

## 4. HAZARDOUS WASTE PREVENTION

### 4.1 Introduction

Waste prevention is central to our national waste policy. While collection, logistics, recovery and disposal are essential elements of any waste management strategy, it is clear that prevention should be a cornerstone, and that considerable resources should be devoted to it.

It is the case that prevention, in many respects, represents a considerably more complex challenge than conventional alternatives, such as disposal. The latter tends to mainly involve technological solutions and logistical arrangements. As such, it can be readily predicted, costed and put in place. Prevention, on the other hand, involves consideration of socio-economic factors including awareness-raising, infrastructural development and culture change. This means that prevention strategies are slower to develop and that the efforts are not visible for a number of years. Their cost is also not insignificant. Between 1986 and 1997, Danish government spending on the promotion of prevention was in excess of £70 million, in addition to the direct investments by Danish companies. However, it is well recognised that prevention can result in cost reductions in the medium and longer term – so that savings can accrue on foot of the investment.

Ongoing work over the past twenty years has highlighted a number of key issues which illuminate the ‘success-factors’ for a prevention strategy. There now exists a clearer understanding of the elements of a successful prevention strategy. Ireland can, and should, use this information in developing its own strategy.

In essence, the model that is developed in this chapter is as follows:

A message (prevention) must be delivered. The target (industry, consumer, agriculture, transport, etc) must receive and understand the message. The efficacy of delivery depends on the *strength* of the message, the *receptiveness* of the recipient, the *proximity* of the messenger and the *ability* of the messenger to deliver it. *Resistance* to the message must be

weakened (and overcome) by awareness-raising and culture change. The contents of the message must be acted upon. This can be enhanced by appropriate incentives (including disincentives not to choose alternatives), and by provision of assistance to effect it.

Three basic requirements of a prevention strategy emerge – education, assistance and incentives. The approach introduced in this chapter is built around these tenets. A prevention programme is proposed which uses all instruments and integrates issues such as demonstration, dissemination, training, assistance, funding, taxation and legislation. The programme requires resources and it may be appropriate that state funding be used to initiate, supplement and enhance the programme.

In 1996, an estimated 327,862 tonnes of hazardous waste was generated and this quantity is projected to increase by up to 48% by 2006. More recent data shows a 12.9% increase between 1996 and 1998 to 370,328 tonnes. This waste and its associated growth presents a number of problems:

- (i) a financial burden on Irish industry;
- (ii) a confidence burden due to the uncertainty of continued disposal routes;
- (iii) a regulatory burden on the authorities;
- (iv) an environmental burden, particularly due to the unreported waste; and
- (v) a burden for succeeding generations, who must manage the consequences of poor current and past practices.

An alternative to the production of much of this waste and the cost of its subsequent management is its prevention.

### 4.2 The benefits of prevention

Implementing a prevention programme will cost money, but it will bring benefits.

#### *Reduced management costs*

The current, and potential future, cost of hazardous waste to Irish business is significant and is

illustrated in this chapter. For the purpose of this exercise, off-site treatment and disposal of waste is estimated to cost approximately £270 per tonne. This figure represents an average cost which currently pertains in the waste management sector. On-site treatment and disposal costs are unknown, but are assumed to be significantly lower at £100 per tonne.

It should be realised that waste costs are recurrent. In addition, growth in economic activity, without associated prevention, results in a growth in waste production. A 4% waste growth per annum has been assumed and a 5% inflation rate from 2000 has been adopted. However, a change in the waste management market, e.g. shut-down of one or more of the small number of key facilities in the EU used by Irish brokers, could have significant effects.

The costs of off-site treatment and disposal are set out in Table 4.1.

In addition, on-site treatment and disposal, which presumably incurs lower costs, may be considered (see Table 4.2).

Also of significance is the quantity of waste currently unreported. Because of its heterogeneous nature, collection costs are likely to be greater. Unreported waste could incur a collection cost of approximately £60 per tonne in addition to a treatment cost of £270 per tonne. At present, this waste is not appropriately managed. This should be remedied. This would have a dramatic financial burden on the relevant sectors if they were paying for this service, as illustrated in Table 4.3.

These costs represent the visible, or direct, costs to business. There are also less visible costs such as management time, liability insurance, raw material costs and the cost of processing raw materials.

#### *Security of disposal*

The export of hazardous waste for disposal may, in principle, be prohibited under EU law. However, as discussed in chapters 3 and 6, we are currently reliant on the willingness of other countries to accept hazardous waste for disposal. The destination of exported hazardous waste changes as national policies and markets change and this

**Table 4.1 Cost of off-site treatment and disposal**

<i>Category</i>	<i>Approximate waste disposed of off-site, tonnes</i>	<i>Current cost per tonne (estimate)</i>	<i>Total annual cost</i>	<i>Predicted annual cost in ten years at 4% waste growth</i>	<i>Cumulative 10-year cost</i>
Reported waste – 1996	31,300	£270	£8.5 million	£19.4 million	£133.4 million
<b>Reported waste – 1998</b>	<b>63,721</b>	<b>£270</b>	<b>£17.2 million</b>	<b>£39.5 million</b>	<b>£271.5 million</b>

**Table 4.2 Cost of on-site treatment and disposal**

<i>Category</i>	<i>Approximate waste disposed of on-site, tonnes</i>	<i>Current cost per tonne (estimate)</i>	<i>Total annual cost</i>	<i>Predicted annual cost in ten years at 4% waste growth</i>	<i>Cumulative 10-year cost</i>
Reported waste – 1996	55,500	£100	£5.5 million	£12.6 million	£86.8 million
<b>Reported waste – 1998</b>	<b>56,298</b>	<b>£100</b>	<b>£5.6 million</b>	<b>£12.9 million</b>	<b>£88.9 million</b>

**Table 4.3 Cost of management of unreported hazardous waste**

<i>Category</i>	<i>Estimated waste produced, tonnes</i>	<i>Current cost per tonne (estimate)</i>	<i>Estimated management cost if it had been collected</i>	<i>Predicted annual cost in ten years at 4% waste growth</i>	<i>Cumulative 10-year cost</i>
Agricultural waste – 1996	32,142	£330	£10.6 million	£24.4 million	£167.4 million
Product waste – 1996	31,043	£330	£10.2 million	£23.5 million	£161.7 million
Extrapolation for non IPC sector – 1996	27,830	£330	£9.2 million	£21.1 million	£144.9 million
Other waste – 1996	6,145	£330	£2.0 million	£4.7 million	£32.0 million
Total unreported waste – 1996	97,160	–	£32.0 million	£73.7 million	£506 million
<b>Total unreported waste – 1998</b>	<b>74,311</b>	<b>£330</b>	<b>£24.5 million</b>	<b>£56.3 million</b>	<b>£387.0 million</b>

highlights our reliance on factors over which we have no control (see for example the *United Kingdom Management Plan for Exports and Imports of Waste*, ref. chapter 6.1.3). The prevention or minimisation of waste will reduce our reliance on international outlets and our exposure to volatile markets.

#### *Competitive advantage*

An additional benefit to business, but one which is more difficult to quantify, is the competitive advantage gained by greater process efficiency and stimulated innovation. There is strong evidence that rigorous air pollution control legislation in Germany provided German industry with the opportunity to develop technologies and services which are now exported. This has been further aided by the adoption of German standards by other regulatory agencies. The Danish government has funded a series of cleaner technology Action Plans. A recent version<sup>4</sup> of these, which refers specifically to products, explicitly states that the plan “will prove a great challenge to Danish trade and industry, as well as affording crucial economic

and industrial policy opportunities”. It states that the “action can only be implemented by active partnership between the business community and the public sector. Conversely, such interaction will consolidate the competitiveness of the Danish business community in future years”. It is apparent that the export of Danish expertise in this field, via their industrial and consultancy firms, is also a significant national income earner.

#### *Reduced environmental impact*

The previous benefits have applied to business, and are visible, though possibly not all recognised. There are also benefits which are external to the business. Hazardous waste which is improperly managed threatens the environment. Abroad, there have been numerous examples of areas which have been blighted by the mismanagement of hazardous waste. Notwithstanding the fact that industrialisation came late to Ireland and hence we do not have problems on the same scale as elsewhere, remediation costs of sites contaminated by hazardous waste are high and the impact on other sectors (e.g. tourism) can be significant.

The production of hazardous waste may be associated with emissions. An operation that is well contained may capture all of its emissions and

<sup>4</sup> Summary: proposal for an intensified product oriented environmental initiative, Danish EPA, March 1997.

therefore have a relatively high ratio of waste to emissions. An operation that is poorly contained may not attempt to capture or abate its emissions and will therefore have a low ratio of waste to emissions. In such a case, examining hazardous waste emissions alone misses the totality of the impact. For example, organic paint residues are hazardous, though there may be little residue in the container. When a paint is used and applied to a surface, all of the solvent in the paint will be emitted to the air. Preventing the hazardous waste residue may be achieved by a material substitution that would prevent the air emission as well.

### 4.3 Prevention objectives

Prevention efforts should be directed to all wastes and emissions produced by a company. Hazardous waste production should be used as a guide to the selection of sectors where progress can be achieved. Particular attention is required to address currently unreported waste. Overall objectives are:

- to develop a prevention ethos in Irish industry and society;
- to increase awareness of the impacts and costs associated with hazardous and non-hazardous waste;
- to avoid cross-media transfer of waste – for example, as a result of the evaporation of volatile wastes to air; and
- to avoid emissions by avoiding the use of substances likely to result in the generation of hazardous waste.

### 4.4 Targets

#### *Background*

There are three principal means of setting targets for the reduction of waste: technical, non-technical or a combination of both.

Technical target setting requires the following:

- a detailed and accurate picture of current waste arisings;
- knowledge of the technologies and practices currently available; and
- experience of applying improved technologies and practices.

In relation to this Plan, it is acknowledged that there is uncertainty in relation to unreported hazardous waste arisings. Until such time as the reporting mechanisms detailed in chapter 3.7 take effect, this situation is unlikely to significantly improve. Secondly, there is no clear picture of the level of hazardous waste prevention practice currently applied. Thirdly, while there are many individual examples of successful prevention efforts in individual companies in other countries, there are few, if any, studies that are solely directed to hazardous waste in firms of a similar size and technological level as exist in Ireland. Countries such as Denmark have a long history of prevention programmes, but have not focused on hazardous waste, and do not have improvement statistics.

Hence there is no clear basis to set and justify targets based on technical experience. It is as valid to demand that it be shown that targets are not achievable as to demand proof that they are achievable. Desire for risk assessment and cost-benefit analysis is valid, but in the absence of data, and the delays and uncertainty in gathering adequate data, application of the precautionary principle must be a significant consideration.

Non-technical target setting requires that a decision be made in relation to the desired target. Such an approach can lead to what is known as “technological forcing” where business is set the challenge to innovate to reach a selected target. There are two elements to the target: the desired prevention quantity and the date of achievement. Adjustment of the latter allows for difficulties in the pace of innovation, while still maintaining the pressure of the set target.

In practice, target setting is based on a number of considerations. A quantitative value may be set, but the timing of its achievement may be adjusted as part of a “negotiation” process between the national government, regulators and the regulated.

There are a number of factors which are recognised as having a potential effect on hazardous waste arisings. The objectives of a prevention programme must be dynamic in order to respond to stimuli beyond its control. Examples of such factors are:

- increased production in the pharmaceutical, chemical and other expanding industrial sectors

is likely to lead to increased arisings of hazardous waste;

- the definition of hazardous waste in EU and national legislation may change again thereby increasing or decreasing the quantity of hazardous waste arisings; and
- availability of waste processing capacity and waste processing costs.

#### *Target recommendation*

National policy emphasises waste minimisation and prevention. However, in establishing prevention targets, it is appropriate that these should primarily apply to hazardous waste which is disposed of. It should be recognised that hazardous waste subject to disposal operations is more likely to cause environmental pollution than hazardous waste subject to recovery operations.

In 1996, 86,754 tonnes of reported hazardous waste were subject to disposal, increasing to 120,354 tonnes in 1998. In 1996, an estimated 98,228 tonnes of unreported hazardous waste were generated and subject to disposal. By 1998, this quantity was estimated to have decreased to 74,311 tonnes. Box 4.1 describes the proposed targets in relation to these categories of hazardous waste disposal.

The targets are ambitious and represent a significant challenge, particularly in view of projected increases in industrial production. Achievement of the targets will require significant commitment to prevention and minimisation on the part of all actors and stakeholders.

The data for 1998 has illustrated significant increases in the generation of hazardous waste since 1996, particularly in the case of reported hazardous waste disposal (an increase of 38.7% was observed between 1996 and 1998). One of the reasons for the increase is rapidly increasing production within the chemical and pharmaceutical industry sectors which are responsible for a large proportion of reported hazardous waste generation. The Agency is optimistic that, notwithstanding increased economic activity across the board, if the prevention programme recommended in this document is implemented fully, then any difficulties faced in achieving the target are more likely to be overcome and the likelihood of

### **Box 4.1 Prevention targets for hazardous waste**

Section 26(2)(b) of the Waste Management Act, 1996 states that the Plan shall “*specify objectives and, where appropriate, targets which in the opinion of the Agency are practicable or desirable in relation to the prevention and minimisation of the production of hazardous waste, the minimisation of the harmful nature of such waste and the recovery or disposal of such waste, over such periods as may be specified.*”

The following targets are proposed in relation to the disposal of hazardous waste:

1. A “standstill scenario” for hazardous waste disposal shall be adopted as a target with 1996 as the base year for that target.
2. The elimination of unreported hazardous waste shall be adopted as a target.

The specific time periods within which these targets are to be achieved shall be agreed with industrial or commercial sectors subject to negotiation with sectoral representatives.

achieving the target increased. While individual efforts have achieved some success, particularly but not exclusively within the IPC licensed sector, there has been no co-ordinated effort towards waste prevention on the part of generators. Successful prevention initiatives on the part of individual companies serve to demonstrate that prevention is possible and, in many cases, that prevention pays.

The following considerations will apply in relation to achieving the target disposal levels:

- It is likely that certain sectors will make significant progress in the reduction of hazardous waste which is subject to disposal. Other sectors will be less successful but, subject to further study and prioritisation (see section 4.7.5 below), identification of appropriate sectors and implementation of prevention programmes will achieve progress towards the achievement of the overall national disposal target;
- The key to achieving prevention is in delinking waste generation from production. This is known as dematerialisation and means that waste volumes may decrease while production volumes increase. It may be possible to analyse trends in



waste generation at individual facilities. These trends may indicate reduced hazardous waste generation relative to product manufactured or productivity.<sup>5</sup> Although little data on the use of such trend analysis exists to date, it is likely that the increased use of this tool at IPC licensed facilities will indicate successful efforts on the part of those generators in preventing hazardous waste.

- Industry and other sectors will need active encouragement in preventing the generation of hazardous waste, particularly where that hazardous waste is currently subject to disposal operations.
- In the short term, the key to reducing dependence on disposal options for hazardous waste is the segregation and reuse, recycling or recovery of that waste. Recovery options may provide financial benefits to companies and reduce waste disposal costs.
- Medium to longer term measures may include material (raw or intermediate) substitution and the adoption of cleaner technologies, both of which should prevent the generation of hazardous waste in the first place.
- In order to provide the necessary assistance to industry in implementing practical changes, the work of the prevention team (see section 4.7.5 below) should be commenced without delay.
- Enforcement of waste management and other environmental legislation is the key to

eliminating unreported hazardous waste. It will be important to ensure that unreported hazardous waste is managed in such a manner as to facilitate the achievement of the standstill scenario for hazardous waste disposal.

#### *Illustration of the scenario*

The following illustration is provided as an example of how a prevention target might be achieved over a seven year period. A varying annual target reduction rate is proposed. This target rate is lower in the early and later stages, reflecting the need to build up the prevention programme, and the increasing difficulty in achieving reduction as the easier options are applied. Table 4.4 and Figure 4.1 illustrate the mechanism whereby a varying annual reduction rate would achieve the prevention target. The illustrations are based on simple projections in hazardous waste generation and disposal to 2008 (using 1998 data as the baseline) and are designed to achieve the “standstill scenario” of 1996 disposal rates. The illustration refers to hazardous waste disposal only.

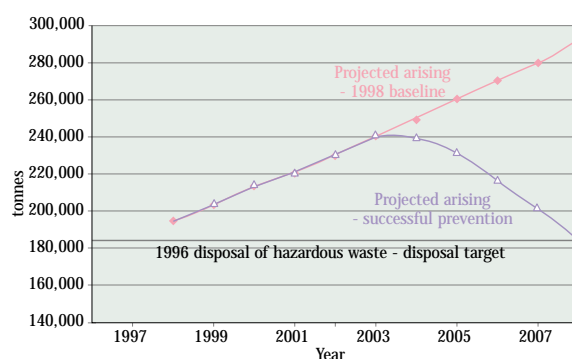


Figure 4.1 Illustration of the effect of prevention targets on hazardous waste disposal

<sup>5</sup> Integrated Pollution Control Licensing. Guidance Note for Annual Environmental Report. EPA 2000.

**Table 4.4 Illustration of annual and cumulative targets representing a “standstill scenario” for hazardous waste disposal**

<b>Year</b>	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Annual target</b>	0	0	4	7	10	10	10	8	0
<b>Cumulative percentage prevention</b>	0	0	0	4.9	13.4	25.1	36.1	46.4	54.1

#### 4.5 Prevention tools and their applicability by sector

A wide range of prevention tools are available. It is necessary to apply several of these, in a co-ordinated and sustained manner to achieve the desired effect.

International experience indicates that a prevention ethos must be fostered if prevention is to be successful. This requires time and a mixture of instruments, which are mutually reinforcing. The key factors are:

- Strong legislation: for example, EPA Act, 1992 and Waste Management Act, 1996. Legislation must be the primary driving force and can be focused on hazardous waste.

- Economic pressures: charges and taxes increase the importance of hazardous waste in management's minds. While legislation can be the initiator, economics can reinforce the move towards prevention.
- Awareness raising: this allows generators of hazardous waste to fully understand both their responsibilities and the possibilities.
- Training and technical assistance: this is essential, particularly for SMEs, but also for larger enterprises.
- Negotiation: firms must be given the "space" to innovate to satisfy objectives set by regulators. This can be done on a firm by firm basis, or on a sectoral or product basis, possibly using voluntary agreements.

**Table 4.5 Tools for the Prevention of Hazardous Waste**

<b>INSTRUMENT</b>	<b>IPC-Licensed</b>	<b>Non-IPC Licensed</b>	<b>Commercial</b>	<b>Domestic</b>	<b>Agriculture</b>
<b>Information-Based Strategies</b>					
Company information/education	●	●	●	○	●
Certification of personnel	●	●	●	○	●
Demonstration - technology	●	●	●	●	●
- methodology					
Company networks	●	●	●	○	●
Benchmark projects	●	●	●	●	●
Product life-cycle assessment	●	●	●	○	○
Environmental Management Systems	●	●	●	○	●
Awards/recognition	●	●	●	●	●
Environmental accounting/reporting	●	●	●	○	●
Public emissions reporting	●	●	●	○	●
Public information/education	○	○	○	●	○
Product labelling	●	●	●	●	●
<b>Incentive-Based Instruments</b>					
Subsidy provision	●	●	●	○	●
Charges	●	●	●	●	●
Taxes	●	●	●	●	●
Marketable permits	●	●	●	○	●
Liability rules	●	●	●	○	●
Environmental agreements	●	●	●	○	●
Technical support	●	●	●	●	●
Procurement policies	●	●	●	○	●
<b>Directive-Based Regulation</b>					
Environmental quality objectives	●	●	●	○	●
Licensing	●	●	●	○	●
Producer responsibility	●	●	●	○	●
Landfill bans	●	●	●	●	●
Specified treatment method	●	●	●	●	●
Substance or product phase-outs	●	●	●	●	●
Substance or product bans	●	●	●	●	●
● - applicable      ○ - not applicable					

#### 4.6 Lessons from elsewhere in devising a prevention programme

Significant experience have been accumulated in Ireland and other countries about what actually works in waste prevention. Too often, initiatives have narrowly focused on one aspect or another of what is now known to be required to conduct an integrated prevention programme. For example, demonstration programmes are a means of promoting good and successful practice but the success of such initiatives alone has not been encouraging. Contact between the companies involved and their consultants has often been too brief for a prevention ethos to be fostered or sufficient knowledge to self sustain a programme to be transferred. Similarly, cleaner production has been flawed by its technology motivated approach. The success of cleaner production initiatives has been restricted by one or other of the following elements:

- a lack of awareness in the company as to what its objectives or reasons for participating are;
- a lack of realisation of the potential benefits;
- competing priorities for time and resources;
- inability to relate to successes in other sectors/regions; and
- suspicion of or a lack of trust in the motives and aspirations of assisting or regulating agencies.

Recognition of the limitations of single initiative approaches has brought about the development of a Sustainable Production Programme ideology. This can be viewed as an ongoing or continuous series of activities based on the learning processes of demonstration, dissemination, assistance and education; the activities must be fostered by an appropriate legislative framework. These instruments and activities result in a culture change which sensitises industry and society at large so that they are more receptive to the prevention ideology.

##### **Demonstration**

Although demonstration projects, of themselves, have not been spectacularly successful, they are recognised as essential elements in the overall process. It is important to realise that, to fulfil their role efficiently, demonstration projects must be:

- adequately funded;
- frequent;
- both sectoral and regional;
- be accompanied by widespread dissemination activities; and
- not be isolated, but be part of an ongoing programme.

##### **Dissemination**

Dissemination is crucial to the success of any programme. The dissemination process should ensure widespread availability of information on:

- successful demonstration activities;
- technical information;
- legislation (present and pending);
- sources of technical and financial assistance; and
- general environmental issues.

##### **Assistance**

In order to ensure success, many companies require assistance. This usually encompasses both technical and financial assistance. Technical assistance can be obtained through the normal consultancy channels, but the use of experts in prevention is optimal.

Typical technical assistance includes:

- prevention opportunity assessments and audits;
- technology identification;
- operational practice review; and
- training.

Financial assistance may be necessary. Smaller companies often have little or no training budget and only weak investment ability. The following financial assistance measures have been applied elsewhere:

- training grants;
- audit grants;
- investment grants; and
- 'soft' loans.

The above financial instruments are exclusive of other fiscal measures such as taxes, fines, etc.



### Education

Some educational measures have been outlined above. Education is an important factor. This includes:

- formal training;
- dissemination of success stories;
- provision of technical information; and
- awareness-raising measures.

## 4.7 The Prevention Programme

A proposed prevention programme is set out in this section. The items listed in the previous paragraphs are viewed as essential components.

A clear delineation can be drawn between two sources of hazardous waste: those generating process waste and those generating product waste. Broadly speaking, two different approaches are recommended for the handling of prevention initiatives relating to the two sources – see Table 4.6.

The generic approaches for the two sources are as follows:

- A Sustainable Production Programme should be initiated for the industrial (manufacturing) and transport sectors. Tools and methodologies exist for the implementation of such a programme.
- Prevention of waste from the other societal segments should be dealt with separately by the use of a range of horizontal instruments including legislative and fiscal instruments. As such, the choice of instruments and decision

making process differs from that of the Sustainable Production Programme.

Prioritisation on certain sectors and/or products is appropriate within either of these approaches such that resources can be focused on prevention initiatives likely to yield the greatest environmental benefit. It is proposed that the responsibility for prioritisation be given to a dedicated prevention team (see section 4.7.5).

### 4.7.1 The Process Waste Programme

The concept of the Sustainable Production Programme has arisen in recent years. The idea stemmed from the understanding that individual activities, such as demonstration projects, were insufficient to stimulate widespread prevention.

Table 4.7 summarises the steps and activities proposed for inclusion in a Sustainable Production Programme. A range of economic and technical instruments and cleaner production options have surfaced over the last decade or so. Each has had limited success, but none on its own has resulted in a self-sustaining regime of sustainable production. Few, if any, utilised a combination of actors (state, private sector and business), far less a combination of instruments. Based on the success or failure of particular aspects of these activities, it is possible to draw up a programme for the establishment of more sustainable prevention activities. As described above, the elements of a Sustainable Production Programme are demonstration, dissemination, assistance and education.

**Table 4.6 Approaches to the Prevention of Hazardous Waste**

<b>Sectors</b>	<b>Characteristics</b>	<b>Approach</b>
(i) manufacturing (ii) transport	<b>process waste</b> ; IPC and non-IPC licensed industry; rail, air, marine and road transport; fleet maintenance, garages; large scale and SME	Develop and implement a <i>sustainable production programme</i> (see 4.7.1 above)
(i) agriculture (ii) households and offices (iii) commercial and industry	<b>product waste</b> arising from product use on farms, in households, commercial and retail outlets and industry	Indirect horizontal measures (see 4.7.2 below)

The costs as set out in Table 4.7 are based on implementation over seven years. The pattern and prioritisation of expenditure will be determined by the prevention team under the guidance of the Implementation Committee (see section 4.7.5).

(The costs presented in the Proposed Plan have been increased to reflect inflation since preparation of the costs in 1999. Data published by the Central Statistics Office show an increase in the Consumer Price Index of 10.4% in the period January 1999 to February 2001 (Central Statistics Office, 16 March 2001). Labour costs in the same period are estimated to have risen in line with national agreements by

17.5%. As many of the costs set out in Table 4.7 are likely to be made up partly of capital costs and partly of labour costs, an average cost increase of 14% has been applied across the board.)

#### 4.7.2 The Product Waste Programme

Product waste needs to be tackled in a different manner to process waste. Products are diverse in function, characteristics and processing requirements and therefore require a different approach. Some of the instruments available for application to long term product waste prevention initiatives are:

**Table 4.7 Elements of a Sustainable Production (Process Waste) Programme**

<i>Activity</i>	<i>Description</i>	<i>Cost</i>
1. Demonstration	Benchmarking in 6 sectors Prevention opportunity assessments in 10 companies per sector Implementation of options <sup>1</sup>	£684,000 £1,368,000 £3,420,000
2. Dissemination	Demonstration success stories Technical bulletins Other prevention information (newsletter) Publicity	£142,500 £57,000 £57,000 £456,000
3. Assistance to all Irish industry	Prevention assessment grants Technical assistance Training grants Investment grants <sup>2</sup> Helpline Sector-specific manuals	£570,000 £570,000 £570,000 £5,700,000 £342,000 £114,000
4. Education	Awareness-raising measures Development and delivery of training courses	£570,000 £1,140,000
Supporting infrastructure <sup>3</sup>		£5,700,000
Additional measures <sup>4</sup> /contingency <sup>5</sup>		£1,140,000
Research and development (industrial and academic)		£2,280,000
<b>Total</b>		<b>£24,880,500</b>
<b>Average annual cost over 7 years</b>		<b>£3,554,357</b>

<sup>1</sup> Grant assistance (50% suggested) for option implementation – estimated at £57,000 assistance per company – i.e. up to 60 companies.

<sup>2</sup> Investment grants for externally approved prevention projects – estimated 100 companies at £57,000 per company.

<sup>3</sup> Staff costs, buildings, information office, overheads, etc.

<sup>4</sup> Arising during course of programme, as a result of advances in technological and sociological thinking.

<sup>5</sup> For changes of policy as a result of (for example) Governmental policy changes.

- product taxes or surcharges;
- awareness-raising campaigns;
- changes in legislation and licensing;
- infrastructural assistance; and
- encouragement of substitution measures.

The use of these instruments should be evaluated on a case by case basis for product wastes. Many of these instruments encourage the collection or improved processing (recovery and disposal) of waste such that the environmental impact of a waste is reduced – in other words, preventing uncontrolled and potentially damaging emissions to the environment.

Product waste is typically generated by consumers (industry, commercial activities, farms and households) who respond to products being placed on the market. It is difficult for consumers to bring about the reduction of hazardous waste or the hazardous nature of a waste generated as a result of the purchase of a product. This is due to two reasons: (a) a lack of awareness of the impact on the environment of certain products and (b) the lack of realistic and affordable alternatives that provide consumers with the choice of switching product. For this reason, if hazardous waste prevention is to be successful, the onus must be returned to the manufacturer or supplier who has the know how and the opportunity to make product changes. The provision of alternatives relies on manufacturers responding to consumer demand.

Funding for a Product Waste Programme can be provided by incentives. Incentives can be given directly to consumers by offering either a choice or a financial incentive (whether positive or negative). Choice is offered by providing consumers with information and ensuring that alternative products exist (see above). Financial incentive may be offered by:

- The establishment of deposit and refund schemes which involve refunding money when the used product is returned (positive incentive).* Such schemes implement producer responsibility obligations and are designed to encourage the return of waste. The product must be appropriately labelled to advertise the scheme and to make the consumer aware of the

additional charge. Broadly speaking, deposit and refund schemes are applicable for such waste types as packaging waste associated with hazardous substances (i.e. containers with residues of pesticide, paint, ink and chemicals), batteries, oil filters and others. Business should be encouraged to voluntarily adopt this approach. In the absence of voluntary agreements, an obligatory take-back scheme should be introduced.

- The imposition of a supplementary charge or tax on the purchase price (negative incentive).* Such a charge should be clearly advertised as being related to the cost of waste management. The funds raised should be allocated towards providing waste management facilities and towards schemes which promote waste prevention (such as training, product development and monitoring systems). An initial level of 5% of the retail value is suggested. Such charges or taxes should be considered only where a deposit and refund measure is not appropriate because where there is no refund, the user is not being encouraged to return the waste. Surcharges and taxes may be applicable for such waste types as pesticide active ingredient, motor or lubricating oil and solvent based paints.

The outline of a programme for the prevention of hazardous product waste is illustrated in Table 4.8. The costs are estimated based on experience in other countries. The most important elements are public and producer awareness campaigns.

(As above (see page 48), the cost data, which was previously presented in the Proposed Plan, has been increased across the board by 14% to reflect inflation since 1999).

#### 4.7.3 Net cost of prevention programmes

The costs for both programmes is shown in Table 4.9.

Clearly, the cost of these programmes is significant but it should be seen in the context of the cost of disposal. Tables 4.1 and 4.2 indicate that the cumulative cost for the disposal of *reported* hazardous waste between 1998 and 2008 could be £360 million. By 2008, the annual cost to industry

for the disposal of reported hazardous waste is projected to be £52.4 million per annum compared to £22.8 million in 1998. All things being equal, any reduction in the quantity of hazardous waste will decrease the cost of hazardous waste management.

As collection rates improve, recovery and disposal costs will be incurred for unreported waste. Table 4.3 illustrates the estimated costs associated with the recovery and disposal of unreported hazardous waste.

The cost should also be considered in comparison with the scale of investment made in other countries (for example, Denmark, £70M), as outlined earlier.

#### 4.7.4 Implementation requirements

The two elements of the prevention programme (*Sustainable Production Programme* and *Product Waste Programme*) as set out above will require dedicated, adequately funded and long term

commitment if they are to be successful. The requirements of an implementation programme are:

- to prioritise initiatives and allocate funding and resources to them;
- to initiate, co-ordinate and manage initiatives; and
- to promote the philosophy and benefits of hazardous waste prevention.

To this end, two implementation requirements are identified: expertise and funding.

#### 4.7.5 Expertise

It is recommended that expertise be allocated at two levels. On the first level, it is recommended in chapter 9 of this document that an Implementation Committee be established to oversee the implementation of the Plan. It is envisaged that a major role for the committee would be in evaluating and steering hazardous waste prevention initiatives.

**Table 4.8 Elements of a Prevention Programme for Product Waste**

<i>Activity</i>	<i>Annual Cost</i>	<i>Total Cost</i>
Public awareness campaign	£1,140,000	£7,980,000
Producer awareness campaign	£ 285,000	£1,995,000
Technical assistance, product re-design	£ 285,000	£1,995,000
Technical assistance, training	£ 114,000	£ 798,000
Investment grants	£ 114,000	£ 798,000
Supporting infrastructure	£ 205,200	£1,436,400
Research and development	£ 342,000	£2,394,000
Contingency	£ 171,000	£1,197,000
<b>Total</b>	<b>£2,656,200</b>	<b>£18,593,400</b>

**Table 4.9 Prevention programme costs**

<i>Activity</i>	<i>Annual Cost</i>	<i>Total Cost</i>
Sustainable Production (Process Waste) Programme	£3,554,357	£24,880,500
Product waste	£2,656,200	£18,593,400
<b>Totals</b>	<b>£6,210,557</b>	<b>£43,473,900</b>

In order to provide information to the Implementation Committee for its consideration, a core 'prevention team' of technical experts should be established with the following functions:

- prioritise and target industrial sectors, specific materials and products;
- propose options for prevention, minimisation and cleaner technology programmes in prioritised sectors;
- liaise with regulators and generators (industrial, commercial, agricultural and consumer groups) for the establishment of initiatives and voluntary agreements;
- liaise with agencies, statutory bodies and other national and international organisations relevant to waste prevention;
- advise on and play an active role in all future grant aid awards and research projects relating to waste prevention and minimisation;
- conduct research into the factors which stimulate or inhibit the implementation of waste prevention – for example, socio-economic factors and generator-regulator relationships;
- implement prevention, minimisation and cleaner technology initiatives, including:
  - benchmarking,
  - opportunity assessments,
  - identification of best practice,
  - training,
  - demonstration projects, and
  - dissemination of information, lessons and successes;
- provide direct advice and support on hazardous waste prevention and minimisation in prioritised and non-prioritised companies and sectors, including:
  - sector and company specific assessments and training,
  - a help-line support service, and
  - sector specific manuals;
- develop information campaigns focusing on environmental and financial aspects of hazardous waste management, including the marketing of a prevention strategy as a viable and desirable business practice;
- advise on the establishment of waste clubs and networks;
- provide general advice and training on hazardous waste prevention and minimisation; and
- prepare an annual report on the progress of hazardous waste prevention and minimisation initiatives.

The proposal for such a core of expertise is not a new one. The Department of the Environment published a discussion document in 1993 on the promotion of cleaner manufacturing technologies which recommended the establishment of a Cleaner Industry Co-ordination Unit which “would be created as a focal point and source of co-ordination for the framework and supporting programmes” relating to cleaner technology.

The functions of the proposed prevention team are not simply to oversee the accounting of any subsidies, or to disseminate technical results, but more importantly to motivate all the parties involved, to implement the prevention activities (i.e. “do the work”), to seek multiplier effects and attempt to build a prevention ethos that will continue after specific projects have concluded. A dynamic, coherent team is required. This cannot be achieved by a disparate set of individuals or activities which are subject to a co-ordination function. A “core of expertise” is required. The desired attributes are:

- prevention expertise and experience;
- experience in handling prevention projects in a range of firms;
- proven experience in international networks of prevention (to bring best practice rapidly to Ireland);
- multi-faceted experience: technological, socio-economic, research, promotional, training and educational;
- the capability to build trust with individual firms; and
- a local or regional presence.

From the point of view of the above list of attributes, it becomes obvious that the characteristics required are not currently at one location but do already exist, at least in part, though distributed between:

- the Environmental Protection Agency (technical expertise, co-ordination of measures);

- local authorities (location, knowledge of local conditions);
- Government departments (oversight of local authorities and central funding, technical expertise, co-ordination of measures); and
- prevention support providers – such as the Clean Technology Centre at Cork Institute of Technology (prevention and information expertise).

It is likely that a team of at least sixteen people would be required to effectively manage a Prevention Programme. Individuals would be required to have technical expertise, public information expertise and industrial liaison expertise. A total salary cost of approximately £5.7 million is estimated for seven years work.

A partnership model is considered to be most appropriate, between organisations with the appropriate prevention expertise and state organisations with statutory functions, with an additional objective of empowering local authority personnel through training and participation in projects. It may not be necessary for all members to be part of a single organisation. In using different organisations, it may be desirable to develop and retain dedicated personnel in the organisations to which their respective roles in a prevention team relate.

The prevention team should be either established as a stand alone body with responsibility to the Government or established as a unit within an existing organisation (such as the EPA, a Government department or other State body). If members of a prevention team are situated at more than one location, individual roles and responsibilities must be clearly defined and unambiguous lines of communication clearly established.

The establishment of a prevention team will require early allocation of resources to recruit and develop personnel whose prime objective is waste prevention. Funding options are discussed in following sections.

Just as it is desired to achieve a multiplier effect within industry, a multiplier effect should be desired with the facilitators. In time, the local

authorities will be better equipped to undertake the prevention role at local level and it is desirable that responsibility would be devolved as levels of expertise increase. As described above, one way to facilitate this is to allocate personnel to work within the local authority areas where the largest generators of hazardous waste are located. Local authorities are in many instances best placed to deal with and develop expertise in the management and prevention of small scale hazardous waste arisings in their functional areas. Any initiatives proposed by local authorities in this context should be developed within the scope of this Plan and its subsidiary programmes.

#### **4.7.6 Regulatory support towards waste prevention and recovery**

The Waste Management Act provides for the use of mechanisms and economic instruments which may be employed in achieving the prevention and recovery of waste and for the making of targets in respect of waste prevention. These sections of the Act may provide the legislative support which may be necessary to ensure the achievement of prevention targets specified in Box 4.1 within agreed time periods.

##### *Prevention*

Section 28 of the Waste Management Act provides regulatory support for the prevention of waste. Section 28(1) allows for local authority and Government support or assistance, including funding, to be made available for prevention projects. Sub-sections (2), (3) and (4) provide for the making of regulations towards steps to be taken or tools to be employed in achieving the prevention or minimisation of waste. Sub-section (5) provides for regulations which may impose compulsory prevention targets.

##### *Recovery*

Section 29(2) of the Waste Management Act allows for local authority and Government support or assistance, including funding, to be made available towards projects which aim to promote or achieve the recovery of waste. Sub-sections (3) and (4) provide for the making of regulations towards steps to be taken or tools to be employed towards achieving such recovery.



#### 4.7.7 Funding

Prevention will result in a cost saving to industry. This cost saving should be used to fund prevention programmes so that the Prevention Plan is cost neutral. However, experience in Europe and in Ireland has shown that companies are hesitant about investing in prevention. This is particularly true for those companies with little previous exposure to a prevention ideology. Successful demonstration with widespread dissemination will be necessary before substantial voluntary investment by industry can be expected. Whatever about company-specific investment in cleaner and innovative technologies, there is little prospect of funding by industry for a national programme which incorporates training, demonstration, information, auditing and technology assessment.

The achievement of the recommended “standstill scenario” target for hazardous waste disposal will require funding if the initiatives and programmes proposed in this document are to be implemented. There are two potential sources of funding – government (central and local) and industry. In principle however, the Prevention Plan should be self-financing as far as possible. Potential options for funding include:

- a) a tax to be imposed on each tonne of hazardous waste subject to disposal;
- b) a direct levy on industry/producers/distributors based on hazardous waste production and/or material consumption;
- c) Government funding either from existing revenue or from additional sources of revenue; and
- d) a combination of Government and industry funding.

Government funding would require a long term commitment to the objectives of a prevention programme. Government funding is likely to be required for certain aspects of the Prevention Plan, particularly those concerned with household hazardous waste. However, government funding may not satisfy the polluter pays principle (see chapter 2.3). It is anticipated that the Waste Management (Amendment) Bill 2001 will provide for the establishment of an Environmental Fund. This fund may be used for implementation of the

National Hazardous Waste Management Plan.

Recent government funding of the Cleaner Production Pilot Demonstration Programme amounted to £1.7 million of which 41% was EU sourced. It is appropriate to again refer to Danish government spending on the promotion of waste prevention which amounted to £70 million between 1986 and 1997 as a benchmark of what is required.

It is proposed that funding be used for:

- a) financing the sustainable production and prevention programmes set out in Table 4.7 and Table 4.8. It is envisaged that technical and financial assistance will be extended to industry over the life of the programmes; and
- b) financing the prevention unit and Implementation Committee for the implementation of prevention measures.

As stated earlier, the required funding for these initiatives is £43.5 million over 7 years. It is essential that funds be allocated for the promotion of hazardous waste prevention and for its implementation. In the absence of adequate funding on initiatives for the prevention of hazardous waste, the prevention targets will not be achieved.

#### 4.8 Key decisions

Hazardous waste costs money and poses a risk to the environment. Increasing hazardous waste production costs more money and causes increased risk. Prevention is a viable alternative with financial and environmental benefits. Previous attempts to prevent waste in Europe have concentrated on a narrow, technological focus, failing to achieve continuous improvement. The alternative approach, drawing on lessons learned in Ireland and elsewhere, of a clearly focused Prevention Programme is recommended. This requires an integrated set of measures including enforcement of legislation and support for waste producers via capital assistance, technical support, training and education.

A key element in this programme is the source of money to fund prevention initiatives so that the target “standstill scenario” for hazardous waste

disposal may be achieved. Two principal options are available: government funding and industry funding. In practice, a combination is likely to be most practicable.

The prevention programme set out in this chapter is one way of achieving the required levels of prevention. Other prevention options were considered during the preparation of the Strategy Study Report and are detailed therein. A prevention programme should be dynamic and should be reviewed and developed as levels of knowledge and expertise increases.