

Waste Prevention Guide for Industry & Business



This guidebook is a joint initiative of

And is part funded by



Limerick
County
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Foreword

It gives me great pleasure to introduce this guidebook, co-funded by the Race Against Waste Campaign, which aims to show how businesses in the Limerick Clare Kerry Region can reduce their waste and emissions through a series of practical, effective yet simple steps.

Limerick, Clare and Kerry County Councils and Limerick City Council have long been committed to enhancing our community and the local environment in our region. We are producing a replacement Waste Management Plan for the 2005-2010 period, to follow on from the original Plan of 2001. The Plan outlines the many initiatives and programmes that will be rolled out over those years. We have in the past introduced, and continue to do so, many business-related initiatives in support of this plan – this guidebook being just one.

One of our main initiatives has been the development of the Limerick Clare Kerry Regional Waste Management Office in 2003. Since then the Regional Waste Minimisation Advisor has been actively engaging with industry/business to support their waste reduction efforts. The activities undertaken include:

- Site visits to companies, support with environmental management issues
- Contacts with main stakeholder groups
- Organisation of seminars, presentations at seminars
- Guidance to companies, distribution of booklets etc.
- Network development
- Demonstration/pilot projects
- A dedicated website: www.managewaste.ie
- Compilation of best practice examples
- The Business to Business (B2B) Green Mentor Scheme with EPA co-funding
- Newsletter publications
- Annual reports
- Promotion of national Race Against Waste campaign
- Promotion of the concept of Cleaner Production

As we advance into this century, we are challenged to achieve meaningful sustainable development: progress on all aspects of our economic, environmental and social performance.

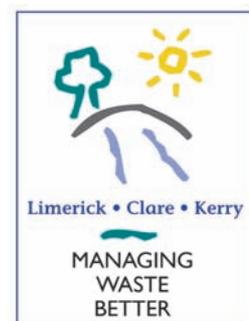
This booklet, produced for us by the Clean Technology Centre, Cork Institute of Technology, demonstrates how our business community can contribute to this progress. It introduces the key points in achieving improvements. Through this guide, companies can benefit financially from addressing resource and waste inefficiencies and at the same time reduce their impact on the environment. It contains many examples of how our local business firms have already taken significant steps to reduce waste while improving profitability and it shows how further progress can be secured.

Together, we can make a difference.

Signed



Philippa King
Regional Waste Coordinator
 Limerick Clare Kerry
 Regional Waste Management Office



Introduction

Environment: problem or opportunity?

Problem?

Management has many issues to consider today. Management of our environmental impacts can seem to be a burden, but it can also be a chance to look at current practices in a new light, to discover the causes of inefficiency and achieve new successes.

Environmental management cannot be ignored. Legal obligations are ever increasing, for example, the recent Waste Electrical and Electronic Equipment (WEEE) Regulations and the requirements of the Packaging Regulations.



Ireland is still dependent on landfill.

The quantity of waste in the Limerick–Clare–Kerry Region is growing, as recent data in the Draft Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2005-2010 has shown (see www.managewaste.ie). It is presenting a burden on the environment and its management is a financial burden on business. Even worse, these costs do not show the full picture.

As well as the obvious costs of waste disposal charges by a contractor, the waste represents purchased raw materials, production costs, staff time to collect and segregate, administration of the invoices and any required analysis, the cost of storage, management time, etc.

Opportunity!

But the story is not all gloom and doom. Local companies have shown they can apply better and more efficient management to achieve high standards:



M&Q Packaging Ltd. are situated in Limerick City and produce High Temperature Nylon Film. In 1998 they produced one skip per day of waste – in 2006 they produced one skip every six weeks! Their improvements have saved cost, labour and storage space.



Klinge Pharma in Killorglin, Co. Kerry and Roche Ireland Ltd. in Clarecastle, Co. Clare, have won a combined total of four national awards since 2001 for their environmental performance.

IBEC
Environment
Awards

Better environmental management has the following benefits:

- easier legal compliance
 - cost savings
 - market protection and growth
 - improved public image and better employee morale
- while contributing to the improvement of the community.

Key Principles

There are a few key principles to follow if you want to make gains in managing your waste:

A Involve all your staff

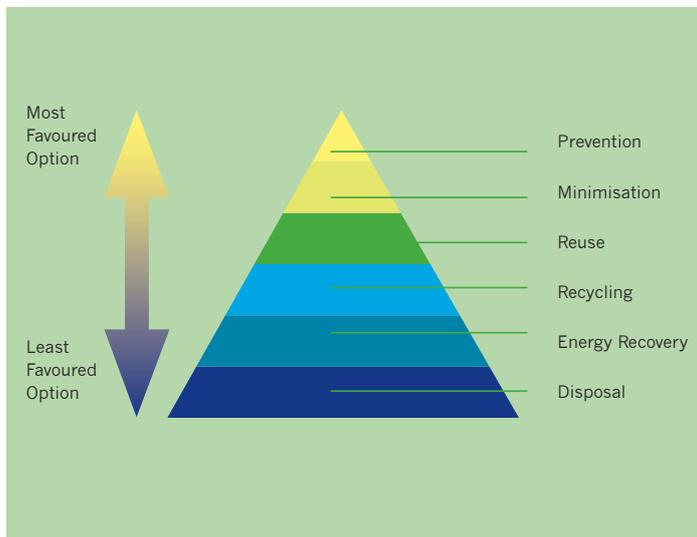
Everyone in the business has a part to play: to lead, to provide resources, to contribute ideas, to assess and implement changes.



Essilor waste minimisation team

B Prevention is better than cure

Avoid or reduce waste if possible, recycle the remainder before treating and disposing of the residues. Address the root causes, not accepting the inevitability of waste.



C Be systematic in your approach to managing waste:

A systematic approach, drawing from the experiences of quality management, lean manufacturing, etc., is more likely to devise financially-effective solutions and be continued to completion. These next pages will show you how to do this.



Involvement of Staff

Environmental Policy

Senior management must decide to tackle waste and commit the necessary resources: time (their own and other staff), and appropriate money for investigation and income generating projects. Often, this commitment is expressed in an **environmental policy**.

An environmental policy is an organisation's statement of its attitude to its overall environmental performance and guides the management of aspects of its activities that may impact on the environment. This need not be complex, but it states the environmental goals of the business, is agreed at top level and is communicated to all employees. It need not be a long document, indeed, a clear, concise, single page is usually the best. It should:

- Briefly describe the business' activities, products and services and significant environmental aspects
- State a commitment to satisfy regulations, to continually improve environmental performance and to prevent waste and emissions
- Provide a framework for setting and reviewing environmental objectives and targets, by indicating overall environmental goals
- Finally, top management, as an indicator of commitment, must sign and date the Policy

You will find links to the published environmental policies of some companies in the region in the "Further Information" section on page 17.

Having an Environmental Policy brings benefits, internal and external to the organisation:

Internal

The process of developing an Environmental Policy brings a focus to the organisation's activities that might impact on the environment, and assists achieving a shared vision of the appropriate management of these activities; when developed, the Policy provides a direction for the organisation's environmental management.

External

Customers, neighbours, regulatory authorities and other interested parties can use the organisation's Environmental Policy as an indicator of its attitude to and concern for the environment.

Teamwork

Staff must be allocated the responsibility and authority to examine the quantities, financial values and origins of waste in the business. Experience elsewhere suggests that forming a team, drawn from all activities in the firm, is a good approach.

The team members bring their expertise and knowledge together and act as communication channels with the rest of the staff. Production, maintenance, purchasing, warehouse, transport, etc., staff all have a part to play. Staff involvement is essential: they know the details of operations, are the source of improvement ideas and are critical to implementing changes.



Klinge Pharma waste minimisation team

Communication

If you are to seek continual improvement, you must share information – internally and externally. This does not mean you give away your commercial secrets! Sharing ideas implies not only that you tell, but also that you can listen. Sharing best practice promotes innovation.

Internal communication

Your **staff** are an excellent source of improvement ideas, and you rely on them to implement changes. You can have:

- Posters
- Newsletters
- Information exchange sessions
- Training sessions
- Awareness days
- Performance results posted in canteens
- Suggestion schemes
- Environmental teams



Roche Ireland Ltd. waste minimisation team

External communication

You can influence your **suppliers** by:

- Engaging them in joint improvement projects, e.g. raw material packaging
- Asking them to report on their own performance, e.g. seeking copies of environmental policies or conducting audits

You can inform your **customers** by:

- Providing environmental information as part of your sales brochures
- Presenting options to your clients, e.g. towel changes in hotels

You can share your good performance with **neighbouring companies** by:

- Hosting a site visit
- Making a presentation at a local event
- Publicising your achievement in the Limerick – Clare – Kerry “Managing Waste in Business” newsletter

THIS ISSUE:

- Launch of Draft Waste Plan
- Update on Waste Minimisation Activities
- Environmental Management Systems
- Cleaner Production including examples

NEW DRAFT WASTE MANAGEMENT PLAN: PUBLIC ENCOURAGED TO MAKE SUBMISSIONS

On Monday 3rd October 2005, Limerick, Clare and Kerry County Councils and Limerick City Council jointly published a Draft Replacement Waste Management Plan (2005-2010) for the Region. It outlines the progress made since the current Waste Management Plan was prepared in 2001 and makes a commitment to increase its recycling target to 45%. The new Plan also proposes thermally treaters of 41% of waste and landfilling only 14%. Proposals include the provision of 32 more Bring Banks and seven additional Recycling Centres in the Region, more homes are to be provided with "Brown Bin" collection service for kitchen / garden waste, and there will be organic waste collection from businesses. The Draft Replacement Plan goes on public display until 12th December 2005 and the local authorities encourage people to view it and make submissions.

"This Draft Replacement Plan sets out how we intend to manage our Region's waste over the next five years. We encourage members of the public as well as organisations and businesses to study the Plan and tell us their views," said Philippa King, Regional Waste Co-ordinator. "Since 1998, there has been a huge increase in waste in this Region and so each one of us needs to focus steadily on reducing the amount of waste we produce and on recycling more in order to achieve EU and national waste management targets."

Tell us your views

The Draft Waste Plan is now on public display until Monday 12th December 2005 in:

Public Libraries during normal opening hours, City Hall, Limerick, County Hall, Dooradoyle, Co Limerick, County Buildings, Tralee and Clare County Council, Information Age Park, Ennis from 9.30am to 4pm, Monday – Friday. On the website www.managewaste.ie.

Written representations in relation to the Draft Replacement Plan should be sent to Regional Waste Co-ordinator, FREEPOST, Regional Waste Management Office, Dooradoyle, Co Limerick, LK441, or by email to rwmo@limerickcoco.ie to arrive no later than 4pm on Monday 12th December 2005. All correspondence should be headed "Draft Replacement Waste Management Plan".

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Clare County Council has put in place a comprehensive water conservation programme. As well as audits of the water system and improved metering, they undertook an awareness campaign to inform their household customers how they, the householders, could save water indoors and outdoors. Simple measures such as using a half litre plastic bottle to reduce the toilet cistern capacity can have significant benefits. Their list of tips, as well as a freephone number for reporting water leaks, has been publicised throughout the county.

Examine Your Activity

You need to closely examine your business activities. There are two general approaches to this: mapping and input-output balances. Each of these is intended to summarise the wastes from your business in a graphical form. Enterprise Ireland has prepared detailed guides on these techniques. They are freely available on www.envirocentre.ie. You will also find useful guidelines from the Race Against Waste campaign on www.raceagainstwaste.ie.

You have to find an approach that suits you, your staff and the nature of your business. A key piece of advice is to start small or start simple. Whichever approach (mapping or balancing) you take, consider the business overall first, or tackle one area or process first.

Start simple

If you take an overall look at the business, you will identify any major opportunity – or unrealised problem! Deal with them first.

Start small

Pick a section of the business. You might select it because you have more information about that area, or eager staff, or a recognised waste problem.

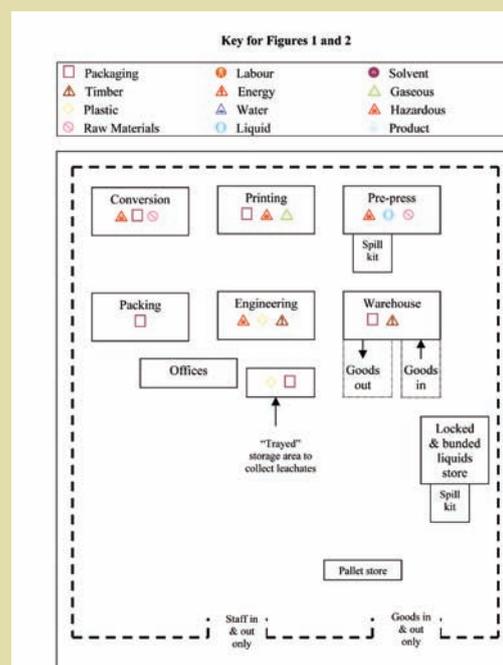
Nothing succeeds like success and quick results please everyone. Be prepared to dig deeper and deeper into your activities. Your maps and balances can get more and more detailed. Think of your activities as being made up of layers of complexity. As you “drill-down” you are getting more information. Ensure you account for all resource (material and energy) consumption and losses. You must estimate or measure the quantities involved. Assign a financial value to them – the cost of material or energy, the cost of treating the waste or emission. This detailed examination presents an opportunity to ensure that all waste is legally managed, and is properly segregated to reduce disposal cost and facilitate recycling.

Mapping

Enterprise Ireland’s *Best Practice Guide BPGCS003 Resource Loss Mapping* suggests you produce a “map” or “plan” which shows the layout of your business operations and you mark in the types and origins of waste. You can also use this to mark where resources, e.g. water and energy are used.

You do not need to produce a dimensioned drawing, this is just a sketch that serves as a focus, a communication tool and a summary of the situation. Make up your own symbols and shorthand to record the details.

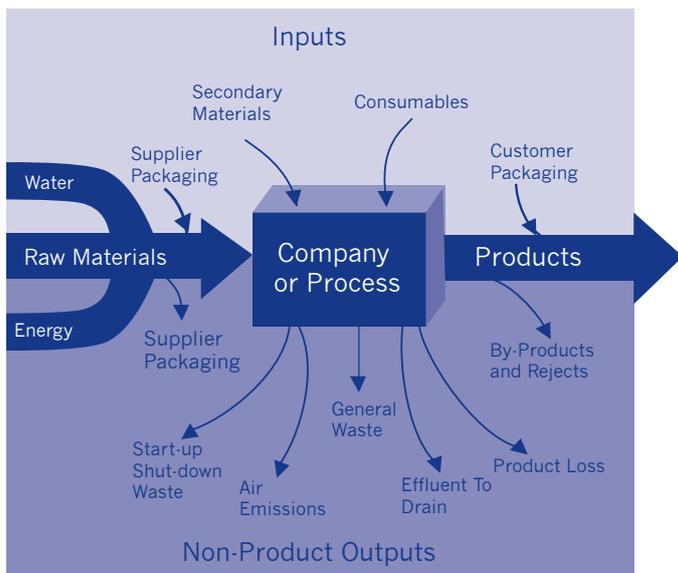
The mapping approach is more suited to simpler activities or businesses that are just starting on their path to tackling their wastes.



Map courtesy Enterprise Ireland’s *Best Practice Guide BPGCS003 Resource Loss Mapping*

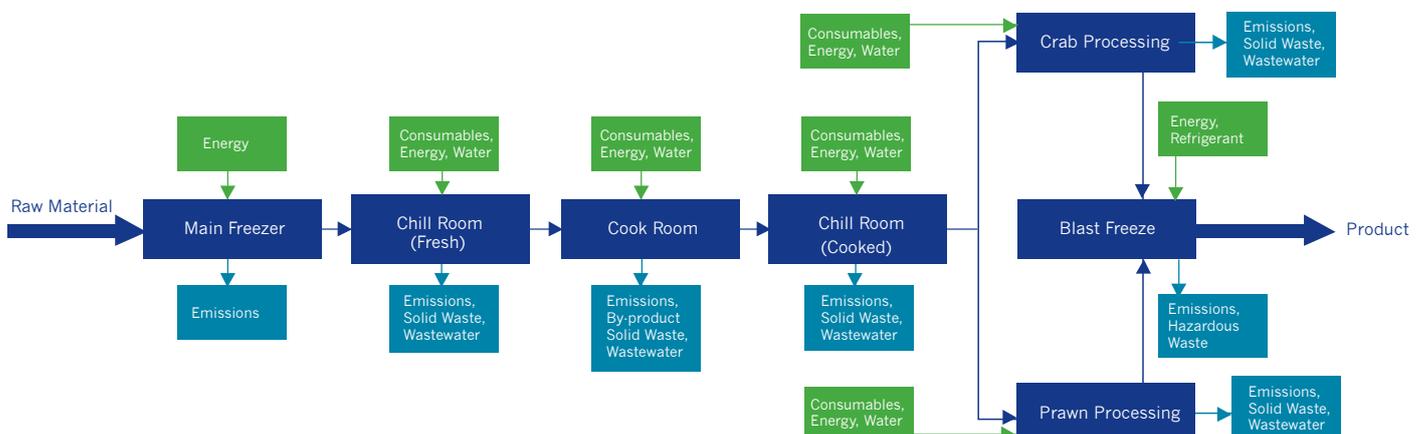
Input-output balancing

Input-output balancing is a bit like accounting, but the focus is on material and energy. The input-output balance approach is more sophisticated than mapping, therefore demands more effort but can turn up more interesting surprises. Everything that goes into your business must come out – either as product or waste. Again you draw a diagram, but now you focus on the logic of the process. You check that every input has been accounted for by an output. Enterprise Ireland's corresponding guide is called *BPGCS004, Process Loss Reduction* (see page 17 of this guide for a link). If you are a large business, you may have the technical staff to prepare a mass balance of your process.



Schematic of inputs and outputs for a business

This schematic illustrates a business. Raw materials, water and energy are purchased by the business. The raw materials may have associated packaging from suppliers. In addition, consumables such as oil, secondary materials such as paint, are used and packaging is used to deliver the product to the customer. All of these are inputs. If they do not become part of the product, they are non-product output. The supplier packaging becomes waste, as do any by-products or rejects. There may be effluent to drain or emissions to air. General waste will arise from administration, canteens, etc. This schematic of the overall business may be elaborated into more blocks, each of them representing a more specific activity, and each with its associated inputs and outputs, as seen in the lower diagram.



Elaborated schematic for a fish processor

Identifying and segregating your waste can bring the following benefits:

- Segregated waste may be recycled at a lower cost than landfilled material
- You are more likely to satisfy legal requirements
- You have a practical and visible measure of the scale of your waste
- The visibility is an excellent communication tool

Segregation of waste is often the necessary first step to avoiding and reducing waste. The cost savings from segregated disposal can be used to fund deeper improvements. Identify the origins and causes of the waste. Ask staff to suggest improvements. Prioritise the wastes. Tackle the largest waste types that require the smallest effort.



Segregation at Supervalu, Corbally, in Limerick City

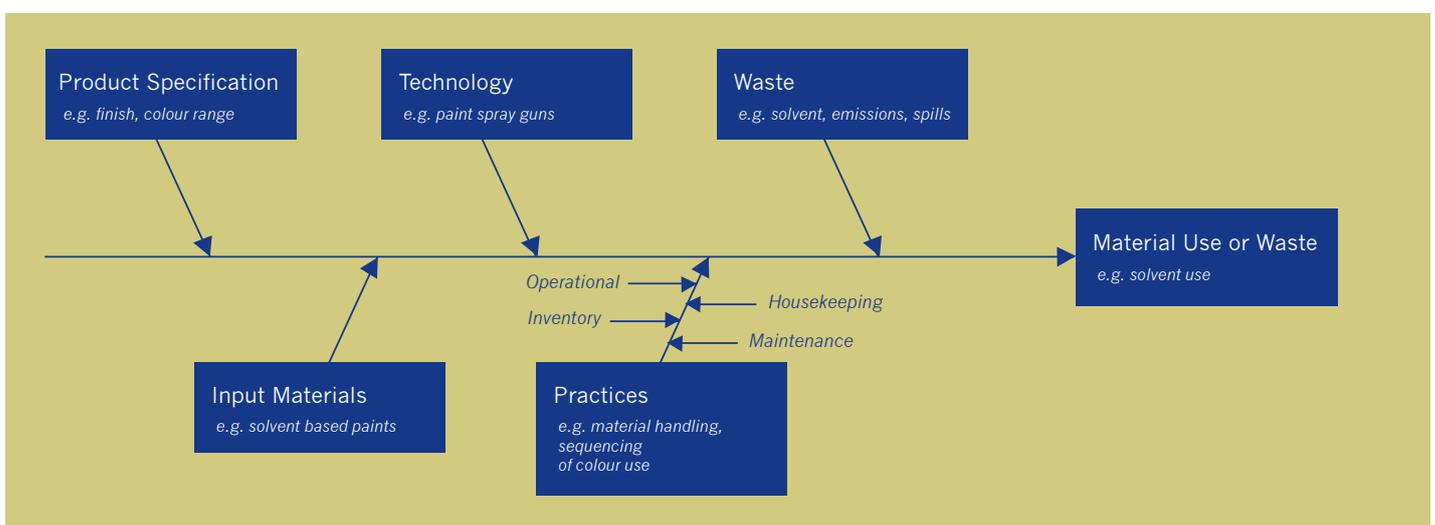
Root cause identification

Remember the goal is to avoid waste. Recycling is good, but costs money. No waste means no cost. Reduced waste means reduced cost. The way to avoid waste is to keep asking “why”? Find the fundamental cause of waste and tackle it at the root.

A simple tool to explore the causes of waste is the “fishbone” diagram, also known as a “cause-effect” diagram. A waste may be explored by looking for the

causative factors. One common approach is to develop the branches of the diagram using: “machines, materials, methods and people”. An alternative checklist derived from prevention studies is: “technology, product specification, input materials and practices”. There is no uniformly best approach. You have to find what works best in your own situation.

When you have identified the waste, its source, quantity and value, you can seek improvements.

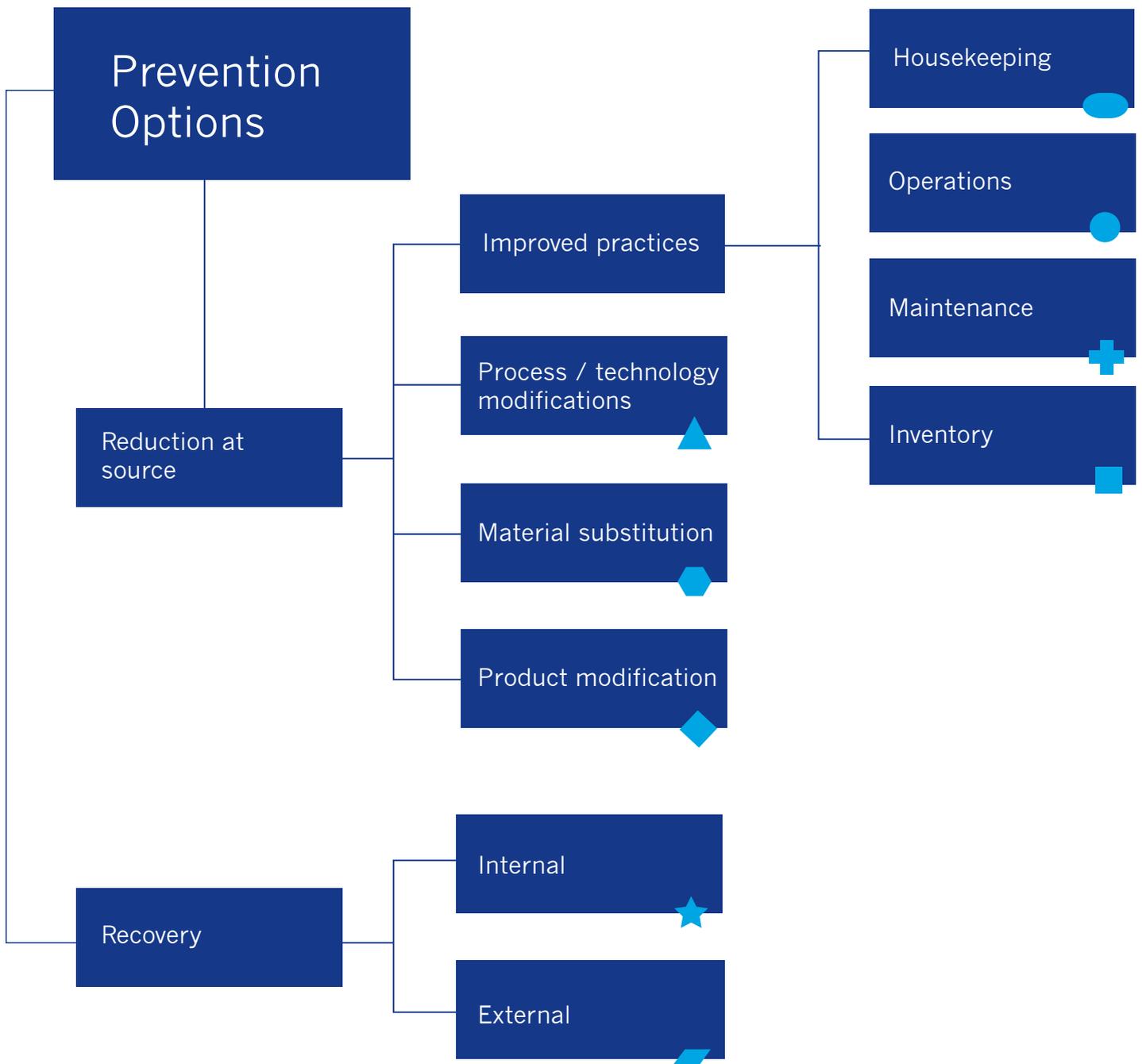


Preliminary root cause diagram for a painting operation

Improvement opportunities

Improvements in Material Usage

A very large number of improvements can be made, but they can be broadly classified as follows. You can use this classification and the examples to prompt improvements in your own operations.



Examples in the Limerick – Clare – Kerry Region:

Andersen Ireland Ltd.

Andersen Ireland Ltd. use electroplating as part of their process to manufacture cosmetic jewellery in Rathkeale, Co. Limerick. After treating the process waste, they are left with three types of filter cake. Through process modifications they have reduced the volume generated of one of the cake wastes by 50%. They have also found a recovery option for the cake by sourcing a company that recovers metals from waste cake. They are continuing to seek further improvement measures for the remainder of the waste.

Beru Electronics Ltd.

Beru Electronics Ltd. in Tralee manufacture diesel cold start systems and temperature sensors for the automotive industry. A solvent degreasing unit was replaced with a self-contained recycling degreasing system, eliminating the generation of spent hazardous degreaser waste.

Klinge Pharma Ltd.

Klinge Pharma manufactures active pharmaceutical ingredients in Killorglin, where it employs 90 persons. Much of their raw material was delivered in fibre drums that originally went to landfill. Major suppliers agreed to convert to reusable or bulk packaging. The remaining fibre drums were dismantled for recycling. These steps in combination with other measures reduced Klinge's landfill waste by 74% over a five year period.

Lee Strand Co-operative Creamery Ltd.

Lee Strand Co-operative Creamery Ltd. produce milk and cream products at their site in Ballymullen, Tralee. Waste prevention initiatives include minimising transport-damaged product (reduced by 53% compared to that in 2000) and minimising reject cartons on the milk filling machines. They altered their 1 litre filling lines to use jumbo reels, reducing the number of changeovers and associated carton waste. The process waste on their filling machines is now less than 1%, in comparison to an industry norm of 4-6%. Application of cleaning chemicals has been optimised resulting in reduced usage of 17% and associated cost savings.

Liebherr Container Cranes Ltd.

Liebherr Container Cranes Ltd. in Killarney has reduced its hazardous waste by improved painting operations. The company installed a machine to mix paint as required, instead of batch mixing. In addition, they purchased a solvent recovery unit to recover waste solvent for reuse in the process. Together these reduced the costs of raw materials and waste disposal. Eventually paint waste will almost totally be eliminated with plans to expand on these improvements.

M & Q Packaging Ltd.

M & Q packaging export their specialised Nylon bags to clients around the world from their base in Limerick City. Working with their customers, they have converted to the use of recycled board in their cardboard packaging, together with the use of water-based inks and the ultimate elimination of instruction inserts via the use of carton printing.

Myson Heating Controls Ltd.

Myson Heating Controls Ltd. employs 100 people in Newcastle West, Co. Limerick, where they manufacture radiator valves and accessories. Their machining produces a mixture of oil and brass swarf. They centrifuge this mixture, sending the oil for recycling off-site. The brass swarf is sent to their brass supplier, who returns 1 tonne of brass for every 1.2 tonnes of trimmings.

O'Connor's Bakery

O'Connor's bakery is a family owned business with manufacturing in Ennis and retail outlets throughout the west. They reduced their waste by changing to bulk delivery of their raw materials and closely matching production to market demand so there is minimal residual product. Their system of waste minimisation and segregation benefits their food safety management system, as well as the environment and saves costs.

Roche Ireland Ltd.

Roche Ireland Ltd., in Clarecastle, Co. Clare, manufacture active pharmaceutical ingredients. A better understanding of their process dynamics has resulted in the elimination of an intermediate isolation step. This has significantly reduced the amount of solvent and energy used and the amount of waste generated. A non-process example of waste minimisation is that they have moved from a time-based to a condition-based maintenance strategy for all lubricants used on site. This involves regular analysis of lubricants to determine effectiveness, then replacement is carried out as required. For hydraulic oil used in centrifuges alone it has reduced consumption from 1000 gallons/year to 250 gallons every 3 years, i.e. a 92% reduction with a saving of €9,000/year.

Solatrex International Ltd.

Solatrex International Ltd., in Shannon, package watches and clocks from the manufacturing plant for distribution to worldwide markets. They replaced Expanded Polystyrene beads as packaging with shredded office paper. Their customers benefit also, since the overall packaging (cardboard and paper) is now easier to recycle.

Improvements in Energy Usage

Reducing our energy needs is good management. It benefits the environment, and with rising energy costs, benefits business.

Energy management – key points

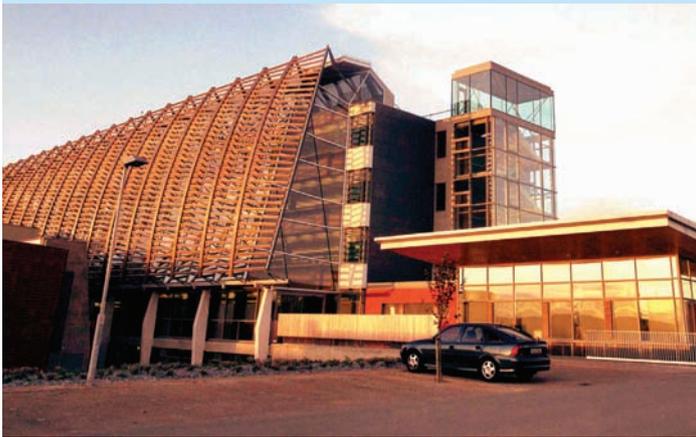
- Avoid the need and losses
- Match supply and use with actual need
- Consider the lifetime cost of purchase and operation
- Monitor performance and target improvements
- Purchase electricity from renewable sources to reduce the environmental impact
- Produce energy on-site at higher efficiency with a combined heat and power (CHP) plant or anaerobic digester
- Use renewable energy sources on site: biomass, wood-chips, solar

Energy sources in Ireland are typically: electricity, gas, or oil. We have been using energy for so long that we take it for granted. Energy-using equipment usually has a long lifetime, so it is worthwhile to pay attention when designing buildings or specifying equipment, maybe paying a bit more initially, but saving more in the longer term. Good design can reduce the need for energy and higher efficiency equipment and controls can pay back in relatively short times. Matching the supply with the expected variations in need should be considered. Monitoring performance by keeping track of usage and bills and by auditing on-the-ground practices will identify losses and provide targets for improvement. On-site supply of energy from renewable sources or by combining heat and power delivery can bring benefits.

As well as powering electronic equipment such as office equipment, energy is used for heating and cooling, providing motion and lighting. Detailed improvement guidelines are available from Sustainable Energy Ireland, but the following table gives an overview:

	Energy Use			
	Heating & cooling	Motion	Lighting	Electronic equipment
Initial specification	Use passive systems for building design Insulate the building and equipment to avoid heat losses or gain	Use high efficiency motors Use electrically powered rather than compressed air devices	Use natural light Match lighting level to task Use high efficiency lighting, e.g. CFLs, reflectors	Purchase equipment with energy saver modes
Control & operation	Match supply with loads (switching) Control temperatures Control air changes Integrate heating & cooling	Match loads with motor or air supply (switching) Use variable speed drives Avoid misuse of compressed air	Use timers, occupancy sensors, daylight responsive control	Activate energy saver modes
Maintenance	Keep boilers and refrigeration condensers clean Check boiler chemicals and refrigerant status	Lubricate equipment Avoid air leaks	Clean housings	
End-of-life	Extend the lifetime of equipment by upgrading it, consistent with maintaining or improving efficiency. When equipment is obsolete, determine if there is a less demanding use or ensure proper component and material recovery. Ensure waste electrical and electronic equipment collectors hold valid permits and take particular care with any hazardous waste.			

When Limerick County Council planned their new County Hall, they designed the building to maximise the use of natural light and ventilation. The new building produces 400 tonnes of carbon-dioxide per annum less than a conventionally designed building.



The Energy Officer in Kerry County Council analysed the Council's own use of electricity. He identified water services as the dominant user, consuming 65% of the total demand. The County Council have progressively introduced high efficiency pumping plant and controls. They have installed their own generators using hydro and diesel power. They are pursuing the installation of Energy monitoring and targeting throughout their larger operations, upgrading building energy efficiency via many cumulative improvements and adopting renewable energy sources where feasible.

The Benedictine Community at Glenstal Abbey installed a heat pump using a local lake as the water source to provide underfloor heating in an extensive new development of the monastery's public facilities, with efficiency, environmental and economical results.



Chapel Lake, Glenstal Abbey.

Improvements in Water Usage

Water is another resource that has been taken for granted. Recent investment in water supply and wastewater treatment must be paid for, leading to rising charges for water use in business. The same improvement techniques as were already discussed for materials apply to water, but experience demonstrates that great savings can be achieved by simply avoiding the unnecessary or excessive use of water. This might require initial measurement to detect excessive use, but a plant tour and staff suggestions can identify easy options for improvement.

Water distribution in the region

The local authorities have been playing their part in conserving water. Limerick County Council established teams in Glin, Patrickswell and Mungret to examine water distribution. They reviewed usage patterns, comparing night and day consumption. They also installed additional meters to improve the knowledge about the system. Using these techniques, they were able to identify areas for further investigation and located and repaired leaks. Typical water savings have been 50%, with associated gains in pumping energy and treatment chemicals. Limerick City Council has undertaken a similar programme. They undertook a preventive maintenance programme to replace piping in areas of high leak risk and conducted an awareness campaign to water consumers.

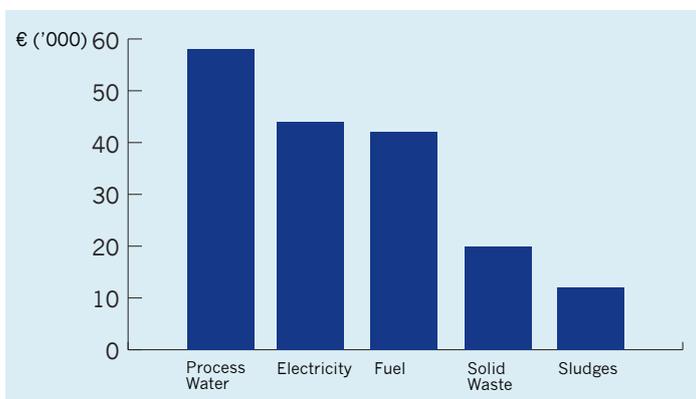
Water management at Essilor Ireland Ltd.

Essilor, a manufacturer of optical lenses in Raheen Business Park, Limerick, have had an environmental programme in place since 1997. Essilor reduced their water bill by 80% from 1995 to 2004, in spite of rising water charges. After auditing their water usage, they set themselves the aim of eliminating water discharge to drain. They achieved a 90% reduction in water use by introducing closed loops in the factory, collecting and recycling water as needed, e.g. separating oil from water. Water is now extensively reused in the plant.

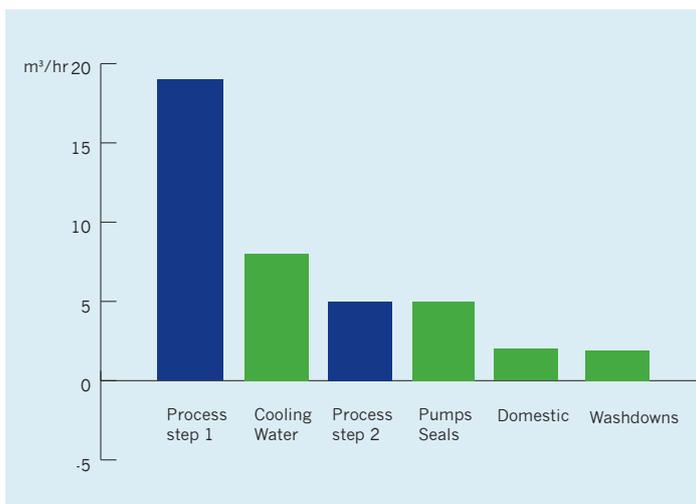
Improvement Planning

Ranking the options

When you have a clear picture of the identity, quantity, value and causes of waste, you want to do something about it! But where do you start? Obviously you want to ensure legal compliance firstly, but after that, cost of current practices and the desire for easy success are useful indicators. You can use a tool called a “Pareto diagram”, which simply ranks the value of usage in decreasing order, e.g.:



From this example it is obvious that process water is the largest cost, followed by electricity and fuel. You can then look at the information on the users of water or electricity, and produce similar, more detailed, diagrams. From these you can “zoom in” on the major consumers.



This diagram details the water users. It shows the process users (in blue) that are difficult to change (in this case) and the others. From this we see that the cooling operation should be examined, followed by the pump seals.

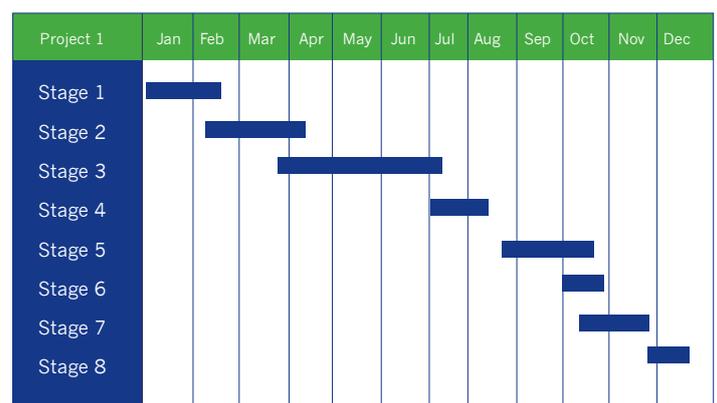
Imagine that after examining the use of cooling water, a number of options have been identified, then a ranking study may be undertaken. This applies a score from 1 (best) to 4 (worst) according to a number of criteria:

Cooling water improvements					
	Payback	Capital cost	Implement	Schedule	Total
A	1	4	2	3	10
B	2	2	1	2	7
C	4	1	1	1	7
D	2	2	2	3	9

From this example, you would implement Option B or C preferably. You can make this more complicated by applying weights to the different criteria. The suggested criteria are only examples, others may be more appropriate for you.

Workplan

Next you must make a plan to achieve the desired improvements. Identify the sequence of changes, when they must occur, how long they will take, and the resources needed. Set targets, both interim and final, to track achievement. Follow the plan to deliver results!



Monitoring Performance

Key performance indicators

Determining the significance of waste, reviewing progress to achieve targets and assessing on-going operations can be greatly helped by using performance indicators. They answer questions like: How important is this waste? How well am I doing?

Measures may be “absolute”, i.e. the actual value is presented, e.g.

Possible measures of actual performance

- Cubic metres of water used per month
- kWh of electricity per month
- kg of waste cardboard per week

However, the real measure of efficiency can be masked by changes in levels of activity, e.g. production rate, number of deliveries, floor area of shop, number of bed-nights in hotel. “Relative” or “normalised” measures take the absolute measure and divide it by a suitable “index”,

Possible indices of activity

- Manufacturing – tonnes of product, total sales, profit
- Offices – number of employees, floor area
- Hotels – floor area, number of employees, number of bed nights

The combination of absolute measure with a relevant activity index gives a truer indicator of the efficiency being achieved, e.g. miles per gallon of fuel.

Possible relative indicators

- Cubic meters of water used per unit of product
- kWh of heating energy per square meter
- kg of waste per kg of product
- Cubic metres of effluent per kg of product
- kg waste per customer
- kg of waste per kg of raw material
- kg recycled per kg of raw material

“A picture speaks a thousand words”, so simple graphs and tables using key measures can summarise a complex situation.

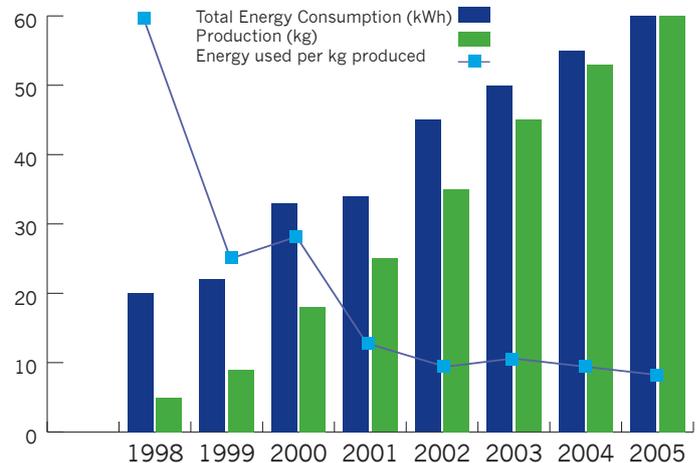


Illustration of absolute measures and relative indicators

Management indicators, such as hours of environmental training per employee, or percentage reduction in energy cost may also be used.

Benchmarks

These performance indicators can be used to compare (“benchmark”) one company’s performance against another, driving standards upwards. They can be used to identify deterioration early or to track continual improvement.

The Irish Hospitality Institute is developing environmental performance in hotels with support from the Environmental Protection Agency’s Cleaner Greener Production Programme. From the hotels they surveyed, they learned that the quantity of waste landfilled ranges from 1.6 kg / sleeper in the best hotel to 5.6 kg / sleeper. This range can be explained by the varying levels of recycling, varying levels of wastefulness and activity due to banqueting at hotels in Ireland. In comparison, the international average is 2.0 kg /sleeper. They also discovered that the cost of water per sleeper is similar to the cost of waste management, but gets much less attention.

Green Purchasing

When you purchase a piece of equipment, you have already had an environmental impact, even before you use it. The manufacture of that product, the extraction of its raw material and its transport have an impact, though maybe in a distant location. At the end of the product's life, recycling may be beneficial for the environment, but only if we buy products containing recycled materials. If we do not – recycling is confined to “segregated disposal”.

- If you purchase an electric motor it will obviously use energy while you use it. You should consider this energy use when making the initial purchase decision. Motors can consume their purchase price in electricity in the first two months of operation. The life cycle cost needs to be assessed. The copper in that motor had to be mined somewhere, followed by smelting and refining into copper wire, even before the motor itself was made.

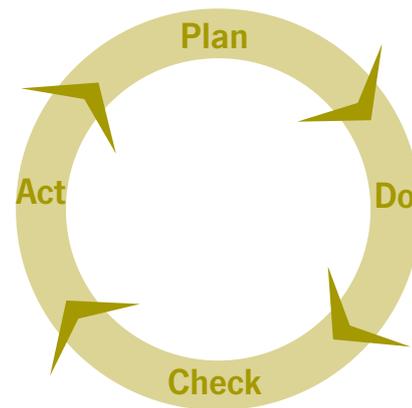
Green purchasing need not be expensive purchasing. If you consider all your costs, you may be able to achieve greater cost efficiencies, for example in selecting high efficiency motors or lighting. Your purchases may have a lot of packaging associated with them – which you must pay to dispose. Specifying returnable packaging or requiring the supplier to take back the packing will avoid this cost.

When purchasing products or services, consider the following:

- Total life cycle cost of ownership
- Possession of a recognised environmental label, e.g. EU Eco Label, Energy Star, German Blue Angel, Nordic Swan
- Energy use
- Recycled material content
- Hazardous substance content
- Use of utilities, e.g. water
- Service materials or components, especially if needed very regularly
- Ease of repair or upgrading
- Supplier's waste management practices
- End-of-life management options

Continual Improvement

Preventing waste is never finished. Business undergoes change, new technologies are developed, new staff have new ideas. You should periodically repeat your review of your activities, seeking new improvements.



An approach commonly used in management systems is called the “Plan – Do – Check – Act” cycle.

- PLAN:** Identify what you need to do, how to do it and when to do it.
- DO:** Carry out your plans or your procedures.
- CHECK:** Have you consistently achieved what you set out to do? Have you identified any shortcomings, corrected them and taken measures to prevent their recurrence?
- ACT:** Do your ambitions, plans and procedures still satisfy your goals? Should they be revised?

Many companies have found it useful to structure their control and prevention of waste in an environmental management system. Some companies have obtained external certification for their system to ISO14001, others are progressing to this in a staged fashion, still others are content to have an “informal” system that addresses the key points without seeking certification. Having a system helps to avoid overlooking some important aspect and makes the environment part of the normal management task. For further information, see Enterprise Ireland's website www.envirocentre.ie, in particular the section on “EMS 4 SMEs”.

Further Information

Further information

This guidebook is a quick introduction to the key points. Much more information is readily available:

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Website: www.managewaste.ie

Local Authorities:

www.limerickcoco.ie
www.limerickcity.ie
www.clare.ie
www.kerrycoco.ie

Other useful websites:

Enterprise Ireland's Envirocentre: www.envirocentre.ie

Lots of information, including:

- Best Practice Guide No. BPGCS003 Resource Loss Mapping
- Best Practice Guide No. BPGCS004 Process Loss Reduction

Race Against Waste: www.raceagainstwaste.ie

They have useful guides relating to waste:

- Small Change – small steps to manage business waste
- Action at work – a guide for large organisations to reduce, reuse and recycle

The Environmental Protection Agency:

www.epa.ie; www.cleanerproduction.ie

ENFO – Environmental Information

Service: www.enfo.ie

Department of Environment, Heritage and Local

Government: www.environ.ie

Sustainable Energy Ireland: www.sei.ie

Limerick Clare Energy Agency: www.lcea.ie

Centre for Environmental Research, University of Limerick, Establishing an Eco-Industrial Network for SMEs in the Mid-West: www.ul.ie/~cer/econet.htm

The National Construction and Demolition Waste Council: www.ncdwc.ie

Hospitality sector guidelines

<http://greentourism.ittralee.ie>
www.greeningirishhotels.ie

Environmental policy examples:

Klinge Pharma: www.klinge.ie/environment.htm

Avocent: www.avocent.com/web/en.nsf/Content/EnvironmentalPolicy_Landing

Roche Ireland Ltd.: www.roche.ie/Safety/Environ.htm

Green purchasing information is available at:

- Handbook on green public procurement
<http://europa.eu.int/comm/environment/gpp/pdf/gpphandbook.pdf>
- Environmental Product database
http://europa.eu.int/comm/environment/green_purchasing
- European Ecolabels
http://europa.eu.int/comm/environment/ecolabel/pdf/public_procurement/pubprocguide_en.pdf

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