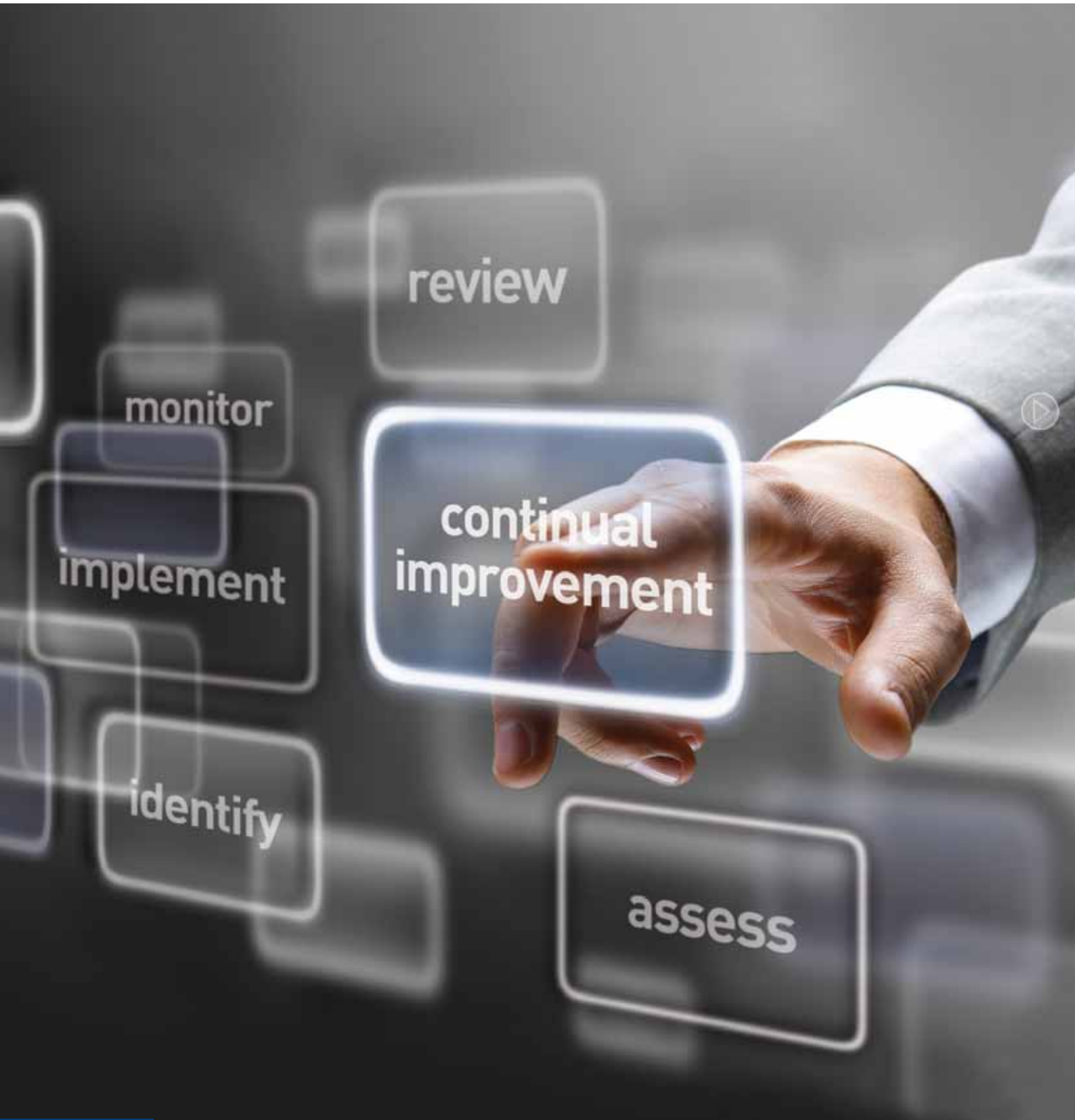
Business Resource Efficiency Guide

Resource Efficiency for Managers



WRAP's vision is a world in which resources are used sustainably.

Our mission is to accelerate the move to a sustainable resource-efficient economy through

- re-inventing how we design, produce and sell products,
- re-thinking how we use and consume products, and
- re-defining what is possible through re-use and recycling

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Summary

WRAP has produced this guide to help health, safety and environment managers; or others with management responsibilities to improve the efficiency of their organisation's use of resources – e.g. raw materials, water, energy – as a means of improving the performance of their business.

Good resource efficiency practices are based on the 'waste hierarchy' and structured around a system of continual improvement with the aim of saving money and reducing environmental impact. This involves a number of key tasks including assessing current waste and material consumption levels, identifying areas for improvement, setting and implementing actions, and monitoring and reviewing their success.

Most of a manager's time is dedicated to delivering the core activities of the organisation and matters such as resource efficiency may seem like an unnecessary distraction. However, managing resources efficiently and reducing waste is an important part of a successful organisation and there are many reasons why a manager should get involved. These are explained in this guide.

This guide offers practical advice on getting a resource efficiency programme started and suggests some 'quick wins' to help.

The self-help approach consists of five main areas.

- Getting management/team support.
- Waste and process mapping, and data gathering.
- Developing an action plan.
- Continued monitoring and review.
- Incorporating resource efficiency into management systems.

1 Introduction

Wherever possible, it is best to avoid producing waste in the first place. However, there are likely to be some wastes generated in your organisation that cannot be avoided, so managing them as efficiently as possible is important.

1.1 What is the purpose of this guide?

This guide is designed to help you improve your waste management systems and increase recycling rates. It will help you, as a manager, to better understand the wastes that your organisation generates and provide you with a methodology to help identify opportunities to reduce your waste arisings and the costs associated with waste disposal. Wherever possible, it is best to avoid producing waste in the first place. However, there are likely to be some wastes generated in your organisation that cannot be avoided, so managing resources as efficiently as possible is important.

This guide contains practical advice to help you to understand resource efficiency and to encourage your staff to identify and develop opportunities for reducing waste. Systematic action can often save at least £1,000/year for every employee. With the right measures, waste costs can easily be reduced to only 1% of turnover – often with little or no investment. These savings go straight to the bottom line. But it's not all down to you – the key to success is to involve everyone and start with easy projects with quick savings to arouse interest.

1.2 Who should use this guide?

This guide is aimed at environmental managers; health, safety and environment managers; or members of other management teams in organisations. You will have responsibility for managing the waste generated and influencing contractual arrangements for waste disposal.

1.3 Benefits for your business

While some waste is inevitable in any organisation, few managers would claim that every conceivable improvement has been identified and implemented. Focusing on cutting resource use and waste can help identify opportunities for improvements that have been missed by other efficiency initiatives. Therefore, good information on resource use and what waste is being generated is vital.

As most of your time is dedicated to core activities, other matters, such as waste reduction, may seem to be an unnecessary distraction. However, managing your resources efficiently is important to your organisation. There are a number of forces driving improvement in waste reduction and resource efficiency that impact on organisations, including:

- the need to cut overhead costs associated with waste disposal;
- rising raw material and energy costs;
- environmental costs of landfill and excessive resource consumption;
- requirement to cut greenhouse gas emissions to mitigate the effects of climate change; and
- increasing legislative requirements associated with waste management.

Identifying waste reduction opportunities and engaging staff in recycling initiatives can help you to reduce your costs as well as the amount of waste disposed of to landfill.

1.4 How to use this guide

You can use this guide to support your existing induction and training programmes in educating and motivating employees about resource efficiency. Some people may already be aware of the cost savings and environmental benefits of reducing waste – others may not.

This self-help approach consists of five main areas.

- Getting management/team support.
- Waste and process mapping, and data gathering.
- Developing an action plan.
- Continued monitoring and review.
- Incorporating resource efficiency into management systems.

2 Why reduce waste?

All organisations produce waste – even efficient ones.

2.1 What is waste?

There are literally hundreds of words for different types of waste. Don't think that your organisation doesn't produce waste simply because it uses another name for it. Whatever you call it, waste is waste. All organisations produce waste – even efficient ones.

Waste is not simply material that is excess to requirements – it represents the loss of valuable assets.

Managers often think that their only waste is the contents of their bins or skips, but this is far from the case. Waste takes many forms, including:

- refuse (also known as solid waste, trade waste, etc);
- waste packaging;
- water;
- effluent;
- waste oils, solvents, liquid residues in drums;
- smoke and fumes;
- heat/energy losses;
- rejects and rework; and
- wasted effort.

Organisations that effectively manage their waste and identify practical ways to reduce the resources they use tend to be more efficient and effective.

2.2 The underlying waste process

Before developing a strategy for resource efficiency, it is essential to understand the underlying process by which all wastes are produced in your organisation. Regardless of your organisation's size and sector, there are five main areas in the waste production process.

1. **Waste produced** – waste is initially produced by an activity or individual in the organisation.
2. **Collected in the organisation** – the waste will be collected at the point of creation and put into a specific receptacle, nearby bin or could be gathered later and taken to a central collection point internally.
3. **Presented for removal off site** – wastes will be presented externally for collection by a third party (private waste contractor or local authority) in a designated container.
4. **Uplifted by contractor** – a third party will uplift the wastes presented and remove them from the site to a collection facility for further treatment and processing.
5. **Waste recycled/disposed off site** – the third party will subject the collected wastes to a process to maximise the volume of waste that can be recycled and minimise the amount disposed of to landfill.

There are a number of actions that can be taken at each stage of this process. As a manager wishing to reduce waste and improve efficiency in terms of resources in your organisation, most effort will be focused on where and how wastes are produced, and how they are collected and presented for off-site removal. The following sections provide useful information to help you decide how best to prioritise your resource efficiency activities.

2.3 Resource efficiency and the waste hierarchy

The waste hierarchy[1] (see Figure 1) identifies waste management options and ranks them in terms of sustainability. All organisations should aim to prevent waste from the outset wherever possible. However, if this is not possible, then consider re-using, recycling or recovering other value (e.g. energy). Not all wastes can be prevented, re-used, recycled or used for the recovery of other values, so you will need to dispose of them in a responsible manner.

[1] The waste hierarchy has been transposed into UK law through the Waste (England and Wales) Regulations 2011.

There are many benefits associated with improving resource efficiency – benefits that will appeal to any organisation, whatever its size.

Figure 1: The waste hierarchy

Waste disposal has the greatest impact on the environment and is typically the least cost-effective waste management solution. Therefore, it is best to aim to 'move up' the waste hierarchy so that you can save money, raw materials, water and energy – as well as improving your environmental reputation.

2.4 Benefits

There are many benefits associated with improving resource efficiency – benefits that will appeal to any organisation, whatever its size. These include:

- cost savings from reduced raw material and waste disposal costs – typically over 1% of turnover can be saved;
- improved process performance;
- improved environmental performance;
- compliance with legislation and reduced risk of environmental incidents; and
- commercial and strategic advantages – it can make your organisation more competitive and improve its standing with customers who seek assurance that their suppliers are operating on a sound environmental basis.

Specific benefits to employees include:

- improved working conditions;
- cost savings (typically £1,000 per employee), releasing money that can be spent on other things such as training, motivation and team working;
- 'feel-good factor' in the organisation; and
- improved recruitment and retention of staff.

Some of these benefits are discussed in more detail below.

2.4.1 Reduced costs

Many organisations believe that the cost of waste is just the disposal cost. However, the true cost of waste is much higher – between 5 and 20 times the cost of disposal and potentially up to 4% of annual turnover.

Waste costs don't stop at how much you pay for disposal, they are just the 'tip of the iceberg'. Figure 2 shows the 'hidden' costs of waste – all of which can be relatively easy to avoid with the right processes and a system in place to measure and monitor the causes of waste.

Your business could save up to 1% of its turnover by implementing measures to reduce waste.

All of these elements can be the source of wasted resources in an organisation. Identifying the true amount and cost of waste will help to establish a baseline position, against which you can measure and demonstrate savings and improvements. Priority can then be given to those actions that either demonstrate the greatest cost savings (thus freeing capital for further improvements) or those that deliver the greatest improvements to environmental performance.

Your business could save up to 1% of its turnover by implementing measures to reduce waste. This means a business with a turnover of £2 million could save £20,000 through a successful resource efficiency programme. This money goes straight to the bottom line.

2.4.2 Improved process performance

Eliminating and reducing waste will improve the performance of your processes by making them more efficient.

2.4.3 Compliance with legislation

Environmental legislation affects every organisation in the UK – particularly with regard to waste. Identifying where waste arises in your organisation and reducing it will help to ensure that your organisation complies with legislation concerning waste handling, storage and disposal.

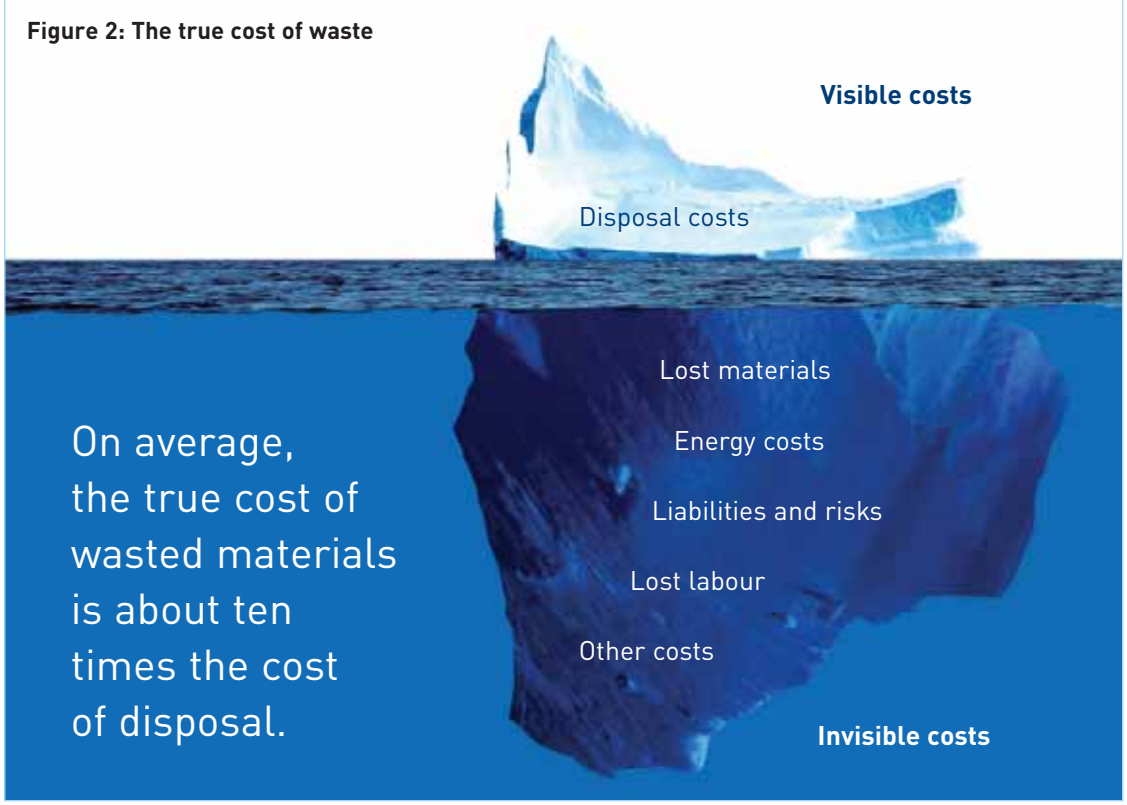
2.4.4 Motivation and team working

A successful resource efficiency programme depends on staff involvement and team working. Getting members of staff involved allows them to take ownership of the improvements and increases their motivation to find opportunities to reduce waste. Team working is essential for brainstorming and suggestion schemes.

2.4.5 Improved recruitment and retention of staff

People who feel part of an organisation and are asked to be involved with programmes and projects are more likely to feel valued by their employer. The culture of an organisation is an important part of staff retention. Training is also a key tool; well-informed employees are more likely to contribute to projects.

Figure 2: The true cost of waste



3 Getting started – developing a resource efficiency programme

Recycling should be considered only when ways to prevent waste and preparing waste for re-use have been investigated.

The principles underlying good resource efficiency practice are based on the waste hierarchy (as described earlier). This order of preference for eliminating waste is based on the fact that prevention is better than cure.

Focusing on the top levels of the waste hierarchy will enable organisations to achieve optimum benefits. It is through careful purchase and better use of resources that your organisation will make the most significant savings in the cost of waste. Recycling should be considered only when ways to prevent waste and preparing waste for re-use have been investigated, followed by recovering other value (e.g. energy recovery). Disposal should be the last resort.

3.1 Continual improvement

Developing a structured and managed approach to resource efficiency (Figure 3) will identify opportunities to save money, raise the profile of the issue in your organisation and set actions for continual improvement.

3.1.1 Assess

- Gain commitment from senior management because any change will require top-level support.
- Review current performance.
- Carry out a survey to identify opportunities to reduce waste and the scope for savings. This will involve collecting and analysing existing and new data. It will also provide a baseline against which progress can be measured.
- Assess the scope and economic feasibility of possible options for improvement.

3.1.2 Plan

- Assign responsibilities (i.e. set up teams, champions or steering groups).
- Look at the survey results and start to set priorities and to think about identifying root causes of waste and solutions.
- Put together a detailed plan outlining objectives, responsibilities and monitoring.

3.1.3 Implement

- Take action by starting to implement improvement plans and data collection systems.
- Use control systems to keep on track.
- Use general approaches for source reduction (e.g. new processes, good operating procedures, technical changes and product changes).

Figure 3: The continual improvement approach to resource efficiency

It is important to bear in mind that, whatever sector your organisation operates in, there are a number of 'quick wins' to help you get started.

3.1.4 Review

- Review the systems in place and make any changes to continue the improvement loop.
- Publicise results and any success to all stakeholders (e.g. directors, employees, team members and external organisations). This will motivate the team and others to carry on and look for further opportunities for continual improvement.

3.2 Generating ideas – some 'quick wins' to get started

Developing a resource efficiency programme from scratch may seem a daunting task or you may have already started on the process and simply run out of ideas. It is important to bear in mind that, whatever sector your organisation operates in, there are a number of 'quick wins' to help you get started.

- **Measurement.** If you are not currently measuring your waste, you are not managing it as effectively as you could be. You should identify why this is the case – is it because your waste contractor does not provide you with detailed information? Does another department hold the information (e.g. finance – this information is often submitted as part of an invoice)? If so, you should ensure that this information is collated centrally to make sure performance is routinely measured and regarded as a visible cost.
- **Monitoring and reporting.** Do you get useful information from your waste and recycling contractor regarding your waste streams and is it in an easy-to-manage format? If not, you should consider asking your waste contractor to provide you with better data on the waste streams they collect (e.g. plastics, paper, metals and general mixed waste) and the quantities of each. The reporting period may vary depending on the volume of waste uplifted, but you should be able to get this information on a monthly basis at least.
- **Weighing.** Do you currently know the weight or volume of waste you produce (tonnes/m^3) over a given time period (e.g. week, month, quarter)? If you do, you should use this information to determine your current performance levels and how much your waste costs you. If you don't, you should consider asking your waste contractor to provide you with this information or carry out a short internal survey to determine the weight of your waste. This could easily be carried out by operational or cleaning staff as part of their day-to-day activities using simple digital scales. Understanding the weight of waste you produce is essential to check that you are being charged an appropriate amount for waste recycling and disposal.
- **Segregation.** If you are not segregating your wastes, you may be paying more for your waste disposal than you need to. Well-segregated recyclable wastes (e.g. paper, plastics, cans, wood and metal) are likely to be fully recycled and your waste contractor will not charge you any Landfill Tax. Effectively segregating these wastes will help ensure that the waste streams are free from contamination and retain as much value as possible.
- **Signage.** Do you currently have a clear system of bin/skip signage? If you have multiple sites, is the signage consistent across all of them? You should consider whether your current system is adequate and encourages effective segregation by your staff.
- **Composition and analysis.** Depending on the nature of your organisation, it is likely that between 70% and 75% of your waste could be recycled. To determine the most appropriate level of waste service for your organisation, you need to understand the composition of your wastes. Carrying out a short composition analysis study of your wastes will allow you to identify the most common waste streams. You will then be able to determine the most appropriate and cost-effective collection and disposal method.
- **Bin selection.** Having appropriate bins for collecting your waste may seem an obvious point, but can have a significant impact on your waste costs. For example, if you are paying for larger bins and they are routinely emptied when only half full, then perhaps having smaller containers or fewer large bins would save money. Perhaps having smaller containers would mean that you could have them situated closer to where waste is actually created? You should also bear in mind that sealed and lockable containers may be required to prevent internal staff or third parties putting contaminating waste into them.

Segregate different wastes to enable re-use, recycling, recovery of other value or, at least, a reduction in disposal costs.

- **Shredders and compactors.** Much of the space in waste containers is air. Reducing the amount of air in the space will maximise the volume of waste you are able to fit in each uplift. Density fill rates will vary depending on the waste type, but typically general waste will have a density of around 250 kg/m^3. Shredding and compacting are two ways that you can reduce the volume of your waste
- **Managing cleaners and facilities management contractors.** Your cleaning and facilities management staff are key in helping you manage your waste more effectively. Ensuring these people are aware of your resource efficiency and/or recycling scheme, and are adequately trained and involved in the process, will help increase the likelihood of your initiatives being successful.

To help you further, some good practice and low-cost ideas for preventing, reducing, recycling and recovering other value from waste are given below.

3.2.1 Production waste

- Look with a 'fresh pair of eyes' at existing activities and ask 'why' as much as possible.
- Look at how raw materials are used, stored, handled and moved and question 'accepted' levels of waste.
- Look at how processes operate and why waste is generated.
- Consider how much of what goes into a process or activity finds its way into a product that has value to customers.
- Quantify and reduce the amount of ancillary materials (e.g. solvents, water, additives) that are used, but are not present in the final product.
- Quantify and reduce the use of consumables (e.g. personal protective equipment, filters, packaging).
- Eliminate unnecessary temporary storage, process steps and movements.
- Assess the amount of packaging used. Consider whether all of it is really necessary. Choose minimally packaged products where possible. Ask suppliers to take excess packaging away with them when making a delivery or to switch to re-usable packaging.
- Segregate different wastes to enable re-use, recycling, recovery of other value or, at least, a reduction in disposal costs. Waste segregation should occur as near to source as possible to reduce the risk of contamination and enable maximum value to be obtained through recovery.
- Change delivery quantities and/or sizes of containers used (e.g. from drums to intermediate bulk containers (IBCs)), but remember that smaller delivery quantities/containers may sometimes be appropriate to reduce labour and potential damage during double handling after delivery.

Encourage suppliers to provide goods in minimal amounts of packaging. Return packaging to suppliers if you can't make use of it.

- Change cutting plans and/or nesting patterns to improve the yield from sheet materials.

3.2.2 Water and liquid wastes

- Encourage good housekeeping and efficient use of water in all areas of the site.
- Repair all dripping taps as soon as possible.
- Check for leaks in water systems regularly.
- Fit flush controls to urinals.
- Consider fitting percussion taps to turn off water automatically in washrooms.
- Consider fitting trigger controls to hosepipes.
- Check the integrity of storage tanks regularly.
- Re-use dirty solvent for cleaning processes.
- Check automatic drain taps regularly.

3.2.3 Smoke and fumes

- Keep chemical/solvent tanks covered to minimise evaporation.
- Ensure all containers of chemicals/solvents are enclosed to reduce fugitive emissions.
- Avoid decanting chemicals/solvents where possible.
- Set up a leak-test and repair programme for all pipework.
- Maintain and service all filters and air inlets regularly.

3.2.4 General waste

- Think before you print. Print only pages of a document that you need.
- Set the default on photocopiers to duplex (double-sided copying). Question whether you need to print or photocopy draft copies at all.
- Make sure staff fully understand how to use printers and photocopiers. This will reduce the number of mistakes and introduce them to the paper-saving features on many machines.
- Avoid mistakes by checking spelling and layout before printing. Do a one-copy trial run before requesting large multiple prints and photocopies.
- Consider introducing specialist software which monitors printer and photocopier usage. This software can also be used to allocate allowances to individuals or departments, with the aim of making people think more carefully about what they need to print.
- Using lower weight paper can reduce paper use. Photocopier paper is normally 80gsm, while higher quality letter and presentation paper is typically between 90gsm and 120gsm. Reducing the weight of all paper to 70gsm can reduce the amount used by weight by up to 12.5%.
- Reducing the default font sizes and margins for electronic templates and documents can increase the amount of information per side without affecting readability.
- When e-mail is received, check if a record is needed and, if not, file it in an e-mail folder rather than printing it out automatically.
- Make someone responsible for returning unwanted mail and removing contact details from mailing databases. This is particularly useful if someone has left and is still receiving unwanted post.
- Make sure drinks machines allow for use of china mugs rather than plastic disposable vending cups. Consider removing plastic cups from water coolers, and provide re-usable glasses.
- Encourage suppliers to provide goods in minimal amounts of packaging. Return packaging to suppliers if you can't make use of it. Work with your suppliers to identify surplus packaging, and use returnable or re-usable packaging where possible. Consider re-using incoming packaging in the packaging of outgoing goods.
- Create a central depository for used, but usable, supplies. Document wallets, clear envelopes and cardboard boxes can often be used several times.
- Wherever possible, try to use durable, high-quality stationery supplies such as re-usable paper clips or treasury tags rather than single-use staples.
- Collect paper that has been used only on one side and use it for drafting, note-taking, etc. Many printers and photocopiers have multi-trays and thus allow a dedicated tray to be filled with part-used paper.

- Re-use envelopes where possible, especially for internal post.
- To increase the effectiveness of paper recycling, the number and location of collection bins needs careful consideration. The shorter the distance people have to walk, the greater the likelihood that paper will be recycled. A waste paper tray at each desk that can be emptied into the main collection bin when full is ideal. Position bins near photocopiers, but put up a notice reminding people to re-use single-sided copies rather than discard them.
- Ensure that recycling bins are emptied by cleaning staff and porters as part of their contract. Work with your waste management service provider to ensure paper is collected for recycling.
- Use 100% recycled paper (with maximum post-consumer waste content) as standard.
- It is now common practice for companies to recycle toner cartridges and sell remanufactured cartridges. Remanufactured goods are often accompanied with a guarantee and many distributors claim that they provide a better print quality and produce up to 20% more prints than a normal cartridge.
- Aluminium is a widely used and easy to collect material. Ensure that aluminium cans are segregated from other metal cans in the collection bin. Look at introducing can recycling bins in areas where they are produced such as canteen and break-out areas.
- Flatten or compact cardboard or other bulky packaging to make collections for recycling easier and more efficient. Segregate cardboard to prevent contamination of high-grade recycled product.

4 Reducing waste – a 'how to' guide

A resource efficiency programme provides a framework to help your organisation manage the wastes it generates and identify suitable opportunities to prevent, re-use, recycle and recover other value from these materials.

A resource efficiency programme provides a framework to help your organisation manage the wastes it generates and identify suitable opportunities to prevent, re-use, recycle and recover other value from these materials. To be successful, a resource efficiency programme has a number of key elements that are summarised in Figure 4. This forms a suggested model based on five steps to develop your own resource efficiency programme. Although it is not essential that every part of each step identified has to be included, it is likely that the impact of the resource efficiency process will be less significant if elements are left out.

Appendix A contains useful resources to help you:

- Worksheet 1: Training needs assessment matrix (completed example and blank version).
- Worksheet 2: Opportunity checklist.
- Worksheet 3: Developing an action plan.

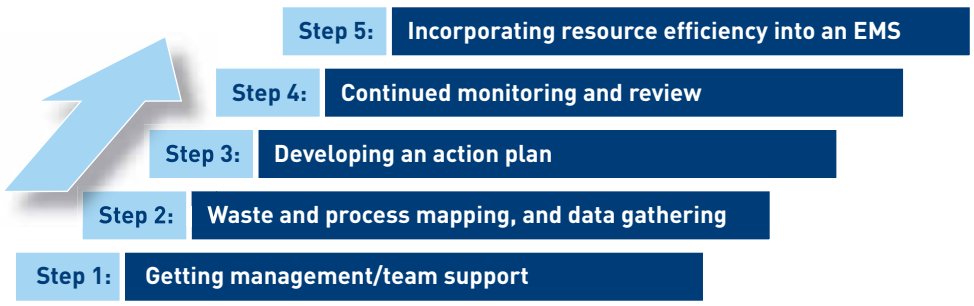
Step1: Getting management/team support – securing buy-in from your colleagues.

Once you have decided that your organisation could benefit from implementing a resource efficiency programme, one of the best ways of getting started is to motivate staff to get involved and to persuade everyone to do their bit. Managers responsible for health, safety, environment, quality and production, and team leaders are in a particularly good position in an organisation to spread this message. More information is provided in Section 4.1.

Step 2: Waste and process mapping, and data gathering – understanding what wastes your organisation produces.

To successfully reduce your organisation's waste and manage it, you first need to see where waste is being produced. It may take some time to complete, but it will be worthwhile! Waste mapping is a useful process to help you achieve this and the following sections provide you with information on how to produce one for your organisation. You should then have a clear understanding of the wastes your organisation produces, where these occur and the reasons why they arise. You will also be able to determine whether these items are essential by-products of a production process or if the amount could be reduced and, perhaps, even eliminated. It is not essential at the start to have exact waste figures although, of course, it helps. The most important thing is to know where waste is occurring and to have a rough idea of the quantity. Measurements like skipfuls or binfuls of waste will help you get an idea of the amount of waste being created around the site.

Figure 4: Resource efficiency model



An initial review can help in gathering basic waste and material information. It will help you to gain a better understanding of where resources are used in your organisation along with an idea of what materials you dispose of. Gathering and analysing data will provide you with reliable information to highlight opportunities for quick savings from no-cost and low-cost measures. Measures with a short payback period will help secure buy-in for devoting more time and resources into developing your monitoring programme. It will also help identify areas that you need to find further details – if you can't measure it you can't manage it! Guidance on waste and process mapping, and data gathering is provided in Section 4.2.

Step 3: Developing an action plan.

Once you have identified the wastes generated by your organisation, you can think about ways to prevent, prepare for re-use, recycle and recover other value from the different types, in line with the waste hierarchy. Guidance on how you can develop and action plan for your organisation is provided in Section 4.3.

Step 4: Continued monitoring and review.

The success of any resource efficiency programme relies on having an effective monitoring and review system in operation. Once sources of waste in an organisation are identified and actions to prevent, re-use, recycle and recover other value from these wastes have been developed, there needs to be a series of ongoing checks to ensure that measures identified are being implemented effectively. This allows areas that aren't working to be highlighted, and further communication and training needs identified to improve performance. It also allows savings to be quantified and successes communicated across the organisation. Guidance on how you can continue to monitor and review your organisation is provided in Section 4.4.

Step 5: Linking with your existing management systems.

It makes sense to incorporate resource efficiency into your existing management systems, as this will be more cost-effective and easier for everyone to understand. There are many links between systems for environmental management and these should be reinforced rather than reinvented. Building on existing systems will result in greater savings for less effort and cost. Resource efficiency involves identifying where there are opportunities to make improvements, developing and implementing action plans, and ensuring continual improvement.

An environmental management system (EMS) also has all of these elements, but is particularly focused on continual improvement. A resource efficiency programme will help to identify objectives and set targets for your EMS (e.g. reduce waste going to landfill by 10% within 12 months). Any resource efficiency programme needs to be aligned with other management systems in the organisation to ensure that the overall efficiency and competitiveness is maintained. Further information on how your resource efficiency programme can fit in with your EMS is provided in Section 4.5.

4.1 Getting management/team support

The key to the success of any scheme is obtaining commitment from staff and senior management. A successful resource efficiency programme changes people's attitudes to waste – causing a shift in the corporate culture.

4.1.1 Overcoming barriers

What are the most common arguments put forward by people for not implementing a resource efficiency programme? How many of the arguments in Table 1 apply in your organisation?

4.1.2 Developing a resource efficiency team

Involving employees from the start encourages ownership and increases the likelihood of the project's success.

Consider setting up a team to co-ordinate action in the organisation. A team can plan, discuss and carry out initiatives that will help to gain support from other staff. A team can also add valuable momentum to the process.

Think about nominating a 'champion' or leader for the site or each department to co-ordinate the initiative, disseminate information and provide feedback to management on progress and suggestions for improvement. Make sure that you appoint

Champions do not have to do everything single-handed. They should be able to involve others from across the organisation to make things happen.

Table 1: Common arguments for NOT implementing a resource efficiency programme

Argument	Solutions
I'm too busy.	So, let's get some help from colleagues.
I don't have the skills.	So, let's see what support is available.
We tried that – it didn't work.	When, how and why not?
Our process is different.	Is this really true? Are minor or major changes required?
It's not financially viable.	Have you included all the benefits? Could things have changed?
I can't get management support.	Have you really tried to make a business case?

someone who is not only enthusiastic and has the ability to motivate staff, but also has the support of senior management.

The role of the project champion can include:

- publicising the project in the organisation;
- developing action programmes;
- identifying potential team members; and
- discussing resources and timescales with senior management.

Champions do not have to do everything single-handed. They should be able to involve others from across the organisation to make things happen.

4.1.3 Get other senior managers involved

To ensure sufficient priority is given to resource efficiency, it is essential to obtain commitment from all members of the senior management team. To get senior managers involved, emphasise the benefits of resource efficiency – cost savings, improved efficiency, enhanced corporate image, etc.

Ways to gain their involvement and commitment might include:

- conducting a 'scope to save' survey and discussing with senior managers the potential for cost savings;
- explaining the opportunities for the savings you have identified;
- giving examples of what similar organisations have done and the benefits they have achieved; and
- taking photos of waste around the site, and show people the problem areas and point out the consequences of doing nothing (e.g. environmental damage, clean-up costs, prosecution and negative publicity).

4.1.4 Team structure

The number of teams will depend on an individual organisation's circumstances such as size, number of processes, number of waste streams, the scale of the data collection exercise, the particular phase of the resource efficiency programme.

Teams can be assigned to particular areas of the organisation, for example:

- each production area or building;
- each material or utility type; and
- particular waste streams or issues.

The team structure should not remain static. Typically, organisations use small teams of between 4 and 8 people to instigate data collection and review ideas. These teams tend to grow as opportunities are identified. They may then split into a number of project or implementation teams.

You may wish to develop a cross-functional team. For larger organisations, this may involve people from accounts, purchasing, production, maintenance and marketing. The project team should ideally be representative of staff from all levels in the organisation (i.e. from management to shop floor).

A staff suggestion scheme can bring out ideas that management would not have thought of.

What is the ideal make-up of your organisation's resource efficiency team? You could draw a hierarchy to illustrate your cross-sectional team. Remember to highlight who will be your champion.

4.1.5 Staff suggestion scheme

Set up a staff suggestion scheme to motivate employees and get them involved in resource efficiency. Employees play an important part in any organisation and are well placed to make suggestions for improvements in their area. A staff suggestion scheme can bring out ideas that management would not have thought of.

Tips for running a successful suggestion scheme:

- Publicise the scheme widely in the organisation and have a central collection point for suggestions.
- Respond to all staff suggestions either publicly or in writing, even if the suggestion cannot be implemented.
- Consider all ideas, even if they need further investigation.
- Give an award, prize or monetary incentive for the best suggestions.
- At the end of the project, give feedback and recognition to:
  - the volume of suggestions received;
  - the winners who have been rewarded; and
  - the changes enacted as a result.

4.1.6 Other ideas for motivating staff

- Set achievable targets, publicise them and monitor them. Applaud staff when the targets are achieved. Revise the targets.
- Develop incentive programmes to encourage staff to design and use resource efficiency ideas.
- Incorporate waste reduction into job performance evaluations.
- Be aware of social pressures in the organisation. Target the first action at groups that are innovative and positive about change.
- To ensure a successful outcome, communicate up and down the management structure to maintain momentum and commitment.
- Link in with the business plan so that capital costs can be budgeted for.
- Report regularly to colleagues, senior managers and staff – seeing progress is encouraging in itself! Use relevant key performance indicators (e.g. litres of water or solvent used per tonne of product).
- Use a notice-board, the staff newsletter and intranet to show progress in the form of graphs and an achievement 'thermometer' or 'ladder' (similar to the target boards used for fundraising).
- One company's waste may be another company's raw material. Ask employees if they know of any relevant waste exchange schemes.

Often, the main sources of wasted resources at work are inefficient systems and poor working practices.

Review your ideas to get staff involved in resource efficiency programmes. As a group, decide which ones you would ideally focus on first. Draw up a 'marketing plan' illustrating how you would launch these ideas for motivating staff. Do you need to design posters, leaflets and notice-board signs? Do you want to brand your ideas (e.g. a mascot that always appears on resource efficiency materials)?

4.1.7 Induction training for new staff

Induction training needs to be dynamic, focused and easily remembered. New employees are normally bombarded by new systems and other forms of training, so it may be best to introduce your environmental and resource efficiency programmes by detailing incentive schemes, activities and potential areas of responsibility for new staff.

4.2 Waste and process mapping, and data gathering

By starting to identify where waste is occurring it will be easier to find out why it is happening.

Producing a waste map will help you to gather a list of wastes to target and assist you in calculating the cost of those wastes. Once you have this information, you will be in a position to decide which to target first – perhaps the easiest and most cost-effective improvements or you may want to look at those that have regulatory compliance implications.

- Stage 1: Produce a site layout waste diagram.
- Stage 2: Develop a process waste flowchart.
- Stage 3: Gather input and output data.
- Stage 4: Update your flowchart.

Waste Mapping: Your Route to More Profit is available from WRAP at www.wrap.org.uk and provides detailed guidance on how to produce a waste map and gather data.

4.2.1 Identifying wasted resources

There are a number of different types of waste that your organisation is likely to produce. An opportunities checklist has been provided in Appendix A to help you identify and categorise your waste. Further ideas are also provided below:

- **raw materials** – this does not just mean the process materials for manufacturing, it also includes consumables (e.g. chemicals, cleaning materials and office paper);
- **water** – (e.g. component rinsing, hand washing and toilets);
- **packaging** – (e.g. some kinds of cardboard or plastic packaging could be re-used, recycled or even resold);
- **solids** – including offcuts as well as defective products;
- **liquids** – including lubricants and effluents;
- **gaseous** – including volatile organic compounds (VOCs) and combustion emissions such as NOx, SOx and CO_2;
- **hazardous** – any of the above where disposal is covered by the Hazardous Waste Regulations[2];
- **solvents** – could include the last two items above; and
- **energy** – (e.g. heating systems (process and space heating), lighting, compressed air, pumps and drives).

Look for the wastes that are produced in each part of your building or stage of the production process. These will include a proportion of the raw materials, together with water, energy and other ancillary materials such as packaging. For an office, waste may be relatively simple to see (e.g. paper, toner cartridges, lighting of empty rooms, plastic cups, pens, and monitors and photocopiers left switched on unnecessarily).

Also, don't forget items that seem peripheral, such as cleaning materials. For industrial applications, the waste streams may include quantities of different metals, chemicals, effluents, etc. Taking photographs of waste will show how much is being produced – and they will be useful for later comparisons, showing just how much has been saved.

[2] Implementation of the revised Waste Framework Directive brought some changes to the Hazardous Waste Regulations. These changes have been brought in by the Waste (England and Wales) Regulations 2011 and the Waste (Miscellaneous Provisions) (Wales) 2011 Regulations.

4.3 Developing an action plan

When you have completed your waste map (using the information in the WRAP guide Waste Mapping: Your Route to More Profit) and gathered and analysed waste data, you will have a comprehensive overview of waste in your organisation that will form a blueprint for reducing waste. You should now be in a position to begin to develop an action plan to identify activities to minimise waste and improve resource efficiency. See Worksheets 2 and 3 in Appendix A for help with your action plan.

Firstly, to improve resource efficiency and develop appropriate actions for dealing with the wastes that arise, it is necessary to understand how inefficiencies occur. Often, the main sources of wasted resources at work are inefficient systems and poor working practices. But, overall, the best way of reducing wasted resources is to prevent waste occurring in the first place. Waste can be dealt with in a number of ways, but the most effective is by following the waste hierarchy: prevent, prepare for re-use, recycle and recover other value, in that order (as described in Section 2).

Elimination is at the top of this ranking system because it is best for the environment. The next best option is to reduce waste production at source. Below this comes the option to re-use, but if this is not practicable, then waste should be recycled, sold as scrap for reprocessing or incinerated for energy recovery. The last and generally least beneficial option for the environment is to dispose of waste to landfill.

Factors to consider in prioritising resource efficiency activities are:

- the ease with which action can be taken;
- the cost of the particular type of waste that is being produced (e.g. precious metals cost more to buy than steel plate, plastic document folders more than plastic cups); and
- the proportion being wasted (the percentage of the raw material that is not profitably used).

You should be able to identify some of these priority areas by looking at the waste figures you have gathered. Your organisation will have its own goals determined by its own policies and practices. However, the easiest and lowest-cost actions will probably be carried through first as they do not require capital investment or time commitments and produce results that can be seen very quickly.

4.3.1 Top tips to help your action plan realise savings

Action plan – top tips

- Start with the major sources of wasted raw materials, packaging and liquid wastes, and then decide your priorities. These may be:
  - the largest amounts of waste;
  - the most expensive wastes (i.e. with the highest value or associated costs); and
  - hazardous wastes.
- Concentrate on opportunities where the largest cost savings can be made and areas where there are practicable ideas for making changes. Pay particular attention to opportunities with immediate savings and those that are no-cost and low-cost.
- Seek suggestions and ideas from operators, supervisors and managers.
- Evaluate possible options for improvement in terms of practicality and cost-effectiveness.

4.3.2 Resource efficiency tips

Further to the example ideas in the blank action plan worksheet included in Appendix A, there are a number of suggestions where you can implement resource efficiency opportunities. Good practice and low-cost ideas for eliminating, reducing and recovering waste are provided in Section 3.2. Highlight those that you think might be useful and achievable for your organisation.

Some generic tips to get started:

- Look with a 'fresh pair of eyes' at existing activities and ask why as much as possible.
- Look at how raw materials are used, stored, handled and moved, and question 'accepted' levels of waste.
- Look at how processes operate and why waste is generated.
- Consider how much of what goes into a process or activity finds its way into a product that has value to customers.

Once you have highlighted those tips that are relevant to your organisation, you should include them in your action plan and identify appropriate methods to implement. You will also develop your own ideas that are relevant to your processes. Ensure that these are included in your action plan as well and effectively communicated internally.

4.4 Continued monitoring and review

The success of any resource efficiency process relies on a robust system of monitoring and review to ensure that actions are being implemented. This needs to be carried out on an ongoing basis to ensure that continual improvements are achieved.

Responsibility for doing this should be agreed between operational staff and management, and included in an individual's key tasks. The tasks should be carried out as part of the daily routine and include activities such as checking that waste segregation is being carried out effectively, the correct bins are being used for the correct waste types and contamination levels are low. Those incidences where actions are not being followed can be identified and communicated back to areas that need to improve. Corrective action can then be implemented (e.g. further staff training or improved bin signage may be required).

As waste is effectively tackled and reduced, the waste map and action plan will change. Actions will be completed, some waste streams may disappear completely, while others may become less important. A regular review of the waste map and action plan will help you to see where improvements have been made and where the next target for action may be. Monitoring and reviewing will also enable you to see and record the genuine achievements made and allow you to communicate these successes to your colleagues.

Alterations required by process or product development may remove some of the waste streams altogether and – just as likely – they may create others. Waste may be 'moved' to other parts of the site. Such changes may mean that sections of the map will have to be updated to cope with new practices and equipment, and your action plan should be updated too to incorporate new actions identified to help prevent, re-use, recycle and recover other value from wastes occurring from these areas.

4.5 Incorporating resource efficiency into management systems

It makes sense to incorporate resource efficiency into your existing management systems, as this will be more cost-effective and easier for everyone to understand. There are many links between systems for quality management, health and safety management, and environmental management. Reinforce overlaps rather than re-invent them; building on existing systems will result in greater savings for less effort and cost.

Setting up an EMS will provide your organisation with a framework through which its environmental performance can be controlled and improved.

4.5.1 What is an Environmental Management System (EMS)?

Increasingly, organisations are recognising that the environment is a management issue and not just a matter of compliance. An EMS is a systematic approach to managing your organisation's impacts on the environment. Having and following an EMS is voluntary, but organisations with an EMS have an explicit commitment to continual environmental improvement.

Setting up an EMS will provide your organisation with a framework through which its environmental performance can be controlled and improved.

An EMS:

- is a mechanism for defining environmental responsibilities for all staff, helping them to understand the environmental impact of their activities and their individual actions;
- ensures that all operations have procedures that minimise their impacts;
- records environmental performance against set targets;
- can be audited; and
- will also help you identify opportunities to reduce waste and, thus, reduce your operating costs.

To implement an effective EMS, you need to know your organisation and understand its impacts on the environment. By knowing how your organisation operates, you will be able to easily identify how to improve efficiency, reduce costs and improve profits.

Although many organisations have already made significant improvements in their environmental performance, an EMS will ensure that improvements continue through ongoing maintenance and monitoring of the system. An EMS also ensures that environmental performance and other related issues are raised regularly with senior management and that the momentum for making improvements is maintained.

4.5.2 What are the benefits of an EMS?

There are a number of potential benefits of implementing an EMS.

Financial

- Identification of opportunities to reduce waste and, thus, costs for raw material, utilities and waste disposal.
- Increased profits.
- Reduced risk of fines for not complying with environmental legislation.
- Lower insurance premiums as risks and liabilities are reduced.
- Retaining site asset value.
- More easily obtainable bank loans.
- Attracting shareholders and investors.

Productivity

- Improved process control (i.e. fewer rejects, less rework, higher yields).
- Reduced use of raw materials and consumables.
- Less waste.

Sales and marketing

- Improved products.
- Competitive advantage (i.e. preferred supplier status).
- Increased sales achieved through promotion of greener credentials.

Management

- Structured approach to environmental issues and continual improvement.
- Keeping ahead of environmental legislation.
- Better relations with regulators.

Public relations

- Improved relations with local community and environmental groups.
- Improved public image.

Personnel and training

- Improved working environment.
- Reduced potential for environmental incidents.
- Increased employee motivation and environmental awareness.

Peace of mind

- Conforming to legal requirements.
- Avoiding penalties for pollution.
- Avoiding bad publicity from pollution incidents.

4.5.3 How does resource efficiency fit into an EMS?

Resource efficiency involves identifying where there are opportunities to make improvements, developing and implementing action plans, and ensuring continual improvement.

An EMS also has all these elements, but is particularly focused on continual improvement. A resource efficiency programme will help to identify objectives and set targets for your EMS (e.g. reduce waste going to landfill by 20% by the end of 2015).

4.5.4 How is training used in an EMS?

Some parts of the workforce will need more information about environmental issues than others. The amount of information will depend on the level of responsibility assigned to them. Start by looking at job descriptions and deciding the level of environmental information needed to carry out particular tasks.

A good way of encouraging involvement in the EMS is to examine whether bonus and suggestion schemes will work for your organisation. Could an existing scheme be adapted to include environmental issues? Such schemes can often be used to motivate and encourage ownership of an EMS.

Certification/verification requires you to demonstrate that the training requirements of employees have been identified through a training needs analysis. You will also need to prove that contractors have received appropriate training before being allowed on site.

4.5.5 Developing a training needs assessment matrix

Use the blank version of Worksheet 1 in Appendix A. Use the completed example matrix given in Appendix A to identify the issues and procedures that your staff need to be trained in and the key roles that will require training.

Fill out the blank matrix to ensure that training is targeted at the right people. If necessary, customise the template to suit your organisation or site.

For more information see the WRAP guide 'Environmental Management Systems' available on the WRAP website (www.wrap.org.uk).

5 Further information

Useful sources of information

WRAP Resource Efficiency Publications www.wrap.org.uk/bre-guides

- Finding Cost Savings: Resource Efficiency for SMEs
- Resource Efficiency for Managers
- Waste Mapping: Your Route to More Profit
- Green Office Guide: A Guide to Running a More Cost-effective and Environmentally Sustainable Office
- Self-assessment Review for Food and Drink Manufacturers
- Packaging Optimisation for SMEs
- Water Minimisation in the Food and Drink Industry
- Saving Money Through Resource Efficiency: Reducing Water Use
- Reducing Your Water Consumption
- Tracking Water Use to Cut Costs
- Workforce Partnerships for Resource Efficiency
- Environmental Strategic Review Guide
- Your Guide to Environmental Management Systems (EMS)

WRAP Online Resource Efficiency Tools www.wrap.org.uk/bre-tools

- Water Decision Tree Tool
- The Rippleffect
- Water Monitoring Tool
- Mogden Formula Tool
- Green Town
- Waste Hierarchy Tool
- Carbon Ready Reckoner Tool
- Volume to Weight Calculator
- Resource Efficient Innovations Database (REID)
- Food Waste Recycling for Your Business
- Hospitality and Food Service Info-Finder

Useful links

- Water Technology List – http://wtl.defra.gov.uk
- Energy Technology List – https://etl.decc.gov.uk

For guidance on environmental topics go to:

- **England** – GOV.UK: Waste and environmental impact
- **Northern Ireland** – NIBusinessInfo: Environment and efficiency
- **Scotland** – Business Gateway: Environment policy and procedures
- **Wales** – Business Wales: Environment - efficiency, waste & pollution prevention

WRAP

WRAP works, uniquely and by design, in the space between Governments, businesses, communities, innovative thinkers and individuals – forging partnerships and developing ground-breaking initiatives to help the UK use resources more sustainably. We have strong relationships with Government decision makers; with business leaders with the ability to influence powerful supply chains and with individuals through our highly respected consumer campaigns.

WRAP works in a distinctive way – developing evidence where there is a knowledge gap, bringing together the right people to work on specific issues, to develop solutions and then, finding ways to implement them.

We focus on the most resource intensive sectors where we have deep expertise and a track record of strong delivery.

We work at all points around the resource 'loop' – preventing and minimising waste, re-using, and recycling. We are able to bring together groups of people who might not naturally work together. This means we can mobilise action to address market failures where there is a disconnect between who needs to take action and who benefits.

WRAP works with UK Governments, the EU and other funders to help deliver their policies on waste prevention and resource efficiency. We take action in those areas where we can have the greatest impact on reducing waste, protecting our natural resources and providing economic and environmental benefits.

WRAP is a registered charity (no. 1159512) and a company limited by guarantee.

Visit www.wrap.org.uk to find out more.

Appendix A: Support materials

Please use the following worksheets as necessary:

- **Worksheet 1**: Training needs assessment matrix (completed example and blank template).
- **Worksheet 2**: Opportunity checklist.
- **Worksheet 3**: Developing an action plan.

Worksheet 1: Training needs assessment matrix (completed example)

Name	Position	Business benefits of environmental improvement	Environmental awareness	Waste hierarchy	Reducing waste	Reducing water use	Waste management procedures	EMS awareness	System maintenance	System auditing
	Managing director	✓	✓	✓	✓	✓		✓		
	Directors	✓	✓	✓	✓	✓		✓		
	Production manager	✓	✓	✓	✓	✓	✓	✓		✓
	Environmental manager	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Shift hands/cell leaders	✓	✓	✓	✓	✓	✓	✓		
	Shifts/cells	✓	✓	✓	✓	✓	✓	✓		
	Maintenance fitters	✓	✓	✓	✓	✓	✓	✓		
	Warehouse	✓	✓	✓	✓	✓	✓	✓		
	Accounts/purchasing	✓	✓	✓	✓	✓		✓		
	Marketing/sales	✓	✓	✓	✓	✓		✓		
	Administration	✓	✓		✓	✓		✓		
	Receptionist	✓	✓		✓	✓	✓	✓		
	Security	✓	✓		✓	✓		✓		

Worksheet 1: Training needs assessment matrix (blank)

Name	Position	Business benefits of environmental improvement	Environmental awareness	Waste hierarchy	Reducing waste	Reducing water use	Waste management procedures	EMS awareness	System maintenance	System auditing
	Managing director									
	Directors									
	Production manager									
	Environmental manager									
	Shift hands/cell leaders									
	Shifts/cells									
	Maintenance fitters									
	Warehouse									
	Accounts/purchasing									
	Marketing/sales									
	Administration									
	Receptionist									
	Security									

Worksheet 2: Opportunity checklist

Department	Area	Possible waste
Incoming materials	Loading docks, pipelines, receiving areas	☐ Packaging containers ☐ Off-spec deliveries ☐ Damaged containers ☐ Spill residue ☐ Cleaning rags, etc ☐ Pallets (non-returnable) ☐ Gloves, overalls, etc
Storage (raw materials, parts, packaging, final products)	Tanks, silos, warehouse, drum storage yards, storerooms	☐ Tank bottoms ☐ Off-spec materials ☐ Excess materials ☐ Damaged containers ☐ Empty containers ☐ Leaks from pumps/valves/pipes ☐ Out-of-date materials ☐ No-longer-used materials ☐ Damaged products
Production	Melting, curing, baking, distilling, washing, coating, forming, machining	☐ Wash water ☐ Solvents evaporating ☐ Still bottoms in tanks ☐ Off-spec product rejects ☐ Catalysts ☐ Empty containers ☐ Sweepings ☐ Ductwork clearout ☐ Additives ☐ Oil ☐ Process solution dumps ☐ Rinse water ☐ Excess materials ☐ Filters ☐ Leaks from tanks/pipes/valves ☐ Spill residue ☐ Swarf/off-cuts ☐ Sludge ☐ Drag-out from baths ☐ Packaging of dispatched goods

Worksheet 2: Opportunity checklist (continued)

Department	Area	Possible waste
Support services	Laboratories, maintenance shops, garages, offices	☐ Chemicals ☐ Samples and containers ☐ Solvents ☐ Cleaning agents ☐ Degreasing sludges ☐ Sand-blasting waste ☐ Lubricating oils and greases ☐ Scrap metal ☐ Caustics ☐ Filters ☐ Acids ☐ Batteries ☐ Office paper, etc
Energy	Buildings, processes, boiler plant and plant distribution system	☐ High temperatures ☐ Lights left on ☐ Hot water taps left running ☐ Doors left open ☐ Air leaks from compressor lines ☐ Heat loss through roof/doors/ windows ☐ Money wasted through buying electricity/gas at high tariffs ☐ Discharge lamps beyond economic life ☐ Poorly controlled or inefficient heating/hot water systems ☐ Electric motors over five years old ☐ Process heat not re-used
Water	Processes, toilets, kitchens	☐ Underground leaks ☐ Urinals flushing continuously ☐ Taps left running ☐ Wasteful washdowns
Other	Consumables	☐ Detergents ☐ Overalls ☐ Gloves

General waste

Waste	Actions	Cost	Benefits
Steel drums	Identify further uses for steel drums (e.g. disposal of chemical wastes). Could they be used for the temporary storage of materials before use? Crush and sell any unused drums as scrap.	None	Non-returnable storage drums are included in the supply price. By re-using them for other purposes, organisations can save the costs of buying items for these other uses.

Think about the waste hierarchy when setting actions

Worksheet 3: Developing an action plan (continued)

Smoke and fumes

Waste	Actions	Cost	Benefits
Evaporation of solvents	Make sure that lids are always put back on drums and cans of solvents, coatings, etc that are not being used.	Operators will need to be educated/trained to do this.	Volatile chemicals and solvents can be lost from unlidded drums through evaporation.

Think about the waste hierarchy when setting actions

Worksheet 3: Developing an action plan (continued)

Water and other liquid wastes

Waste	Actions	Cost	Benefits
Solvent cleaners	Use detergent and warm water for cleaning general surfaces and floors (this can be just as effective as solvent-based solutions). Clean regularly to prevent the build-up of stubborn deposits that might need the use of solvents to remove them.	None	Cleaning operations often use unnecessarily large quantities of solvent. In some cases, their use can be avoided altogether.

Think about the waste hierarchy when setting actions

We hope that you have found this guide helpful on your route to greater resource efficiency. Don't forget that WRAP is here to help you to improve resource efficiency. Visit the website at www.wrap.org.uk

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recycle