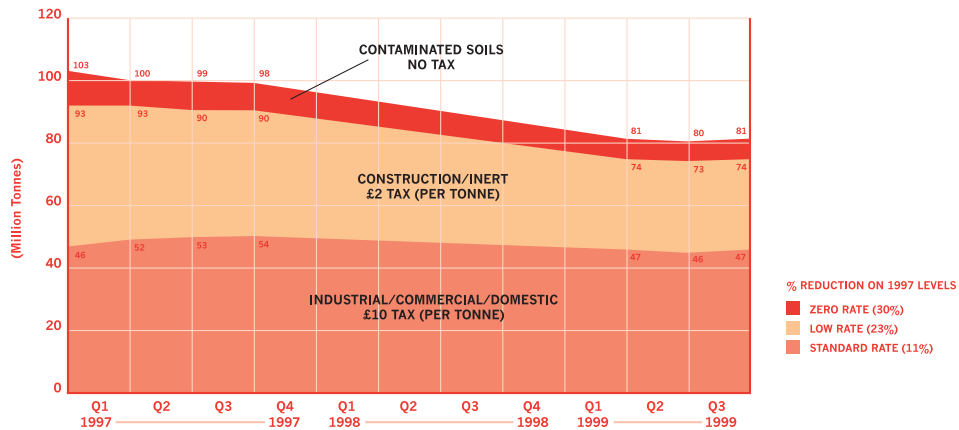


Fig 18. Trends in Landfill Tonnage^{Ref. 143}

PRODUCER RESPONSIBILITY: THE WAY AHEAD

The European Commission is developing the radical concept of whole life products to apply across industry sectors. This will work alongside producer responsibility in propelling an environmentally driven revolution in product design and manufacture. Biffa believes these two drivers, Producer Responsibility and Integrated Product Policy, should be the main fiscal tools for boosting recycling markets. We would like to see the UK Government develop tax breaks to help businesses fund the retrieval costs of meeting their new recycling obligations. This, together with a manufacturer's right to reclaim the material used to make its products after they are scrapped, would make recycled materials competitive with virgin alternatives.



EU PACKAGING WASTE REGULATIONS

We are committed to helping make the packaging waste directive work. However, we believe the way it is being applied in the UK is fundamentally flawed and should not be used as a model for other industry recycling schemes. The bones of the regulations are:

- Businesses with turnover greater than £2 million to recover 43% of packaging waste in 1999 and 52% in 2001.
- By 2001, at least half these obligations to be met by recycling.
- The UK, via these industry obligations, to achieve the directive's national targets - at least 50% recovery, a minimum 25% from recycling.

The packaging industry is the test bed for producer responsibility initiatives, which will apply in the near future to makers of vehicles, electrical and electronic goods.

Through Biffpack, our packaging waste compliance scheme, Biffa is already working with 239 companies including John Lewis Plc, Iceland and British Aerospace to meet their recycling obligations. We have also urged the Government to use landfill tax revenues to help industries facing new recycling obligations to pay for greener product designs and manufacturing processes.

TRADEABLE PERMITS: GETTING IT RIGHT

Tradeable permits work by allowing businesses to buy "licences to pollute" from competitors. When one business exceeds its obligations to recycle a percentage of its waste, for example, then it can pass on the excess to a direct competitor who is struggling to meet the target. The aim is to stimulate recycling and pollution reduction among businesses by making it a profitable activity.

The first such sector-based schemes were piloted successfully in the United States in relation to gas discharges from power stations. In the UK, tradeable permits have been piloted in the packaging sector, under the direction of the Environment Agency. The agency has adopted a vertical approach rather than the horizontal method applied by the US regulators. As a result tradeable permit funds have passed straight down the supply chain from manufacturers to recycling operators without stimulating a notable expansion of packaging industry recycling schemes. Tonnages of recycled packaging waste have actually dropped since the system was introduced in 1997.

The Government will extend tradeable permit systems to other industries such as electrical goods and motor vehicle manufacturers when they become liable under European law to reduce their waste output. Biffa believes the 'flawed packaging system' should be modified in line with the U.S. (using tradeable permits to reward high compliance organisations). We also think it would be a mistake for the Environment Agency to oversee future schemes as economic analysis is not its principal area of expertise.



MARKETS FOR RECYCLED MATERIALS

UK markets for recycled materials remain very sluggish and small, mainly because of the discouragingly high costs and risks which reprocessors face. If we are to meet our national recycling targets, such markets will have to be developed substantially.

Taxing businesses and forcing them to recycle more of their product materials will help. But this alone will not make recycled products mainstream. The public at large will only buy them if they are high quality, attractive and good value, as well as ethically desirable.

FOSTERING AN ECO-DESIGN REVOLUTION

To address this issue, the Government has appointed a Market Development Group made up of representatives from reprocessors, industry and community groups. Their recommendations for enhancing recycling markets in glass, paper, plastic, steel and aluminium, published in June 1999, included:

- Developing innovative uses for recycled materials.
- Improving the quality and standards of recycled products.
- Urging public bodies and private businesses to buy more recycled goods.
- Taking action to stabilise the markets, such as price and contract guarantees.

The Government is also consulting on a range of further economic penalties and incentives to stimulate demand. Ideas include imposing minimum recycled content standards on various industries and introducing either charges or subsidies to encourage more use of re-used materials by industry and households of which electricals is a good example.

TONNES OF EQUIPMENT RECYCLED IN 1998

EQUIPMENT	ARISINGS	% RECYCLED
Large household appliances	392,000	88%
Telecoms	8,000	50%
IT Equipment - data processing	97,000	46%
IT Equipment - office	132,000	38%
Radio, TV, audio	72,000	4%
Lighting	12,000	1%
IT Equipment/Networks	128,000	0 %
Tools	25,000	0 %
Small household appliances	30,000	0 %
TOTAL	896,00 TONNES	

Source: ICER Report Jan 2000

Fig 19. Electricals & Electronics - An Industry of Recovery Extremes^{Ref. 108}



TECHNOLOGICAL EVOLUTION

Technology is a key delivery mechanism for sustainable waste management. But technological hardware, however sophisticated, will not work in isolation. We in the waste industry have a vital role to play both in commercially developing new technologies and in integrating them into existing waste management delivery networks on the ground. Our industry must also provide advice and support for both central and local government on how to exploit evolving technologies to speed up the delivery of sustainable waste management programmes nationwide.

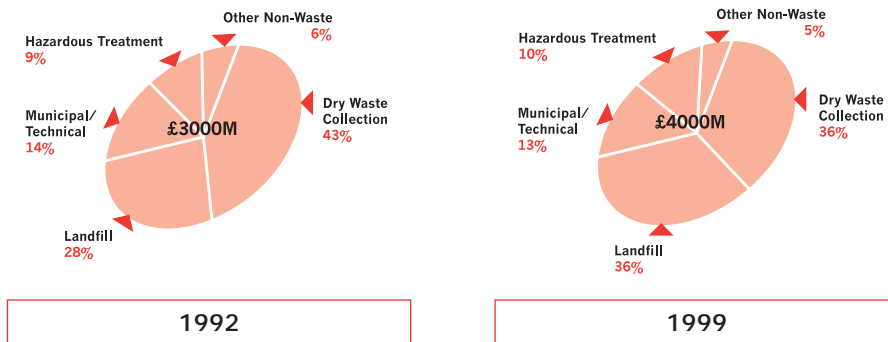


Fig 20. Waste Sector Turnover by Activity - 1992 vs 1999 (Source: Biffa)^{Ref. 129}

The raw technology already exists, in large part, to make waste practice sustainable. We have the capacity to burn, freeze, sieve, crush, separate, distil and biodegrade waste in order to re-use it or to reduce its mass or ability to cause harm.

However, investing in these technologies in the UK at the end of the 20th century is not cost effective - for the simple reasons that going direct to landfill remains much the cheapest way of dealing with waste. Until taxes and recycling obligations really begin to bite, companies will continue to lack the financial incentives to apply sustainable best practice in their factories and warehouses.



CURRENT UK ENERGY FROM WASTE SITE LOCATIONS

In deciding how best to divert waste from landfill, we must also learn from the past. The history of the waste industry is littered with ambitious 'technology solutions' which were supposed to provide all the answers. Instead some produced polluted residues on a grand scale. Others proved to be either operationally unreliable, too costly to run or reliant on too high a market share to be economical. The lesson for the future must be to employ a more flexible mix of the technologies available and under development, combined with economic measures and/or political targets. This is the way ahead, not quick fix solutions which put too much faith in the ability of technology alone to deliver change.

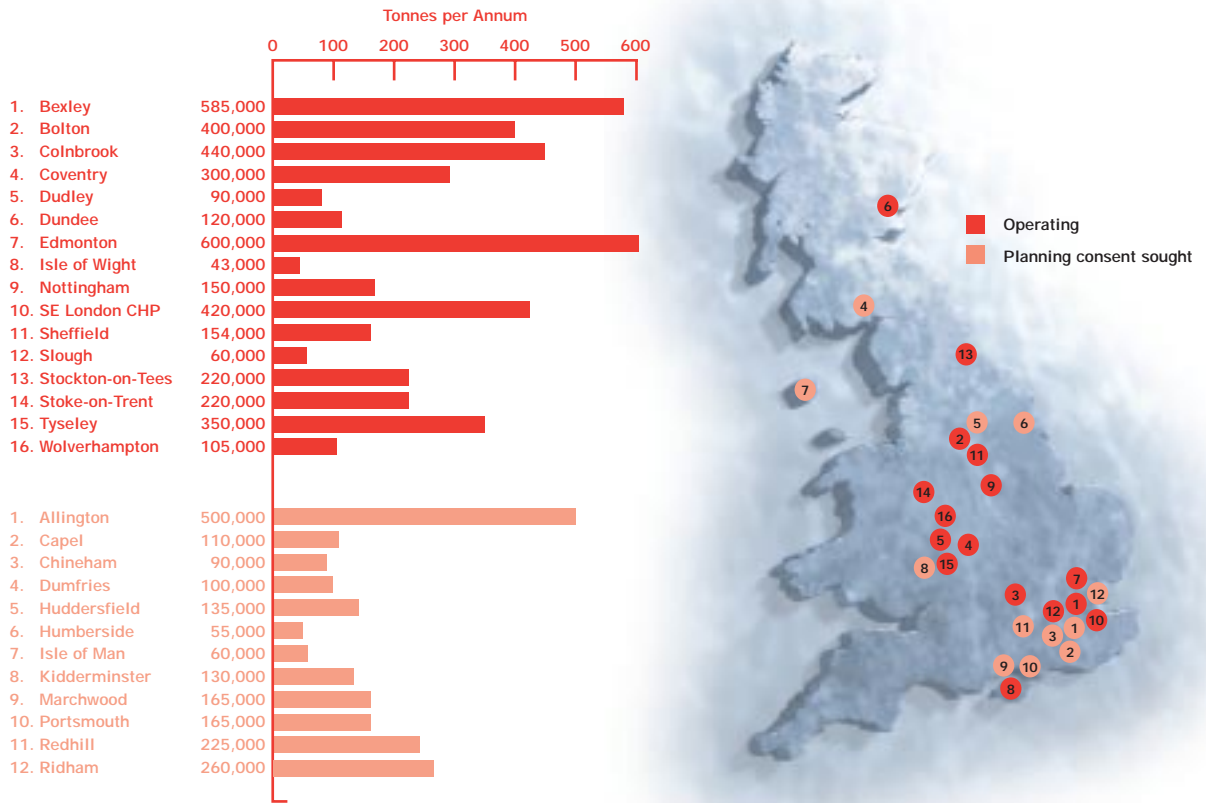


Fig 21. Energy from Waste - The State of Play (Non + Inclusive Combined Heat + Power)^{Ref. 72}
 (Additional information from 'Energy from Waste Association')

WASTE MINIMISATION

Technology providers are developing waste minimisation, separation, treatment, recycling and recovery techniques which will help deliver sustainable waste practice.

In their broadest sense, sustainable waste technologies include the design and manufacture of products to minimise waste materials during production and at the end of their lives. Vehicle manufacturers, for example, are using lighter body parts, improved castings technology and thinner engine metals to increase fuel efficiency and reduce waste materials sent for scrap. In 1998, Biffa signed ground-breaking contracts with Goodyear, BIP Chemicals and Bass Leisure Retail, under which savings achieved through waste minimisation and recycling programmes are shared between ourselves and the customer. The unique system works by using contractual financial incentives based upon the sharing of specialist knowledge.

Waste minimisation is also officially defined as 'reducing the hazardousness of materials sent for disposal.'^{Ref. 1} The Landfill Directive will require all waste to undergo some form of 'treatment' process. These include sorting, segregation, shredding (to reduce particle size) or thermal treatment, before the residue is sent to landfill. Technologies employed by Biffa at our waste treatment plants include recovery, chemical and biological treatment filtration and secondary chemical fuel preparation.

BACKTRACK - MINIMISING HAZARDOUS WASTE DISPOSAL

In 1996 Biffa launched Backtrack, a unique collection service for small quantities of recoverable and recyclable, special and hazardous wastes such as solvents and paint tins. Companies such as B&Q are issued with special kits to store the materials which Biffa then collects and sends to reprocessors or energy to waste plants. By keeping hazardous materials out of landfill, Backtrack is integral to our strategy of developing more sustainable practices, targeted at high risk, small volume waste streams.

MATERIALS AND ENERGY RECOVERY

Around 30%^{Ref. 1} of all the waste the UK produces is recovered, mostly from commerce and industry. The market is dominated by established recycling technologies, for paper, glass, aluminium and cardboard as well as energy from waste incineration plants (which are classified as 'recovery').



Several promising new technologies are currently close to commercial use. These include pyrolysis (baking) and gasification technologies to process organic waste for energy, using techniques which also produce other usable by-products such as carbon black. The composting industry is also picking up after a slow start (see graphic below). National quality standards, designed to standardise and improve the often poor quality of waste-derived compost, are due in 2000 and a similar European directive is planned for 2004.

	1995	1999	2010	2013	2020	
Arisings	29.3	33.0	45.6	49.9	61.3	Million Tonnes
Biodegradable Content	18.2	20.4	28.3	30.9	38.0	
Allowable to Landfill	-	-	13.6	9.1	6.4	
Biodegradable Municipal Waste Required to be Diverted from Landfill	-	-	14.7	21.8	31.7	

Fig 22. Organic Arisings^{Ref. 152}

Even waste sent to landfill provides a recovery benefit. Around 165 landfill sites now generate electricity from captured methane gas. Biffa has installed such schemes at twelve plants making the company a net producer of electricity. This benefit will reduce, however, as the landfill directive's targets on diverting biodegradable waste begin to bite and the amount of waste sent to landfill falls.

Achieving the right balance between all these technologies, especially the old and the new, is vital if the UK's future waste strategy is to succeed. A too dramatic tipping of the scales towards energy from waste plants is likely to hinder both the development of a mainstream recycling and composting industry and the commercialisation of innovative new techniques. In 'A Way With Waste', the Government states that a major incineration building programme must not be allowed to 'crowd out recycling initiatives'. But it fails to explain what safeguards it would introduce to avoid this.

COMPOSTING OF SUPERMARKET WASTE - A RETAIL REVOLUTION?

Biffa is collaborating with Sainsbury's, Waitrose and Safeway to test the commercial viability of producing high quality compost from supermarket fruit and vegetable waste. We collect the organic waste in wheeled bins from 50 stores in the Thames Valley region. It is then blended experimentally with other materials at the Elm Farm Research Centre in Newbury to try to develop a crop-enhancing compost. The ultimate aim is to sell compost back to the supermarkets, thus completing a virtuous circle. The research is 90% funded by Biffa (from landfill tax credits) and 10% by the supermarkets. We believe that such future collaborations will be essential if the recycling of organic wastes is to become viable on a large scale.



LOGISTICS AND DATA MANAGEMENT

Two outside elements are also needed to deliver this technology revolution. First a more sophisticated logistics network. Secondly, a sound national system of waste stream data management, an issue we raised on page 16. At present most municipal waste is collected, transported to landfill and disposed of unseparated, rather than recycled, because this is the cheapest option. The best way to reverse this situation is simply to drive down the cost of the logistics involved in recycling usable materials. 'A Way With Waste' highlights the need for a comprehensive nationwide infrastructure to enable segregated collection of wastes for recycling. We believe this would be best achieved via the letting of large scale regional contracts to waste collectors and reprocessors, linked to specific industries. We also suggest that the costs of operating such a system could be offset by using revenue raised from eco-taxes, such as the landfill levy, to relieve financial pressures on hard pressed local authorities. The 'quid pro quo' might lie in greater co-operation from local authorities with regard to:

- Planning Issues.
- Regionally Based Solutions.
- Cooperative approaches with adjacent authorities.
- Incorporating PFI concepts into the heart of waste strategy.

THE FUTURE LIES WITH STRATEGIC PARTNERSHIP

RECYCLING CARDBOARD

In 1994 Biffa entered into a unique partnership with SCA Recycling, a major reprocessor based in Aylesford. Under the agreement, SCA gives us a guaranteed market for all the cardboard we can supply to them. In return, all the cardboard we collect around the country for recycling - about 5,000 tonnes a year - is delivered to SCA branches. The aim is to help stabilise the market for recycled cardboard and enable Biffa to expand our recycling programme with confidence. As more waste is recycled to meet the Landfill Directive's targets, such partnerships between collection specialists and reprocessors will become increasingly common. We believe they represent the future shape of the waste management industry.

RECYCLING GLASS

Britain is renowned as a nation of beer drinkers. Our 57,000 public houses and 70,000 clubs, hotels and restaurants use a huge amount of glass (around 350,000 tonnes a year). Although it is perfectly possible to recycle glass, at present most empty bottles end up in landfills. This is because collections need to reach a certain scale and route density in order to be commercially viable and environmentally efficient. Existing recycling collection services have all too often failed because they are piecemeal, geographically limited and expensive.

Biffa is helping to address this problem by developing an ambitious national pub glass collection service in partnership with Cleanaway. In mid 1998 public houses in Birmingham, Leeds, Manchester and London owned by 12 members of the Brewers and Licensed Retailers Association began using the service. By mid 1999, it is expected that public houses across the country will be taking part, as well as other licensed outlets such as hotels, restaurants and clubs (a total of around 90,000 sites).



CONCLUSION

The next 20 years will bear witness to a leap forward in awareness of environmental and sustainability issues within Government, the scientific community, industry and the general public. It is hoped that these challenges will be met by integrated thinking between each of these constituencies at every level - local, regional, national and international. Such co-operation will be crucial if mankind is to prove capable of responding to the multiple challenges created by our management of the Earth and its finite resources.

Those challenges extend far beyond the remit of this publication. We have sought to deal here solely with how to provide the expertise, logistics and technological support to reduce this nation's growing annual waste tally.

We have sought to demonstrate the crucial role of Government, as a central facilitator, in achieving this far from easy task. Nevertheless, it is down to all of us - the waste industry, environmental and community organisations, industry, commerce, local government and individual citizens - to support and contribute to the development of informed debate in this challenging and controversial area.

Many of us will not be alive to confirm whether success has been achieved in terms of the future natural environment. But there is little doubt that investing time and energy in making our society less wasteful of its natural resources will help to position our economy more effectively in the global marketplace.

We hope you feel that 'A Question of Balance' contributes to the debate and proves helpful. If you wish to provide us with feedback on your views, please visit our web site discussion page at www.biffa.co.uk.



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