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WASTE MINIMISATION PROFILES OF OECD MEMBER COUNTRIES

Contact: Henrik Harjula, Tel: (33-1)45249818, Fax: (33-1)45247876
E-mail: henrik.harjula@oecd.org; website: www.oecd.org/env/lists4.htm

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FOREWORD

The overall objective of the OECD's 1996-97 Waste Minimisation Work Programme (WMWP) was to evaluate and propose policies for closing material cycles, and to assess policy options meant to reduce the dependence of waste generation on economic activities. The purpose of Project 1 of the WMWP, the results of which are reported in this document, was information sharing on the status of waste minimisation in OECD countries and a review of national experiences with meeting the targets that had been set.

A number of other documents describe waste minimisation efforts at the OECD level and in individual Member countries. However, the information in these documents differs widely with regard to level of detail and timeliness. In order to obtain an overview of current national waste minimisation definitions, concepts, strategies, instruments and experiences, a comprehensive survey was carried out. A detailed questionnaire developed for this purpose was sent to national authorities responsible for waste minimisation. The survey results, which provide an overview of waste minimisation in 21 OECD countries as of mid 1996, are summarised in a companion volume, *Waste Minimisation in OECD Member Countries* [ENV/EPOC/PPC(97)15/REV2].

Detailed profiles of 18 countries have been created for this document, based on the survey responses. Available resources did not allow the elaboration of additional profiles.

The original draft of this document was prepared by the German consulting firm of Lahmeyer International, whose project team consisted of Hans-Joachim Hampel, Bernhard Rasch and Andreas Schlüter. Their work was financed by the German government, which also hosted the OECD Workshop on "Building the Basis for a Common Understanding on Waste Minimisation" in Berlin in October 1996. The final draft was produced within the OECD Secretariat by Laurent Renevier. This document has been prepared for publication with the assistance of a consultant, John Smith.

Delegates to the Pollution Prevention and Control Group have had the opportunity to review all the information presented and have agreed that it should be de-classified. This document is published on the authority of the Secretary-General of the OECD.

TABLE OF CONTENTS

FOREWORD2

GENERAL LIST OF ACRONYMS4

AUSTRALIA5

AUSTRIA17

CANADA32

DENMARK48

FINLAND59

FRANCE70

GERMANY82

ITALY102

JAPAN110

KOREA121

THE NETHERLANDS131

NEW ZEALAND143

NORWAY153

SPAIN164

SWITZERLAND176

TURKEY187

UNITED KINGDOM195

UNITED STATES208

GENERAL LIST OF ACRONYMS

CD	Construction and demolition (as in "CD waste")
CT	Clean technology (ies)
EMS	Environmental Management System(s)
EPS	Expanded polystyrene
EPR	Extended Producer Responsibility
HDPE	High density polyethylene
IPCC	Integrated Pollution Prevention and Control
MSW	Municipal solid waste
NGO	Non-governmental organisation
PBT (or PBTB)	Polybutylene terephthalate
PCB(s)	Polychlorinated biphenyls
PCT(s)	Polychlorinated terphenyls
PET	Polyethylene terephthalate
PPCG	Pollution Prevention and Control Group (OECD)
PR	Public relations
R&D	Research and development
SME	Small and medium-sized enterprise(s)
UNEP	United Nations Environment Programme
WEEE	Waste (of) Electrical and Electronic Equipment
WM	Waste minimisation

AUSTRALIA

Contact person

Mr. Rosh Ireland
 Environment Australia
 Environmentally Sustainable Industry Branch
 Waste Minimisation Section
 Tourism House, 40 Blackall St.
 Barton ACT 2600

Tel: 61-2-6274-1659
 Fax: 61-2-6274-1640

Acronyms

ANZECC	Australian and New Zealand Environment and Conservation Council
AWD	Australian Waste Database
IWRAs	Industry waste reduction agreements
NEPM	National Environment Protection Measure
NPI	National Pollutant Inventory

1. Definitions, terms, concepts, and target-setting

In Australia there is **not a formal definition of waste minimisation in Federal law**. Nevertheless, some Australian States/Territories have definitions of waste minimisation in their State/Territorial legislation or mandatory documents. Waste minimisation stands for the reduction of waste amount and waste toxicity.

The **scope of waste** does not include radioactive waste, mining waste, dead animals, agricultural waste, or discarded explosives. Waste minimisation measures are not applied to liquid wastes or sewage sludge, which are handled under other arrangements.

Waste minimisation means influencing consumption patterns, implementing clean technologies, product design and recycling, re-use and recovery (on- and off-site), and incineration with energy recovery. According to the general understanding and usage of the term, incineration, treatment and landfilling are not waste minimisation measures.

The **hierarchy of waste minimisation measures** is laid down in the National Waste Minimisation and Recycling Strategy (1992). According to this voluntary programme:

- Waste prevention has priority over waste reduction;
- Waste reduction and re-use have priority over recycling;
- Recycling within the same production process has priority over recycling in other processes;
- Reduction of quantity has priority over the reduction of waste toxicity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

This hierarchy is not legally defined. However, it is generally applied for waste disposal throughout States and Territories.

Australia's **waste minimisation priorities** for waste streams and industrial sectors are shown in the following table. Criteria indicate why these priorities/targets have been set.

Waste minimisation priorities	Targets	Criteria
Waste streams: Green waste CD waste Commercial, industrial and institutional waste (post-industrial packaging and office waste) Post-consumer packaging Waste paper	Material-specific targets or detailed arrangements for waste reduction	Negotiation of voluntary industry waste reduction agreements on an industry-by-industry basis
Industrial sectors: Construction and demolition industries Industries generating post-industrial packaging and office waste	See above	Negotiation of voluntary industry waste reduction agreements on an industry-by-industry basis

2. Political and administrative responsibilities

National institutions	Tasks and responsibilities
Federal government, Environment Australia	Setting of priorities, participation in enactment of laws (scope is limited), strategic planning, approval and control, scientific support, information and public relations, international co-operation, statistics
Australian and New Zealand Environment and Conservation Council (ANZECC)	Setting of priorities, strategic planning
National Environment Protection Council	Strategic planning

Australia has a federal political and administrative system. States and Territories have their own governments and legislation.

Waste minimisation priorities, e.g. key waste streams and measures, and strategic planning are determined mostly by the **Australian and New Zealand Environment and Conservation Council (ANZECC)**, a non-statutory council of Australian and New Zealand ministerial authorities at the Federal, State and Territorial level. The enactment of laws for waste minimisation is carried out primarily at the State/Territorial level. The Federal government has responsibility for inter-regional and international environmental issues. It provides policy leadership and co-ordination across all levels of government.

Approval and control are primarily carried out at State and Territorial level. Local governments and municipalities have direct responsibility for the collection and disposal of wastes. Approval, control, operation of disposal facilities, and information services are additional tasks.

3. Waste legislation

In Australia there is separate waste legislation, laid down in the 1989 **Hazardous Waste Act** (regulation of exports and imports). The States and Territories have the major constitutional responsibility for environmental management, which includes regulation on waste minimisation and waste management.

On the national level there is no waste stream-specific legislation. Some Australian States/Territories have such legislation.

In the future, Australia will develop and improve its system of legal regulations on waste minimisation. The following approaches will be pursued:

- establishing legislation to enable the implementation of the **National Pollutant Inventory (NPI)** ;
- reaching **voluntary industry waste reduction agreements (IWRAs)** through the ANZECC, in order to establish national consistency in regard to waste minimisation measures; and
- introduction of higher land fill disposal fees to reflect the user-pays principle.

4. Key instruments

a) Plans and programmes

Australia has set up a wide variety of mandatory and voluntary plans and programmes, including voluntary agreements with industry on waste reduction. These plans and programmes are set up on the national, territorial and municipal level. They cover MSW, hazardous waste, key industrial sectors, key waste streams and products, R&D, information, and enforcement control. Plans and programmes established by Federal units have a voluntary character only.

In general, plans and programmes are regarded as important priorities. Those on the municipal or local level pertaining to MSW are regarded as most important, whereas the areas of R&D and consultancy are reported to have "average" priority.

<p>Plans and programmes – selected examples</p>	<p>1) National Waste Minimisation and Recycling Strategy (1992): Set up by the Commonwealth Environment Protection Agency, this voluntary programme contains national waste management and minimisation strategies and lays down a hierarchy of waste management priorities. There is a definition of objectives and actions for specific waste streams. Target is 50% reduction of waste going to landfills (baseline 1990 per capita level); some States have adopted tighter targets. Programme includes National Kerbside Recycling Strategy and the National Packaging Guidelines.</p> <p>2) ANZECC Industry Waste Reduction Agreements (IWRAs, 1991-ongoing): Voluntary agreements for industries/sectors to reduce the amount of waste going to landfill. Relevant for construction and demolition industries, packaging and paper industries, and industries which produce post-industrial packaging waste, office waste and organic waste. ANZECC and industry are examining ways to develop IWRAs (industry waste reduction agreements) and guidelines for the industry as a whole.</p> <p>3) Waste Wise Construction Programme (1995): Target groups are building and demolition contractors, building suppliers, and recyclers. Programme is voluntary at the national level. Key companies prepare waste reduction plans which become part of their operational procedures. Some States have established mandatory legislation with action plans.</p>
<p>Experience/ effectiveness</p>	<p>In general, the voluntary approach has been very successful to date. Industry has generally met and, in some cases, exceeded material recycling targets.</p> <p>2) Agreements currently being negotiated or underway. Acceptance is generally high, dependent on industrial sector. Costs vary according to voluntary actions proposed by industry. Increased trading advantages and new markets for secondary raw materials were created. Industry compares voluntary agreements to otherwise enacted legislation.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>Development of an organic waste strategy and of a National Environment Protection Measure (NEPM) on waste minimisation. Review of Federal government codes and purchasing policies to remove barriers to the use of recycled materials. Development of IWRAs (industry waste reduction agreements) for packaging, including packaging paper, aluminium, glass, steel, liquid paperboard (i.e. coated paperboard for beverage packaging) and plastic, and other key wastestreams.</p>

b) Mandatory instruments

Australia does not apply legally defined technical standards to support waste minimisation. However, ANZECC intends to define technical standards, codes and guidelines in such a way that barriers to using recycled materials can be overcome. **Standards for recycled paper and biodegradability** have been set by **Standards Australia**. A standard on compost was being formulated at the time of the survey. These standards do not have legal status unless adopted as part of a Federal or State/Territory law.

Production bans to support waste minimisation have not been enacted, but **product restrictions** are applied. They can be found in the form of deposit-refund schemes only in South Australia.

All States and Territories have established approval processes to which all facilities for landfill construction are subject. In this way, the development of landfills in certain areas is prohibited.

<u>Bans and restrictions</u> – selected examples	<p>1) Landfill bans: States and Territories have the power to introduce legislation banning the landfilling of specific types of waste. For example, several States ban the disposal of whole tyres at landfills.</p> <p>2) Container deposit legislation in South Australia (1979): Deposit-refund for beverage containers.</p>
Experience/ effectiveness	2) Deposit scheme is successful. Cans have disappeared from the waste stream. Return rates are on “average” above 80% for all types of containers. All types of beverage containers should be included in the deposit legislation.
Is stronger application foreseen?	Depends on progress and outcomes of voluntary action. Governments have not ruled out instruments and legislations should they be necessary.
Miscellaneous	No application of Extended Producer Responsibility schemes.

c) Economic instruments

There are **taxes and duties** on waste which is landfilled (in some States only).

Financial aid programmes and economic incentives have been established. Financial aid is given for R&D, pilot plant design and construction, development of clean technologies, and consultancy services. Incentives are used to promote the marketing of recycled goods.

Financial aid is granted by Federal, State and Territorial governments, municipal administrations, and industry. It can take the form of subsidies, grants/funding, and tax concessions. Governmental institutions, universities and research institutions, facility operators, and industry apply for financial aid.

<u>Financial aid and economic instruments – selected examples</u>	1) Sale tax exemption for 100% recycled paper (1990-1995): Was applied to 100% recycled paper in order to stimulate demand for recycled paper products. Tax was abolished in 1995
Experience/ effectiveness	In general, financial support programmes have been successful.
Is stronger application foreseen?	YES Various instruments are under examination. The goal is to develop new markets for recycled materials.

d) Suasive instruments

Australia has established information services for private households and industrial waste producers. Information systems and databases are available on state-of-the-art waste disposal technology. Public authorities run pioneer projects that serve as examples. Market facilities are in operation for trading recycled goods and end-of-use products.

Australian companies use Environmental Management Systems, including environmental reporting and waste balances. Eco-labelling systems have been established.

<u>Information provision and public relations – selected examples</u>	<p>1) Implementation of the National Pollutant Inventory (NPI) through ANZECC: The NPI scheme includes transparent public nomination of chemicals to be reported, with community access to all information. The scheme was being discussed at the time of the survey and its implementation was being prepared.</p> <p>2) Australian Waste Database (AWD): Contains data on waste disposal; recycling to be integrated in future.</p> <p>4) Clean Up Australia (Clean Up the World) Programme (1996): Action programme initiated by Australia and organised in conjunction with UNEP activities worldwide. The programme targets towns, communities and individuals wanting to improve their natural environment. A two-day action campaign was to be carried out in September 1996.</p>
Experience/ effectiveness	<p>Monitoring and information gathering is problematic for isolated rural and smaller urban regions.</p> <p>2) Sound informational basis for waste minimisation decisions.</p>
Is stronger application foreseen?	YES Further development of information processes is required. Assessment of national co-operative policies and programmes. Improving monitoring to enable better reporting and policy evaluation.

<p><u>EMS, environmental reports and eco-labelling – selected examples</u></p>	<p>1) Australian Manufacturing Council (1992): Best Practice Environmental Management: The Council set up this management tool and recommends it to companies. Included is the establishment of comprehensive Environmental Management Systems which incorporate waste management principles.</p> <p>2) The Australian Chemical Industry Council (1992): Establishment of the Responsible Care Programme, which includes a waste management code of practice.</p> <p>3) Environmental Management Systems/waste reports: Applied by industry as part of industry waste reduction agreements.</p>
<p>Experience/ effectiveness</p>	<p>In general, regarded as effective.</p> <p>Product labelling has improved the rate of recycling of packaging waste, as part of increasing consumer awareness.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>Eco-labelling will be considered, together with national voluntary agreements with industry.</p>

e) Conclusions

All activities in favour of waste minimisation are predominantly handled by the States and Territories, with co-ordination and leadership from the Federal government. Voluntary plans and programmes have a high priority with the Federal government. Decision-makers show a preference for a co-operative national approach based on voluntary agreements with industry. At the national level, voluntary reduction through producers accepting shared responsibility for waste minimisation is preferred.

States and Territories support these national approaches and plans. However, their governments do not rule out legislation or other controls if objectives formulated in the Federal plans are not met.

In Australia no single governmental level is responsible for nation-wide waste minimisation. The success of activities depends on a partnership between all levels of Federal, State/Territorial and local government, business, industry and the broader community working together.

The Federal government defines national strategies and encourages a consistent approach to policy and regulation, in order to reduce market distortions through different regional practices.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsandother NGOs	Wastedisposalindustry
Basicposition onwaste minimisation	Stronglysupportiveof voluntaryprogrammesand suasiveinstruments; resistancetomandatoryand economicinstruments	Supportive	Stronglysupportive	Strongresistanceto mandatoryandeconomic instruments;neutralon suasiveandvoluntaryones
Participation inwaste legislation obligatory?	YES Applicableinsome States/Territories	Notapplicable	NO	NO
Support ofwaste minimisation by	Industryandbusinessesuse productadvertisingandPR campaignstosupportwaste minimisationefforts. Industrialassociationsoffer informationandconsultancy servicestoindustry.	Consumers' willingness to changeconsumption behaviourisconsidered "average";good acceptanceofexisting recyclingfacilitiesand homecomposting. Separatecollectionof wasteisnotmandatory; voluntarycurbside recyclingprogrammeshave provensuccessful.	Contributiontothe developmentof IWRAs(industry wastereduction agreements) Informingthepublic andpoliticians	Promotionofrecycling technologies
Hindering ofwaste minimisation by	Verystronglobbyingcan occur;voluntaryagreements havebeendelayeddueto inconsistencyofactionsat Statelevelwiththenational approach.	Landfilldisposalfeesare unpopularandhave increasedillegaldumping	None	Someresearchprojects sponsoredbyindustryand associatedresultsare questionable
Influenceon wasteminimisation/ overall contribution	50% "Major"contribution	40% DiffersfromStatetoState	5% "Medium" contribution	5% "Medium"contribution
Isstronger influence foreseen?	YES Furtherdevelopmentof industrywastereduction agreements(IWRAs)and reviewofexistingones	YES	YES Betterinformation onobjectivesand targets;influencing publicawareness	YES Stakeholderconsultations onwastelegislation

6. Key products and waste streams

Past	Present	Future
Post-consumer packaging (paper, steel, aluminium, glass, plastics, liquid paperboard ¹)	Post-consumer packaging (paper, steel, aluminium, glass, plastics, liquid paperboard ¹)	Post-consumer packaging (paper, steel, aluminium, glass, plastics, liquid paperboard ¹)
Old newsprint	Old newsprint	Old newsprint
	Green organic waste	Organic waste
	CD waste	CD waste
	Commercial and industrial waste (post-industrial packaging and office waste)	Commercial and industrial waste (post-industrial packaging and office waste)
Tyres and oils	Tyres and oils	Tyres and oils
End-of-life vehicles	End-of-life vehicles	End-of-life vehicles
White goods	White goods	White goods

¹ Coated paperboard used for beverage packaging

These priorities were laid down in the agenda of the tenth meeting of ANZECC, November 1995.

Australia provided specific information concerning its waste minimisation policies for three key wastestreams: **wastepaper** , **CDwaste** ,and **packagingwaste** .

	Wastepaper (oldnewsprint)	CDwaste	Packagingwaste
Reasonsforpriority	Quantity;scarceresources; economicreasons;landfill spacespared	Quantity;CTavailable; scarceresources;economic reasons;landfillspaceis spared	Quantity;toxicity;CT available;scarceresources; landfillspaceisspared;the publicexpectsactivitiestobe undertaken,asthisisavery visibleformofwaste
Wasteminimisation target	Reductionofamounttobe landfilled;improvedsource reductiontechnologies 40%recyclingratefor newsprint;71%ofinputfor manufacturingpaper packagingshallbe secondaryfibre	Reductionofamounttobe landfilled;recycledmaterial tobere-usedforbuilding material	Reductionofamounttobe landfilled(50%lessrequiring disposalin2000,withbaseline of1992);recyclingand involvementofcommunities; improvedsourcereduction technologies Recyclingratesby1995:25% (plasticcontainers),45% (glass),65%(aluminium cans),40%(steelcansby 2000),20%(coated paperboardforbeverage pakaging,or“liquid paperboard”)
Instrumentsand measures	Plansandprogrammesand suasiveinstruments	Plansandprogrammes (industryagreementwith federalgovernmentto reduceCDwaste drastically);suasive instruments;criteriaforuse ofrecycledmaterials	Plansandprogrammes (nationalvoluntaryindustry wastereductionagreements); suasiveinstruments
Successandfailure; experience	Instrumentswereeffective; demandforpaperwith recycledcontentincreased; industryrespondedwith morede-inkingand recyclingplantswhen confrontedwithUSrecycled contentregulations; economicfactorshindered increaseinrecoveryrates; nonewinitiativesare planned,asprogresshas beensatisfactory.	Atthetimeofsurvey,five companiesweretakingpart inthe WasteWise ConstructionProgramme .	Successfultodate;industry hasexceededmaterial recyclingtargetsinsome cases;limitstowaste reductionhavebeenidentified andarebeingaddressed;new IWRAs(industrywaste reductionagreements)will follow.

Shown in the following table are some waste collection rates (i.e. percentage of material recovered/collected from curbside recycling) and the recycling rate of collected wastepaper.

Type of waste, component	Collection rate	Recycling rate (of collected total)
Wastepaper	57% (95/96)	72.3% recycled fibre input into domestic packaging materials
Newsprint	52.7% (95/96)	
Waste glass	42%	
Aluminium cans (collected via "drop-off centres")	65%	
HDPE (high density polyethylene) bottles	42%	
Steel cans	27% (May 96)	

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Voluntary industry waste reduction agreements (IWRAs)	Industry, macroeconomy	Increased production efficiency and hence reduced production costs; reduced disposal costs; reduced rehabilitation costs; establishment of markets for secondary goods; less dependence on natural resource extraction Administrative costs of waste minimisation plans, monitoring and reporting
Increased waste disposal fees for MSW and industrial waste, to reflect user-pays principle	Private households, businesses, industry	Increased recycling and waste prevention; more intensive use of resources; relief of landfill sites

Government and industry share the view that waste minimisation measures have neither a positive nor a negative effect on the economy. Consumers, however, consider these measures have a positive economic impact. Australia states that **prices, duties or fees** can be used as instruments to positively influence waste minimisation.

8. Prospects and future approaches

In the future, Australia will follow the priorities listed below:

- The Federal government will develop a National Packaging Covenant that will encompass the whole of the packaging chain and be based on shared responsibility. The Government position is that the Covenant is to be based on voluntary industry participation, but it will consider economic instruments should waste reduction targets not be met.

On the OECD/international level, the following approaches will be followed:

- Benchmarking and collection of statistical information to make possible improvements in the comparisons of waste management data;
- Establishment of best practice principles for waste minimisation. This would include explanations of the pros and cons of the different policy approaches of various national governments. The importance of cultural interests requires further development with regard to waste management issues.

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AUSTRIA

Contactperson

Mr. Kurt Stangel
 Federal Ministry of the Environment
 Department III/5-Waste Management
 Stubenbastei 5
 1010 Vienna

Tel: 43-1-515-223-525
 Fax: 43-1-515-223-003
 E-mail: kurt.stangel@bmu.gv.at

Acronyms

AWG	Waste Management Act (Bundes-Abfallwirtschaftsgesetz)
UVP-G	Law on Environmental Impact Assessment (Umweltverträglichkeitsprüfungsgesetz)

1. Definitions, terms, concepts, and target-setting

Austria's **definition of waste minimisation**, as set out in the Federal Waste Management Act (Abfallwirtschaftsgesetz) of 1990, corresponds to the working definition of the OECD. Waste minimisation denotes quantitative and qualitative waste prevention.

The **scope of waste** includes agricultural waste and liquid waste, e.g. solvents and sewage sludge, but does not include radioactive waste, dead animals, or discarded explosives.

According to the above mentioned definition, thermal waste treatment without energy recovery, waste treatment prior to landfilling, and landfilling itself are not understood to be waste minimisation measures.

Austria has established criteria to define thermal waste treatment with energy recovery. These criteria are set out in the decree on packaging waste (Verpackungsverordnung) of 1992. Incineration is considered to be energy recovery if the combustion process meets state-of-the-art criteria, if certain emission limits are met, and if there is a specific input quality.

The **hierarchy of waste minimisation measures** is set out in the Federal Waste Management Act (Abfallwirtschaftsgesetz) of 1990:

- Tax revenues are used for waste minimisation measures;
- Waste prevention has first priority;
- Re-use has priority over recycling;
- On-site recycling (within the same process) has priority over off-site recycling;
- Reduction of toxicity has priority over reduction of amount;
- Material recycling and thermal recycling with energy recovery have the same priority (pursuant to the latest amendment of the Federal Waste Management Act); and
- Recycling has priority over landfilling.

Austria's **waste minimisation priorities** for products/waste streams, processes and industrial sectors are shown in the following table. Criteria indicate why these priorities/targets have been set.

Waste minimisation priorities	Targets	Criteria
<ul style="list-style-type: none"> • Products/waste streams: Packaging materials, batteries, neon tubes, refrigerators, CD waste, organic fraction of MSW, end-of-use vehicles, waste oil and lubricants, medical waste, waste paint and lacquer 	<ul style="list-style-type: none"> • Reduction of waste generation • Re-use of recycled materials • Reduction of waste toxicity • Least possible amount of waste to be landfilled 	<ul style="list-style-type: none"> • Constantly increasing quantity of waste generated • Waste that could be recycled is landfilled for economic reasons • Waste toxicity
<ul style="list-style-type: none"> • Processes: Dry cleaning, metal surface cleaning 	<ul style="list-style-type: none"> • See above (and) • Substitution of toxic substances/input material by ecologically beneficial materials 	<ul style="list-style-type: none"> • See above
<ul style="list-style-type: none"> • Industrial sectors: Leather manufacturing, textiles, food and beverages, foundries, paper mills, agriculture, photo processing, timber processing 	<ul style="list-style-type: none"> • See above 	<ul style="list-style-type: none"> • See above

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Ministry for the Environment, Youth and Family Affairs (Bundesministerium für Umwelt, Jugend und Familie)	Setting of priorities, participation in the enactment of laws (together with other ministries and regional governments), strategic planning, approval and control (see below), scientific support, information provision and public relations, international co-operation (together with relevant organisations)
Federal Ministry for Economic Affairs (Bundesministerium für wirtschaftliche Angelegenheiten)	Approval and control
Federal Environment Agency (Umweltbundesamt)	Scientific support, international co-operation, statistics

Austria is a federal republic with a central government. There are regional governments and administrative authorities in the regions (*Bundesländer*).

Responsibility for the enactment of laws is shared by the central and regional governments. The central government is responsible for hazardous waste legislation, but may issue regulations on non-hazardous waste if uniform nation-wide legislation is required. In all other cases, the regional governments are free to establish their own regulations.

Institutions on the regional level are also authorised to undertake the tasks listed in the above table. Disposal itself, and information public and public relations are mainly carried out by municipalities.

3. Wastelegislation

In Austria the central laws for waste management are the **Federal Waste Management Act** (Bundes-Abfallwirtschaftsgesetz-AWG, 1990, as amended) and the **Act on the Sanitation of Contaminated Sites** (Altlastensanierungsgesetz, 1989, as amended). Both include provisions on waste minimisation.

Provisions on waste minimisation are also included in regulations concerning wastewater (Wasserrechtsgesetz) and chemical substances (Chemikaliengesetz) in environmental liability and criminal law and in laws concerning industry and trade (Gewerberecht).

Integrated environmental legislation is part of the **Law on Environmental Impact Assessment** (Umweltverträglichkeitsprüfungsgesetz-UVP-G, 1993).

Regulations are in force for the following **key wastestreams/products** :

- Municipal Solid Waste (MSW) in general:
- organic fraction of MSW (biowaste);
- waste paper;
- packaging material and plastic refills;
- end-of-life vehicles;
- batteries;
- neon tubes;
- refrigerators;
- CD waste;
- lubricants;
- product labelling; and
- industrial waste in general.

The regulations in force differ significantly as to their successful enforcement. The decrees on packaging material, batteries, neon tubes, and the organic fraction of MSW are particularly effective. "Average" effectiveness is reported for regulations concerning refrigerators and the separate collection of CD waste. Altogether, no major implementation and enforcement problems were identified.

The **amendment of the Act on the Sanitation of Contaminated Sites**, which increased charges for final deposition, and the **Ordinance on Landfilling** (1996), which tightened provisions on the construction of landfill sites and on waste to be landfilled, have contributed to waste prevention and recycling.

Decrees are planned for waste of electric and electronic equipment (WEEE), waste medicines, and waste paper. Moreover, Austria indicates that it would be willing to intensify the application of Extended Producer's Responsibility.

4. Key instruments

a) Plans and programmes

Both mandatory and voluntary waste management plans and programmes are in force in Austria. They cover MSW, key industrial sectors, key waste streams and products, R&D, information, and enforcement control. Key industrial sectors and key waste streams are regarded as the most important aspects.

Plans and programmes have been set up and are executed by international, national, regional and municipal authorities.

<p><u>Plans and programmes – selected examples</u></p>	<p>1) Voluntary waste management plans on national and regional level (Bundes- und Landesabfallwirtschaftspläne): Plans include information on the present waste management situation, definition of targets, and standards for the reduction of waste quantity and toxicity. Necessary activities of national and regional authorities, and required disposal and waste treatment facilities, are outlined. Identical information is given in waste management plans on the regional level.</p> <p>2) Sector-specific waste management concepts for several (to date, 13) industrial sectors (Branchenkonzepte) : Description of waste reduction measures, recycling and treatment according to the state-of-the-art.</p> <p>3) Voluntary agreements between ministry and industry : For example, implementation is voluntary for the recycling of end-of-use vehicles, waste tyres, and PVC pipes. Targets are increasing the use of recycled goods and of safe disposal.</p>
<p>Experience/ effectiveness</p>	<p>1) Publishing deficiencies in the waste management system, and at the same time offering solutions, has increased public acceptance of measures to be taken. Working out plans in co-operation with different stakeholders has facilitated mutual understanding by authorities, industry, and other groups.</p> <p>2) Evaluation is ongoing; so far, there has been good response by target groups (industry); financial aid has been given to support companies.</p>
<p>Is stronger application foreseen?</p>	<p>YES There is mandatory updating of national and regional waste management plans. Sector-specific waste management concepts are planned for other industrial sectors (CD waste, acids and alkalis).</p>

b) Mandatory instruments

Technical standards referring to waste minimisation are set out in legal documents that are binding for all types of plants and production processes, including recycling. The regulations are relevant for both plant approval and plant operation and disposal facilities. Technical standards are updated according to innovations.

<p><u>Technical standards</u> – selected examples</p>	<p>1) Waste Management Act, 1990: Sets standards for approval of industrial plants (including waste recycling and treatment plants) and defines principles of waste recycling and treatment.</p> <p>2) Clean Air Act, 1988 (referring to boiler plants): Definition of limits for gaseous, solid and fluid emissions.</p> <p>3) Wastewater Act (Wasserrechtsgesetz), including regulations for different industrial sectors, 1991: Limits for the discharge of wastewater and technical standards for reduction of its quantity and toxicity. The Act includes a ban on dilution. Plant operators are obliged to control their emissions and reduce/treat wastewater.</p> <p>4) Ordinance on Landfilling, January 1st, 1997: Defines site requirements and sets standards for landfilling technology and approval of landfill construction and operation. Quality of waste to be landfilled is defined.</p>
<p>Experience/ effectiveness</p>	<p>Technical standards for waste recycling are necessary to prevent waste being sent to plants that operate more cheaply due to application of older technologies. Harmonization of technical standards is a good means of guaranteeing safe treatment/disposal of <i>all</i> waste streams.</p> <p>2) Improved emission control technologies might lead to additional solid waste generation (e.g. filter dust).</p> <p>4) In effective since the beginning of 1997. This ordinance is regarded as the most important technical standard in the waste minimisation field.</p>
<p>Is stronger application foreseen?</p>	<p>Yes</p> <p>For batteries and WEEE. A federal law on immission control was being drafted at the time of the survey.</p>

Bans and restrictions (see following table) cover product use, product labelling, deposit-refund schemes, and product take-back by manufacturers and businesses. The construction of landfills in certain areas and the landfilling of certain waste streams are regulated as well (see Ordinance on Landfilling in the table above).

<p><u>Bans and restrictions</u> – selected examples</p>	<p>1) Ordinance on Packaging Waste (Verpackungsverordnung, 1992): Implements measures for take-back and recycling by fixing different recycling rates for packaging waste, depending on the packaging material.</p> <p>2) Ordinance on Setting Targets for the Prevention and Recycling of Packaging Waste: Sets targets for different beverages – in relation to the filling volume – which must be met by refilling and recycling. Furthermore, graduated quotas have been fixed for the maximum admissible quantities of packaging waste to be landfilled, excluding packaging waste from beverages.</p> <p>3) Ordinances on refrigerators, batteries, fluorescent tubes and other lamps containing mercury (Kühlgeräte-, Batterie-Lampenverordnung, 1990-92): Manufacturers and businesses have the obligation to charge a deposit (for fluorescent lamps and other lamps containing mercury) or an anticipatory disposal fee (for refrigerators). They must take back end-of-life products (lamps, refrigerators and batteries). Vendors can take part in a nation-wide recycling system guaranteeing state-of-the-art treatment. These ordinances set maximum limits for pollutants in batteries and fluorescent lamps.</p> <p>4) Ordinance on plastic beverage refills (Verordnung über wiederbefüllbare Kunststoffe, 1990): Businesses have the obligation to charge a deposit and take back refills.</p>
<p>Experience/ effectiveness</p>	<p>1) The ordinance has led to more low-waste and easy-to-recycle packaging materials. The amount has remained at the same level. From 1991 to 1994, the rate of recycling of one-way packaging material rose to 55% (95% material recycling, 5% thermal recycling). Free riders distort competition. Acceptance by consumers is very good, and with industry it is almost as good. The provision of a nation-wide collection and recycling infrastructure caused problems in the beginning.</p> <p>3) Collection and recycling rates are approximately 65%; extensive PR campaigns are necessary.</p> <p>4) Minimum re-user rates (refilling and material recycling) were exceeded; disposal of one-way packaging decreased by 39% (1990-94); 11% less one-way packaging was sold (1990-1994).</p>
<p>Is stronger application foreseen?</p>	<p>YES Ordinances on WEEE, waste medicines, and waste paper are planned.</p>
<p>Miscellaneous</p>	<p>Ordinance on labelling of food and beverages</p>

c) Economic instruments

There are **taxes and duties** on energy, raw materials, and waste treatment and disposal.

Financial support and economic incentives are used extensively in regard to both MSW and industrial waste minimisation. Financial support is given for R&D, pilot plant design and construction, the development of clean technologies, consultancy services, eco-balances, and environmental auditing.

All levels of authorities offer financial support (subsidies, low-interest credits, free-of-charge consultancy services). Universities, consulting companies, and industry are taking advantage of these programmes.

<p><u>Economic instruments</u>– selected examples</p>	<p>1) Disposal fee (Altlastenbeitrag): The waste disposal fee (earmarked for sanitation/containment of contaminated sites) is levied when waste is delivered for landfilling or, in the case of export, for final disposal (landfilling, underground storage). The fee, which depends on the landfills' technical standards, is in the range of approximately US\$15-100 per tonne.</p> <p>2) Law on environmental sponsoring (Umweltfördergesetz, 1993): Investment aid is available for measures aiming at pollution abatement (including waste minimisation). Up to 80% of total costs are subsidised.</p> <p>3) Project-related financial aid through national and regional funds: There is an emphasis on airborne emission control, the implementation of clean technologies in paint shops (reduction of emissions of organic solvents, recycling of paint sludge), and setting up of environmental audits and ecological management systems in SMEs.</p>
<p>Experience/ effectiveness</p>	<p>In general, these economic instruments are regarded as effective.</p> <p>1) Fees encourage waste minimisation through prevention and recycling. The goal is to reduce the number of landfills and upgrade their technical standard, as well as to rehabilitate contaminated sites. Revenues are used to rehabilitate contaminated sites, e.g. old landfills and illegal dumps.</p> <p>3) Good target group acceptance, but possibilities are not too well known. Application for financial aid has been facilitated, especially for SMEs. This is a great advantage. Financial aid programmes have contributed to making waste minimisation a generally accepted target within industry and society.</p>
<p>Is stronger application foreseen?</p>	<p>YES Financial support is to continue on the same level.</p>

d) Suasive instruments

Information services on waste minimisation and the state-of-the-art of waste disposal are available to private households and industry. These services are run by national, regional and municipal institutions and by industrial associations. Facilities for trading recycled materials are operating effectively.

<p>Suasive instruments – selected examples</p>	<p>1) Information material on waste management published by the federal ministry: Informs regional authorities, industry, and educational institutes concerning legal aspects. These groups disseminate information to waste producers. A network of important information receivers has been set up and is updated.</p> <p>2) Provision of information to industry, businesses and consumers through the ministry, regional authorities, and waste management advisers: Brochures, PR campaigns, and on-site consulting are used.</p> <p>3) Implementation of Environmental Management Systems in industry and authorities: EMS are a voluntary management instrument.</p> <p>4) Environmental/waste management reports: These instruments are mandatory for companies with more than 100 employees and for plants that need legal approval. Records of waste generation and disposal must be kept. Establishing a waste management concept is mandatory for certain plants.</p> <p>5) Statistics: The Federal Environmental Agency (Umweltbundesamt) operates an information system on quality, quantity, origin and disposal of all toxic waste streams. Companies are obliged to supply information.</p> <p>6) Eco-labelling: Environmentally friendly products and services can be awarded an eco-label that informs consumers concerning product attributes.</p>
<p>Experience/ effectiveness</p>	<p>1), 2): Distribution of information requires co-ordination (which information is given to whom, and when?). It is important to disseminate identical information to ensure uniform transfer of information to all target groups. Comprehensive information leads to good acceptance of governmental measures. In the end, full information leads to more efficient use of resources.</p> <p>3) Approximately 5% of all companies had established an EMS at the time of the survey. Experiences were not yet available.</p> <p>4) Relevant for approximately 90% of companies. A review of waste management concepts showed that considerable reductions in the amounts of waste were possible, so that cost savings could be achieved. Knowledge concerning the obligation to establish environmental reports and waste management concepts is not widespread enough.</p> <p>5) A waste minimisation policy without a statistical database cannot be effective.</p>
<p>Is stronger application foreseen?</p>	<p>YES Austria indicates it would be willing to intensify provision of information to industry. There is the intention to extend the legal obligation to introduce waste management concepts to smaller companies.</p>

e) Conclusions

Austria sets clear priorities with the use of mandatory instruments. Experience shows that mandatory targets have usually been more successful than voluntarily ones, as sanctions can be included in mandatory instruments.

According to experience gained at the time of the survey, the implementation of voluntary instruments has often led to a distortion of competition due to the existence of free-riders. Moreover, positive effects with voluntary instruments can usually only be achieved when measures are realisable without additional costs to companies. Otherwise, industry would be reluctant to take action. The targets of voluntary agreements between authorities and industry are therefore generally set in such a way that they can be met without additional effort and costs. Otherwise companies would tend to boycott the agreements, with the side effect of gaining competitive advantages. On the other hand, there are always companies willing to exceed targets for marketing and image reasons. To increase manufacturers' responsibility for the disposal of products (Extended Producer Responsibility), only mandatory instruments are considered by Austria to be appropriate.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Supportive of voluntary programmes and instruments; neutral on other instruments	Regulations are seen as most effective	Neutral	Supportive of all types of instruments
Participation in waste legislation obligatory?	Industry and businesses: YES Associations: NO	NO	NO	NO
Support of waste minimisation by	Voluntary agreement on recycling of end-of-use vehicles, waste tyres, credit cards Industry accepts self-imposed obligations to recycle waste Product advertising and image campaigns Associations provide information, support R&D, and run their own waste treatment facilities	Consumers have supported low-waste products and home composting; they readily use recycling facilities	Informing the public; assistance in ensuring law enforcement	Taking part in pilot tests of collection and recycling (e.g. of WEEE) for economic and image reasons
Hindering of waste minimisation by	Some companies boycott voluntary agreements or ignore regulations in order to gain competitive advantages	Disposal discipline becomes poorer (more illegal dumping) when disposal fees are recharged for waste delivered to disposal sites	NO	NO
Influence on waste minimisation: overall contribution	70% "Major" contribution	5% "Minor" contribution	5% "Minor" contribution	15% "Minor" contribution
Is stronger influence foreseen?	YES Ecological product design is required; businesses can decide on product range	YES	YES	YES Feedback of experience gained with waste treatment and recycling into design of production processes

6. Key products and wastestreams

Past	Present	Future
Waste minimisation programmes for leather and textiles, foundries, paper mills, agriculture, food and beverages	Sector-specific waste minimisation programmes for waste oil and lubricants, electroplating sludge, photochemicals; an evaluation of the effectiveness of this instrument is being undertaken	WEEE and waste medicines (draft decrees), end-of-life vehicles, waste paper; waste minimisation programmes for CD waste, salt, acids and alkalis planned at the time of the survey

Austria provided specific information concerning its waste minimisation policies for three key waste streams: **CD waste**, **packaging waste**, and **industrial waste** in general.

	CD waste	Packaging waste	Industrial waste
Reasons for priority	Quantity; CT available; scarcer resources	Quantity; CT available; scarcer resources; production is waste-intensive; short product life-cycle	Quantity and quality; CT available; scarcer resources; economic reasons
Waste minimisation targets	Separation and best possible recycling; effective use of landfill capacities	Effective use of landfill capacities; promotion of refills; increase of producer's responsibility; achievement of defined recycling rates	Waste minimisation according to the state-of-the-art; use of recycled materials; effective use of landfill capacities; reduction of contaminants
Instruments and measures	Plans and programmes; mandatory instruments; information; taxes and duties	Plans and programmes; mandatory and voluntary instruments; packaging decree	Plans and programmes; mandatory and voluntary instruments; taxes and duties; financial support
Success and failure; experience	Regulations are effective; decree on separate collection of CD waste; recycling is still more expensive than landfilling; tighter control in future is planned	Regulation has proved effective; massive PR activities successful; collection and recycling are still expensive; distortion of competition through free-riders; tighter control will be necessary in future	Intelligent waste management can be cost-saving; clean technologies involve high outlay; pay-back periods are often too long

Some collection and recycling rates for MSW components are shown in the following table.

Type of waste, component	Collection rate (% of volume generated)	Recycling rate (of collected total)
Organic fraction	65%	100%
Paper and cardboard	68%	100%
Glass	70.5%	100%
Tin cans and other metals	90,000t	100%
Plastic and paper packaging	60%	95%
Hazardous waste	16,500t	-
Fluorescent tubes	70%	-
Refrigerators	60%	-
Batteries	65%	-

Separate collection of domestic waste is mandatory.

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Sector-specific waste management concepts	Leather industry, paper mills	Savings through reduction in disposal costs
Regulations	Waste disposal industry and suppliers of environmental technologies	Gain in turnover
Regulations on waste disposal duty	Disposal near the country's border	Distortion of competition: waste may be taken to cheaper disposal plants in neighbouring countries
Home composting	Private households, especially in rural areas	Cost savings
Quantity-orientated disposal fees for MSW	Private households (in some municipalities only)	Savings possible, depending on consumer behaviour

In the view of the Austrian government, waste minimisation measures have a positive economic effect. Industry and consumers share the opinion that these measures have no detrimental economic impact.

In Austria **prices, duties and fees** are used to support waste minimisation in the following areas:

- Disposal fees are included in product prices, which promotes product design and production processes that consider future disposal, recycling or repair;
- Landfilling is made more expensive (through duties on disposal) in order to make waste prevention and recycling more attractive;
- There are quantity-orientated disposal fees for MSW (see table above).

8. Prospects and future approaches

Austria has set the following targets for the future:

- enhancing producer responsibility through legally binding regulations;
- further integration of waste management costs in product prices;
- harmonization of measures within EU and OECD countries, in order to prevent distortion of competition;
- comprehensive information provision to the public (seen as an instrument of major importance for future success);
- harmonization of definitions at the OECD level;
- setting of technical standards (state-of-the-art) for recycling technologies at the OECD level; and
- intensifying exchange of information and data at the OECD level.

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CANADA

Contact person

Mr. Bob Christensen
Senior Program Engineer
Prevention and Treatment Division
Environment Canada
K1A03H Ottawa, Ontario

Tel: 1-819-953-0459
Fax: 1-819-953-6881

Acronyms

AMRC Association of Municipal Recycling Co-ordinators
CEPA Canadian Environmental Protection Act
CCME Canadian Council of Ministers of the Environment
NAPP National Packaging Protocol
3Rs Reduce, Re-use, Recycle

1. Definitions, terms, concepts, and target-setting

In Canada there is **no formal legal definition of waste minimisation**. The term *waste minimisation* is considered to include the 3Rs (Reduce, Re-use, Recycle). Waste minimisation does not mean the reduction of waste toxicity.

The **scope of waste** does not include radioactive waste, mining waste, dead animals, agricultural waste or discarded explosives. Liquids are considered to be waste when they can no longer be used for their original intended purpose and are destined for recovery or final disposal. Historically, the federal government has not considered sewage sludge to be a waste. However, the Canadian Council of Ministers of the Environment (CCME) recently decided that sewage sludge would be included as a waste for purposes of the 50% reduction target.

Waste minimisation means influencing consumer behaviour, introducing and implementing clean technologies, product design and recycling, and re-use and recovery (on- and off-site). Incineration of any kind (with or without energy recovery) is considered to be disposal, not waste minimisation. The same applies to landfilling and landfilling pre-treatment. Incineration processes are regarded as energy recovery if the feed has a calorific value of >5500 BTU/lb (≈12.800 kJ/kg).

The **hierarchy of waste minimisation measures** is not set out in a law or a mandatory document. The hierarchy is described in the *Federal Waste Reduction Perspectives*, a federal policy document. According to this document:

- Waste prevention has priority over waste recycling;
- Re-use has priority over recycling;
- Reduction of quantity has priority over the reduction of waste toxicity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

This hierarchy is not to be applied bindingly, as it is not defined in a legal document. Nevertheless, the hierarchy applies to waste producers, the manufacturing industry, and disposal facility operators when deciding on the recycling or disposal method.

Canada's **waste minimisation priorities for products, waste streams, processes and industrial sectors** are shown in the following table. Criteria indicate why these priorities/targets have been set.

Waste minimisation priorities	Targets	Criteria
Products: Paints Batteries Tyres Waste streams: Packaging Organic Paper CD waste	No landfilling of these products Diversion from disposal (applies to all)	Hazardousness Hazardousness Amount, volume Amount, volume (applies to all)
Processes: Metal plating	Diversion of sludge from disposal	Hazardousness
Industrial sectors: Construction	Encouragement of sustainable construction	Amount, volume

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Environment Canada	Has the lead on international co-operation issues and on the management of toxics, as prescribed by the Canadian Environmental Protection Act (CEPA)
Canadian Council of Ministers of the Environment (CCME)	Proposes national policies, standards and priorities, but has no authority to implement or enforce legislation
Statistics Canada	Statistics

Canada has a federal political and administrative system. The ten provinces and two territories have their own governments.

The **Canadian Council of Ministers (CCME)** comprises 13 environment ministers from the federal, provincial and territorial governments. Responsibilities for all kinds of tasks in regard to waste minimisation lie with the provincial governments and municipalities. At the federal level general decisions are taken, the framework is established, and guidelines are drawn up.

Each of the provinces and territories has its own legislation. Proposed changes to federal legislation, the Canadian Environmental Protection Act (CEPA), would provide the authority to require the development of pollution prevention plans for certain toxics and hazardous wastes exported for disposal. Moreover, legislation on transboundary movements of waste is enacted by the federal government.

Approval and control of disposal plant operation are delegated to provincial and municipal authorities.

3. Waste legislation

Current federal legislation on waste management deals only with the inter-provincial and transboundary movements of hazardous waste. New authority is being sought under the **Canadian Environmental Protection Act (CEPA)** to better implement Canada's international obligations in regard to the transboundary movement of all waste. All provinces and territories have their own legislation dealing with the management of hazardous and non-hazardous waste. Some provinces have separate waste legislation; in others waste management is included in other environmental legislation.

Regulations are in force in different provinces for the following **key waste streams/products** :

- Municipal Solid Waste (MSW) from domestic and commercial sources in general;
- packaging material, beverage containers;
- waste paper;
- hazardous industrial waste in general;
- used paint; and
- tyres.

Enforcement of these regulations is good given the current climate of fiscal restraint by provincial governments, which limits the availability of financial resources.

In the future, Canada is going to develop and improve its system of regulation concerning waste minimisation. At the federal level, proposed changes to CEPA would recognise the principle of stewardship and user/producer responsibility and would require pollution prevention plans, in some cases, for transboundary movements of waste. In addition, provinces and territories will pursue approaches that include:

- regulation of the selective collection of municipal waste;
- regulation of the recovery of short-lived goods (beverage containers, other packaging, etc.) and Extended Producer Responsibility (EPR) programmes for selected wastes;
- enforcement of legislation concerning disposal;
- regulation of waste audits and minimisation plans for industrial, commercial and institutional establishments and municipalities; and
- legislation for creating a new legal entity for solid waste management and minimisation.

4. Key instruments

a) Plans and programmes

In Canada both mandatory and voluntary plans and programmes exist. They are set up by the federal and provincial governments and by municipalities. These plans and programmes cover MSW, hazardous waste, key industrial sectors, key waste streams and products, R&D, information provision, and enforcement control. They have voluntary as well as mandatory provisions.

Plans and programmes at provincial level are regarded as most important. They are seen as a means of reaching waste minimisation targets defined in provincial environmental legislation. Therefore, provinces and municipalities often apply mandatory programmes to achieve targets, whereas the federal government draws up mostly voluntary programmes.

<p>Plans and programmes – selected examples</p>	<p>1) National Packaging Protocol (NAPP) , 1989: Contains descriptions of six packaging policies and actions required to implement them. Milestone targets are set: e.g. the rate of packaging sent for disposal in 2000 shall be no more than 50% of the 1988 amount.</p> <p>2) Provincial 3Rs regulation : A binding law applies to non-hazardous waste from residential, institutional, commercial and industrial sources. Actions to be taken are municipal composting programmes, waste audits, reduction and recycling workplans, and exemption from the normal approval process for recycling facilities that meet certain standards.</p> <p>3) Provincial post-consumer paint stewardship programme (1994): This programme was created by paint manufacturers and retailers in response to a regulation comparable to Extended Producer Responsibility (EPR) requiring the paint industry to assume “stewardship” for its end-of-use products. Systems for collection and recycling of leftover paint are developed on the regional and municipal level. “Eco-fees” are charged for paint containers to be sold.</p>
<p>Experience/ effectiveness</p>	<p>1) The 1992 interim target for packaging waste reduction was achieved. Acceptance by target groups (industry, provinces, consumers) initially was good. At the time of the survey, industry and the provinces were considered to be losing interest in taking actions to achieve milestone targets for 1996 and 2000.</p>
<p>Is stronger application foreseen?</p>	<p>YES Future product stewardship programmes, Waste Management Strategy Programmes</p>

b) Mandatory instruments

Canada does not apply legally defined technical standards for manufacturing and recycling processes to support waste minimisation. All manufacturing and recycling processes must comply with existing environmental legislation in order to be granted provincial approval to operate.

Canada has not enacted production bans to support waste minimisation, but **product restrictions** are used. They can take the form of product take-back obligations (“stewardship”) and deposit-refund schemes.

Canadian provinces generally require environmental impact assessments and other approval processes for the construction of landfills. Municipalities or provinces ban landfilling of various waste streams, such as paper, wood, CD waste, scrap tyres, and liquids.

<p><u>Bans and restrictions—selected examples</u></p>	<p>1) Landfill bans: Application in several provinces and municipalities, e.g. for paper, plastics, glass, automotive batteries, waste paint.</p> <p>2) Deposit-refund schemes: Numerous applications in various provinces for refillable and recyclable beverage containers.</p> <p>3) Provincial half-back deposit-refund system: Applies to recyclable but not refillable beverage containers. Consumer receives half the deposit back, while the other half will support the municipal unit, paying for better collection, recycling and composting.</p> <p>4) Provincial lead-acid battery deposit-refund system: Return is mandatory; deposit is CAN\$5, with unclaimed charges going to retailers.</p>
<p>Experience/ effectiveness</p>	<p>2) Deposit-refund schemes have proven successful and are well accepted. In one province, retailers receive 40% of the deposit in exchange for storing returned beverage containers. Return rates for beverage containers are about 75%.</p> <p>3) Experience at the time of the survey was considered encouraging.</p>
<p>Is stronger application foreseen?</p>	<p>YES Expansion of deposit-refund schemes</p>

c) Economic instruments

There are **taxes and duties** on waste-intensive products, waste treatment, and landfilling.

<p>Taxes, duties or licenses—selected examples</p>	<p>1) A provincial levy on non-refillable alcohol containers: Industry is charged 10 cents per container manufactured.</p> <p>2) Taxes on new tyres sold (in several provinces): Taxes up to CAN\$4 are charged. Tax revenues go to funds financing recycling programmes, R&D, credits to companies manufacturing new products from scrap tyres, support of separate collection.</p> <p>3) A provincial sales tax on disposable diapers: Tax of 7% (diapers previously had been tax exempt). Revenue goes to special environmental fund.</p> <p>4) Provincial and local tipping fees: Fees up to CAN\$150 per tonne for non-hazardous waste, according to waste type. Disposal costs for hazardous waste are higher.</p> <p>5) Advance disposal surcharge for pesticide containers : This voluntary industry-sponsored programme run by the Crop Protection Institute is found in most provinces. The charge is CAN\$1 per container. Revenues support collection, handling and recycling of used containers.</p>
<p>Experience/ effectiveness</p>	<p>5) Approximately 75% recovery rate through drop-off centres</p>
<p>Is stronger application foreseen?</p>	<p>YES</p>

Financial aid programmes and economic incentives are applied extensively for both MSW and hazardous waste minimisation. Financial aid is given for R&D, design and construction of pilot plants, development of clean technologies, consultancy services, eco-balances, and eco-auditing.

Financial aid is granted by federal institutions and provincial administrations and through private funding. Subsidies, low-interest credits, and free-of-charge consultancy services are offered. Applicants are universities, research institutions, consulting companies, disposal facility operators, and industry.

<p><u>Financial aid and economic incentives – selected examples</u></p>	<p>1) Action 21: Federal government funding programme for public environmental awareness initiatives and local environmental projects, e.g. on waste minimisation. Non-profit, non-governmental groups can apply for funding.</p> <p>2) Technology Partnerships Canada – Environmental Technologies: Federal investment support programme for business in the form of interest-free loans. Support is given to the development of new technologies, processes and products. Up to 30% of the project costs are subsidised.</p> <p>3) A provincial waste reduction fund: 50% cost share for waste reduction initiatives, to a maximum of CAN\$5,000. Available to municipalities and local serviced districts.</p> <p>4) A provincial financial assistance programme for the recycling industry: Subsidisation of up to 50% of capital costs, loan guarantees. Relevant for capital costs in excess of \$250,000. There are similar programmes in other provinces.</p> <p>5) Quebec Financial Assistance Programme to Municipalities: Funding of recycling programmes and waste recycling facilities. There are similar programmes in other provinces.</p>
<p>Experience/ effectiveness</p>	<p>Financial support programmes have been successful in kick-starting municipal programmes.</p>
<p>Is stronger application foreseen?</p>	<p>YES The use of governmental financial support programmes will probably decrease, and more emphasis will be put on industry participation in funding.</p>

d) Suasive instruments

In Canada waste minimisation is promoted by information services available to private households and industrial waste producers. Databases are available on current waste reduction initiatives. Public authorities run pioneer projects that serve as examples. Market facilities exist for trading recycled goods and end-of-use products.

These services are offered by federal, regional and municipal administration and by industry, industrial associations and NGOs.

<p><u>Information provision and public relations – selected examples</u></p>	<p>1) A provincial recycling council: Information service on recycling. A toll-free telephone hotline was used initially, but was recently cancelled due to cut-backs in funding. Target groups are administration, industry, the public and municipalities.</p> <p>2) A provincial recycling organisation: This organisation is run by the province and provides information on recycling. It also supports the management of a deposit-refund system for beverage containers and a programme on recovery and recycling of waste tyres. A waste exchange service is under operation.</p> <p>3) An association of municipal recycling co-ordinators offers information to private households.</p>
<p>Experience/ effectiveness</p>	<p>1), 2) Information services and public relations have proven effective. Budget cuts have led to reduced services.</p>
<p>Is stronger application foreseen?</p>	<p>YES More information will be provided on Environmental Management Systems, environmental reports, and eco-labelling.</p>

<p><u>EMS, environmental reports and eco-labelling – selected examples</u></p>	<p>1) Environmental Management Systems in industry and public institutions: An EMS is a voluntary management instrument, providing a framework for a company's environmental policies, practices and structures.</p> <p>2) Environmental/waste management reports: Voluntary instruments. The reports consist of aggregated data.</p> <p>3) Waste balances: Voluntary and mandatory instruments concerning the input and output of material.</p> <p>4) Eco-labelling, Environmental Choice Programme: This voluntary programme has developed environmental criteria against which products and services are assessed. Companies whose product or service passes testing and verification are licensed to use the EcoLogo. The companies are charged license fees according to sales figures for the certified products or services. Examples, among others, are: dry cleaning services, toilet tissue, products made from recycled rubber, and photo-finishing services.</p>
<p>Experience/ effectiveness</p>	<p>1) Effective EMSs were in place in a considerable percentage of Canada's largest companies at the time of the survey, and EMS quality had improved dramatically in the previous two years. However, most of those companies did not have plans to seek ISO 14000 certification for their EMSs because they were not yet convinced of the benefits of doing so.</p> <p>2) About 20% of all companies set up environmental reports for government and/or the public.</p> <p>3) About 50% of all companies drew up waste balances.</p> <p>4) At the time of the survey, about 100 products and services had been certified. Acceptance of the Environmental Choice Programme was good. The EcoLogo was having a positive marketing effect. Setting up the criteria for product/service assessment was time-consuming.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>The Environmental Choice Programme was going to expand the number and range of products it licensed. Some provinces planned to use waste audits and minimisation plans more intensively in the future. Planned changes to federal environmental legislation (CEPA) might require industry to develop pollution prevention plans for certain wastes.</p>

e) Conclusions

At the time of the survey, Canada's federal government considered voluntary plans and programmes and suasive instruments as the most important instruments, followed by economic instruments. Successful instruments were regarded as being successful on their own and were not analysed in combination.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Strongly supportive of voluntary plans and programmes; strong resistance to mandatory plans and instruments	Supportive, especially of economic instruments.	Strongly supportive	Strongly supportive of mandatory instruments if they are in own interest; resist economic instruments
Participation in waste legislation obligatory?	NO Lobbying against waste legislation	Not applicable	NO	NO
Support of waste minimisation by	Canadian Chemical Producers Association has integrated waste into environmental reports. Crop Protection Institute runs a pesticide container recycling programme. Industrial associations offer information services to industry and do R&D on their behalf. Waste minimisation efforts are relevant for product advertisements and PR campaigns. Product take-back systems are operating for beverage containers in most provinces and for paint in at least in one province.	Consumers' willingness to change consumption behaviour is "average". Good acceptance of existing recycling facilities; participation in home composting is indicated as "below average" (10% of households have backyard composters). Since households' participation is already very high, they are not legally required to separate recyclable materials from household waste. Curbside recycling is accessible to 50% of all households.	Provision of information to the public and to politicians; development of waste minimisation concepts and policies	Depends on own (especially economic) interests; implementation of a facility to disassemble and recycle office equipment Providing industrial customers on-site waste minimisation services, including changing the manufacturing process and replacing hazardous ingredients
Hindering of waste minimisation by	No answer	User-pay programmes in some cases were rejected by consumers.	None	No
Influence on waste minimisation/ overall contribution	30% "Medium" contribution	10% "Medium" contribution	30% "Major" contribution	30% "Medium" contribution
Is stronger influence foreseen?	YES Extended Producer Responsibility and multi-stakeholder consultations	YES Increased participation in waste minimisation programmes but not in policy development	YES In multi-stakeholder consultations	YES In multi-stakeholder consultations

6. Key products and wastestreams

Past	Present	Future
Beverage containers	Beverage containers	Beverage containers: increasing the number of items covered
Other packaging	Other packaging	Other packaging and short-lived goods
Newsprint	Newsprint	Newsprint
Tyres	Tyres	Tyres
	Household hazardous waste	
		Paint, used oil

Canada provided specific information concerning its waste minimisation policies for three key waste streams: **wastepaper** , **CDwaste** ,and **packaging**.

	Wastepaper	CDwaste	Packaging
Reasons for priority	Quantity;CTavailable;scarceresources;economicreasons	Quantity;CTavailable;scarceresources;economic reasons	Quantity;CTavailable;scarceresources;economic reasons
Waste minimisation targets	Wereconsideredbutnot adopted	Nospecifictargetsdefined	Reductiontargets(baseline 1988): 20%by1992 35%by1996 50%by2000 (targetsarevoluntary)
Instruments and measures	Plansandprogrammes; mandatoryinstruments; financialsupportand suasiveinstruments	Wastereductionworkplans andrecyclingprogrammes forlargeconstructionand demolitionprojectsare mandatoryinaparticular province;financialsupport andsuasiveinstruments	Abovetargetsdefinedinthe NationalPackaging Protocol;instrumentstobe appliedareplansand programmes,financial supportandsuasive instruments
Success and failure; experience	Instrumentswereeffective. Demandforpaperwith recycledcontentincreased. Industryrespondedwith morede-inkingand recyclingplantswhen confrontedwithUS recycledcontent regulations.Economics hindersincreasein recoveryrates.Nonew initiativeswereplannedat thetimeofthesurvey,as progresshadbeen satisfactory.	Effectivenessofexisting instrumentswasconsidered pooratthetimeofthe survey.Majorobstaclesare theavailabilityofcheap meansofdisposal,and gettingindustrytoplaya largerrole.Acceptanceis highwitharchitects,but lowwithcontractorsand builders.Throughsuasive instrumentssuchas informationexchange networksandmulti-stakeholderagreements, industrywillbeencouraged toincreaseitssupport.	The1992targetwas achieved.Suasive instrumentsprowdeffective. Therewasdecreasing interestonthepartofsome stakeholders(industry, provinces);municipalities remainedsupportive.

Somewasterecyclingratesareshowninthefollowingtable:

Typeofwaste,component	Collectionrate	Recyclingrate(forcollectedtotal)
Wastepaper	-	40%
Wasteglass	-	25%
Tyres	-	36% (re-useandrecycling)
Solidwasteoverall	-	30%

7. Costsandbenefits

Wasteminimisationmeasurescanleadto costsandbenefitsfordifferentgroups.Examplesareshowninthetablebelow.

Wasteminimisationmeasures	Affected	Costsandbenefits
Mandatorycurbsiderecycling programmes	Municipalities	Dependsonmarketpricesforrecycled goodsandtypeofcollectionssystem
Mandatorycurbsiderecycling programmes	Wastemanagementindustry	Costsoutweighedbyeconomicbenefits
Easy-to-recyclepackaging	Consumers	Mayincreasecostsforconsumers
Reducedpackaging	Consumers	Mayreducecostsforconsumers

Intheviewofthegovernmentandconsumers,wasteminimisationmeasureshavepositiveeconomic effects.Industryconsiderstheseeffectstobenegative.

Canada states that **prices, duties or fees** can be used as instruments to positively influence waste minimisation, but that unforeseen consequences may occur. Raising disposal fees for sanitary landfill in the Torontoarea(provinceofOntario)ledtowastebeingtruckedacrossthebordertotheUnitedStates.

8. Prospects and future approaches

In the future, Canada will follow the priorities listed below:

- The federal government will continue to explore opportunities for voluntary agreements with industry sectors to reduce waste;
- The federal government will examine the application of economic instruments;
- The federal government will intensify multi-stakeholder consultations and co-operation and co-ordination with provinces, industry and NGOs;
- The federal government will continue to explore opportunities to increase the use of pollution prevention planning by industry through voluntary and mandatory means, such as changes to the Canadian Environmental Protection Act (CEPA);
- There will be increased use of mandatory instruments by the provincial governments.

At the OECD/international level, the following approaches will be followed:

- Harmonization of product policy development (Extended Producer Responsibility) would help to minimise trade barriers;
- Waste minimisation policy with impacts on international trade would be more appropriately applied at an international level;
- Development of international standards and information exchange;
- Voluntary agreements with industry sections.

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DENMARK

Contact person

Mr. Leif Mortensen
Head of Division
Environmental Protection Agency
Strandgade, 29
1401 Copenhagen K

Tel: 45(32)66.01.00
Fax: 45(32)66.04.79

1. Definitions, terms, concepts, and target-setting

In Denmark the **formal definition of waste minimisation** is set out in the Environmental Protection Act of 1991 (and related amendments) and corresponds to the to the OECD working definition. Waste minimisation encompasses reduction of waste quantities as well as of waste toxicity (quality). Waste minimisation in Denmark applies to liquid waste and sewage sludge, but does not cover radioactive waste, mining waste, dead animals, agricultural waste, or discarded explosives.

Waste minimisation in Denmark includes action on the following policy levers: product design, clean production technologies, re-use (on- and off-site), recycling and recovery, as well as incineration with energy recovery. The general understanding and use of the term *waste minimisation* imply that incineration without energy recovery, waste treatment, and landfilling are not regarded as waste minimisation measures. Reduction of consumption patterns is not considered to be waste minimisation.

The **hierarchy of waste minimisation measures** is set out in the 1993-1997 Action Plan for Waste and Recycling, drafted by the Ministry of the Environment's Environmental Protection Agency. The Action Plan is a voluntary programme, according to which:

- Waste prevention has priority over waste reduction;
- Waste reduction and re-use have priority over recycling;
- Recycling within the same production process (on-site) has priority over recycling in other processes (off-site);

- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

However, minimisation of waste hazard does not have priority over minimisation of waste amount.

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
National government, Environment Protection Agency	Setting of priorities, participation in the enactment of laws, strategic planning, approval and control, scientific support, information provision and public relations, international co-operation, statistics
National legislature	Enactment of laws

Denmark has a central government. The country is divided into counties and municipalities with their own governments and legislation.

Waste planning is a co-operative effort between regional and local authorities, with broad directions set out by the national Ministry of the Environment. Waste planning is an instrument for overall waste management. It consists of surveys of wastestreams, along with objectives and guidelines.

The Ministry of the Environment is responsible for entering into agreements with the relevant waste-producing industries, issuing statutory orders concerning product and recycling regulation, waste disposal, and waste incineration. The Ministry also subsidises the development of projects, capital investments and investigations and establishes charges on waste, packaging and products.

The Danish EPA publishes information, investigations and technical reports that form the basis for decisions and specific projects.

3. Wastelegislation

In Denmark there is no separate waste minimisation legislation. Legal provisions concerning waste minimisation are integrated into the 1991 **Environmental Protection Act**, specifically in chapter 6 of the Act.

Denmark has enacted regulations specific to some waste streams: for instance, the 1986 statutory orders on the collection of material for recycling from private households and the recycling of material from industrial enterprises and of food waste from catering centres.

At the time of the survey, Denmark was in the process of evaluating the results of the action plan for waste and recycling, then ending, and preparing a subsequent action plan. The following lines of work were being explored:

- new management tools;
- information initiatives;
- environment, energy, resource and economic analyses of alternative waste treatment schemes;
- material flow analyses;
- documentation on the state-of-the-art in terms of waste quantities and composition;
- definition of waste that is suitable/unsuitable for incineration;
- development of collection systems and of treatment and treatment/processing plants, including studies of health and safety in the workplace; and
- development of outlets/applications for recyclable materials.

4. Key instruments

a) Plans and programmes

Denmark has set up a wide variety of mandatory and voluntary plans and programmes. Among these are general plans established on a voluntary basis. Special mandatory plans and programmes are used for MSW, in some key industrial sectors, or for some key wastestreams.

Voluntary plans and programmes are used in the area of R&D for key products and for the provision of consultancy services. These plans and programmes are prepared on a national or supranational level. Priorities on the national level are mainly set on a voluntary basis, except in the case of municipal waste, whose priorities are established at the municipal level on a mandatory basis. By the same token, implementation and control are performed on a mandatory basis at the municipal level.

<u>Plans and programmes – selected examples</u>	Action Plan for Recycling of CD Waste : This programme is aimed at increasing the recycling rate within the construction and demolition sector. The target groups are industry and contractors in this sector.
Experience/ effectiveness	Subsidised by the Danish government, the Action Plan achieved a very high rate of acceptance and implementation. Waste recycling increased from 15 to 60% between 1986 and 1993. The main obstacles encountered during the programme were linked to traditions within the sector. In general, plans and programmes have proven effective in Denmark.
Is stronger application foreseen?	Not foreseen

b)Mandatoryinstruments

Denmarkdoesnotapplylegallydefinedtechnicalstandardstosupportwasteminimisation.

Insupportofwasteminimisationpolicy,however,Denmarkdoesuse **restrictions such as product bans, mandatory labelling, deposit-refunds, and mandatory take-back by producers** . However, instruments such as restrictions on product use, on the construction of landfills, and on the landfilling of certain waste products are not used.

<u>Bans and restrictions</u> – selected examples	1) Ban on beverage containers : This ban was introduced with a view to support waste minimisation in Denmark. 2) Ban on combustible waste for disposal on landfill
Experience/ effectiveness	1) Very high acceptance and implementation rates within target groups; no economic impact on the government or target groups; no obstacles to implementation In general, product bans and product restrictions have proven effective in Denmark. 2) The ban came into force in 1997.
Is stronger application foreseen?	Not foreseen

c) Economic instruments

There are **taxes and duties** on raw materials, resources and energy, waste-intensive products, and treatment and landfilling. The following pieces of legislation have been enacted with regard to waste-driven taxation:

- 1988 Taxation of Raw Materials and Waste Act;
- 1991 Taxation of Beverage Containers Act;
- 1995 Act on the Taxation of Nickel-Cadmium Batteries; and
- 1995 Act on the Taxation of Certain Chlorinated Organic Solvents.

<p><u>Taxes, duties or licenses</u> – selected examples</p>	<ul style="list-style-type: none"> • Taxation of waste destined for incineration or depositing : The objective is to provide an incentive for minimisation and recycling of waste from households and industry. Duties are set at the following levels: <ul style="list-style-type: none"> • incineration with energy recovery: DK210/t • other types of incineration: DK260/t • landfill disposal: DK335/t. • Duties are collected through waste treatment plants. • In general, revenues from taxation on waste are not spent on waste minimisation efforts. However, in some cases, such as the tax on nickel-cadmium batteries, part of the return is used for collection efforts.
<p>Experience/ effectiveness</p>	<p>The waste taxation scheme has been fully implemented and largely accepted by target groups. Significant waste reductions have been achieved. For instance, CD waste has been reduced by an annual 500,000 t. The economic impact on the Danish state has been estimated at DKK500 million, while the economic impact on target groups has been negligible. No obstacles to implementation were reported.</p> <p>Overall, tax instruments have proven effective in Denmark.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>In the field of waste raw materials in particular</p>

Denmark also uses **financial support** in regard to both MSW and industrial waste. Financial support is channelled into R&D for waste prevention and recycling technologies, pilot tests, investments in low-waste production processes and products, consultancy services for companies, innovative waste recycling technologies, eco-balances, life-cycle assessments, and eco-audits. These measures are supported essentially through subsidies from the Danish state, counties and municipalities, as well as industry funds. Financial support is granted to government institutions, universities and research institutes, industry, and the disposal sector.

According to the Environmental Protection Act, aid may be granted to R&D projects that aim at promoting recycling, at significantly reducing environmental impact by switching over to cleaner technology, or at reducing problems in connection with waste disposal. Up to 75% or even 100% of the project may be funded, depending on whether results are useful only to the recipient firm alone or can have wider benefits.

Similarly, aid can be granted for investments in recycling plants and in waste collection equipment on condition that the recipient demonstrates the investment will bring about a permanent increase in recycling of products, materials or residuals, significantly reducing the impact on the environment or resulting in the appropriate utilisation of products, materials or residuals.

Financial aid can also be granted for the disposal of waste oil.

Overall, financial support instruments have proven effective in Denmark. More intensive use of these instruments was being considered at the time of the survey.

d) Suasive instruments

Denmark supports waste minimisation through pioneering projects undertaken by public authorities, information offices for private households, central information pools or information offices for industrial waste producers, information systems and databases on the state-of-the-art in waste minimisation, and exchange markets for recycled goods and products. Information and consultancy services are provided on a voluntary basis to central administration.

<u>Information provision and public relations – selected examples</u>	Danish Information System for Waste and Recycling (ISAG) : Reports on the production of waste in Denmark, waste treatment, recycling, imports and exports, and the origins of waste and provides comparisons with the objectives set for the future (e.g. the year 2000). The ISAG system now relies on registration procedures whereby questions must be answered on the geographic origin, industrial source, type of waste, type of treatment, etc. for each truck load of waste received at treatment facilities
Experience/ effectiveness	Turning the ISAG system into a registration procedure was in response to experience in the compilation of data under the old calculation-based system. The main problem was the lack of recent, accurate and reliable data, along with the lack of clear definitions and terminology. Overall, information instruments have proven effective in Denmark.
Is stronger application foreseen?	Not foreseen

Within the framework of its waste minimisation policy, Denmark uses Environmental Management Systems, environmental/waste reports, waste balances, eco-labelling for low-waste production and products, and eco-labelling for recycling products. Denmark applies such programmes as the EU-EMAS, BS 7750, ISO 14000 and the EU eco-labelling programme on a voluntary basis for industrial and commercial activities. Progress at the time of the survey was still unknown.

Overall, EMS, environmental reports, and eco-labelling had proven effective. The government expected to use them more intensively in the future.

e) Conclusions

At the time of the survey, priority was given to voluntary plans and programmes, economic instruments, and suasive instruments. Mandatory instruments were described as having an “average” priority, while mandatory plans and programmes received the least attention from the Danish government.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	<p>Strongly supportive of waste minimisation in general and of voluntary plans and programmes, as well as of suasive instruments</p> <p>Neutral position on economic instruments</p> <p>Strong resistance to mandatory plans and programmes and mandatory instruments</p>	Highly supportive of waste minimisation in general	Strongly supportive	Strongly supportive of waste minimisation policy in general; strongly supportive of mandatory and voluntary plans and programmes, mandatory instruments, suasive instruments; neutral towards economic instruments
Participation in waste legislation obligatory?	NO Legislation is discussed with industry. Consensus is a tradition as regards waste minimisation.	Not applicable	NO	NO
Support of waste minimisation by	YES	Very high acceptance rate of home composting; widespread use of existing recycling possibilities; change in consumer behaviour towards avoidance of waste-intensive products	Contributing information to politicians and the public	NO
Hindering of waste minimisation by	NO	Landfill disposal fees are unpopular and have increased illegal dumping.	None	NO
Influence on waste minimisation/ overall contribution	<p>50% in policy</p> <p>75% in implementation</p> <p>“Major” contribution</p>	<p>25% in policy</p> <p>15% in implementation</p> <p>“Average” contribution</p>	<p>25% in policy</p> <p>10% in implementation</p> <p>“Average” contribution</p>	<p>0%</p> <p>Insignificant contribution</p>
Is stronger influence foreseen?	Under consideration	Not foreseen	Not foreseen	Not foreseen

6. Key products and waste streams

In Denmark the following waste streams have the highest priority within the framework of waste minimisation:

	Wastepaper	Packagingwaste	Industrial/commercial wastes
Reasons for priority	CT available; recycling promotes sustainable use of natural resources	Quantity; recycling promotes sustainable use of natural resources	Quantity; quality; recycling promotes sustainable use of resources
Waste minimisation target	Increasing recycling rate The target is set out in: Danish Action Plan for Waste and Recycling 1993-1997; Order on Municipal Collection of Recyclable Material and Products from Private Households, No. 881 of 1986-12-11; Order on Municipal Collection of Recyclable Material and Products from Industrial Enterprises, No. 882 of 1986-12-11.	Ban on certain beverage containers The target is set out in: Order on Packaging for Beer and Soft Drinks, No. 124 of 1989-02-27, amended by Order No. 540 of 1991-07-09.	Planning ongoing
Instruments and measures	Plans and programmes	Mandatory instruments	No answer
Success and failure; experience	No answer	No answer	No answer

7. Costs and benefits

In the view of the government and consumers, waste minimisation measures have a positive effect on the economy. Industry considers that they have a neutral impact.

Denmark states that waste minimisation can be positively influenced by the use of **prices, duties or fees** as policy instruments. Waste minimisation had not lead to increased demand for and availability of low-waste products at the time of the survey.

8. Prospects and future approaches

No information provided at the time of the survey.

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FINLAND

Contact person

Mr. Hannu Laaksonen
 Ministry of the Environment
 P.O. Box 399
 00121 Helsinki

Tel: 358-0-199-19708
 Fax: 358-0-199-19716

1. Definitions, terms, concepts, and target-setting

In Finland **waste minimisation is not defined** in the Waste Act or in waste plans and programmes. However, all the key aspects of the OECD working definition can be found in the Waste Act (1072/93).

The **scope of waste** includes municipal waste, industrial waste, hazardous waste, agricultural waste, mining waste, and liquid waste, for example solvents and sewage sludge. It excludes radioactive and nuclear waste, as well as discarded explosives.

According to the Waste Act, thermal waste treatment without energy recovery, waste treatment prior to landfilling, and landfilling itself are not understood to be waste minimisation measures. Finland has not established criteria to distinguish thermal waste treatment from energy recovery.

The **hierarchy of waste minimisation measures** is set out in the Waste Act:

- Waste prevention has first priority;
- Re-use has priority over recycling;
- Recycling on-site has the same priority as recycling off-site;
- Reduction of toxicity and reduction of amount have the same priority;
- Material recycling has priority over thermal recycling with energy recovery; and
- Recycling has priority over landfilling.

This hierarchy is applied to product design, plant approval and operation, and waste disposal.

Finland's **waste minimisation priorities** for products, wastestreams and industrial sectors are shown in the following table. Criteria indicate why these priorities/targets have been set.

Waste minimisation priorities	Targets	Criteria
Products: Batteries and accumulators	Restrictions on mercury, cadmium and lead content	Reduction of hazardous waste components
Wastestreams: 1) MSW 2) Building waste 3) Industrial waste 4) Waste from mining/water and energy production 5) Twelve specific wastestreams	1) 15% reduction by 2005; recovery rate 50% by 2000, 70% by 2005; 2) 15% reduction by 2005; recovery rate 70% by 2005; 3) 15% reduction by 2005; recovery rate 70% by 2005. 4) Reduction per production unit; recovery rate 50% by 2005. 5) Recovery rates 70-90% by 2005	Minimising amount of waste to be finally disposed of, e.g. in landfills; recovery of material and energy
Industrial sectors: Pulp and paper industry, mechanised forestry, metal industry, food industry, chemical industry, SMEs, mining, water and energy management, agriculture and farming	Quantitative and qualitative targets for development of cleaner technologies, as well as reduction and recovery of wastestreams	

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Ministry of the Environment	Setting of priorities, participation in the enactment of laws (together with Regional Environment Centres and municipalities), strategic planning, international co-operation
Finnish Environment Institute	Scientific support, information provision and public relations
Statistics Finland	Statistics

Finland has a central government. The country is divided in 13 regions with Regional Environment Centres.

Responsibility for participation in the enactment of laws is shared with the Regional Environment Centres and with municipalities. Approval and control of plants are tasks of the regional and municipal environment authorities (boards).

3. Waste legislation

In Finland the central law in regard to waste management is the **Waste Act (1072/93)**. This law includes regulations on waste minimisation.

Regulations on waste minimisation are also set out in the **Chemical Act**, the **Water Act** and the **Air Pollution Control Act**.

At the time of the survey, no integrated environmental legislation had been passed. A legislative proposal designed to implement the EU Directive on integrated pollution prevention and control (IPPC) was under preparation.

Regulations are in force for the following key waste streams/products:

- batteries and accumulators;
- waste oils;
- tyres; and
- sewage sludge.

In the future, Finland has decided to integrate taxes, fees and other economic instruments into waste minimisation legislation. A further need is seen for regulations on specific waste streams. Finland indicates it would be willing to emphasise the responsibility of producers through Extended Producer Responsibility schemes, e.g. for WEEE.

4. Key instruments

a) Plans and programmes

In Finland both mandatory and voluntary plans and programmes are in force. In regard to waste minimisation, they cover MSW, key industrial sectors, key waste streams and products, R&D, and enforcement control.

Plans and programmes are set up by national, regional and municipal authorities. National and regional authorities must draw up plans and programmes. With the exception of provisions in the Waste Act concerning the movement of waste, these plans and programmes are not binding.

<p><u>Plans and programmes—selected examples</u></p>	<p>1) National Waste Plans (mandatory) (1996-2005) : Set up by the Ministry of the Environment and applicable to MSW, industrial waste, and specific waste streams. General and waste-specific targets and measures are defined; a description of the state-of-the-art is given. The impact of measures on the economy and the environment is shown, as well as the monitoring and control necessary for actions. The plans include mandatory provisions when waste movements are concerned.</p> <p>2) Regional Waste Plans (mandatory) (1996-2005) : Set up by Regional Environment Centres. They contain information identical to that in waste plans at the national level.</p> <p>3) Development Programme on Waste Research 2000: The programme was set up in 1992 by the Advisory Board for Waste Management. It contains objectives and key points of waste-related R&D: reducing waste generation and contaminants, recycling and recovery, waste treatment, environmental impacts, communication and information.</p> <p>4) Municipal Waste Management Plan (voluntary): In several municipalities.</p>
<p>Experience/ effectiveness</p>	<p>1) The implementation of plan-related measures has increased waste management costs at national, municipal and industrial level. Economic obstacles can be expected.</p>
<p>Is stronger application foreseen?</p>	<p>YES Finland indicates it would be willing to follow up implementation of plans more effectively than in the past.</p>

b) Mandatory instruments

In Finland very few legally defined technical standards are applied. However, waste minimisation regulations are integrated into licensing processes.

Although Finland does not apply technical standards to control waste minimisation, **bans and restrictions** are in widespread use. They cover product use and obligations to take back end-of-use products.

<p><u>Bans and restrictions</u> – selected examples</p>	<p>1) Council of State Decision on Batteries and Accumulators Containing Hazardous Materials (105/1995): Applicable for batteries containing mercury, cadmium and lead. Batteries with a mercury content >0.025% are not to be manufactured and sold. Batteries must be labelled. Products are banned unless batteries can be easily removed by user.</p> <p>2) Council of State Decision on Recovery and Treatment of Waste Tyres (1246/1995): Manufacturers and importers are obliged to organise the take-back and recovery of waste tyres.</p> <p>3) Bans and restrictions regarding landfills : Issued by the competent authorities, usually together with the approval/licensing of landfill operation.</p>
<p>Experience/ effectiveness</p>	<p>The overall effectiveness of bans and restrictions is rated as good.</p> <p>2) In force only since 1 June 1996. Collection rate is 60-70%. About 50% of the collected amount is recovered either as material or energy. Acceptance by manufacturers and importers is high; no economic impacts on the government, but there are additional costs for the manufacturer and importer. Finland expects problems because of free-riding and the lack of recovery capacities.</p>
<p>Is stronger application foreseen?</p>	<p>YES Planned: A national regulation on landfill operation was expected to be issued in late 1996. Regulations on biological waste, waste paper, packaging, end-of-life vehicles, and CD waste are in preparation. WEEE is another subject of future interest.</p>
<p>Miscellaneous</p>	<p>For refillable bottles and recyclable cans, deposit-refund schemes are in operation. There is a ban on burning waste oil in small incinerators.</p>

c) Economic instruments

There are **taxes and duties** on waste-intensive products and on the treatment and disposal of waste.

Financial support and economic incentives are in widespread use for both MSW and industrial waste minimisation. Support is given for R&D, pilot plant design and construction, development of clean technologies, and consultancy services. It can be given foreco-balances and environmental auditing. Authorities at the national and regional level offer financial support which most often takes the form of subsidies.

Municipalities, industry, consulting companies, and NGOs apply for these funds.

<p><u>Taxes, duties or licenses, financial support, or economic incentives – selected examples</u></p>	<p>1) Tax on alcoholic beverages (Act 1471/94): Tax is charged on alcoholic drinks in non-refillable and non-recyclable containers (4 FIM/litre) and non-refillable but recyclable containers (1 FIM/litre). Beverages sold in refills are tax-free.</p> <p>2) Tax on sweets and soft drinks (Act 1474/94): Tax is charged on soft drinks in non-refillable and non-recyclable containers (4 FIM/litre) and non-refillable but recyclable containers (1 FIM/litre). Soft drinks sold in refills are tax-free.</p> <p>3) Waste oil charge (Act 894/86): Manufacturers and importers of lubricating oil are obliged to pay 250 FIM (approximately US\$ 50) per tonne of oil. This revenue is used to subsidise collection, recovery and disposal of waste oil and clean-up of oil contaminated sites.</p> <p>4) Research subsidies (Ministry of the Environment, 1980-): Funds for R&D in the area of waste minimisation; recipients are industry, research institutes and NGOs.</p> <p>5) Research and development subsidies (Technology Development Centre, 1980-ongoing): Subsidies for clean technologies and environmental protection.</p> <p>6) Grants for the promotion of environmental protection (Ministry of the Environment and Regional Environmental Centres, 1987-1995, 1996-): Subsidies for R&D and experimental work on waste management and environmental protection in general. Projects covering clean technologies and waste minimisation are preferred.</p> <p>7) Landfill tax (1996): Landfilling MSW is subject to a tax of 90 FIM (approximately US\$20) per tonne. A comparable tax on industrial waste was under consideration at the time of the survey.</p>
<p>Experience/ effectiveness</p>	<p>1), 2) Alcohol and soft drinks in non-refillable containers have been taxed since the late 1970s. For this reason the percentage of non-refillable containers is rather low, at 5-10%. The tax on non-refillable beverage packaging has proved highly effective.</p> <p>3) The charge was established in 1987. At the time of the survey, the recovery rate was about 75-80% (no information given on means of recovery). The oil industry opposes this charge. The “average” yearly revenue is about 20 million FIM (approximately US\$4 million). Altogether the waste oil charge has proved very efficient.</p> <p>3), 4), 5), 6) Subsidies and other forms of financial support have proven effective. The combination of the waste oil charge and the ban on burning oil in small incinerators has been shown to be effective.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p>
<p>Miscellaneous</p>	<p>3) Waste oil may only be incinerated in units >5 MW.</p>

d) Suasive instruments

In Finland the central, regional and municipal administrations provide information and advisory services to private households and industry. Information and databases on the state-of-the-art in waste minimisation are available to the public. **Statistics Finland** supplies statistical data. The **Finnish Environment Institute** and the Regional Environment Centres of all 13 regions provide information services to industry, businesses and private households. NGOs supply information, especially to private persons and households.

In the future, there will be an intensification of efforts to provide information on waste regulations and on possibilities to reduce waste quantity and quality, as well as to increase waste recovery.

Facilities exist for trading recycled goods and waste (waste exchanges). Municipalities are obliged to provide all the information necessary to implement the Waste Act and regulations passed thereunder.

Finnish enterprises use Environmental Management Systems, environmental reports, waste balances and eco-labelling.

e) Conclusions

At the time of the survey, Finland clearly gave highest priority to economic, mandatory and suasive instruments, as they were regarded as the most effective. Plans and programmes were considered less effective. It was felt that bans and restrictions, and activities to extend producer responsibility, might lead to distortions in international trade unless legal requirements were uniform in all countries. Nevertheless, Finland indicated it would be willing to intensify producer responsibility for environmentally friendly product manufacturing through legally binding regulations.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersand private households	Environmentalgroups andotherNGOs	Wastedisposalindustry
Basicposition onwaste minimisation	Neutral	Supportive	Stronglysupportive	Neutral
Participation inwaste legislation obligatory?	Industryandassociations participateinlegislationvia committees,etc.	Consumer associations participatelike industry	Participationvia committees,etc.	Participationvia committees,etc.
Supportof waste minimisation by	Noanswer	Noanswer	Informationtothe public;majorinfluence onpublicawareness, participationin legislation	Noanswer
Hinderingof waste minimisation by	Reluctanttowardstaxesand additionalfees	Noanswer	Notapplicable	Noanswer
Influenceon waste minimisation/ overall contribution	Influenceonpoliticaldecision-makingregardedashigh	Noanswer	Describedas“medium”	Noanswer
Isstronger influence foreseen?	YES	YES	YES	YES

6. Key products and waste streams

Past	Present	Future
Wastepaper	Packaging	CDwaste
Municipal sewage sludge	Sewage sludge	Packaging
Oil waste	Biowaste	WEEE
Glass	Tyres	End-of-use vehicles
Metals scrap		Plastics

Key products and waste streams are listed in the National Waste Plan up to 2005 .

Finland identified three waste streams of high priority within its waste minimisation policies: **packaging waste** , **WEEE**, and **CD waste** .

	Packaging waste	WEEE	CD waste
Reasons for priority	Quantity; recycling promotes sustainable resource management; educational reasons	Recycling; hazardous materials	Quantity; recycling
Waste minimisation target	Prevention of generation; increase in recovery rate	No answer	No answer
Instruments and measures	Plans and programmes, duties and taxes, information and public relations through Council of State Decision on Packaging Waste issued in 1996; deposit-refund for refillable bottles and aluminium cans	Waste Act; Extended Producer Responsibility	Council of State decision under preparation
Success and failure; experience	The tax on non-refillable beverage packaging has proven most effective. Essential steps for successful implementation are to agree on responsibility-sharing between municipalities and producers, and to ensure sufficient capacities for recovery.	No answer	No answer

Collection and recycling rates for MSW components are shown in the following table. The responsibilities of private households in regard to collecting waste separately (and other requirements) vary from one municipality to another.

Type of waste, component	Collection rate	Recycling rate (% of collected total)
Organic fraction	10%	100%*
Waste Paper	approximately 60%	100%*
Glass	45%	100%*
Tin cans and other metals	No answer	No answer
Plastic and paper packaging	34%	100%*
WEEE	17%	100%*
Waste tyres	60-70%	50%

* In general, 100% of the collected total is being recycled. No information was available on the amount of waste resulting from the recycling processes.

7. Costs and benefits

In Finland, **prices** have been used as an instrument to support waste minimisation. High prices for the landfilling of sewage sludge have encouraged recovery; high prices for the final disposal of hazardous waste have encouraged reduction and recovery of waste.

8. Prospects and future approaches

For the future, Finland has set the following targets:

- Increasing producer responsibilities for different products;
- National regulations on producer responsibility may lead to the distortion of competition within international trade if other countries enact different regulations on the same products. This applies to bans and restrictions, as well;
- Harmonization of regulations concerning producer responsibility in OECD countries in order to avoid distortion of competition.

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Council of State Decision on the Use of Sewage Sludge for Agricultural Purposes.

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FRANCE

Contact person

M. Alain Strebelle
Ministère de l'environnement
Direction de la Prévention des pollutions et des risques
Sous-direction des produits et des déchets
20 Avenue de Ségur
75302 Paris 07 SP

Tel: 33-1-42-19-15-51
Fax: 33-1-42-19-14-68

Acronyms

ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie (Environment and Energy Control Agency)
ICPE	Installations classées pour la protection de l'environnement (Classified Installations for Environmental Protection)
ILEC	Institut de liaison et d'étude des industries de consommation

1. Definitions, terms, concepts, and target-setting

The **interpretation of the term** *waste minimisation* in French law is consistent with the OECD working definition. Article 1 of Law N° 92-646 of 13 July 1992 implicitly defines waste minimisation:

1° [...] preventing or reducing the generation and toxicity of waste, chiefly by weighing on the development and distribution of products;

3° [...] extracting value out of waste through re-use, recycling or any other action aimed at recovering from waste some reusable material or energy.

In addition, Law N° 92-646 of 13 July 1992 laid the groundwork for a policy centred around the optimal value recovery from waste and the closing of traditional landfills for raw waste. The notion of final waste (*déchet ultime*) was introduced in Article 1 of that law:

In the meaning of the present law, final waste is waste that is no longer amenable to further treatment under prevailing technical and economic conditions, especially through extraction of its valuable part or through reduction of its polluting or harmful characteristics.

Under Law N° 92-646 of 13 July 1992, only final waste that poses the least hazard for the environment will be allowed for storage. These overall goals are stated in the regulatory texts. Thus, waste disposal plans must include *measures recommended for preventing the increase in the generation of waste* , as well as *measures aimed at preventing the generation of packaging waste from households so as to promote re-use of these wastes* .

The **scope of waste** includes radioactive waste, dead animals, agricultural waste and discarded explosives. Liquid wastes and sewage sludges are also targeted by waste minimisation measures.

Waste minimisation measures are influencing consumption behaviour, the implementation of clean technologies, product design, recycling, re-use and recovery (on- and off-site). Incineration can be considered as recovery or disposal. Technical criteria are set in a regulation of 10 October 1996 on incinerators and facilities for the co-incineration of some special industrial wastes. These criteria are either (a) the annual rate of transformation of the recovered energy for specialised waste incinerators, or (b) the calorific content of waste for installations using waste as a substitute fuel.

The **hierarchy of waste minimisation measures** is set out in the modified law of 15 July 1975 on waste disposal. It is as follows:

- Waste prevention has priority over waste recycling;
- Re-use has the same priority as recycling;
- Recycling within the same production process has the same priority as recycling elsewhere;
- Reduction of quantity has the same priority as reduction of waste toxicity;
- Material recycling has the same priority as energy recovery; and
- Recycling has priority over landfilling.

The application of this hierarchy is mandatory according to Article 1 of the 1975 law.

France's **wasteminimisationpriorities** forproducts,waste streams,processesand industrialsectors are showninthe followingtable.Criteriaindicatwhythepriorities/targetshavebeenset.

Priorities	Targets	Criteria
<p>Products: End-of-lifevehicles</p>	<p>By2002,90%oftheweightofnewcarshastobe recovered.By2015,only5%willbedisposedof. Theaimsofautomobilemanufacturerswithregardto car designare: -cleancars, -easierdisassemblybefore shredding, -useofrecyclablematerials, -useofrecycledmaterials.</p>	<p>Largequantities</p>
<p>Wastestreams: Allsortsofwaste MunicipalSolidWaste Packaging Industrialwastepackaging Wasteoils Certain typesofspecial industrialwastes (arrêtedu18/12/92)</p>	<p>Banondirectlandfillingin2002 Separatecollectionrateof75% Recyclingrateof75%(ofamountcollected)by2002 Recoveryismandatory. Disposalinthenaturalenvironmentisprohibited. Incentivesaregivenforre-use,eitherasarawmaterial forrecyclingorregeneration,orasindustrialfuel. Thesewastesarenottowedtobedirectlylandfilled, i.e.withoutanypre-treatment.Theycanonlybe landfilledif: -theyarefinalwaste(“ <i>déchetsultimes</i> ”); -theyhavebeenstabilised. Forcertain typesofspecialindustrialwastes,this regulationmusthavebeenappliedsince30March1995; forothers,itwillcomeintoeffecton30March1998.</p>	<p>Seeabove Hazardousness Hazardousness;toxicity</p>
<p>Processes: Ironandsteelindustry Pulpandpaperindustry Mechanicalindustry Surfacetreatment Paintindustry</p>	<p>Foreachoftheseindustries,guidelineshavebeen developedwhichprovidealternativeproposalstowards reductionatsourceorrecoveryandmethodsto reducethevolumeofwasteinthosespecificauthorised industrialprocesses.</p>	
<p>Industrialsectors: Anyindustrialinstallation selectedbythecompetent authoritiesaccordingto toxicityorhazardousnesson theonehand,andquantityof wastegeneratedontheother hand(circulaireN°90-96du 28/12/90)</p>	<p>Aim:withinfiveyears,everyICPEtodevelopa“waste plan”inordertoprovideregulationsforwastedisposal.</p>	<p>Toxicity; hazardousness; quantity</p>

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Ministry for the Environment, Directorate for the prevention of pollution and risks, Waste and product division – product environmental quality office and waste management	Setting priorities, drafting regulations for classified installations and waste management, decree and order-decree, circular, information and public relations, international co-operation
Environment and Energy Control Agency (ADEME)	Organisational missions on research, technical advice, heightening awareness and financial incentives in the development of clean technology and in waste disposal and recycling, international co-operation
French Environmental Institute (IFEN)	Statistical service, develops statistical methodologies and disseminates scientific and statistical documents, international co-operation
National Institute for Industrial Environment and Risks (INERIS)	Technical expertise, testing, research, studies and consulting, standardisation, certification and regulation, international co-operation

France has a central political and administrative system. Besides the central government, there are 22 *régions* and 97 *départements* with their own governmental bodies.

Strategic planning for waste management is done on different levels: by the national government itself, and on the regional and departmental level by the respective authorities. Approval and control tasks are delegated to administrative bodies at the regional and departmental levels as well. Several entities of the national government (DRIRE, DDE, DDAF, DDASS) take part in the development and follow-up of waste management plans:

- DRIRE: Regional Department for Industry, Research and the Environment;
- DDE: District Infrastructure and Equipment;
- DDAF: District Department for Agriculture and Forest; and
- DDASS: Department of Health and Social Services.

Water agencies provide financial aid to industrial firms for the disposal of special industrial waste (DIS) and subsidies for the creation of treatment centres for this type of waste. They provide a framework for the agreement of covenants for collective waste disposal facilities and waste collectors.

3. Wastelegislation

There is separate waste legislation in France, set out in the modified law of 15 July concerning waste elimination and reclamation of materials. The 1975 law has been modified by Law N° 92-646 of 13 July 1992 concerning waste disposal, and by the ICPE law. There are particular clauses for waste minimisation. The waste legislation was also supplemented by Law N° 95-101 of 2 February 1995.

The existing legislation centres on four main issues:

- **Cleaner production:** Approximately 2000 firms have been mandated to perform waste studies. These studies are conducted in three steps, whose purpose is to provide: (a) a good knowledge of the waste produced by each firm; (b) a technical and economic evaluation of solutions to be implemented in order to reduce the generation of waste and of final waste; and (c) a basis for concrete development measures.
- **Waste disposal plans:** These plans must ensure that effective waste management systems are implemented, by studying the needs of waste transformation facilities in particular.
- **Waste storage:** The legal deadline for limiting the quantity of landfilled waste has been set for July 2002.
- **A tax collected by ADEME** promotes the development of innovative treatment technologies. The proceeds from this tax contribute to the construction of waste treatment facilities.

The Environment Ministry also contributes to the development of voluntary measures in the field of separate waste collection and recycling. These measures are especially aimed at dental fillings, and construction and demolition waste.

Industrial and agricultural installations likely to generate risks or pollution and nuisances are subject to the law of 19 July 1976 concerning classified installations for the protection of the environment (ICPE). This regulation is based on an integrated approach to environmental protection, i.e. one which considers all emissions and effluents (water, air, noise, waste). In France, approximately 500,000 installations are required to submit a declaration. Some 68,000 sites include at least one installation requiring an authorisation for operation.

4. Key instruments

a) Plans and programmes

In France only mandatory plans and programmes exist. They are developed at the national, regional and local level and must specify the measures which need to be taken in order to prevent the increase of waste. They cover MSW and key industrial sectors.

<p><u>Plans and programmes – selected examples</u></p>	<p>1) Regional waste management plans for hazardous waste: These plans give information on waste types and quantities, and wastes to be recycled and disposed of, and describe the appropriate waste management measures within the region's waste treatment and disposal facilities. Setting up these plans and having them approved is mandatory.</p> <p>2) Waste management plans for MSW in <i>départements</i>: Similar to the above-mentioned plans.</p> <p>3) General Agreement on the disposal of unserviceable vehicles (1993): This is a voluntary agreement between the automobile industry and the government on the recycling and disposal of end-of-life vehicles. The agreement covers the entire industry. Its goals are for design, recycling, processing of unserviceable vehicles, and disposal.</p>
<p>Experience/ effectiveness</p>	<p>Eighteen regional plans and 65 <i>département</i> level plans have been adopted. Regional plans provide for the construction of a network of storage installations well distributed throughout the territory. Regional plans contain numerous recommendations and mandatory measures on material transformation.</p>
<p>Is stronger application foreseen?</p>	<p>Fourteen <i>département</i> level plans have been subjected to public enquiry. Inter-regional co-operation must be pursued further. The coverage of regional plans will have to be limited to hazardous waste.</p>

b) Mandatory instruments

<p><u>Bans and restrictions – selected examples</u></p>	<p>1) Décret du 1^{er} avril 1992, concerning packaging waste from households: Industries using packaging are collectively responsible for reclamation and elimination of packaging from consumer goods.</p> <ul style="list-style-type: none"> • They can collect and transform waste themselves (for instance, the pharmaceutical industry with the CYCLAMED programme); • They can participate in the “Eco-Emballages” programme. In this case, the collection and transformation system to which they contribute is agreed and operated directly by the local governments. <p>2) Décret No. 94-609 du 13 juillet 1994, concerning packaging waste from industrial and commercial sectors:</p> <p>Since 21 July 1995, such packaging wastes have to be recovered by agreed ICPE.</p>
<p>Experience/ effectiveness</p>	<p>MSW packaging : In 1995, 6.14 million tonnes of packaging from households was produced. 420,000 tonnes of this waste was recycled with the financial support of Eco-Emballages [127,000 t of steel out of a total of 500,000 t (25%); 1,200 t of aluminium out of a total of 30,000 t (4%); 24,000 t of cardboard out of 1.8 million t (1.3%); 12,000 t of plastics out of 1.2 million t (1%); 256,000 t of glass out of 2.3 million t (11%)]. After three years of existence, Eco-Emballages signed contracts in August 1996 for separate collection and sorting of different materials with 128 local communities representing about 19.6 million inhabitants, 8.1 of whom are directly involved in sorting at source.</p>
<p>Is stronger application foreseen?</p>	<p>Through an increase in the number of contracts, Eco-Emballages aimed to cover 37 million inhabitants in 1997, 12.5 of whom would benefit from separate collection contracts.</p> <p>Eco-Emballages’s objective for 1998 is to recycle 250,000 t of steel, 10,000 t of aluminium, 180,000 t of carton, 60,000 t of plastics, 1.2 million t of glass, i.e. 1.6 million tonnes of packaging which will be recycled.</p>

c) Economic instruments

There are **taxes and duties** on waste treatment and landfilling.

<p><u>Taxes, duties or licenses</u> – selected examples</p>	<p>1) Until 30 June 2002: Tax on landfilling of household waste and disposal of special industrial waste excluding landfilling:</p> <p>The tax amount is 30 FF/t in 1996, 35 FF/t in 1997, and 40 FF/t from 1998 to 30 June 2002. The amount of tax is <i>doubled for landfilling of special industrial waste</i>.</p> <p>Revenues from the tax on landfilling of household waste will be used to pay for the development of innovative technologies, rehabilitation of dump sites, and processing equipment. Revenues from the tax on special industrial waste are used to rehabilitate contaminated sites where the persons who caused the contamination cannot be found.</p> <p>These funds are managed by ADEME (“Fonds de modernisation de la gestion des déchets”).</p>
<p>Experience/ effectiveness</p>	<p>Generally regarded as effective</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>The tax on landfilled municipal solid waste and the disposal of special industrial waste is scheduled to increase to FF35/t in 1997 and FF40/t in 1998, and will remain at this rate until 2002.</p>

d) Suasive instruments

In France waste minimisation is encouraged through services offering information to private households and industrial waste producers. Industry has access to central information pools. Databases are available on state-of-the-art waste disposal technology. Public authorities run demonstration projects that serve as examples. Market facilities for trading recycled goods and end-of-use products are in operation.

<u>Information provision and public relations – selected examples</u>	In September 1996, publication of a catalogue on prevention of packaging waste to provide better information to consumers and promote production by industry of lighter, environmentally sustainable packaging
Experience/ effectiveness	No answer
Is stronger application foreseen?	Creation of the Packaging Council (packaging industry, product manufacturers, retailers, Eco-Emballages, ILEC, environmental organisations, consumer organisations). This is a neutral body responsible for developing a Code of Good Practices for packaging and disseminating information on waste prevention, recycling possibilities, etc.

<u>EMS, environmental reports and eco-labelling – selected examples</u>	<p>1) Eco-labelling</p> <p>Waste minimisation is taken into consideration as one of the environmental issues related to product design. It often appears in the French eco-label “NF-ENV”, for example on trash bags, paints and varnishes, glues, vacuum cleaners, individual composting appliances, etc. or in the European eco-label, for example on washing machines, refrigerators, electric bulbs, detergents, etc.</p> <p>2) Eco-product Prize (Prix Eco-produit)</p> <p>The Eco-product Prize rewards design of a product that is the most environmentally friendly at every stage of its life-cycle. It is awarded every two years by the Assembly of the French Commerce and Industry Chambers (ACFCI).</p>
Experience/ effectiveness	No information available
Stronger application in the future?	<p>The following categories of products have applied for an NF-ENV eco-label:</p> <ul style="list-style-type: none"> • glues for floor covering, • vacuum cleaners, • school and office furniture.

e) Conclusions

No information was provided at the time of the survey

5. Key players and their roles in waste minimisation

No information was provided at the time of the survey

6. Key products and waste streams

Past	Present	Future
Packaging waste	Packaging waste	Packaging waste
Waste oils	Waste oils	Waste oils
	End-of-life vehicles	End-of-life vehicles
	End-of-life batteries and accumulators	End-of-life batteries and accumulators
	Construction and demolition wastes	Construction and demolition wastes
	Asbestos wastes	Asbestos wastes
		PCBs
		Waste tyres
		Electrical and electronic waste
		Medical waste

Recycling rates for several types of waste are shown in the following table:

Type of waste	Recycling rate
Paper and board	43%
Glass	46%
Plastics	8%
Metals	33%
Mineral and synthetic oils	30%

7. Costs and benefits

No information was provided at the time of the survey.

8. Prospects and future approaches

No information was provided at the time of the survey.

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GERMANY

Contactperson

Mr. Andreas Jaron
Ministry of Environment, Nature Conservation and Nuclear Safety
Ahrstrasse 20
53175 Bonn

Tel: 49-228-3052-570
Fax: 49-228-3052-398

Acronyms

BImSchG	Federal Immission Control Act (Bundesimmissionsschutzgesetz)
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit)
KMU	Small and medium-sized enterprises (Kleine und mittlere Unternehmen)
TA	Technical Instructions (Technische Anleitung)
UBA	Federal Environmental Agency (Umweltbundesamt)
WMA	Waste Management Act (Kreislaufwirtschafts- und Abfallgesetz)

1. Definitions, terms, concepts, and target-setting

In Art. 3 (1) of the German Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal (Waste Management Act – WMA), the **definition of waste** is as follows: “... waste shall mean all movable property ... which the holder discards, or intends or is required to discard. ‘Waste for recovery’ is waste that is recovered, waste that is not recovered is ‘waste for disposal’”. This definition of waste corresponds to the definition given in EU waste legislation.

The **scope of waste** includes animal carcasses, agricultural waste and liquid waste, e.g. solvents and sewage sludge, but excludes radioactive waste and mining waste.

The **waste management hierarchy** is given in Art.4(1) of the WMA: “Waste

1. must, firstly, be avoided; this must be accomplished especially by reducing its amount and noxiousness;
2. must, secondly, a) be subjected to substance recycling or b) used to obtain energy (energy recovery).”

“Measures for **waste avoidance** include, especially, closed-cycle management of substances within plants, low-waste product design, and consumer behaviour oriented to the acquisition of low-waste and low-pollution products.” (Art.4(2))

“**Substance recycling** means substitution of raw materials through the extraction of substances from waste (secondary raw materials), or use of the substance properties within waste for their original purpose, or for other purposes, except for direct energy recovery. Substance recycling is considered to occur when, in keeping with an economic perspective, and taking into account the impurities present in the relevant waste, the main purpose of the relevant measure is to use the waste, and not to eliminate its pollution potential.” (Art. 4 (3))

“**Energy recovery** means the use of waste as a substitute fuel; the priority for energy recovery does not affect thermal treatment of waste for disposal, especially household waste. The main purpose of a measure in question shall be taken as the criterion for differentiation. For a given waste sample that has not been mixed with other substances, the type and extent of the waste’s impurities, and the additional waste and emissions occurring as a result of its treatment, are the criterion for determining whether the relevant waste management measure’s main purpose is energy recovery or treatment.” (Art.4(4))

However, in Germany **no definition of waste minimisation is given in a law**. The term *waste minimisation*, as it is applied in Germany, nevertheless corresponds with the working definition of the OECD. Waste minimisation includes the reduction of waste quantity and toxicity.

Waste minimisation means influencing consumer behaviour, implementation of clean technologies, recycling, re-use and recovery (on- and off-site), and thermal waste treatment with energy recovery. Germany has established comprehensive criteria concerning energy recovery in Art. 6(2) WMA: “...energy recovery is permissible only when 1. the thermal value of the waste in question, without the waste being mixed with other substances, is at least 11,000 kJ/kg, 2. a combustion efficiency of at least 75% is achieved, 3. the resulting heat is either used by the person/entity recovering the energy or supplied to a third party, and 4. further wastes produced during the recovery process can be landfilled if possible without further treatment.” The caloric value can be disregarded when renewable raw materials are used for energy recovery.

According to the German understanding of waste minimisation, thermal waste treatment without substantive energy recovery, waste treatment prior to landfilling, and landfilling itself are not waste minimisation measures.

The **hierarchy of waste minimisation measures** can be derived from the Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal (Waste Management Act – WMA), as already described above:

- Waste prevention/avoidance has first priority;
- Re-use has the same priority as recycling;
- Recycling on-site has priority over recycling off-site;

- Reduction of toxicity has the same priority as reduction of waste amount;
- Material recycling has (unless a different priority is given by an administrative ordinance) the same priority as energy recovery; and
- Recycling has priority over landfilling.

This hierarchy is to be applied by waste producers and disposal facility operators when deciding on the means of recycling or disposal.

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, BMU)	Setting of priorities and participation in the enactment of laws (both in co-operation with regional governments), strategic planning, information and public relations, international co-operation
Federal Environmental Agency (Umweltbundesamt, UBA)	Strategic planning, scientific support, information and public relations, international co-operation, and statistics

Germany is a federal republic. In addition to the central government (in Bonn and Berlin) there are governments and administrative authorities in the states (*Länder*).

Waste management legislation falls within federal concurrent competence, i.e. state legislation is only permitted in cases where the federal competence to issue legislation is not or is not fully used. Legislation (laws as well as ordinances and administrative regulations) in the area of waste management, however, generally require the consent of the second (state) chamber (*Bundesrat*).

The *Länder* and their ministries may only pass laws and regulations if they do not contradict federal laws.

Approval and control of disposal plant operation are delegated to regional and municipal authorities.

Some institutions at the regional level are also authorised to perform the tasks listed in the above table. Waste disposal itself, especially disposal of MSW, is usually in the hands of the municipalities. Regional and municipal institutions contribute a great deal to supplying information and initiating public relations campaigns.

3. Wastelegislation

In Germany the essential law in regard to waste management is the **Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal (Waste Management Act – WMA)**. This law includes comprehensive regulations concerning waste minimisation.

Regulations concerning waste minimisation are also included in the **Federal Immission Control Act (Bundesimmissionsschutzgesetz, BImSchG 1990)**. This Act is of particular importance with regard to waste avoidance in production processes. It contains a provision requiring that, during a production process, the generation of waste must be avoided according to the state-of-the-art (Art. 5 (1) No. 3). A number of administrative ordinances describe the state-of-the-art with regard to certain waste streams from certain production processes. These are binding for the authorities granting licenses and supervising the facilities. They can be enforced by orders of the responsible authorities also regulating the maintenance of the production process with regard to existing, already licensed facilities.

A law containing integrated environmental legislation is not in force, but many elements of integrated pollution control are part of the WMA and the Federal Immission Control Act. A draft was being drawn up and discussed at the time of the survey.

Regulations are in force for the following **key wastestreams/products** :

- Municipal Solid Waste (MSW) from domestic and commercial sources in general;
- the organic fraction of MSW (green waste);
- packaging material and plastic refills;
- waste oil and lubricants;
- hazardous industrial waste in general;
- halogenated solvents; and
- sewage sludge.

The regulations in effect differ in terms of successful enforcement. The **Decree on Packaging Waste (Verpackungsverordnung, 1991)** has been particularly effective. This decree caused a redesign of packaging to make it less waste-intensive. As a result, waste generation decreased and material recycling increased. Problems were identified with regard to the enforcement and control of the decree.

In the future, Germany is going to develop and improve its system of legal regulations on waste minimisation. The following approaches will be pursued:

- Waste producers which annually produce more than a total of 2,000 kg of waste requiring special supervision, or more than 2,000 tonnes of waste requiring supervision, per waste category, will prepare a waste management concept for the avoidance, recovery and disposal of the produced waste. The waste management concept serves as an internal planning instrument and must be submitted, upon request, to the competent authority for evaluation in connection with waste management planning. A corresponding decree was in preparation at the time of the survey;
- Public authorities will take more waste minimisation measures to serve as examples for others;

- Those responsible for disposal (municipalities, disposal operators) will be obliged to advise waste producers on appropriate waste minimisation measures;
- Amendment of the decree on packaging waste (Verpackungsverordnung);
- Amount-proportionated disposal fees were under discussion in several regions and municipalities;
- Since enforcement of some regulations is rather poor, efforts must be made to intensify control;
- Extension of the EPR (Extended Producer Responsibility) concept;
- Legal regulations will be introduced where voluntary agreements have not proven effective;
- Future regulations were planned for WEEE, end-of-use vehicles, batteries, and construction and demolition waste at the time of the survey;
- An ordinance on composting of organic matter was under preparation at the time of the survey.

4. Key instruments

a) Plans and programmes

In Germany both mandatory and voluntary plans and programmes are in force. With regard to waste minimisation, they cover MSW, hazardous waste, key industrial sectors, key waste streams and products, R&D, information, and enforcement control. Whether they contain voluntary or mandatory provisions differs from state to state.

Plans and programmes are set up and executed by regional and municipal authorities. The federal Ministry for the Environment sets up nation-wide programmes. Classified as most important are mandatory plans and programmes (regional and municipal) regarding MSW management and enforcement control. Plans define waste minimisation targets and describe necessary measures, including the required waste disposal facilities.

<p>Plans and programmes – selected examples</p>	<p>1) Regional Waste Management Programmes (e.g. Abfallwirtschaftsprogramm des Landes Schleswig-Holstein, 1991): Include the region’s basic policies on waste minimisation and final disposal; cover MSW and industrial waste. Provisions are not binding.</p> <p>2) Regional Waste Management Plan – Part 1: MSW and Part 2: Industrial Waste (Abfallentsorgungsplan Baden-Württemberg – Teilplan Hausmüll, 1987 und Teilplan Sonderabfall, 1996) : Part 1 describes waste minimisation measures to be applied in order to reach the target of recycling 50% of MSW within ten years. Target groups are consumers, businesses, and municipal and regional authorities. The plan’s provisions regarding industrial waste (with the aims of waste avoidance and recovery, required disposal facilities, authorised disposal facilities, suitable areas for landfills and other disposal plants) have been legally binding for waste producers and disposal facility operators since 1996.</p> <p>3) Regional Programmes on Prevention and Recycling of Hazardous Waste (e.g. Vollzugsprogramm zu § 13 BImSchG des Landes Niedersachsen, 1992): In Phase 1 waste-intensive industrial sectors and plants were identified and investigated, and possibilities to prevent and recycle waste were shown. Waste minimisation measures are going to be taken during Phase 2. The authorities control their implementation. The programmes were set up to improve law enforcement (obligation of plant operators to prevent and recycle waste).</p>
<p>Experience/ effectiveness</p>	<p>1), 2) Plans and programmes tend to lose their timeliness rapidly as technologies develop. Often financial aid programmes are set up to support plan realisation.</p> <p>3) Target group (industry) partly was not willing to co-operate, showing that acceptance still is not satisfactory. Difficulties occurred in identifying the waste-intensive industrial sectors or plants.</p>
<p>Is stronger application foreseen?</p>	<p>YES Future application in the areas of MSW, hazardous waste, and waste generated in plants that do not require legal approval for operation</p>

b) Mandatory instruments

Technical standards for waste minimisation in production and recycling processes are contained in the Waste Management Act (WMA), its regulations and administrative ordinances. Technical standards for waste minimisation in production processes are regulated in the Federal Immission Control Act, its regulations and administrative ordinances. This piece of legislation also sets out the requirements for the licensing of facilities, with the exception of landfills, which are regulated by the Waste Management Act.

Technical standards for solid waste treatment plants, incineration and sanitary landfilling (criteria for site selection, required technical features), and criteria concerning the quality of waste to be landfilled are set out in technical instructions that are similar in effectiveness to a decree.

<p><u>Technical standards – selected examples</u></p>	<p>1) Technical Instructions on Waste from Human Settlements (TA Siedlungsabfall, 1993): Contain technical standards for the construction of different types of landfills and necessary treatment facilities, requirements on landfill operation, information and documentation. Most important are the allocation criteria defined in Appendix B. Waste not meeting these criteria will usually require thermal treatment prior to landfilling. The instructions serve as guidelines for authorities. Disposal must fulfil these technical standards by 2005. The separate collection of waste, especially green waste, is mandatory. Residues from waste treatment processes shall be recovered in the best possible way.</p> <p>2) Technical Instructions on Hazardous Waste (TA Abfall, Teil 1, 1991): Contains technical standards for intermediate storage of waste, waste treatment facilities, landfills and geological dumps for hazardous waste. Appendix C contains waste categories and the appropriate disposal method for each category; priorities are given. Appendix D defines allocation criteria for landfills.</p> <p>3) Federal Immission Control Act, Art. 5 (1) No. 3 (Bundesimmissionsschutzgesetz, BImSchG 1990) : This provision requires that during a production process the generation of waste has to be avoided according to the state-of-the-art. Administrative ordinances describe the types of plants for which these provisions are mandatory, and the state-of-the-art with regard to certain waste streams from certain production processes. These are binding for the authorities granting licenses and supervising the facilities. They can be enforced by orders of the responsible authorities also regulating the maintenance of the production process with regard to existing, already licensed facilities.</p>
<p>Experience/ effectiveness</p>	<p>1) Technical standards have proven effective. Instructions require the rehabilitation of most German landfills and make pre-treatment of waste absolutely necessary. Technical facilities have to be installed.</p> <p>2) These technical instructions have considerably contributed to the increase in waste disposal standards. The information given in the above mentioned Appendices C and D play a major role.</p> <p style="text-align: right;"><i>(table continued on next page)</i></p>

<p>Technical standards (cont.)– Is stronger application foreseen?</p>	<p>YES</p> <p>Decree on Environmental/Waste Management Reports: A draft decree was under discussion at the time of the survey. According to this decree, waste management concepts and waste balances would become mandatory for companies generating more than 2 tonnes of hazardous waste per year. Records of waste generation and disposal would have to be kept.</p> <p>Issuing of statutory ordinances giving priority to substance recycling or to energy recovery for certain waste types.</p> <p>Issuing of obligations for plant operators to construct and operate plants in such a manner that waste is avoided, recovered or disposed of, following provisions from the Federal Immission Control Act.</p> <p>Requirements for closed substance cycle waste management, e.g., among others, restrictions on certain wastes, mandatory waste labelling requirements, separation, gathering, supply, collection (collect-and-brings systems), transport, storage. Certain waste types will be defined as for restricted circulation and specific recovery operation only.</p>
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Germany has enacted **production bans** in order to support waste minimisation (e.g. for PCBs). Laws concerning products exist in the form of product take-back obligations and deposit-refund schemes.

<p>Bans and restrictions– selected examples</p>	<p>1) Decree on Packaging Waste (Verpackungsverordnung, 1991): Relevant for packaging of all goods except hazardous substances. End-of-use packaging has to be collected and recycled (material, not thermal recycling) by commerce and manufacturers. Manufacturers and distributors can be released from individual take-back obligations by joining a nation-wide collection system. Therefore, industry has set up its own take-back and recycling system, the “Duales System”, financed by license fees. Deposits have to be charged on one-way packaging if the percentage of beverages sold in refillable packaging is less than 72%. The decree includes product labelling obligations.</p>
<p>Experience/ effectiveness</p>	<p>1) Packaging waste generation before 1991 was approximately 15 Mio t p.a.; a reduction of approximately 1.3 Mio t could be achieved; approximately 7 Mio t p.a. material is being recycled. Packaging design has changed towards light-weight, one-compound packaging. Acceptance by consumers is very good. Technical standards have led to large investments in collection and recycling facilities. Operational costs are high, but transferred to consumers via product prices. Free-riders (manufacturers) are reluctant to pay license fees. Technologies for material recycling and sorting still need technological development.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>Product take-back obligations for WEEE, batteries, end-of-use vehicles, construction and demolition waste</p>

c) Economic instruments

Taxes and duties are levied on waste treatment and disposal, and in some municipalities on waste-intensive products such as one-way tableware. Duties are charged by the regional governments only and differ according to taxation object and level.

<p>Taxes, duties or licenses – selected examples</p>	<p>1) Regional hazardous waste disposal duties (Sonderabfallabgaben in verschiedenen Ländern, 1991): Duty is charged when hazardous waste is not recycled but delivered for final disposal. Duties of that type are levied in several states (<i>Länder</i>). They have to be paid by producers of hazardous waste (both private and public). Duties range from US\$ 65-200 per tonne, depending on the toxicity of the waste. Duty is not relevant for producers of small amounts of waste and for consumers. Often financial aid programmes financed by duty revenues are set up to support development of clean technologies and prevention of waste.</p> <p>2) Regional Waste Disposal Duty (Abfallabgabe des Landes Schleswig-Holstein, 1994): Duty is similar to 1). In addition, operators of landfills and incinerators have to pay a duty in order to make material recycling more competitive. Duty is US\$ 17-60 per tonne for waste producers and \$ 17-50 for operators of landfills and incinerators.</p> <p>3) Municipal tax on one-way tableware (Kommunale Verpackungssteuer, Stadt Kassel, 1992): Tax is charged by local municipalities for the use of one-way tableware in fast-food restaurants and at concerts and other public events.</p>
<p>Experience/ effectiveness</p>	<p>1) In the view of the <i>Länder</i>, the duties have encouraged waste minimisation. Waste disposal has decreased by approximately 50%. Duties have led to a strong surge of waste recycling. Acceptance by waste producers is rather low. Duty revenues must be used for waste minimisation measures, e.g. information provision and support of clean technologies. In order to avoid the duty, some waste producers apply dubious recycling measures (e.g. incineration in cement factories instead of material recycling).</p> <p>2) Poor acceptance with waste producers and plant operators. Rate of waste prevention not exactly known (approximately 30% less). Generally, there is little economic effect on industry. Revenues must be used for waste minimisation measures.</p>
<p>Stronger application in the future?</p>	<p>NO Duties presently in force should be kept at the same level.</p>

Financial aid programmes and economic incentives are applied extensively for both MSW and industrial wasteminimisation. Financial aid is given for R&D, pilot plant design and construction, development of cleantechologies, consultancy services, eco-balances and eco-auditing. The main emphasis varies.

Authorities at all levels, as well as industry, offer financial aid (subsidies, low-interest credits, free-of-charge consultancy services). Universities, consulting companies, disposal facility operators, industry, public authorities, and municipalities apply for this aid.

<p><u>Financial aid and economic incentives – selected examples</u></p>	<p>1) Financial aid for R&D by e.g. the Federal Ministry for the Environment or Regional Authorities (Forschungsförderung): R&D support of waste recycling technologies and prevention measures, pilot plant construction and operation. Target groups are industry, universities, research institutes and regional authorities.</p> <p>2) Financial aid for investments in recycling facilities by Regional Authorities (Investitionsförderungsprogramme der Länder): Relevant for regional industry and disposal facility operators, support is given to pilot plant tests and R&D for waste minimisation measures at company scale.</p> <p>3) Financial aid programme for the implementation of environmental audits in SMEs (Small and Medium-Sized Enterprises) (Förderprogramm für KMU beim Aufbau eines Stoffstrommanagementsystems, Baden-Württemberg 1996): SMEs taking part in EU eco-audits can receive financial subsidies and free consulting services.</p> <p>4) Investment aid programmes by investment banks (Investitionsförderprogramme der Banken) : Similar to 2). Aid is given through low-interest credits. Target groups are private and public companies and disposal facility operators.</p>
<p>Experience/ effectiveness</p>	<p>Acceptance and effectiveness of financial aid programmes are generally very good. In the long run, they lead to decreased disposal costs for the waste producer. Application procedures are sometimes complicated and time-consuming, especially for SMEs. It is important to co-ordinate the programmes in order to avoid the support of measures that have contradictory effects. R&D aid is seen as a means to ensure companies' competitiveness, especially in the area of environmental technology.</p>
<p>Stronger application in the future?</p>	<p>NO In response to technological innovations, the financing institutions continuously adapt the target areas of their programmes. The total budgets available vary.</p>

d) Suasive instruments

In Germany information services on waste minimisation and the state-of-the-art in waste disposal technology are available to private households, commerce and industry. These services are run by national, regional and municipal institutions, by industrial associations, and by the local and regional Chambers of Commerce. On the national level the Federal Environmental Agency (Umweltbundesamt) disseminates information. On the municipal level waste advisors (*Abfallberater*) are responsible for information transfer to local businesses, industry and private households.

Waste exchanges are in most cases run by the Chambers of Commerce. The system has been improved and operates effectively.

<p><u>Information provision and public relations – selected examples</u></p>	<p>1) Provision of information to industry and commerce through Regional Waste Management Agencies (Zentrale Stellen, Beratungsagenturen, Koordinierungsstellen in verschiedenen Ländern): These agencies offer consulting services on industrial waste minimisation measures. They are often financed by the revenues from waste disposal duties. Tasks are organisation and logistical co-ordination of waste streams and disposal facilities within the region, and technical and financial aid for pilot testing of clean technologies.</p> <p>2) Provision of information to local businesses and consumers through recycling specialists at the public services department of local authorities (Kommunale Gewerbe-/Abfallberater): Recycling specialists disseminate information to consumers on separate collection of MSW, home composting, and purchasing of low-waste products. They try to increase public awareness through brochures and information campaigns. Local businesses receive support with regard to appropriate recycling facilities and information on waste minimisation measures. These services are mostly free for consumers and businesses.</p>
<p>Experience/ effectiveness</p>	<p>1) Effective in all industrial sectors, as companies generally realise financial benefits. In some cases industry shows little acceptance of consulting services offered by local or regional authorities. Pilot tests of clean technologies contribute to further development of the state-of-the-art in recycling.</p> <p>2) Separate collection rates could be increased. Success in influencing consumer behaviour is difficult to judge, as product advertisements (e.g. for soft drinks in cans) could have negative effects. Consumer-orientated PR campaigns need to be co-ordinated with education efforts in schools and universities. Information services on the municipal level are often limited by budget restrictions.</p>
<p>Is stronger application foreseen?</p>	<p>NO The intensity of information and PR campaigns should remain at the present level; it strongly depends on public spending.</p>

<p><u>EMS, environmental reports, and eco-labelling – selected examples</u></p>	<p>1) Implementation of Environmental Management Systems in industry and authorities: EMS are a voluntary management instrument. Companies that have decided to apply for eco-auditing certification must set up an EMS.</p> <p>2) Environmental/waste management reports (1996): According to this decree, waste management concepts and waste balances will become mandatory for companies that generate more than 2 tonnes of hazardous waste per year. Records of waste generation and disposal must be kept.</p> <p>3) Eco-labelling: Environmentally friendly products can be awarded an eco-label (<i>Blauer Engel</i>) if they meet certain criteria (e.g. use of recycled materials, low toxicity). The label informs consumers concerning product attributes. Examples are: remoulded tyres, products made of recycled paper, organic solvent-free paint, etc.</p> <p>4) Certification of specialised waste management companies: Such companies, as well as waste management associations, can apply for certification. Certified companies will have certain privileges within the waste management control system. Certification will require a supervision contract with a technical supervision organisation, which must be approved by the federal government.</p> <p>5) Company Waste Management Officer (Art. 54 Waste Minimisation): Certain waste-producing and waste disposal companies must appoint a waste management officer. Similar duties are formulated in the Immission Control Act and the Clean Water Act (immission control and water protection officer). With regard to waste management, the following tasks and duties have to be fulfilled by the officer: to advise the plant operator and personnel on closed substance cycle waste management and on waste disposal; to supervise waste generation, treatment, recovery and/or disposal; to supervise compliance with existing legislation; to report on detected insufficiencies to the management; and to make proposals for necessary adjustments. These proposals should comprise environmentally compatible, low waste-producing processes and products and procedures for avoidance of waste, for re-use and recovery of used products, and for safe disposal of the remaining wastes. The officer is not responsible to the control and enforcement authorities. His duties are internal. The institution is established as an internalised control mechanism.</p>
<p>Experience/ effectiveness</p>	<p>1) At the time of the survey, only a few companies (mostly big companies or ecologically leading enterprises) had implemented an EMS.</p> <p>3) Eco-labelling is said to be an effective instrument for minimising waste generation. The label has positive marketing effects. However, effects measured in tonnes of waste prevented cannot be measured.</p>
<p>Is stronger application foreseen?</p>	<p>YES Environmental Management Systems; environmental concepts and balances at company level</p>

e) Conclusions

In Germany's persuasive instruments had shown little effectiveness at the time of the survey. The decree on packaging (a mandatory instrument) had demonstrated very good performance within a rather short period. Packaging waste generation had decreased significantly, and packaging design had changed towards lightweight, low-waste, single-compound packaging.

A dense network of information services is available to waste producers. Many institutions on the federal, regional and local level provide information and consulting services on waste minimisation.

In the future, the German Federal Ministry for the Environment intends to rely increasingly on voluntary agreements on waste minimisation measures between industry and government. For example, the German automobile industry has agreed to the take-back of end-of-use vehicles. Regulations will be passed only when voluntary agreements are unsuccessful, cannot be reached, or prove to be unsuccessful.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Neutral; strong resistance to mandatory instruments and disposal duties	Supportive; regulations are seen to be most effective	Strongly supportive	Supportive of all kinds of instruments
Participation in waste legislation obligatory?	YES Strong influence on legislation, mostly through comments on draft laws, lobbying, and the Ministry for Economic Affairs	Not applicable	YES Significant impact on public opinion; lobbying	YES Comments during process of passing laws; lobbying
Support of waste minimisation by	Construction companies have initiated separate collection of CD waste on-site and concepts for "intelligent demolition". The automobile industry has agreed to the take-back and recycling of end-of-use vehicles. Foundries have reduced the generation of used sand. Battery manufacturers have developed heavy metal-free batteries. Mutual agreement on sustainable development (including waste minimisation) between Bavarian government and industry (Umweltpakt Bayern, 1995). Industry and businesses use advertising and image campaigns to disseminate waste minimisation efforts. Associations supply information and support R&D.	Readiness to change consumer's behaviour and demand for low-waste products is reported as "average". Acceptance of home composting facilities and voluntary use of recycling facilities also "average".	Information to the public and politicians; development of waste minimisation concepts and policies	Depends on own (especially economic) interests. In general, recycling measures have more support than waste prevention activities. Activities to intensify recycling are taken in order to extend existing market areas (e.g. collection and composting of green waste, waste tyres) or to generate increased demand (e.g. recycling of WEEE). Recycling facilities are supplied when duties make waste disposal more expensive than recycling.
Influence on waste minimisation/ overall contribution	50% "Major" contribution	10% "Minor" contribution	30% "Medium" contribution	10% "Minor" contribution
Is stronger influence foreseen?	YES Extended Producer Responsibility, voluntary agreements have first priority. Regulations are necessary when industry is reluctant to take measures.	YES Necessary changes in behaviour need further support. Information, motivation and education are seen as very important.	YES	YES Quality of waste streams delivered for recycling/ re-uses should be improved through better collection and sorting systems. Obligation to have recycling technologies certified.

6. Key products and waste streams

Key products and waste streams are shown in the table below. Priorities differ within Germany, according to the waste minimisation measures that have already been taken in the regions. The information in the table therefore does not hold true for all German states (*Länder*). Priority waste streams are in some cases addressed in regional waste management programmes.

Past	Present	Future
CD waste, green waste, waste oil, glass, paper, packaging, paint and lacquer sludge, metal plating sludge, foundry sand, sewage sludge	WEEE, green waste, packaging, paint and lacquer sludge, metal plating sludge, foundry sand, sewage sludge	WEEE, end-of-use vehicles, packaging, sewage sludge

Germany provided specific information concerning its waste minimisation policies for three waste streams: **WEEE** (especially from data processing and telecommunications equipment), **end-of-use vehicles**, and **sludge from painting, grinding and metal plating**.

	WEEE	End-of-use vehicles	Sludge from painting, grinding, metal plating
Reasons for priority	Quantity and toxicity; scarce resources; manufacturing is waste-intensive.	Quantity and toxicity (partly); scarce resources; manufacturing is waste-intensive; disposal is very expensive.	Quantity, not toxicity; CT available; scarce resources; economic reasons; waste-intensive processes.
Waste minimisation target	Development of products containing less contaminants; product labelling to ease material recycling; easy-to-dismantle products; intensifying re-use after recycling	Development of automobiles containing less contaminants; product labelling to facilitate dismantling and material recycling; intensifying material re-use after recycling	Increased waste prevention (all types of sludge) and waste recycling (oil and metal-containing grinding sludge)
Instruments and measures	Plans and programmes; mandatory instruments (where sensible); information; recycling/disposal costs are part of product's price; return of end-of-use equipment should be free for consumers	Plans and programmes; information and public relations; possibly passing of a regulation (dependent on measures taken by automobile industry)	Plans and programmes; mandatory instruments; taxes and duties; financial aid; information provision and public relations.
Success and failure; experience	Measures not yet taken. Necessary financial support through municipalities (for PR campaigns) might be problematic.	Measures not yet taken. Technical standards regarding future automobile construction and recycling need to be established.	Generation of paint and metal plating sludge decreased significantly through combination of disposal duty, free consulting services for waste producers, and support of clean technologies.

Collection and recycling rates of MSW components are shown in the following table. They differ considerably, as collection systems and recycling facilities are not the same throughout the country. The figures given below show “average” rates.

Type of waste, component	Collection rate	Recycling rate (of collected total)
Organic fraction	50%	96%
Paper and cardboard	87%	100%
Glass	78%	100%
Tin and aluminium cans and other metals	65%	approximately 100%
Plastic and paper packaging	75%	97%
Batteries	35%	100%
Automotive batteries	95%	100%
Waste tyres	94%	98%
WEEE	no data available	estimated 10%
Textiles	estimated 70-80%	estimated 70-80%

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Decree on packaging waste	Packaging manufacturers and distributors	Development of innovative packaging; gain in international competitiveness
Draft of a decree on WEEE	Manufacturers of electric and electronic equipment	Development of new recycling technologies; industrial sector has taken technological leadership
High technical standards for waste disposal	All waste producers in industry, trade and commerce	Significant increase of recycling and disposal costs; large investments in state-of-the-art disposal facilities have boosted economy

In the view of the government, waste minimisation measures have a positive effect on the economy. Industry and consumers share the opinion that waste minimisation measures have no substantial economic impacts.

In Germany prices have had a strong influence on waste minimisation efforts, particularly with regard to post-industrial or production waste. Rising waste management standards have had a strong impact on disposal fees. Additionally, some federal states have introduced levies on waste disposal. This has had an influence on waste minimisation, as the following examples show:

- Higher disposal fees for commercial waste have led to increased recycling efforts by waste producers. The same is true for other disposal fees. In some cases waste producers choose low-quality recycling in order to avoid disposal fees. The setting of standards for good recovery practice is therefore of prime importance;
- Appropriate pricing of fees for the recovery of waste wood and construction and demolition waste can channel these waste streams to recycling facilities – away from disposal on landfills without any pre-treatment;
- Introduction of a disposal fee for end-of-user refrigerator has led to more cases of illegal dumping;
- Deposit-refund schemes are effective, are well accepted by consumers, and contribute to waste prevention (e.g. with regard to soft drinks, beer, mineral water, milk). Expensive and scarce landfilling capacities are relieved;
- Quantity-based fees for disposal of domestic MSW have led to reduction of waste generation by 25-40%.

Disposal fees have not been shown to influence the disposal behaviour of private households.

8. Prospects and future approaches

Germany has set the following targets for the future:

- At the international and OECD level: making efforts to improve prevention and recycling of commercial and industrial waste;
- At the international level: exchange of information on the state-of-the-art, in order to harmonize technical standards;
- Technical requirements concerning recycling and disposal facilities need harmonization on the international level, especially regarding the target of closing material cycles as far as possible;
- At the OECD level, the management of material cycles should be promoted as part of Environmental Management Systems in companies;
- Municipal waste must be treated according to the state-of-the-art. The input criteria for landfills (Technical Instructions on Waste from Human Settlements, Appendix B) require treatment of the waste prior to landfilling. At the time of the survey, these allocation criteria could only be achieved by thermal treatment.

The German Ministry for the Environment favours voluntary responsibilities, and mutual agreements between authorities and industry on waste minimisation measures, rather than regulations.

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ITALY

Contact person

Mrs. Loredana Musmeci
Istituto Superiore di Sanita
Laboratorio Igiene Ambientale
Viale Regina Elena 299
00161 Rome

Tel: 39-6-49902770

Fax: 39-6-44487083

Acronyms

ARF Applied Research Fund
TIF Technology Innovation Fund

1. Definitions, terms, concepts, and target-setting

In Italy the **definition of waste minimisation** corresponds to the working definition of the OECD. Waste minimisation denotes the reduction of waste amount and waste toxicity.

The **scope of waste** does not include radioactive waste, mining waste, dead animals, agricultural waste or discarded explosives. Waste minimisation measures are relevant for liquid wastes and sewage sludge.

Waste minimisation means influencing consumer behaviour, implementation of clean technologies, product design and recycling, re-use and recovery (on- and off-site), and incineration with energy recovery. The Italian understanding of waste minimisation is that incineration without energy recovery, treatment prior to landfilling, and landfilling itself are not waste minimisation measures.

Italy has not yet established criteria to distinguish incineration with energy recovery from other incineration processes. Possible criteria were being studied and were under discussion at the time of the survey.

There is not a **hierarchy of waste minimisation measures** in Italian legislation. According to the Italian understanding of waste minimisation, however, the following hierarchical structure is valid:

- Waste prevention has priority over waste reduction;
- Waste reduction and re-use have priority over recycling;
- Recycling within the same production process has priority over recycling in other processes;
- Reduction of quantity has no priority over the reduction of waste toxicity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

2. Political and administrative responsibilities

National bodies	Tasks, responsibilities
Ministry for the Environment	Setting of priorities, participation in the enactment of laws
Regions	Strategic planning
Various national scientific institutes	Scientific support
Ministry of Foreign Affairs	International co-operation

Italy's political and administrative system is centrally oriented. The country is divided into several regions, some of which have autonomous status.

3. Waste legislation

In Italy there is separate waste legislation. There was no integrated environmental legislation at the time of the survey. Provisions concerning waste minimisation were an integral part of waste legislation as a whole.

Italy is going to develop and improve its system of regulations concerning waste minimisation. Legislation on MSW, packaging waste, end-of-life vehicles, and WEEE was underway.

4. Key instruments

a) Plans and programmes

Italy has mandatory and voluntary plans and programmes, set up at national, regional and municipal level. Mandatory plans and programmes exist for MSW and key waste streams; voluntary ones cover key industrial sectors and key waste streams, R&D, and consultancy. Plans and programmes established by federal entities have a voluntary character only.

Plans and programmes – selected examples	No information given in response to the survey questionnaire
Experience/ effectiveness	Too little experience to judge
Stronger application foreseen?	YES In the field of MSW and industrial waste

b) Mandatory instruments

The Italian government has defined technical standards for reutilisation and recovery of waste. These standards refer to chemical/physical characteristics and atmospheric emission limits. They are legally binding for specific plants and recycling processes only. They are to be considered during plant approval and operation. These standards are adapted to the state-of-the-art.

Technical standards – selected examples	1) Decreto Ministeriale 5 settembre 1994: No detailed information given in response to the questionnaire 2) Decreto Ministeriale 16 gennaio 1995: No detailed information given in response to the questionnaire
Experience/ effectiveness	Most likely effective, but sufficient data unavailable 1, 2) No information given
Is stronger application foreseen?	YES For MSW and industrial waste

Italy has not enacted production bans or product restrictions. In some areas the construction of landfills is prohibited by law.

<u>Bans and restrictions:</u> selected examples	Not yet enacted
Experience/ effectiveness	Not applicable (see above)
Is stronger application foreseen?	YES Product take-back obligations planned for WEEE

c) Economic instruments

Taxes and duties are levied on raw materials, waste treatment and landfilling.

<u>Taxes, duties or licenses</u> – selected examples	1) Tax on landfill and incineration without energy recovery (1996): Tax is dependent on type of waste. Part of the revenues is used for establishing separate collection systems in municipalities, the construction of recycling plants, and the promotion of clean technologies.
Experience/ effectiveness	Not enough experiences so far
Is stronger application foreseen?	YES

Financial aid programmes and economic incentives have been set up. Financial aid is given for R&D, pilot plant design and construction, and development of clean technologies.

Financial aid is granted by federal and regional administrations. It can take the form of subsidies and low-interest credits. Governmental institutions, universities and research institutions, disposal facility operators, and industry apply for financial aid.

<p><u>Financial aid and economic incentives – selected examples</u></p>	<p>1) TIF – Technology Innovation Fund, (Law 46/1982): Fund managed by the Ministry for Industry whose purpose is to promote technological innovations in industry. Since 1990, end-of-pipe technologies and clean technologies, including waste reduction at source, have been funded.</p> <p>2) Three-year programme for environmental protection (1995): The programme is managed by the Ministry for the Environment and aims at establishing waste minimisation measures on the regional level by financing projects.</p> <p>3) ARF – Applied Research Fund (1982): The fund is managed by the Ministry of Scientific Research. It finances, among others, applied research in the field of waste minimisation.</p>
<p>Experience/ effectiveness</p>	<p>A detailed evaluation of effectiveness has not yet been carried out.</p> <p>1) Industry has shown particular interest in developing cleaner technologies and waste minimisation measures.</p>
<p>Is stronger application foreseen?</p>	<p>Not clear</p>

d) Suasive instruments

Some Italian regions have established information services for private households concerning separate waste collection. Public authorities run pioneer projects that serve as examples. Market facilities for trading recycled goods and end-of-use products are in operation. The Ministry for the Environment operates an information pool on environmental issues in general (waste minimisation matters included).

Italian companies use Environmental Management Systems, including environmental reports and waste balances. Eco-labelling systems exist.

<p><u>Information provision and public relations – selected examples</u></p>	<p>No information given in response to the questionnaire</p>
<p>Experience/ effectiveness</p>	<p>Insufficient information available</p>
<p>Is stronger application foreseen?</p>	<p>YES Mostly at the municipal level</p>

EMS, environmental reports and eco-labelling – selected examples	Large companies in particular have applied Environmental Management Systems, waste reports and waste balances (e.g. Fiat, Enichem, Zanussi)
Experience/ effectiveness	Application in progress, no definite experience at the time of the survey
Is stronger application foreseen?	YES

e) Conclusions

Based on the experience collected at the time of the survey, Italy favoured mandatory plans, programmes and instruments. Suasive instruments were regarded as of minor importance. Economic instruments and voluntary plans and programmes were considered to have medium priority with the federal government.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsandother NGOs	Wastedisposalindustry
Basicposition onwaste minimisation	Stronglysupportiveof voluntaryprogrammesand suasiveinstruments; resistancetomandatory instrumentsandplans;neutral towardseconomic instruments	Supportive	Noanswer	Noanswer
Participation inwaste legislation obligatory?	NO Consultationduringdrafting oflaws	Notapplicable	Noanswer	Noanswer
Supportof waste minimisation by	Industrialassociationsoffer informationandconsultancy servicestoindustry Productadvertisements,PR campaignsandinformation policiesinregardtowaste minimisationefforts	Consumers'willingnessto changeconsumption behaviourreportedas "average";goodacceptance ofexistingrecycling facilities;littlehome composting	Noanswer	Noanswer
Hinderingof waste minimisation by	Noanswer	Noanswer	Noanswer	Noanswer
Influenceon waste minimisation/ overall contribution	Noanswer	Noanswer	Noanswer	Noanswer
Isstronger influence foreseen?	YES Establishmentofmore responsibilityforend-of-life products	Noanswer	Noanswer	Noanswer

6. Key products and waste streams

No information provided at the time of the survey.

7. Costs and benefits

No information provided at the time of the survey.

8. Prospects and future approaches

No information provided at the time of the survey.

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JAPAN

Contact person

Mr. Kenji Nakamura
Ministry of Health and Welfare
Water Supply and Environmental Sanitation Department
1-2-2 Kasumigaseki, Chiyodaku
Tokyo 100-45

Tel: 81-3-3501-9671
Fax: 81-3-3502-6879

Acronyms

MITI Ministry of International Trade and Industry

1. Definitions, terms, concepts, and target-setting

Japan's **definition of waste minimisation** is set out in the Waste Management and Public Cleansing Law (Law No. 137 of 1970) and corresponds with the working definition of the OECD. This definition can also be derived from the Law for Promotion of Sorted Collection and Recycling of Containers and Packaging (Law No. 112 of 1995).

Waste minimisation is understood as a reduction of waste quantity and quality.

The **scope of waste** includes mining waste, agricultural waste, dead animals and liquid waste, e.g. solvents and sewage sludge, but excludes radioactive waste and discarded explosives.

According to the above mentioned definition, waste incineration with and without energy recovery is regarded as a waste minimisation measure. The same applies to waste treatment prior to landfilling and landfilling itself. In Japan thermal recycling is defined as incineration with energy recovery by electric power generation. Other incineration processes leading to the supply of steam are not understood to be waste minimisation.

The **hierarchy of waste minimisation measures** is set out in the Basic Environment Plan:

- Waste prevention has first priority;
- Re-use has second priority;
- Recycling into raw materials has third priority;
- If material recycling is not feasible for technical or economic reasons, heat recovery through incineration is applicable as a measure of recycling;
- Disposal of waste has the last priority;
- Within waste recycling the following hierarchy is defined:
 - Recycling within the original manufacturing process has priority over recycling in other processes;
 - Reduction of toxicity has the same priority as reduction of amount;
 - Material recycling has priority over thermal recycling with heat recovery; and
 - Recycling has priority over land filling.

These hierarchies are binding for product design, approval and operation of plants, and the selection of appropriate disposal measures/procedures.

Japan's **waste minimisation priorities** for waste streams are set out in the following table. Criteria indicate why these priorities/targets have been set.

Priorities	Targets	Criteria
Waste streams: 1) Packaging waste 2) Waste containing heavy metals 3) Waste oil 4) Waste acids and alkalis	1) Recycling rate of 100% for packaging made of plastics, paper, glass and metal 2)- 4) appropriate treatment and safe disposal	1) Rapid increase in amount generated 2) Waste is hazardous to human beings and the environment

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Institute of Public Health	Setting of priorities through e.g. life-cycle assessment of products; scientific support, international co-operation
Institute of Environment	Setting of priorities, scientific support, international co-operation
Institute of Industry and Technology	Setting of priorities, scientific support, international co-operation

Japan has a central government. Scientific support from the central government includes running schools for local authorities in order to educate technicians.

Waste minimisation priorities are also set at regional and municipal levels. The same applies to scientific support and waste disposal.

3. Waste legislation

In Japan the central law in regard to waste management is the **Waste Management and Public Cleansing Law** (1970), which includes regulations on waste minimisation. Regulations on waste minimisation are also set out in the **Water Pollution Control Law**, the **Air Pollution Control Law**, and the **Packaging Waste Recycling Law**.

The **Basic Environmental Law** (1993) comprises integrated environmental legislation.

Regulations are in force for the following **key waste streams/products** :

- Municipal Solid Waste (MSW) in general;
- organic fraction of MSW;
- waste paper;
- end-of-use vehicles;
- infectious waste (Infectious Waste Disposal Regulation): the regulation defines disinfection measures, and enforcement is fairly comprehensive although cases of illegal dumping occur;
- industrial waste in general (**Regulation on the Disposal of Hazardous Waste**): enforcement is reported to be “average”, with cases of inappropriate waste treatment and illegal dumping occurring.

In the future, Japan indicates it would be willing to tighten regulations on industrial waste and to extend regulations concerning producer responsibility. A regulation concerning the rehabilitation of illegal dumping sites is planned.

4. Key instruments

a) Plans and programmes

Both mandatory and voluntary plans and programmes are in widespread use in Japan. In regard to waste minimisation, they cover MSW, key industrial sectors, key waste streams and products, R&D, information, and enforcement control. Mandatory plans and programmes dealing with MSW, key industrial sectors, key waste streams, and approval and control set waste minimisation priorities at national, regional and municipal level. Plans and programmes are established and executed by national, regional and municipal authorities.

<p>Plans and programmes – selected examples</p>	<p>1) The Basic Environment Plan by the Environment Agency of Japan (12/1994): This plan sets out basic concepts and long-term objectives of environmental policy. It is based on the Basic Environment Law, enacted in 1993. Part III, Section 4 of the plan, which deals with Policies on Waste and Recycling, includes a hierarchy within waste disposal, defines the reduction in waste generation, and indicates recycling targets specific to waste streams.</p> <p>2) The Order of the Ministry of International Trade and Industry (10/1991): MITI set a target recycling rate of 55% for waste paper in 1994 and a utilisation rate of 55% for glass cullets in 1995.</p> <p>3) Council for Industrial Structure, Waste Disposal and Resource Reclamation Subcommittee Report (11/1990): The Council set target recycling rates of at least 60% for tin cans in 1995 and 60% for aluminium cans by the end of 1994.</p> <p>4) Packaging Waste Recycling Plan (4/1997): Mandatory plan establishing targets relevant to all manufacturers: recycling rate for PET bottles is 17,500t/year (1997-2001); that for glass cullets is 530,000-650,000t/year (1997-2001).</p>
<p>Experience/ effectiveness</p>	<p>4) This plan was not to come into force before 1997. Reduced national expenditure on disposal, whereas industry will have to pay recycling fees. Disposal infrastructure needs to be established. It might be difficult to extend the use of recycled products.</p>
<p>Is stronger application foreseen?</p>	<p>YES Establishing plans for waste paper and plastic (other than PET) recycling</p>

b) Mandatory instruments

Japan uses mandatory instruments for waste minimisation.

General technical standards referring to waste minimisation are set in the Waste Management and Public Cleansing Law. These standards deal with the appropriate management and recycling of domestic and hazardous waste streams. The regulations are binding for different production processes, including those involved in recycling. They are relevant for plant approval and operation, as well as waste disposal. An updating of technical standards is carried out according to technological innovations.

<p>Technical standards – selected examples</p>	<p>1) Waste Management and Public Cleansing Law (Law No. 137 of 1970) together with Cabinet Order for Implementation of Waste Management and Public Cleansing Law (Cabinet Order No. 300 of 1971) : The law’s target groups include all manufacturers and operators of disposal facilities. Comprehensive technical and other standards for collection, transport and disposal are set out in the Cabinet Order.</p> <p>2) Law for Promotion of Sorted Collection and Recycling of Containers and Packaging (Packaging Regulation) : The law defines obligations regarding sorted collection and recycling relevant for government, municipalities, industry, and operators of disposal facilities.</p>
<p>Experience/ effectiveness</p>	<p>In general, technical standards have proven effective.</p>
<p>Stronger application foreseen?</p>	<p>YES Japan wants to tighten technical standards for waste collection, treatment and disposal. The list of waste streams regulated should be extended.</p>
<p>Miscellaneous</p>	<p>There are technical standards for construction of a final disposal facility/landfill and treatment of hazardous waste.</p>

Japan does not use product bans, but it does use **product restrictions** to support waste minimisation. Restrictions apply to product labelling, deposit-refund schemes, and the obligation of producers and retailers to take back products after use. Product use is not restricted. The construction of landfills in certain areas and the landfilling of certain types of waste is regulated as well.

c) Economic instruments

Japan does not use taxes, duties or similar economic instruments to promote waste minimisation.

Financial aid is granted to strengthen waste minimisation efforts for both MSW and industrial waste. Support is given for R&D, pilot plant design and construction, development of clean technologies, consultancy services, eco-balances and eco-auditing.

All levels of authorities offer financial aid through subsidies and low-interest credits. Financial support is given to industry and to disposal facility operators. Universities and consulting companies do not apply for these financial resources.

<u>Taxes, duties or licenses, financial aid, or economic incentives – selected examples</u>	1) Subsidies for waste disposal facility construction: This financial aid is given by the national government (Ministry of Finance) to municipalities in order to promote the construction of technically appropriate waste disposal facilities.
Experience/ effectiveness	1) Financial aid is regarded as highly effective. Budget limitations restrict the amount given.
Is stronger application foreseen?	No information provided in response to the questionnaire

d) Suasive instruments

Japan provides information services on waste minimisation and the state-of-the-art in waste disposal to private households and industry. These services are run by national, regional and municipal institutions and by industrial associations. Facilities (markets) for trading recycled materials are operating.

Companies use Environmental Management Systems, reports, eco-balances and eco-labelling.

<p>Suasive instruments – selected examples</p>	<p>1) Group lectures on waste minimisation for citizens: Most municipalities provide group lectures for their citizens and disseminate information on waste collection and reduction, etc.</p> <p>2) General information service through the Ministry of Health and Welfare: PR campaigns via television, brochures, posters, and other media.</p> <p>3) Eco-labelling by the Environmental Agency: Several materials are eco-labelled to identify their environmental impacts. Labels must give information about material or product attributes (refer to paper, plastics, aluminium and steel).</p> <p>4) Environmental Management Systems (EMS): Within these systems, life-cycle assessments are established.</p> <p>5) Administrative support through the Ministry of International Trade and Industry: Dissemination of information to industry and businesses; setting of guidelines.</p>
<p>Experience/ effectiveness</p>	<p>1) Through information provision the popularity of recycling has increased.</p> <p>3) Results are essential for classifying products according to environmental impacts.</p> <p>4) Approximately 10% of all companies used EMS at the time of the survey.</p>
<p>Is stronger application foreseen?</p>	<p>YES No specific information given in response to the survey</p>

e) Conclusions

Japan uses all types of instruments, without indicating a preference for one specific type.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsandother NGOs	Wastedisposal industry
Basicposition onwaste minimisation	Supportive;activeresistanceto economicinstruments	Supportive;regulations areregardedasmost effective	Strongsupport	Neutral
Participation inwaste legislation obligatory?	Industryandbusinesses: YES Associations:NO	Notapplicable	NO	NO
Supportof waste minimisation by	Industry,businessesand industrialassociationstakeown initiatives(nospecific informationgiven);industrial associationssupplyinformation andsupportR&D,runtheirown wastetreatmentfacilities; productadvertisingandpublic relationscampaigns	Changeoccurringin consumerbehaviour (avoidingwaste-intensive products);theuseof homecompostingand recyclingfacilities describedas“average”; voluntaryrecyclinghas increasedsignificantly	Informationtothe publicand politicians;assistance incontroloflaw enforcement;policy-makingsuggestions; voluntarymaterial recycling	Noanswer
Hinderingof waste minimisation by	None	Reluctantetosupport separatecollectionandto refrainfrombuying overpackagedgoods	Notapplicable	None
Influenceon waste minimisation/ overall contribution	40%(influence) 30%(significanceforreaching targets)	40%(influence) 40%(significancefor reachingtargets)	10%(influence) 10%(significancefor reachingtargets)	10%(influence) 20%(significancefor reachingtargets)
Isstronger influence foreseen?	YES	YES	YES	YES

6. Key products and waste streams

Waste incineration had a very important role in the past, but efforts are now being made to intensify waste recycling, with the goal of a zero-emission production system. The separate collection of materials was a priority in the past, but today product labelling has some priority, with the goal of selection of products and materials according to their labelling (see table below).

Past	Present	Future
Waste incineration	Waste recycling	Zero emission
Separate collection of waste	Labelling of materials and products	Selection of materials and products

Within Japan's waste minimisation policy, the following two waste streams are regarded as most important: **packaging** and **industrial waste in general**.

	Packaging	Industrial waste
Reasons for priority	Quantity and toxicity; CT available; scarce resources; economic reasons	Quantity and quality; CT available; scarce resources; economic reasons
Waste minimisation target	Reduction of generation and toxicity	Reduction of generation and toxicity and increase in prevention and recycling rate
Instruments and measures	Plans and programmes; mandatory and suasive instruments, duties, taxes and financial support	Plans and programmes; mandatory (technical standards, bans and restrictions) and suasive instruments; financial support
Success and failure; experience	Obstacles may include the need to construct disposal facilities. It might be difficult to increase the recycling of products. Further measures are planned with regard to products made of paper and plastics	Technical standards set in regulations have proven effective. The need to develop new waste minimisation technologies might delay successes. Acceptance of these measures is generally good.

Recycling quotas for MSW components are shown in the following table.

Type of waste, component	Collection quota	Recycling quota (of collected total)
Glass	-	55%
Tin cans and other metals	-	60%

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Regulations	Businesses	Savings through reduction of disposal costs
Regulations	Manufacturers of packaging	Increased disposal costs

Government, industry and consumers share the view that waste minimisation measures have neither positive nor negative effects on the economy.

In Japan **prices** are used to support waste minimisation in the case of recycled goods, which are subsidised to facilitate and promote their trade on existing markets (price-lowering effect).

8. Prospects and future approaches

Suasive instruments have been particularly effective. Their use should be intensified at the national and international level. Mandatory instruments such as technical standards for the recycling of industrial waste are regarded as appropriate means of encouraging waste minimisation.

Making the packaging law a success is one of Japan's main targets.

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KOREA

Contact person

Mr. Byung-Seong Chun
 Permanent Delegation of Korea to the OECD
 2/4 rue Louis David
 75016 Paris, France

Tel: (33)(1)44.05.20.50
 Fax: (33)(1)47.55.86.70

1. Definitions, terms, concepts, and target-setting

In Korea there is **no formal definition of waste minimisation** in a national law or legal document. However, the Korean understanding of the term *waste minimisation* corresponds with the OECD working definition. Waste minimisation denotes the reduction of waste amount and waste toxicity.

The **scope of waste**, according to the Waste Management Act, does not include radioactive waste or medical waste. Waste minimisation measures cover liquid wastes.

Waste minimisation means influencing consumption patterns, improvement of manufacturing processes, implementation of clean technologies, product design and recycling, re-use or recovery (on- and off-site), and incineration with energy recovery. According to the general understanding and usage of the term, waste incineration without energy recovery, treatment prior to landfilling, and landfilling itself are not waste minimisation measures.

There are no fixed criteria to distinguish thermal waste treatment (incineration without energy recovery) from energy recovery (incineration with energy recovery).

The **hierarchy of wasteminimisationmeasures** is set out in the Waste Management Act (1993) and in the Act Relating to Promotion of Resources Saving and Reutilisation (1992). According to these mandatory documents:

- Wastepreventionhaspriorityoverwastereduction;
- Wastereductionandre-usehavethesamepriority;
- Recyclingwithinthesameproductionprocesshaspriorityoverrecyclinginotherprocesses;
- Reductionofhazardouswastehaspriorityoverthereductionofwasteamount;
- Materialrecyclinghasthesamepriorityasenergeticrecoverythroughincineration;and
- Recyclinghaspriorityoverlandfilling.

This hierarchy must be applied during product design and consumption. It is also relevant to the disposal of wastestreams.

Korea's **wasteminimisationpriorities** for products and wastestreams are shown in the table below.

Priorities	Targets	Criteria
<p>Products: Cars Whitegoods, home appliances</p> <p>Wastestreams: Packaging waste Bulky waste Food (organic) waste</p>	<p>Product design pro-recycling Product design pro-recycling</p> <p>Reduction of amount and promotion of recycling Promotion of recycling</p> <p>Reduction of amount and promotion of recycling</p>	<p>Not provided</p>

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Ministry of Environment (MOE)	Setting of priorities, participation in the enactment of laws, strategic planning, approval and control, information and public relations, international co-operation, statistics
MOE Waste Management and Recycling Bureau	Setting of priorities
MOE Waste Management Policy Division	Setting of priorities, participation in the enactment of laws, strategic planning
MOE Waste Recycling Division	Approval and control
National Institute of Environmental Research, and Korea Environmental Technology Research Institute	Scientific support
Statistics Office	Statistics

Korea's political and administrative system is centralised. Local governments have responsibility for the management of all general wastes (i.e. domestic waste and non-hazardous industrial waste). The national government is responsible for the management of hazardous industrial waste.

3. Waste legislation

In Korea there is separate waste legislation. Provisions concerning waste management and waste minimisation are primarily set out in the 1986 **Waste Management Act**, the 1992 **Act Relating to Promotion of Resources Saving and Reutilisation**, and the 1995 **Act Relating to Promotion of Construction of Waste Treatment Facilities and Support of Inhabitants Near the Facilities**.

Provisions pertaining to waste minimisation are also found in the 1990 **Toxic Chemical Control Act**.

Korea's waste minimisation approaches are based upon product liability, producer responsibility, and disposal standards.

4. Key instruments

a) Plans and programmes

Korea has several mandatory and voluntary plans and programmes. Voluntary plans and programmes deal with MSW, R&D and consultancy; mandatory ones are concerned with key industrial sectors, waste streams, and implementation and control. Programmes are established on the national, provincial and municipal level.

Plans and programmes are regarded as instruments of minor importance. More importance is given to R&D and consultancy programmes.

<p><u>Plans and programmes – selected examples</u></p>	<p>1) Comprehensive Waste Treatment Plan (1993): Set up by the Ministry of Environment, this voluntary programme contains middle- and long-term targets (1992-2001) for waste generation per capita. The main target is the minimisation of waste needing treatment prior to final disposal. The plan calls for rehabilitation of landfills: upper limit for waste volumes sent to landfills in 2002 is 45% of amount generated; 25% is to undergo incineration. The plan defines targets for technological development in order to catch up with more advanced countries.</p> <p>2) Master Plan for Resources Recycling and Reutilisation (1993): Five-year plan. Key objectives are increasing collection efficiency and restructuring production and distribution systems, in order to facilitate recycling. Promotion of demand for recycled goods. Action plans set standards for manufacturers of vehicles, metal cans and synthetic resins. The guidelines contain targets for reutilisation of waste resources for recycling businesses (waste paper, waste glass, scrap iron (cans), waste plastics). In order to facilitate separate collection and recycling, certain products must be marked with symbols or figures (product labelling).</p>
<p>Experience/ effectiveness</p>	<p>In general, plans and programmes have proven effective. Waste generation has decreased and the recycling rate has increased.</p>
<p>Is stronger application foreseen?</p>	<p>YES Especially with regard to industrial waste generators and manufacturing industries</p>

b)Mandatoryinstruments

Korea uses **technical standards** to support wasteminimisation. They are legally binding for specific branches, plants and production processes and for recycling operations and are continually adapted to the state-of-the-art.

Korea has enacted **production bans and product restrictions** to encourage waste minimisation. Restrictions concern product use, labelling of products, deposit-refund, and product take-back obligations.

Landfilling of specific types of waste is restricted by law.

<p><u>Technical standards, bans or restrictions—selected examples</u></p>	<p>1) Ordinance on packaging methods and packaging materials (1993, revised 1995): Manufacturers are recommended to use refillable containers. The use of specific packaging materials is prohibited for recycling reasons. Products subject to this ordinance are cosmetics (eye, hair products) and liquid and powder detergents. Packaging for transportation is not subject to this ordinance.</p> <p>2) Regulation on disposable waste: Certain restaurants and cafeterias are prohibited from using disposable dishes. The same applies to disposable lunch boxes.</p> <p>3) Waste Management Act (1986): This act provides standards and guidelines for waste storage, collection and transport.</p>
<p>Experience/ effectiveness</p>	<p>Technical standards have proven effective. Their implementation has led to a reduction of waste toxicity and to better waste disposal. Further standards are planned for incineration and landfilling.</p> <p>Bans and restrictions have proven effective. Their implementation has led to increased recycling and the reduction of the amount of packaging waste.</p> <p>1) The number of products available in refillable packaging has greatly increased.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>Establishment of standards for recycled products and of food (organic) waste regulations.</p>

c)Economicinstruments

There are **taxes and duties** on raw materials and waste-intensive products.

<p><u>Taxes, duties or licenses—selected examples</u></p>	<p>1) Deposit-refund system for producers and importers (1992): Producers and importers of recyclable goods (e.g. food and beverage containers, batteries, tyres, lubricants, televisions, air conditioners, washing machines) are required to make cash deposits which are reimbursed according to their performance with regard to the re-use or recovery of their products. The objective is to induce producer to re-use and recycle materials.</p> <p>2) Waste treatment charge system: Manufacturers which produce goods that are difficult to collect, treat or recycle, or are likely to render waste treatment difficult, are subject to a charge. This system applies to containers of toxic products, batteries, anti-freezes, fluorescent lamps, chewing gums, disposable diapers, synthetic resins, etc.</p>
<p>Experience/ effectiveness</p>	<p>Generally regarded as effective. Tax and duty revenues are spent on waste minimisation.</p> <p>1) Substantial increase in waste tyre, oil and battery collection rates. Because deposit rates are often set too low to cover collection and recovery costs, industry is reluctant to install collection systems and facilities.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p> <p>Expansion of deposit-refund system to cover more items and increasing treatment charges to cover costs of collection and treatment. Tax benefits for the recycling industry are planned.</p>
<p>Miscellaneous</p>	<p>Korea introduced a new waste collection fee for domestic waste, based on waste volume instead of a property tax on houses (as was the case before). This measure proved effective: waste generation was reduced substantially and the volume of recyclable waste increased. The new collection and fees system has been in force nationwide since 1995.</p>

Financial aid programmes and economic incentives have been set up for both MSW and industrial waste minimisation activities. Financial support is given for R&D, pilot plant design and construction, and development of clean technologies.

Financial aid is granted by national, regional and local governments and by industry. It can take the form of subsidies, low-interest credits, cost-free consulting services, and sureties. Governmental institutions, universities and research institutions, disposal facility operators, and industry apply for financial aid.

<p><u>Financial aid and economic incentives—selected examples</u></p>	<p>1) Technology Development Fund: Funding of the construction of recycling facilities.</p> <p>2) Tax exemptions: Recycled products are exempted from VAT; sales tax is reduced for the recycling industry by around 10-20%.</p>
<p>Experience/ effectiveness</p>	<p>In general, financial support programmes have been successful.</p>
<p>Is stronger application foreseen?</p>	<p>YES</p>

d) Suasive instruments

Korea has established information services for private households and industrial waste producers. Public authorities implement pilot projects. Market facilities for trading recycled goods have been created. All these are voluntary services.

Korean companies use Environmental Management Systems, including environmental reports and waste balances. Eco-labelling systems exist.

<u>Information and public relations – selected examples</u>	No information was provided at the time of the survey.
Experience/ effectiveness	At the time of the survey, suasive instruments were not considered to have proven effective.
Is stronger application foreseen?	YES

<u>EMS, environmental reports and eco-labelling – selected examples</u>	1) Eco-labelling programme (1992): Recycled goods and low-polluting products can be awarded the Eco-Mark.
Experience/ effectiveness	The general view is that EMS and eco-labelling programmes are effective instruments. 1) At the time of the survey, the programme was considered to have been ineffective. An Eco-Mark product purchasing inducement system was planned, together with PR campaigns.
Is stronger application foreseen?	YES

e) Conclusions

At the time of the survey Korea had a clear preference for mandatory instruments such as restrictions, technical standards and economic instruments (e.g. tax exemptions, charges and fees). Suasive instruments were not considered to have proven effective.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsandother NGOs	Wastedisposal industry
Basicposition onwaste minimisation	Supportiveofmandatoryand voluntaryprogrammesand suasiveinstruments,resistance toeconomicinstruments	Supportive;economic instrumentsandlegislation regardedasmosteffective	Supportive	Noanswer
Participation inwaste legislation obligatory?	YES	Notapplicable	NO	YES
Supportof waste minimisation by	Industryandassociationsuse productadvertisingandPR campaignstodisseminate informationonwaste minimisationefforts. Industrialassociationsoffer informationandconsultancy servicestoindustry.They operatedisposalfacilitiesand carryoutR&Dworkonbehalf ofindustry.Associationsrun wastecollectionssystemsforyesandwastelubricants. Producerresponsibilityexistsfor certainproducts.	Consumers'willingnessto changeconsumption behaviourisgood.Existing recyclingfacilitiesarewell accepted,butparticipationin homecompostingislow. Separatecollectionofwaste ismandatory.	Provisionof informationtothe publicandpoliticians	NO
Hinderingof waste minimisation by	Noanswer	Noanswer	Noanswer	NO
Influenceon waste minimisation/ overall contribution	40% "Major"contribution	30% "Major"contribution	20% "Minor"contribution	10% "Minor"contribution
Isstronger influence foreseen?	YES	YES	YES	YES

6. Key products and waste streams

Korea provides specific information concerning its waste minimisation policies for three key waste streams: **waste paper**, **commercial/industrial waste**, and **packaging**.

	Waste paper	Commercial/industrial waste	Packaging
Reasons for priority	Quantity; CT available; scarcer resources	Quantity; toxicity; CT available; scarcer resources; economic reasons	Quantity; toxicity
Waste minimisation target	Increasing recycling rate	Reduction of amount, increasing recycling rate, reducing hazard	Reduction of amount
Instruments and measures	Plans and programmes, mandatory instruments, duties and taxes, financial support, suasive instruments Legally binding provisions in the Act Relating to Promotion of Resources Saving and Reutilisation	Plans and programmes and mandatory instruments Legally binding provisions in the Waste Management Act	Plans and programmes, mandatory and suasive instruments Legally binding provisions in the Act Relating to Promotion of Resources Saving and Reutilisation
Success and failure; experience	Deposit-refund system and volume-based disposal fee have proven effective. Problems were encountered during establishment of the recycling system. Acceptance of measures is good. Further measures: economic instruments and product ban.	No information given in response to questionnaire	No information given in response to questionnaire

Some recycling rates for different types of waste are shown in the following table. The recycling rate for waste glass has declined due to increasingly widespread use of PET bottles and paper containers. The Korean Tire Industry Association introduced a waste tyre retrieval system in 1991. Waste tyres are also collected through other private agents. Waste lubricants are collected by agents organised under the Korea Lubricant Association.

Type of waste	Collection rate	Recycling rate (of collected total)
Waste paper	-	50% of total paper consumption (1994)
Waste glass	-	46% (1994)
Waste tyres	-	82% of total number discarded (1994)
Waste lubricants	-	none given in response to questionnaire
Household waste	-	15% (1994)
Industrial waste, i.e. non-hazardous and hazardous	-	61% (1994)

7. Costs and benefits

In the view of the government and consumers, waste minimisation measures have beneficial effects on the economy. Industry considers that waste minimisation measures have no significant economic impacts.

Korea states that **prices, duties or fees** can positively influence waste minimisation.

8. Prospects and future approaches

In the future, the Korean government will continue efforts to reduce the amount of waste generated.

At the OECD/international level, the following approaches will be followed:

- Voluntary instruments;
- Transboundary movement of waste needs co-ordination at the international level.

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THE NETHERLANDS

Contact person

Mr. Melchior Bus
 Ministry of Public Housing, Physical Planning and Environment Protection
 Directorate of Waste Management Policy/645
 P.O. Box 30945
 2500 GX The Hague

Tel: 31-70-339-41-88
 Fax: 31-70-339-12-84
 E-mail: M.F.Bus@DA.DGM.minvrom.nl

1. Definitions, terms, concepts, and target-setting

In the Netherlands the **definition of waste minimisation** corresponds to the OECD working definition. This definition is not part of a law. The term *waste minimisation* is understood to comprise the reduction of waste quantity and toxicity.

The **scope of waste** does not include radioactive waste, dead animals, agricultural waste, or some types of liquid wastes. Waste minimisation policy covers mining waste, discarded explosives, and sewage sludge.

Waste minimisation means influencing consumer behaviour, implementation of clean technologies, product design and recycling, and re-use and recovery (on- and off-site). Incineration processes of any kind (with or without energy recovery) are considered to be disposal activities, not waste minimisation measures. The same applies to landfilling and landfilling pre-treatment. Criteria to distinguish thermal waste recycling (with energy recovery) from thermal waste treatment (without energy recovery) were being discussed at the time of the survey.

The **hierarchy of waste minimisation measures** is set out in the Environmental Management Act (1993). According to this law:

- Waste prevention has priority over waste recycling;
- Re-use has priority over recycling;

- Recycling within the same production process has priority over recycling in other processes;
- Reduction of quantity has the same priority as reduction of waste toxicity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

This hierarchy is relevant for plant approval and operation. It applies to waste producers, the manufacturing industry, and disposal facility operators when deciding on the means of recycling or disposal. In the Netherlands there are no specific waste minimisation targets for individual products, waste streams, processes, or industrial sectors. However, a general target for prevention of, and recycling of, waste is set out in the National Environmental Policy Plan 2.

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Directorate of Waste Management Policy; Ministry of Housing, Spatial Planning and the Environment	Setting of priorities, participation in the enactment of laws, strategic planning (working out plans and programmes), information provision and public relations (public information campaigns, target group meetings), international co-operation (participation in EU, OECD and UNEP meetings)
Parliament, Audit Office	Approval and control
National Institute of Public Health and Environmental Protection	Scientific support, statistics

The Dutch political and administrative system is federal. The country is divided into provinces with their own governments.

Besides the central bodies listed above, provincial and municipal authorities and institutions set up their own strategic plans and adopt general programmes. Disposal facilities are operated at provincial and municipal level. Waste minimisation is taken into account during plant approval procedures. Both provinces and municipalities organise information and PR campaigns to assist industry and the public in waste minimisation efforts.

3. Wastelegislation

In the Netherlands there is no separate central law on waste management. Instead, the government has enacted an integrated environmental law which includes provisions on waste management and waste minimisation: the **Environmental Management Act** of 1993, amended in 1994.

Regulations are in force for the following **key wastestreams/products** :

- biological waste, green waste;
- packaging waste (regulation in preparation at the time of the survey);
- waste paper (voluntary regulation);
- end-of-life vehicles (voluntary regulation);
- agricultural soils (regulation under preparation);
- tyres (voluntary regulation with supportive legislation);
- batteries;
- PVC-containing building waste (voluntary regulation); and
- waste glass (voluntary regulation).

Positive experience and an excellent response are reported for the regulations on batteries and green waste. Experience with the performance of legislation on packaging waste and tyres was not available at the time of the survey.

In the future, the Netherlands will develop and improve its system of regulations on waste minimisation. The following approaches will be followed:

- introduction of take-back obligations (packaging);
- introduction of ban on landfilling;
- taxation of final disposal (first phase: landfilling);
- tighter regulations on final disposal through decree on landfilling and on emission standards for incinerators; and
- harmonization of technical standards at the international level.

4. Key instruments

a) Plans and programmes

Both mandatory and voluntary plans and programmes have been implemented in the Netherlands. Mandatory programmes cover general waste minimisation aspects, key waste streams, and plant operation and control. Voluntary plans and programmes deal with MSW, key industrial sectors, key waste streams and products, R&D, approval, and enforcement control.

Plans and programmes exist on the national, provincial and municipal level. Those at national and provincial level are regarded as the most important.

<p><u>Plans and programmes – selected examples</u></p>	<p>1) National Environmental Policy Plan 2 (1994): Comprehensive, integrated approach outlining strategies, policies and instruments. Plan focuses on various target groups and their possible contribution to reaching the three major objectives of the plan: 1) strengthening implementation; 2) additional measures where existing policy is not sufficient; and 3) sustainable production and consumption. The Plan has a mandatory character.</p> <p>2) Ten-Year Programme on Waste 1995-2000 (1996): Mandatory programme regulating the management of ten key waste streams, e.g. household waste, CD waste, waste from shops and offices, shredder waste, uncleanable polluted soil. Description of waste generation scenarios up to 2000. The programme plans national disposal capacities (landfilling and incineration). Provinces, municipalities, and operators of facilities are targeted. Periodic reviews are planned.</p> <p>3) Multi-Year Plan for the Disposal of Hazardous Wastes (1993): Mandatory plan describing the generation of 17 waste streams and planning the required disposal capacities. Plan is binding for licensing authorities and for hazardous waste managers. It includes national policy plan for transboundary movement of hazardous wastes.</p> <p>4) Biowaste Action Programme by the Ministry for Housing, Planning and Environment (1994): National workplan listing measures for achieving a significant reduction in the waste volumes for incineration and landfill, and at the same time producing a valuable end product (compost, fertilizer). Targets are mandatory introduction of separate biowaste collection, increasing biowaste processing capacities, and establishing the marketing of finished compost. Action programmes are being set up to achieve the targets.</p>
<p>Experience/ effectiveness</p>	<p>In general, plans and programmes are regarded as effective.</p> <p>2) The target of supplying sufficient landfilling and incineration capacities has been reached. Acceptance by target groups is good. No economic impacts on government; disposal tariffs increased considerably. Decentralised competencies impeded nation-wide waste management as set out in the plan. The plan has proven effective. As it requires the approval of all stakeholders in the area of disposal, common ground and transparency in decision-making could be created.</p>
<p>Is stronger application foreseen?</p>	<p>Not foreseen</p>

b) Mandatory instruments

The Netherlands does not apply legally defined technical standards regarding manufacturing and recycling processes to support waste minimisation. However, a separate unit (*infomil*) is in charge of assisting authorities (provinces/municipalities) by formulating provisions for prevention and recycling of waste to be included in the license. These provisions take account of the state-of-the-art.

The Netherlands has not enacted production bans to support waste minimisation. However, **product restrictions** are used. They include obligation to label products and product take-back obligations. No deposit-refund schemes are in operation.

The construction of landfills and the landfilling of certain types of waste are restricted in a decree on landfilling.

<p><u>Bans and restrictions – selected examples</u></p>	<p>1) Decree on disposal of dry cell batteries (1995): Industry is responsible for safe disposal of batteries. Extended Producer Responsibility.</p> <p>2) Wastelandfillban decree (1995/96): Ban on landfilling for 32 categories of waste. In force as of 1 January 1996. The ban will enable government to realise prevention and recycling targets. Objective is internalisation of costs for forms of disposal other than landfilling (landfilling is far cheaper than recycling or incineration).</p> <p>3) Car tyre disposal decree (1995): Take-back and disposal obligation for tyre manufacturers, importers, garages and service centres, which must build up and finance a collection system and guarantee recycling and disposal either individually or collectively. This system, set out in a plan, needs approval by the Minister of Environment. The decree is the result of intensive consultations with the business branch organisations concerned. Consumers will be charged for tyre disposal.</p>
<p>Experience/ effectiveness</p>	<p>First, discussions are held with branch organisations in order to reach voluntary agreements on waste minimisation. In case this does not lead to an acceptable result, legislation is prepared. Legislation leaves a maximum of flexibility for the stakeholders except in regard to the targets to be reached.</p> <p>1) Before adoption of the decree, no voluntary agreement with industry had been reached. Then pressure was exerted (i.e. adoption of the decree). Now acceptance by industry is good. Disposal costs are included in the product price. International obligation lacking.</p> <p>2,3) Little experience and information on effectiveness at the time of the survey.</p>
<p>Stronger application foreseen?</p>	<p>YES Regulations on WEEE, packaging and agricultural soils.</p>
<p>Miscellaneous</p>	<p>Product take-back obligations for end-of-life vehicles, agricultural soils, packaging and car tyres</p>

c) Economic instruments

There are **taxes and duties** on raw materials/resources and on waste treatment and landfilling.

<p><u>Taxes, duties or licenses – selected examples</u></p>	<p>1) Environmental tax act (1995): Among others: tax on landfilling to be paid to the operator of the landfill by every person intending to landfill waste. Tax revenues do not have to be used for waste minimisation measures.</p> <p>2) Waste disposal fee for end-of-life vehicles (1995): Fee is embedded in the Environmental Management Act. It is paid on every car by its first buyer (added to purchase price) when the first Dutch registration is issued. Fee revenues are used to finance recycling activities. Funds are managed by a foundation. Objective is recycling of at least 86% of car materials by the year 2000.</p>
<p>Experience/ effectiveness</p>	<p>Generally regarded as an effective instrument.</p> <p>1) Amount of waste to be landfilled decreased by 20%. Acceptance by target group is good. Substantial increase in the amount to be paid was under consideration at the time of the survey.</p> <p>2) In 1995, far more end-of-life vehicles were recycled than expected.</p>
<p>Is stronger application foreseen?</p>	<p>Not foreseen</p>

Financial aid programmes and economic incentives are used for both MSW and hazardous waste minimisation. Financial aid is given for R&D, pilot plant design and construction, development of clean technologies, and consultancy services. No financial support is provided for implementation of eco-balances and eco-auditing.

Financial aid is granted by federal institutions, the provinces and industry. It can take the form of subsidies, sureties, and fiscal depreciation privileges.

Universities, research institutions and industry, including disposal facility operators, apply for financial aid.

<p><u>Financial aid and economic incentives – selected examples</u></p>	<p>Detailed information was not given in response to the questionnaire.</p>
<p>Experience/ effectiveness</p>	<p>In general, financial support has proven effective.</p>
<p>Is stronger application foreseen?</p>	<p>Not foreseen</p>

d) Suasive instruments

No information was provided at the time of the survey.

e) Conclusions

No information was provided at the time of the survey.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsandother NGOs	Wastedisposal industry
Basicposition onwaste minimisation	Generallysupportive;infavour ofsuasiveinstruments;neutral towardseconomicinstruments; strongresistancetomandatory plansandinstruments	Stronglysupportive	Stronglysupportive	Neutral;supportiveof suasiveinstruments only
Participation inwaste legislation obligatory?	YES Consultedearlyinlegislative process	Notapplicable	YES	YES
Supportof waste minimisation by	Dutchcarimportersand disassemblersstarted"Auto RecyclingNetherland", a recyclinginitiative. ProductadvertisingandPR campaignsrelatedtowaste minimisationarecommon instrumentsinindustryand businesses. Industrialassociationoffer informationservicestoindustry andapplyR&Dontheirbehalf.	Thereisgoodacceptance ofexistingrecycling facilities;lowparticipation inhomecomposting. Readinesstochange consumptionbehaviouris low. Thereisnolawthatprivate householdscollect wasteseparately.	Informationtothe publicandthe politicians; developmentof wasteminimisation conceptsandpolicies Contributebysetting targets,stimulating consumers, influencingpublic opinion	Supplying consultancyservices intheareaofseparate collectionand introductionof recyclingtechnologies
Hinderingof waste minimisation by	Inregardtodrycellbatteries, industrywasnotcommittedto theproposedplansofthe government.	Noanswer	None	None
Influenceon waste minimisation/ overall contribution	30% "Medium"contribution	30% "Major"contribution	10% "Medium" contribution	30% "Major"contribution
Isstronger influence foreseen?	YES ThroughEnvironmental ManagementSystems	Notforeseen	Notforeseen	Notforeseen

6. Key products and wastestreams

Past	Present	Future
Wasteoil	Wasteoil	
Batteries		
Cartyres		
End-of-lifevehicles		
Dredgingspoil	Dredgingspoil	Dredgingspoil
CDwaste	CDwaste	
Ferrouscompoundsindomestic waste, especially cans		
Phosphorgypsum	Phosphorgypsum	Phosphorgypsum

Thesewastetypesaresetoutinthe MemorandumonthePreventionandRecyclingofWaste (1988).

The Netherlands provided specific information concerning its waste minimisation policies for three key wastestreams: **biologicalwaste** , **CDwaste** ,and **end-of-lifevehicles** .

	Biologicalwaste	CDwaste	End-of-lifevehicles
Reasonsforpriority	Quantity;savingscarce resources	Quantity;CTavailable; savingscarceresources; economicreasons	Toxicity;savingscarce resources
Wasteminimisation target	Reductionoffinal disposalby25%; recoveringvaluable fertilizerforsoil improvement	10%preventionrate; 90%recyclingrate	Recyclingrateof86%by 2000;decreasing environmentalrisks associatedwithcar dismantling
Instrumentsand measures	Plansandprogrammes, mandatoryinstruments andsuasiveinstruments; “BiwasteAction Programme”(1994)	Plansandprogrammes; mandatoryinstruments,and dutiesandtaxes.Targets aredefinedinthe “ImplementationPlanfor BuildingandDemolition Waste”.Nofuture measuresareplanned.	Plansandprogrammes (voluntaryagreementofcar industryandassociated organisationstorecycling fee);financialsupportand suasiveinstruments.Targets aredefinedintheImplementationPlanforend-of-lifevehicles.
Successandfailure; experience	Effectiveinstruments werethebanon landfillingandfinancial incentivesintariffs. Acceptancehasbeenvery good.Inthepioneerphase planning,logistics, collection,treatmentand marketingcaused difficulties.	Effectiveinstrumentswerethebanonlandfillingand taxes.Acceptancehasbeen verygood.Marketingthe secondaryrawmaterials andsettingenvironmental criteriaforthemcaused difficulties.Highcostsfor finaldisposalencourage preventionandrecycling.	In1995,farmoreend-of-life vehicleswererecycledthan expected.

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Separate bio-waste collection	Consumers	Reduced disposal costs, more competitive processing
End-of-life vehicles, disposal fee	Consumers	Disposal supplement of US\$150

In the view of the government and industry, waste minimisation measures have a positive economic effect. Consumers consider that they have a negative impact.

The Netherlands states that **prices, duties or fees** can be used to positively influence waste minimisation. High tariffs for landfilling have caused a shift in disposal options. High incineration tariffs have led to waste prevention and more re-use.

8. Prospects and future approaches

No information was provided at the time of the survey.

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NEWZEALAND

Contactperson

MrsEllenBlake
 MinistryoftheEnvironment
 84BoulcottStreet
 P.O.Box10362
 Wellington

Tel:64-4-473-40-90
 Fax:64-4-471-01-95

1. Definitions, terms, concepts, and target-setting

In New Zealand there is **no formal definition of waste minimisation** in legislation. However, the understanding of the term *waste minimisation* in New Zealand corresponds to the OECD working definition. Waste minimisation denotes the reduction of waste amount and of waste toxicity.

The **scope of waste** does not include radioactive waste, mining waste, or discarded explosives. Dead animals, agricultural waste, liquid wastes, and sewage sludge are regarded as waste and are thus subject to waste minimisation measures.

Waste minimisation means influencing consumer behaviour, implementation of clean technologies, product design and recycling, and re-use and recovery (on- and off-site). Incineration processes are not widely used, and no consideration has been given to whether waste incineration is seen as a waste minimisation measure. According to the general understanding of the term *waste minimisation*, incineration without energy recovery, waste treatment prior to land filling, and land filling itself are not waste minimisation measures.

The **hierarchy of waste minimisation measures** is set out in the Government Waste Policy (August 1992) and the Ministry of the Environment Waste Work Programme (1995/96). According to this voluntary programme:

- Waste prevention has priority over waste reduction;
- Re-use of products/waste has priority over recovery/recycling;

- Recycling within the same production process has the same priority as recycling in other processes;
- Reduction of quantity has the same priority as the reduction of waste toxicity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

This hierarchy was not legally binding in any area at the time of the survey, but was certainly applied for waste management operations.

New Zealand's **waste minimisation priorities** for wastestreams and industrial sectors are shown in the following table. Criteria indicate why these priorities/targets have been set.

Priorities	Targets	Criteria
Wastestreams: Used oil Packaging	95% collection by 2000 Non-numeric target, but an accord to "minimise packaging waste" has been established.	A large-volume, high-impact waste; public pressure
Industrial sectors: Construction and demolition Agriculture	Not set at the time of the survey Not set at the time of the survey	Large volume Non-point source pollution

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Ministry of the Environment	Setting of priorities, participation in the enactment of laws, strategic planning, information provision and public relations, international co-operation, statistics
Ministry of Foreign Affairs and Trade; Ministry of Commerce	International co-operation
Crown Research Institutes (among others)	Scientific support

New Zealand has a centralised political and administrative system. Most environmental controls and policies in the waste area are established by regional and local governments.

On the regional level, councils set priorities and environmental standards, work out strategic planning, and initiate information and PR campaigns. Approval (e.g. issuing discharge consents) and control are fully carried out by regional and local councils. The local councils usually provide waste collection and disposal facilities, either directly or contracted to private operators. Most regional councils are collecting waste statistics. These are collated by the Ministry of the Environment.

Local governments and municipalities have direct responsibility for the collection and disposal of wastes. Approval and control, and operating disposal facilities and information services, are additional tasks.

3. Waste legislation

In New Zealand there is no separate waste legislation. However, the **Resource Management Act (1991)** and the **Hazardous Substances and New Organisms Act (1996)** (two pieces of integrated environmental legislation) include provision on waste minimisation.

There is no waste stream-specific legislation.

New Zealand has a preference for voluntary measures. Therefore, in the future voluntary agreements with industry on waste minimisation will be sought and supported. New Zealand sees priority needs for legal regulation on hazardous waste disposal at landfills. At the time of the survey it did not intend to mandate waste minimisation.

4. Key instruments

a) Plans and programmes

New Zealand has several plans and programmes dealing with waste minimisation. Most are voluntary and do not include mandatory elements. They are established on the regional, local and national level.

There are general environmental plans with sections on waste minimisation, as well as waste-specific programmes. They cover MSW, key industrial sectors, and key waste streams. There are no plans dealing with research and development, consultancy, or implementation and control.

Plans and programmes are regarded as rather important waste minimisation measures. This is true especially for MSW-orientated programmes on the local level, and for programmes dealing with industrial sectors and key waste streams. Plans on the regional level are considered less important, apart from those covering implementation and control.

<p><u>Plans and programmes – selected examples</u></p>	<p>1) Minimising Packaging Waste – A national strategy for minimising the volume of packaging waste in New Zealand (1996): Set up by the Packaging Environmental Advisory Group (PEAG), this programme has led to an accord between industry and the central government to minimise packaging waste. The packaging goods industry has produced a Code of Practice. The programme has the goal of producing educational material on packaging, its role and environmental effects.</p> <p>2) Regional policy statements, regional plans, district plans: These cover waste minimisation and waste management matters. They contain mandatory regulations that apply to all businesses/residents in an area.</p> <p>3) Project C&D (1994): Regional programme that aims at reducing the quantity of construction and demolition waste disposed in the area. The first stage was the investigation of current waste practices, waste management and waste composition. The outcome has seen further activities such as post-collection sorting, construction site demonstration projects, and regulatory initiatives.</p>
<p>Experience/ effectiveness</p>	<p>In general, plans and programmes are regarded as an effective way to achieve waste minimisation. They ensure that participants are up-to-date on changes as the programmes develop. Programmes are seen as time-consuming and generally can only focus on one or two issues at a time (industry or wastestream).</p> <p>1) Industry was well in favour of the “Packaging Accord”.</p> <p>3) No information was available at the time of the survey.</p>
<p>Is stronger application foreseen?</p>	<p>YES Continue current level of programmes</p>

b) Mandatory instruments

New Zealand does not use legally defined technical standards, or product bans or restrictions, to support waste minimisation.

National Landfill Guidelines recommend that landfills not be sited in, for example, floodable areas. Site-specific considerations determine where landfills may be constructed. Consents for a landfill specify what types of waste are acceptable at a specific site. The conditions depend on site characteristics and the level of control in place, e.g. staffed/unstaffed. Most landfills ban hazardous wastes.

c) Economic instruments

There are no central government levies, taxes or other economic instruments of any kind for waste minimisation purposes. Increasingly, local authorities are introducing charges for disposal of wastes which reflect the full costs of disposal. These charges, however, are not uniform. The Ministry of the Environment is developing an economic model to assist local authorities to accurately cost their waste disposal facilities.

Financial aid programmes and economic incentives have been set up in regard to MSW and industrial waste. Financial aid is given for R&D, cleaner production projects, consultancy services for companies, waste analysis surveys and eco-balances, life-cycle assessment, and eco-auditing. Incentives are used to promote marketing of recycled goods.

Financial aid is granted by the state and some regional administrations. It is given through subsidies. Governmental institutions, universities and research institutions, disposal facility operators, and industry apply for subsidies.

<p><u>Financial aid and economic incentives – selected examples</u></p>	<p>1) Public Good Science Fund (ongoing): Research agencies both public and private, including universities, can apply for funding for R&D in areas including waste minimisation. The fund is administered by the central government.</p> <p>2) Sustainable Management Fund (ongoing): The fund is administered by the Ministry of the Environment. Any group or organisation can apply for funds for practical application of technologies and for information gathering. Waste minimisation has high priority for funding. Subsidy rates range from 20 to 70%.</p>
<p>Experience/ effectiveness</p>	<p>Financial support programmes have been successful. They accelerate the realisation of desired outcomes. However, research funding is not always easy to obtain.</p> <p>2) The analysis of waste streams and cleaner production demonstration projects in the construction and demolition area have been funded. The fund is well accepted by the target group.</p>
<p>Is stronger application foreseen?</p>	<p>YES Continue at same level</p>

d) Suasive instruments

New Zealand has established information offices for private households that are run by regional and local administrations. These offices are not mandated by law. They usually offer information on recycling. Some municipal authorities have information offices that offer cleaner production information to local enterprises. Demonstration projects performed by public authorities receive support. Waste exchanges for trading recycled goods and end-of-use products are in operation.

Some New Zealand companies use Environmental Management Systems. An eco-labelling programme for low-waste products has been set up.

<u>EMS, environmental reports and eco-labelling – selected examples</u>	1) Environmental Choice New Zealand: Eco-labelling system that sets standards for environmentally friendly products in specific categories. The scheme is run by an independent agency.
Experience/ effectiveness	1) Propagation in industry is low. Use is increasing in a few areas, such as paint.
Is stronger application foreseen?	Not known Eco-labelling system is expected to see increased use. Industry will probably establish more Environmental Management Systems.

e) Conclusions

Voluntary and industry-run systems and measures are preferred methods of implementing waste minimisation policy in New Zealand. Therefore, voluntary plans and programmes and suasive instruments are rated as very important. In the area of packaging waste, for example, voluntary actions (by industry), coupled with monitoring to ensure that reductions are occurring, is seen as the best solution to the problem. Low priority is given to mandatory waste minimisation measures.

In regard to economic instruments, disposal charges are increasingly introduced on the local level. There are no other forms of economic instruments. Waste minimisation projects have a high priority for funding. Several funds are being administered by the central government.

In the future, New Zealand will seek to:

- increase the use of economic instruments;
- set up codes of practice;
- carry out demonstration projects;
- inform New Zealanders about waste minimisation issues and thus produce educational material; and
- intensify work with industry groups, with the goal of reaching voluntary agreements.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Supportive of voluntary programmes and suasive instruments; neutral towards economic instruments and waste minimisation policy in general	Supportive	Supportive	Slightly supportive of voluntary plans and programmes, economic and suasive instruments
Participation in waste legislation obligatory?	NO	Not applicable	NO But consultation on environmental law	NO
Support of waste minimisation by	Several industrial branches are promoting cleaner production programmes, e.g. the chemical industry's Responsible Care programme. Industry and businesses use product advertising and PR campaigns in their waste minimisation efforts. Industrial associations offer information and consultancy services to industry. A few Extended Producer Responsibility programmes have been set up recently (used oil, lead-acid batteries, refrigerators).	Consumers' willingness to change consumption behaviour is described as "average". Good acceptance of existing recycling facilities and home composting (where available). Separate collection of waste is not mandatory. All actions are voluntary or encouraged by local authorities. High collection rates in most urban areas	Strong support of local recycling programmes Work on reducing packaging waste has been driven forward Information to the public and politicians Active role in policy development	Not known
Hindering of waste minimisation by	Some take action to prevent regulations, including adoption of voluntary programmes. Support usually as long as initiatives fall in their "comfort zone".	Initial opposition to schemes which increase direct charges, such as charges per bag of rubbish or for access to landfill	None	Not known
Influence on waste minimisation/ overall contribution	35% "Major" contribution	20% "Minor to medium" contribution	35% "Medium" contribution	10% "Minor" contribution
Is stronger influence foreseen?	Not known	Continuing at same level	Continuing at same level	No answer

6. Key products and wastestreams

Past	Present	Future
-	Packaging waste	Motor vehicle wastes
-	Used oil	
-	Organochlorines (PCP, insecticides such as DDT, chlorinated dioxins)	
-	Construction and demolition waste	

New Zealand provided specific information concerning its waste minimisation policies for three key wastestreams: **used oil**, **CD waste**, and **packaging waste**.

	Used oil	CD waste	Packaging waste
Reasons for priority	Quantity; toxicity; sustainable use of scarce resources	Quantity; CT available; sustainable use of scarce resources	Quantity; sustainable use of scarce resources; a lot of public pressure exerted to deal with this wastestream
Waste minimisation target	Reduction of oil contamination, especially of water; increased recycling and safe disposal; increased public awareness of disposal issues	Reduction of amount to be landfilled and increase in recycling	Reduction of packaging waste and increase in recycling
Instruments and measures	Plans and programmes and suasive instruments Along-term agreement between the government and major oil companies has been reached on either recycling oils safely or burning it as fuel in a cement kiln.	Plans and programmes and suasive instruments Joint initiative of regional and local authorities to reduce CD waste	Plans and programmes and suasive instruments Voluntary agreement between the government and the packaging goods industry
Success and failure; experience	Voluntary agreement had just been set up at the time of the survey; too soon to say whether it is effective	Too soon to say	Too soon to say

There are no legally required rates for waste recovery. Reliable information is not available on nationwide collection rates. There is separate collection of waste paper and glass, scrap metal from private households, packaging waste, and textiles.

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Introduction of cleaner production practices in industry	Industry	Positive economic effects
Voluntary industry agreements (e.g. used oil programme)	Industry	Direct financial costs to companies, but these are generally perceived to be lower than if government had regulated as a solution
Waste minimisation measures in industry	Consumers	Any cost increase will be passed on to consumers

In the view of the government, waste minimisation measures have a positive effect on the economy. The views of consumers and industry were not reported.

8. Prospects and future approaches

No information was provided at the time of the survey.

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NORWAY

Contactperson

Mr. Jan Johansen
 Norwegian Pollution Control Authority
 B.P. 8100 Dep. 0032
 Oslo 1

Tel: 47-22-57-34-00
 Fax: 47-22-67-67-06
 e-mail: jan.johansen@sftospost.md.dep.telemax.no

1. Definitions, terms, concepts, and target-setting

In Norway a **definition of waste minimisation** corresponding to the OECD definition is provided in the report to the national assembly (Report to the Storting No. 44 [1991-92] relating to measures to reduce waste, increase recycling, and ensure environmentally sound waste management). According to that definition, waste minimisation stands for the reduction of the generated amount waste (quantity) and the toxicity of waste (quality).

The **scope of waste** does not include radioactive waste or discarded explosives, but does include mining waste, dead animals, and agricultural waste. Waste minimisation measures are also applied to liquid wastes and sewage sludge.

Norway's interpretation of waste minimisation encompasses changes in consumption patterns, implementation of clean technologies, product design, recycling, re-use, recovery (both on- and off-site), and incineration with energy recovery. According to the general understanding and use of the term, incineration without energy recovery, treatment and landfilling are not waste minimisation measures. Although no criteria had been set for distinguishing thermal waste recycling (i.e. with energy recovery) from thermal waste treatment (without energy recovery), Norway was preparing such rules at the time of the survey.

The **hierarchy of waste minimisation measures** is set out in the Report to the Storting, according to which:

- Waste prevention has priority over waste reduction; and
- Recovery and recycling have priority over landfilling.

In addition:

- Wastereductionandre-usehavethesamepriorityasrecycling;
- Recycling within the same production process (i.e. on-site) has the same priority as recycling in other processes (off-site); and
- Materialrecyclinghasthesamepriorityasenergyrecovery.

However, reduction of waste toxicity does not have any priority over reduction of the quantity of wastegenerated.

This hierarchy is applied mainly for the approval and operation of plants, not for product design or the selection of disposal procedures.

Waste minimisation priorities for wastestreams and products are shown in the following table.

Priorities	Targets	Criteria
Wastestreams: wastepaper(de-ink) beveragepackaging cardboardandcorrugatedboard metalpackaging EPS(expandedpolystyrene) otherplasticpackaging packagingcontaininghazardous materials constructionanddemolitionwaste	80% recovery (minimum 65% material recycling) 60% material recycling 60% recovery (min. 50% material recycling) 80% recovery (min. 30% material recycling)	
Products: leadaccumulators end-of-lifevehicles cartyres WEEE	95% recycling 90% recycling 100% recycling (landfill prohibited) targetsnotfixedyet	Cost-benefit analysis has been used as a basis for all target-setting

Norway reports very good experience with setting targets. It does not express any preferences for mandatory or voluntary targets.

2. Political and administrative responsibilities

Name of national bodies	Tasks, responsibilities
Ministry of Environment	Setting of priorities, international co-operation
Norwegian Pollution Control Authority	participation in the enactment of laws, strategic planning, approval and control, international co-operation
Regional Commissioners	approval and control
GRIP	information provision and public relations
NORSAS	information provision and public relations
Statistics Norway	statistics
Hired consultants	scientific support

Norway has a centralised political and administrative system.

Priorities are set by the Ministry of Environment for industrial sectors for some measures (e.g. economic measures and Extended Producer Responsibility), some key waste streams (e.g. packaging), and biological and hazardous waste.

The **Pollution Control Authority (SFT)** is responsible for mandatory instruments such as permits and regulations, e.g. the ban on scrap tyres and the obligation to recycle all collected corrugated paper. The SFT is also responsible for establishing strategic instruments according to these principles:

- Prices must reflect the total costs of alternatives;
- Enterprises are responsible for the waste generated by their products;
- Municipalities are responsible for total waste management; and
- There should be improvement in the level of knowledge.

Approval and control are handled jointly by the SFT and regional commissioners. Mandatory instruments (e.g. permitting requirements) are listed in the Pollution Control Act. The control of manufacturing is covered under the Product Control Act.

In regard to information provision and public relations, industry is informed through GRIP and NORSAS. Consumers benefit from the work of GRIP and NORSAS, but also from that of groups such as Friends of the Earth Norway.

Responsibility for international co-operation is shared by the Ministry of Environment and the SFT. For instance, the Ministry manages relations with bodies such as the EU and UNEP, while the SFT is in contact with OECD and the Nordic Council of Ministers.

3. Wastelegislation

In Norway there is separate waste legislation. It is integrated into the **Pollution Control Act** (Act No.6 of 13 March 1981 concerning protection against pollution and concerning waste). In addition, there are specific pieces of waste legislation, e.g. on:

- wastepaper (cardboard and corrugated board): **Regulation on separation, storage and delivery for recycling of brown paper**, adopted 5 May 1994);
- municipal waste (overall);
- biological waste;
- packaging waste (**Regulation on return systems for beverage packaging**, adopted 10 December 1993);
- end-of-life vehicles (**Regulation on refund of deposit for end-of-life vehicles**, last amended 20 February 1996);
- industrial waste (overall);
- harmful batteries (**Regulation concerning environmentally harmful batteries**, adopted 17 July 1990);
- discarded tyres (**Regulation relating to the disposal, collection and recycling of discarded tyres**, adopted 25 March 1994).

Material recycling and recovery of municipal waste are administered at the municipal level and handled jointly with waste producers (industry). Pre-treatment, incineration and landfilling are also administered at the municipal level. For industrial waste, waste producers themselves must handle pre-treatment, incineration and landfilling.

The Norwegian experience with regulations specific to some waste streams has been extremely positive:

- The regulation on waste paper has been functioning very well. The actors responsible for separating, storing and delivering waste paper for recycling operations have been fulfilling their obligations with the assistance of the industry, which ensures a system for collection and recovery of brown paper in accordance with an agreement with the Norwegian government.
- Packaging waste is regulated by either by a tax system (beverage packaging, with the exception of milk and milk products) or voluntary agreements (packaging not covered by the tax system). Most of the voluntary agreements on packaging waste were adopted in 1995 and have functioned very well.
- The system for collection and recycling of end-of-life vehicles has been in operation since 1978 and has performed very well. In the period 1978-1992, approximately 83% of end-of-life vehicles were taken care of annually. In the period 1992-1994, approximately 90% were processed.

- The regulation on harmful batteries has also been very positive. The actors responsible for accepting, storing and delivering lead batteries for recycling have fulfilled their obligations with the assistance of industry, in accordance with an agreement with the Norwegian government.

During the last five years the Norwegian government has conducted several negotiations with industry, resulting in agreements according to which the industry takes responsibility for ensuring environmentally sound treatment of their products when they end up as waste. Today agreements covering, for example, paper, cardboard, plastics, beverage cartons, car batteries and car tyres, are in effect. New waste streams being considered are waste from electric and electronic equipment, packaging containing hazardous waste, and construction and demolition waste. Some of the agreements have been strengthened by regulations or economic instruments. The Norwegian government will start to evaluate the introduction of a tax on waste delivered to landfills or incineration plants.

Norway is considering the following for the future:

- evaluating regulations concerning CFC-containing refrigerators and freezers;
- evaluating regulations for:
 - electric and electronic scrap;
 - construction and demolition waste;
 - waste from packaging used for hazardous waste;
 - used nickel-cadmium batteries.

4. Key instruments

a) Plans and programmes

Norway uses a wide variety of mandatory and voluntary plans and programmes. The national strategy for waste management, provided in the Report to the Storting (No. 44, 1991-92), is mandatory. Specific plans and programmes have also been adopted for municipal waste, key industrial sectors, and key waste streams; R&D for key products; provision of consultancy services; and implementation and control. All these plans and programmes are voluntary and are operated at the central (national) level except in the case of municipal waste. For municipal waste, mandatory plans and programmes are adopted at the level of the municipalities (according to the Pollution Control Act § 33A). In addition, voluntary schemes are entered into on a voluntary basis at the national level.

In general, plans and programmes have proven effective in Norway. The national plan is considered to have been instrumental in supporting waste minimisation policy. Experience with municipal plans is too recent to evaluate at this stage. At the time of the survey, Norway was considering using plans and programmes more intensively. For instance, a revised national plan for waste management was in preparation

b) Mandatory instruments

<p><u>Technical standards, bans and restrictions – selected examples</u></p>	<p>1) Pollution Control Act : Issued by the Ministry of Environment (1981, last amended 1996), the Act regulates pollution and waste in the external environment. The purpose of the Act is to protect the external environment from pollution and to reduce existing pollution, as well as to promote better treatment of waste. It regulates the fundamental questions related to both pollution and waste. In addition, it is an enabling act which gives authorities the legal basis to issue regulations and take individual decisions ensuring an effective implementation of the act.</p> <p>2) Product Control Act : Issued by the Ministry of Environment and the Ministry of Children and Family Affairs (1976, last amended 1993), the Act regulates products. The purpose of the Act is to prevent products from causing damage to health or the environment in the form of disturbances of ecosystems, pollution, waste, noise or the like. The Product Control Act gives authorities the legal basis for issuing regulations and taking individual decisions when necessary to prevent the effects mentioned under the purpose of the Act.</p> <p>3) Regulation on the separation, storage and delivery for recycling of brown paper (corrugated board and cardboard) : Issued by the Ministry of the Environment in 1994, the regulation aims at reducing the environmental problems caused by brown paper through ensuring recycling.</p> <p>4) Regulation on return systems for beverage packaging : Issued by the Ministry of the Environment in 1993, the regulation intends to help bring about effective beverage packaging return systems with a high rate of return, which will prevent littering and reduce the amount of waste from such packaging.</p> <p>5) Regulation concerning environmentally harmful batteries : Issued by the Ministry of the Environment in 1990, it regulates the duty to deliver, the collection, and the delivery for recycling of lead batteries. In addition, it regulates the labelling of environmentally harmful batteries, ban on import, export and distribution of certain types of batteries, and the obligation to take back environmentally harmful batteries.</p> <p>7) Regulation on PCBs : Issued by the Ministry of Environment (1979, last amended 1990), it regulates production, import, export, distribution, use, waste treatment, and other ways of handling PCBs and products containing PCBs. Production, import, export, distribution, use and waste treatment are prohibited without a special licence.</p> <p>8) Regulation relating to the disposal, collection and recycling of discarded tyres : Issued in 1994 by the Ministry of the Environment, it aims at reducing the environmental impact of tyres when they end up as waste in tips, dumps, landfills, etc., by ensuring a high degree of recycling of discarded tyres.</p>
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c) Economic instruments

No information was provided at the time of the survey.

d) Suasive instruments

No information was provided at the time of the survey.

e) Conclusions

No information was provided at the time of the survey.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Strongly supportive of waste minimisation in general, and more specifically of mandatory plans and programmes, suasive instruments; high levels of support also for voluntary plans and programmes; resistance to mandatory and economic instruments	Strongly supportive of waste minimisation in general Consumers and private households consider information and public relations instruments as most effective, followed by economic instruments; regulations viewed as least effective	Strongly supportive of waste minimisation in general	Highly supportive of waste minimisation in general; considerable support for voluntary plans and programmes; neutral towards mandatory plans and programmes and towards suasive instruments; opposed to mandatory and economic instruments
Participation in waste legislation obligatory?	NO Industry and related associations have some influence on development of policy and legislation during hearings process	NO	NO Their opinion is sought.	NO Asked for comments on waste legislation Influence on the legislative process is considered weak
Support of waste minimisation by	Industry, trade and industrial associations take initiatives to support waste minimisation, e.g. collection and recycling of milk cartons. Industrial associations support companies in the implementation of waste minimisation through the provision of consultancy and R&D services.	High user rate for existing recycling possibilities; "average" acceptance of home composting; changes in consumption behaviour; avoidance of waste-intensive products; increased demand for low-waste products Consumers and private households participate in separate waste collection	Significant contribution in the areas of packaging and waste reduction. They contribute information to politicians and the public, develop concepts and political principles.	The waste disposal industry strives to strengthen its business position in the marketplace.
Hindering of waste minimisation by	NO	NO	NO	NO
Influence on waste minimisation/ overall contribution	Policy-making: 30% Implementation: 40%	Policy-making: 20% Implementation: 20%	Policy-making: 40% Implementation: 10%	Policy-making: 10% Implementation: 30%
Is stronger influence foreseen?	Not foreseen: level of participation is considered adequate today, but expansion of producer responsibility to other wastes may be considered	YES	Not foreseen	Not foreseen

6. Key products and wastestreams

Past	Present	Future
Paper		
Scrap tyres		
Biological waste	Biological waste	
	Packaging	
	Hazardous waste	
		WEEE
		Scrapped oil installations

These priorities are set out in the 1994 and 1995 Environmental Policy Statements.

Norway provides specific information concerning its wasteminimisation policies for three key waste streams: **biological waste** , **packaging waste** ,and **WEEE**.

	Biological waste	Packaging waste	WEEE
Reasons for priority	Quantity generated; recycling promotes sustainable use of resources	Quantity generated; recycling promotes the sustainable use of resources	Quality of waste generated; CT available; recycling promotes sustainable use of resources
Waste minimisation target	Smaller quantities going to landfill Objective defined in the Report to the Storting No.44(1992)	Reduced resource use per functional unit	Stopping dispersal of hazardous substances from this type of products
Instruments and measures	Plans and programmes, mandatory instruments and suasive instruments	Plans and programmes, mandatory instruments, financial support and suasive instruments	Plans and programmes
Success and failure; experience	Mandatory instruments have proven effective. Actors need to understand that waste minimisation includes considerable initial costs. Acceptance has been surprisingly high. Planned: landfilling of stable material only	No information provided	No information provided

7. Costs and benefits

Industry's position on the economic effects of waste minimisation measures is neutral. The government and consumers consider that waste minimisation has a rather supportive effect on the economy.

Norway states that **prices, duties or fees** can be used to positively influence waste minimisation. Prices must reflect the total cost of the waste, which in turn provides improved conditions for recycling (Report to the Storting No. 44, 1992).

Funds for waste minimisation and safe disposal of municipal waste are raised through fees and duties associated with waste. In the case of industrial waste, funds are raised through private investment, (privately financed) product fees, public investment support, and fees and duties associated with waste.

In Norway charges for collecting, recycling, treating and landfilling municipal waste are determined by the municipalities. The municipalities also determine, jointly with private firms, the level of prices for treating and landfilling industrial waste. Industry sets its prices for collection and recycling of industrial waste.

8. Prospects and future approaches

No information was provided at the time of the survey.

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SPAIN

Contact person

Mr. Jose Hernandez Nieto
Ministerio de Obras Publicas y Transporte
Castellana 67
28071 Madrid

Tel: 34-1-597-82-66 or 597-82-77
Fax: 34-1-597-85-14 or 597-87-15

Acronyms

ACBC	Waste Plan of the Autonomous Community of the Basque Country
ASEGRE	Association of hazardous waste management business
CCPI	Catalan Centre for Cleaner Production Initiatives
GDRQA	General Direction of Environmental Quality and Assessment
IHOBE	Sociedad Pública Gestión Ambiental
PITMA	Environment and Technological Industry Programme of Ministry of Industry and Energy
XUME	(see IHOBE above)

1. Definitions, terms, concepts, and target-setting

Spain's **definition of waste minimisation** does not correspond to the OECD working definition. The term *waste minimisation* is understood to mean preventing and/or reducing waste and improving the quality of the waste generated, including reduction of hazard. Re-use, recycling and recovery on-site with favourable environmental balances are within the definition of waste minimisation as well.

This definition is not part of a federal law or legal document, although some autonomous regions have included a definition of waste minimisation into their law system.

The **scope of waste** does not include radioactive waste, mining waste, dead animals, agricultural waste, or discarded explosives. However, liquid wastes and sewage sludge are understood to be the object of waste minimisation measures.

Waste minimisation means influencing consumer behaviour, implementation of clean technologies, and product design. Incineration or thermal waste treatment are considered as waste recovery measures where

the economic and environmental balance is positive. In all other cases, waste incineration is a disposal operation. Landfilling and landfilling pre-treatment are also classified as disposal operations.

The **hierarchy of waste minimisation measures** is set out in the Spanish National Hazardous Waste Plan 1995-2000, in the federal law on urban solid waste (Law 42/1975), and in other laws and plans of autonomous regions:

- Waste prevention during manufacturing has priority over waste recycling;
- Re-use has priority over recycling;
- Waste treatment on-site has priority over external treatment;
- Recycling within the same production process has priority over recycling in other processes;
- Reduction of hazard has priority over the reduction of waste quantity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

This hierarchy has impact on product design, plant approval, and operation and disposal procedures.

Spain's **waste minimisation priorities** for products, waste streams, processes and industrial sectors are shown in the following table. Criteria indicate why these priorities/targets have been set.

Priorities	Targets	Criteria
Products: PCBs and PCTs Cyanides and heavy metals Hexavalent chromium Asbestos End-of-life vehicles	20% reduction 50% reduction 52% replace-rate 50% reduction Recovery	Toxicity Toxicity Recovery of metal acids Quantity
Waste streams: Solvents Waste oil Ashes and slag	20% reduction Regeneration Recovery	Quantity Substitution of toxic compounds Improvement of processes
Processes: Paint manufacturing	Modification of composition	Substitution of toxic compounds
Industrial sectors: Coating metals surfaces Dry cleaning Leather industry Textile manufacturing Chemicals and pharmaceuticals	Recovery Reduction of toxicity	Application of CT Toxicity of chemicals Substitution of toxic substances

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
General Direction of Environmental Quality and Assessment (GDRQA)	Setting of priorities, participation in the enactment of laws, international co-operation
Deputy Direction of Waste Policy	Strategic planning (studies on sector-specific waste minimisation, auditing of waste minimisation in industry, implementation of National Hazardous Waste Plan)

Spain has a central government. The 17 autonomous regions have their own governments.

Major tasks in regard to waste minimisation policy are fulfilled by the autonomous regions and their governments. Next to the central government, the regional environmental institutions decide on priorities, take part in the enactment of laws, carry out strategic planning, and provide scientific support and information services. Scientific support is often provided by private and public institutions contracted by the central or regional government.

Large municipalities have set up waste management planning. Some municipalities operate information services and carrying PR campaigns aimed at private households. Regional and municipal administrations are responsible for plant approval and operation control.

3. Waste legislation

The Spanish central government has enacted a law on **hazardous waste** (Law 20/1986) together with application decree 20/1986. A law on **urban solid waste** (Law 42/1975) was passed in 1975. These laws include provision on waste minimisation. In addition, central law on **water** (Law 29/1985), **coastal areas** (Law 22/1988), and **protection of the atmospheric environment** (Law 38/1972) are concerned with waste minimisation. So far, no integrated environmental law has been passed.

Several autonomous regions have passed waste management legislation.

Regulations are in force for the following **key wastestreams/products** :

- Municipal solid waste (MSW);
- waste oil;
- industrial waste; and
- PCBs and PCTs.

Regulations on several other wastestreams are in force in autonomous regions.

A draft law on packaging waste was being discussed at the time of the survey.

The effectiveness and enforcement of these regulations is reported to be "average".

In the future, Spain will develop and improve its system of regulations concerning waste minimisation. The following approaches will be followed:

- increasing the possibilities of the measures of the autonomous regions, as well as of other departments of the central government, in order to support waste minimisation;
- incorporation of EU laws into Spanish law, particularly in the field of hazardous waste;
- establishing a regulatory framework to ensure the polluter-pays principle is applied and to promote implementation of clean technologies;
- creation of adequate instruments for control and inspection in all autonomous regions.

Co-ordination of the measures taken in the regions needs to be extended.

4. Key instruments

a) Plans and programmes

Spain has drawn up voluntary plans and programmes covering MSW, hazardous waste, and key industrial sectors. Plans are prepared by the central and regional governments and by several municipalities. Mandatory plans and programmes have been set up to improve implementation and control.

Voluntary plans and programmes at regional level are regarded as the most important.

<p>Plans and programmes – selected examples</p>	<p>1) Spanish National Hazardous Waste Plan 1995-2000 (1995): This voluntary plan serves as a guideline for medium and long-term measures by the central government in the area of hazardous waste management. The plan provides a summary of objectives and main fields of action. Primary targets are the reduction of waste generation and proper disposal of waste. Moreover, re-use and recycling are to be promoted. The plan sets quantified targets. It is relevant for all industrial sectors.</p> <p>2) Catalan Hazardous Waste Management Programme (1994): Voluntary programme containing targets for 1996 and 2000 for several waste streams. Action programmes are set up to help reach the objectives set out in the programme. Emphasis is on waste incineration, most toxic wastes, and wastes with the greatest minimisation potential. The action programme defines measures to be taken.</p> <p>3) Waste Plan of the Autonomous Community of the Basque Country – ACBC (1994): Voluntary plan giving priority to waste prevention and waste reduction at source. Objective for 1994-2000 is reduction of waste volume reduction by 25%.</p>
<p>Experience/ effectiveness</p>	<p>1) Acceptance by industry is reported to be “average”. Adequate means to control the progress of the programme were not available as required at the time of the survey. Therefore, there was insufficient information on performance and effectiveness.</p>
<p>Is stronger application foreseen?</p>	<p>YES Future programme will deal with prevention, clean technologies, and solid urban waste management.</p>

b) Mandatory instruments

Spain does not use legally defined technical standards for manufacturing and recycling processes to support waste minimisation.

<u>Technical standards</u>– selected examples	1) Order of 28 July 1989 on pollution prevention in the titanium dioxide industry (1989): Because of the high toxicity of the waste generated during production, the order postulated zero pollution, which could be achieved by process modifications. The regulation was enforced from 1989 to 1992.
Experience/ effectiveness	Technical standards are not regarded as effective instruments. 1) Acceptance by industry was good. Difficulties occurred with adapting the modified technical process. The target of zero-pollution was achieved in 1992.
Is stronger application foreseen?	Not foreseen

Spain does not use production bans to support waste minimisation, but there are **product restrictions** which can take the form of restricted product use regulations and product take-back obligations. Spain does not have deposit-refund schemes.

<u>Bans and restrictions</u>– selected examples	1) Basic Law 20/1986 on Hazardous Waste: Labelling of certain products, safe storage, and registration are obligatory for industry. Manufacturing can be restricted if there is not adequate waste treatment. 2) PCB management order (1989): Enterprises operating machines containing more than 5 kg of PCBs or PCTs must declare possession of these machines. Producers/retailers must take back PCBs.
Experience/ effectiveness	Bans and restrictions are not regarded as effective instruments. 2) Acceptance is good.
Is stronger application foreseen?	Not foreseen.
Miscellaneous	Bans and restrictions referring to the construction of landfills and the landfilling of certain types of waste.

c)Economicinstruments

Spain does not apply taxes or duties as waste minimisation instruments . **Financial support programmesandeconomicincentives** areusedextensivelyforbothMSWandhazardouswasteminimisation. Financial aid is given for R&D, pilot plant design and construction, development of clean technologies, consultancyservices,eco-balancesandeco-auditing.

Financial aid is granted by federal institutions, and by regional and municipal administrations. They offersubsidies, low-interest credits, and free-of-charge consultancy services. Universities, research institutions,consultingcompanies,disposalfacilityoperators,andindustryapplyforfinancialaid.

<u>Financialaidand economic incentives– selectedexamples</u>	<p>1) Spanish National Hazardous Waste Plan 1995-2000: The funding of plan-related projects is provided by the environmental protection and housing department and by the cohesion fund of the European Union. Projects managed by the autonomous regions are funded by the cohesion fund. Financial contribution to investments is 25%. Funds are obtainableformanufacturingandwastetreatmententerprises.</p> <p>2) Environment and Technology Industry Programme of Ministry of Industry and Energy–PITMA(1991): Noinformationgiveninresponsetothequestionnaire.</p>
Experience/ effectiveness	<p>Toolittleexperiencetojudgeeffectivenessatthetimeofthesurvey.</p> <p>1)Fundingprovidedtotheregionsreflectstheamountofhazardouswasteproducedintheregion.Co-fundingbytheautonomousregionshashinderedprojectrealisation.</p>
Isstronger application foreseen?	<p>YES</p>
Miscellaneous	<p>Severalautonomousregionsprovidesubsidiesforwasteminimisationandeco-auditing (since1993).</p>

d) Suasive instruments

In Spain waste minimisation is promoted by information services offering support to industrial waste producers. Databases are available on the state-of-the-art in waste disposal technology. Public authorities run pioneering projects that serve as examples. There are market facilities for trading recycled goods and end-of-use products.

These services are offered by the federal, regional and municipal administrations and by industry and industrial associations. The operation of information services is not legally mandatory.

<p><u>Information provision and public relations</u> – selected examples</p>	<p>1) Sector-specific waste minimisation studies: The studies give information on pilot projects and clean technologies. They are distributed to enterprises.</p> <p>2) Technical advice on waste minimisation by the National Society for Waste Management – EMGRISA: Information on waste minimisation is given to SMEs.</p> <p>3) Regional Waste Agency in the Basque Region (IHOBE, XUME): IHOBE is a public corporation reporting to the Vice-Ministry of the Environment in the Basque region. Together with XUME, both units promote the use of cleaner technologies, direct environmental audits, and draw up waste minimisation programmes.</p> <p>4) Catalan Centre for Cleaner Production Initiatives (CCPI): The CCPI is part of the Catalan waste agency. Major activities are information gathering, publishing and supplying feasibility studies (economic and financial) of waste minimisation projects, arranging agreements with enterprises to carry out pilot projects, and facilitating international contacts between companies, bodies and institutions.</p>
<p>Experience/ effectiveness</p>	<p>Suasive instruments have proven effective.</p>
<p>Is stronger application foreseen?</p>	<p>YES Emphasis on hazardous waste and MSW</p>

<p><u>EMS, environmental reports, and eco-labelling</u> – selected examples</p>	<p>1) Environmental Management Systems in industry and public institutions: An EMS is a voluntary management instrument giving information on companies' environmental policies, practices and structures.</p> <p>2) Environmental/waste management reports: Voluntary instrument. The reports register the generation of hazardous waste, waste characteristics, and the manufacturing process.</p>
<p>Experience/ effectiveness</p>	<p>Generally regarded as effective.</p> <p>1) Propagation is slow and is restricted to large enterprises.</p> <p>2) Propagation in companies is reported to be "average".</p>
<p>Is stronger application foreseen?</p>	<p>YES Emphasis on reducing generation of hazardous and urban solid waste</p>

e) Conclusions

At the time of the survey, there had not been sufficient experience with waste minimisation instruments in Spain. For this reason, information on their effectiveness could not be given. Economic instruments and plans and programmes, both voluntary and mandatory, were regarded as priority instruments.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Supportive, especially of suasive instruments; resistancetomandatoryplans and instruments	Neutral; information and PR are regarded as most effective, legislation as far less effective	Strongly supportive	Active resistancetowaste minimisation policy, though supportive of economic and suasive instruments
Participation in waste legislation obligatory?	YES Represented in the environmental advisory council which takes part in the legislative process	Not applicable	YES Represented in the environmental advisory council, which takes part in the legislative process	NO
Support of waste minimisation by	Some industrial associations offer information services to industry and do R&D on their behalf. They do not operate disposal facilities. Industry and businesses support their waste minimisation efforts with product advertisements and PR campaigns.	Avoiding purchase of waste-intensive products and demanding low-waste products Good acceptance of recycling facilities	Participation in legislation; information to the public and politicians	Implementing quality and Environmental Management Systems in hazardous waste treatment/disposal enterprises (by ASEGRE – association of hazardous waste management business)
Hindering of waste minimisation by	Participation in waste management for packaging waste (according to draft law) is not adequate.	None	None	None
Influence on waste minimisation/ overall contribution	50% “Major” contribution	15% “Minor” contribution	25% “Medium” contribution	10% None
Is stronger influence foreseen?	YES More voluntary agreements with industrial sectors, setting objectives and promoting transfer of technological information	YES Participation in the environmental advisory council, which takes part in the legislative process	YES Participation in legislation, balancing influence of industry	NO

6. Key products and waste streams

Past	Present	Future
Solvents, mineral oils, PCBs, asbestos, biocides	Solvents, mineral oils, PCBs, asbestos, biocides	Solvents, mineral oils, PCBs, asbestos, biocides
Paper, plastics and packaging	Paper, plastics and packaging	Paper, plastics and packaging
	End-of-life vehicles	End-of-life vehicles
	Tyres	Tyres
	Batteries	Batteries
	WEEE	WEEE
	Electroplating sludge	Electroplating sludge
	Sewage sludge	Sewage sludge

Spain provided specific information concerning its waste minimisation policies for three key waste streams: **used solvents**, **electroplating sludge**, and **packaging waste**.

	Used solvents	Electroplating sludge	Packaging waste
Reasons for priority	Quantity and toxicity; CT available; saving scarce resources; economic reasons	Quantity and toxicity; CT available; saving scarce resources	Quantity; saving scarce resources; economic reasons
Waste minimisation target	Recovery rate of 70% for 1997; minimisation 10%	Recovery rate of 23% for 1997; minimisation 15%	Recovery rate 65% (weight); recycling rate 45% (weight); minimum material recycling of 15%; targets defined in draft law (at time of survey)
Instruments and measures	Plans and programmes, mandatory instruments, duties and taxes, financial support and persuasive instruments	Plans and programmes, mandatory instruments (plant operation control), financial support and persuasive instruments	Plans and programmes, mandatory instruments, duties and taxes, financial support and persuasive instruments
Success and failure; experience	SMEs still lack information. Acceptance by industry is increasing.	Companies resist changing manufacturing processes. Acceptance by industry is increasing.	Not yet available

Separate collection of urban solid waste is not mandatory for private households. Nevertheless, some waste streams are collected separately. Collection rates are shown in the following table.

Type of waste, component	Collection rate	Recycling rate (of collected total)
Greenwaste	Pilot tests operating	-
Waste paper	40%	-
Waste glass	25%	-
Scrap metal, e.g. tins cans	12% (pilot tests only)	-
Batteries	95%	-

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Information provision and technical assistance, financial support	SMEs	Reduced pay-back periods for investments in clean technologies
Zero waste production process	Electroplating industry	Reduced costs for freshwater and wastewater treatment; sanctions if process is not modified

In the view of the government, waste minimisation measures have a clearly positive effect on the economy. Industry and consumers share the opinion that they have a neutral effect.

Spain states that waste minimisation cannot be influenced through the use of prices for disposal services.

8. Prospects and future approaches

In the future, Spain will follow the priorities listed below:

- At the federal level, use of information services and other persuasive instruments will be intensified;
- The federal government indicates it would be willing to expand financial support;
- At the international level, Spain regards seco-labelling as an appropriate instrument;
- Technical standards need harmonization on the international level;
- Also at the international level, the transfer of technological know-how will be promoted;
- At the OECD level, a common understanding of waste minimisation and clean technology concepts will be reached.

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SWITZERLAND

Contact person

Mr. Marco Buletti
Swiss Agency for the Environment, Forests and Landscape
(Bundesamt für Umwelt, Wald und Landschaft)
Waste Division
3003 Berne

Tel: 41-31-322-93-80
Fax: 41-31-323-03-69
E-mail: Marco.Buletti@BUWAL.ADMIN.ch

Acronyms

EMPA Eidgenössische Materialprüfungs- und Forschungsanstalt
FOEFL Federal Office of Environment, Forests and Landscape

1. Definition, terms, concepts, and target-setting

In Switzerland there is **no formal definition of waste minimisation** in federal law. Nevertheless, the OECD working definition corresponds to the Swiss understanding of the term *waste minimisation*. The latter can be derived from the Swiss Waste Management Concept of 1992. Waste minimisation denotes the reduction of both waste amount and of waste toxicity.

The **scope of waste** does not include radioactive waste, mining waste, dead animals, agricultural waste, or discarded explosives. Waste minimisation measures are relevant for liquid waste and sewage sludge.

Waste minimisation measures are influencing consumer behaviour and the implementation of clean technologies, product design, recycling, and re-use or recovery (on- and off-site). Incineration processes, regardless of possible energy recovery, are not regarded as recovery or waste minimisation measures. The same is true for waste treatment prior to landfilling and for landfilling itself. MSW, sewage sludge, and combustible components of CD waste must be incinerated if they cannot be recycled.

At the time of the survey, the **hierarchy of waste minimisation measures** was set out in the draft of the law on the protection of the environment. According to this document:

- Waste prevention at source has priority over the reduction of generated waste;
- Waste recovery and recycling have the same priority as re-use (depending on specific circumstances);
- Recycling within the same production process does not have any priority over recycling in other processes;
- Reduction of quantity has the same priority as reduction of waste toxicity (depending on specific circumstances);
- Material recycling has the same priority as energy recovery (true for certain waste streams; incineration is not a recycling operation); and
- Recycling has priority over land filling.

This hierarchy is not to be applied strictly for all waste disposal operations. Switzerland tries to find solutions adapted to the specific waste problem, rather than simply following principles or obeying the above hierarchy. If a recycling operation is not economically feasible, the recycling measure may not be implemented.

Switzerland's **waste minimisation priorities** for products, waste streams and industrial sectors are shown in the following table. Criteria indicate why these priorities/targets have been set.

Waste minimisation priorities	Targets	Criteria
Products: Batteries	Return/recycling rate of 80%	Environmental impact
Waste streams: Beverage containers	Draft: Minimum return rates for refills and for one-way containers	Waste amount
Metal-plating sludge	Best possible recovery (voluntary industry agreement)	Environmental impact and difficulty of final disposal
Construction and demolition waste	Best possible recovery (including qualitative standards for secondary construction material)	Waste amount and environmental impact
WEEE	Best possible recovery (including mandatory take-back, standards for recycling)	Environmental impact; resource recovery
Industrial sectors: Different branches, e.g. casting industry, metal plating.	No specific targets; co-operation of authorities with branches	Environmental impact, difficulty of final disposal, waste amount

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Swiss Agency for the Environment, Forests and Landscape	Setting of priorities, participation in the enactment of laws, strategic planning, approval and control, information and public relations, international co-operation, statistics
Eidgenössische Materialprüfungs- und Forschungsanstalt (EMPA)	Scientific support
Federal Office of Statistics (Bundesamt für Statistik)	Statistics

Switzerland has a federal political and administrative system. The cantons have their own governments and legislation. Whereas the laws and decrees are enacted at national level by the FOEFL, their implementation is mostly the responsibility of the cantons. Approval and control tasks, information services, and PR campaigns are carried out at both national and cantonal level. MSW disposal is often delegated to the municipalities.

3. Waste legislation

In Switzerland there is no separate waste legislation. However, the **Federal Law relating to the Protection of the Environment** (1983) deals with waste, including waste minimisation in its chapter 4. This law is currently being revised. The **Technical Ordinance on Waste Treatment** (1990) is an important legal document. There are also provisions pertaining to waste minimisation in the **Ordinance relating to Environmentally Hazardous Substances** (1986). There is no integrated environmental legislation.

Regulations are in force for the following key wastestreams/products:

- Municipal Solid Waste (MSW) in general;
- green waste;
- packaging waste;
- waste paper;
- industrial waste in general;
- CD waste (guideline);
- WEEE (ordinance underway at the time of the survey);
- batteries (ordinance underway at the time of the survey).

Enforcement of the relevant legal instruments (in this case, the Ordinance relating to Environmentally Hazardous Substances of 1986) is reported to be better than “average”. Implementation of regulations on MSW and waste paper is fairly good. Performance in the area of green waste is reported to be only “average”. The Ordinance on Beverage Containers has proven effective, but one-way bottles and cans are gaining market share at the expense of refill containers.

In the future, Switzerland is going to develop and improve its system of regulations on waste minimisation. The following approaches will be followed:

- disposal fees for certain products have to be paid in advance by manufacturer or importer; and
- stricter enforcement of the polluter-pays principle.

4. Key instruments

a) Plans and programmes

Switzerland has set up mandatory and voluntary plans and programmes, including voluntary agreements with industry sectors on waste reduction. Programmes are established at national, cantonal and municipal level. They cover MSW, key industrial sectors, key waste streams and products, R&D, provision of information, consultancy services, and enforcement control.

In general, plans and programmes are regarded as important. They have been established mainly at the national level, less at cantonal level, and at municipal level only for MSW, consultancy services, and implementation and control.

<u>Plans and programmes – selected examples</u>	1) Industry sector waste reduction programmes: Voluntary programmes including disposal concepts for different sectors of industry (metal plating, casting, sandblasting). Information is provided on environmentally sound disposal of crucial waste streams. Cantonal and local administrations, as well as industrial associations, are given financial assistance by the government for implementing and supporting programmes.
Experience/ effectiveness	In general, the voluntary approach has been effective. Plans have helped initiate waste minimisation activities and have increased awareness. Plan development is time-consuming. Participation by industry depends on the economic situation and is sometimes poor. Acceptance of programmes is high when economic advantages can be attained. Free-riding occurs. 1) Referring to the concept for the metal-plating industry: Acceptance is reported to be “medium”: about 50% of the target group participates. Obstacles to success are the poor economic situation in general and cheap land filling facilities that attract galvanic sludge.
Is stronger application foreseen?	YES The main effort will be to continue programmes already in existence.

b) Mandatory instruments

Switzerland uses legally defined **technical standards** to support waste minimisation efforts. These standards are legally binding for the operation of specific plants and processes and waste disposal activities. They are regularly adapted to the state-of-the-art.

<u>Technical standards</u> – selected examples	1) Technical Ordinance on Waste Treatment (1990): Technical requirements referring to landfill operation, waste storage, waste incineration, and composting. A list of wastes permitted for landfilling is included.
Experience/ effectiveness	Generally regarded as effective, but detailed information was not given in response to the questionnaire.
Is stronger application foreseen?	YES

Switzerland has **production bans and product restrictions**, including restrictions on product use, obligations to label products, deposit-refund schemes, and product take-back obligations. The construction of landfills and their operation are subject to legislation.

<u>Bans and restrictions</u> – selected examples	1) Ordinance on beverage containers (1991): Businesses must charge a deposit for refillable beverage containers. If the amount of waste remaining after one-way containers have been recycled exceeds a given limit, a deposit has to be charged on one-way containers. Containers must be labelled to give information on components.
Experience/ effectiveness	Generally regarded as effective, but detailed information was not given in response to the questionnaire.
Is stronger application foreseen?	YES

c) Economic instruments

There are **taxes and duties** on waste treatment and landfilling. The revenues are not used to finance wasteminimisationactivities.

<u>Taxes, duties or licences – selected examples</u>	No information given in response to the questionnaire
Experience/ effectiveness	Effective, but experience is limited to disposal fees and deposit-refund schemes
Stronger application foreseen?	YES Duties on raw material that generate hazardous wastes should be discussed; disposal fees for batteries, aluminium cans, PET bottles

Financial aid programmes and economic incentives have been set up. Financial aid is given for R&D, pilot plant design and construction, consultancy services, eco-auditing, and the establishment of eco-balances.

Financial aid and funding are initiated by the federal and cantonal governments and their administrations. Support is given through subsidies, cost-free consultancy services, and sureties. Governmental institutions and the disposal sector apply for financial aid.

<u>Financial aid and economic incentives – selected examples</u>	1) Subsidies to the disposal sector: Target groups are private and semi-private organisations in this sector. Subsidies are granted according to the legal provisions for the construction of disposal facilities that conform to the state-of-the-art.
Experience/ effectiveness	In general, financial support has been effective. Although state expenses for subsidies are high, they have contributed considerably to building and developing the Swiss waste management system.
Is stronger application foreseen?	Not foreseen The granting of subsidies will be reduced in future and replaced by measures based on the polluter-pays principle.

d) Suasive instruments

Switzerland has mandatory information services for private households and industrial waste producers. Information offices exist at the state, canton and municipal level.

<u>Information provision and public relations – selected examples</u>	No information given in response to the questionnaire.
Experience/ effectiveness	Information and information exchange are regarded as most important. Related efforts have proven effective.
Is stronger application foreseen?	Not foreseen

Some Swiss companies use Environmental Management Systems (EMS), environmental reports, and waste balances. Companies start these activities of their own free will. Eco-labelling is not used.

<u>EMS, environmental reports, and eco-labelling – selected examples</u>	No information given in response to the questionnaire
Experience/ effectiveness	Generally regarded as effective
Stronger application foreseen?	YES

e) Conclusions

Switzerland has set high technical standards for final waste disposal, mainly for incineration and landfilling. These standards are formulated in legal documents. As a result, waste disposal has become increasingly costly. This was and still is a major incentive for waste generators to apply waste minimisation measures, and is applicable to both private households and industrial waste producers.

Suasive and economic instruments are regarded as the most important activities. The use of these instruments is mainly the responsibility of the cantons. The federal government establishes the legal framework and formulates guidelines.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Supportive of voluntary, suasive and economic programmes and instruments; neutral towards mandatory instruments	Strongly supportive; information and legislation regarded as most important	Strongly supportive	Neutral
Participation in waste legislation obligatory?	YES Government has the duty to co-operate with industry (provisions not yet in force).	Not applicable	YES Consultation during legislative process	YES Consultation during legislative process
Support of waste minimisation by	Product advertisement and PR campaigns include waste minimisation considerations. Associations offer information and technical consulting services and operated disposal facilities.	Willingness to change consumption behaviour is good. Acceptance of existing recycling facilities, including home composting, is high.	Informing the public and developing concepts and political principles	NO The disposal sector fulfils obligations according to legal provisions. No extra efforts are made.
Hindering of waste minimisation by	Voluntary battery disposal fee (part of purchase price): free-riding occurs Reluctance to introduce deposit on PET beverage containers	Increasing disposal costs sometimes criticised	None	NO (see above)
Influence on waste minimisation/ overall contribution	60% "Major" contribution	25% "Medium" contribution	10% "Minor" contribution	5% "Minor" contribution
Is stronger influence foreseen?	YES	YES Provision of information to the public on disposal and recycling facilities regarded as crucial	YES Greater contribution to developing political concepts	YES Greater emphasis on recycling

6. Key products and waste streams

Past	Present	Future
Non-recoverable waste in general	Non-recoverable waste in general	Non-recoverable waste in general
Beverage containers, packaging	Beverage containers, packaging	Beverage containers, packaging
	Metal platings sludge	Metal platings sludge

This information comes from the Swiss Waste Management Concept and the Guidelines of Waste Management in Switzerland.

Switzerland provided specific information concerning its waste minimisation policies for three key waste streams: **electroplating sludge**, **commercial and industrial waste**, and **beverage containers and packaging waste**.

	Electroplating sludge	Commercial and industrial waste	Beverage containers and packaging waste
Reasons for priority	Toxicity; CT available; scarce resources; economic reasons	Quantity and toxicity; CT available; scarce resources; economic reasons	Quantity; CT available; scarce resources.
Waste minimisation target	Generation of single metal compounds sludge that can be recycled more easily; as a result, increase in recycling rate	Increasing prevention and the recycling rate; disposal in Switzerland (incineration) These targets are defined in legal documents.	Reduction of amount of household waste and sensible consumption of natural resources Minimum recycling rates and other restrictions are defined in the ordinance on beverage containers.
Instruments and measures	Plans and programmes, duties and taxes, financial support. Industry sector initiated a commission that worked out a specific disposal concept. Commission is funded by state and cantonal units.	Plans and programmes, technical standards, bans and restrictions, duties and taxes, suasive instruments and financial support	Technical standards, bans and restrictions, duties and taxes, and suasive instruments
Success and failure; experience	A voluntary industry agreement was reached. Landfilling is still too cheap and attracts sludge disposal. Acceptance of concept is good insofar as all companies make the same efforts (free-riding problem).	No information given	Enforcement of the ordinance has been ineffective. Consumer acceptance generally good. Problems with participation in separate collection. Acceptance by packaging industry poor due to mandatory recycling rates.

Some collection and recycling rates in the year 1995 are shown in the following table:

Type of waste, component	Collection rate	Recycling rate (of collected total)
Greenwaste	40%	100%
Waste paper, cardboard, corrugated paper	61%	-
Waste glass	85%	-
Batteries	60%	100%
Aluminium cans	85%	-
PET bottles	75%	-

7. Costs and benefits

In the view of the Swiss government and consumers, waste minimisation measures have a positive effect on the economy. Industry considers that they have neither a positive nor negative impact.

Switzerland states that **prices, duties or fees** are effective in supporting waste minimisation measures. Higher costs for disposal lead to increased waste prevention, reduction and recycling efforts. This is true for private households and for industrial waste generators.

8. Prospects and future approaches

In the future, Switzerland will follow the priorities listed below:

- The federal government will continue to set strict technical standards for all waste disposal facilities, mainly landfills and incinerators. These standards will at least meet state-of-the-art requirements.
- Closely associated with the setting of technical standards are efforts to ensure their best possible implementation, and thus the successful enforcement of legislation.

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TURKEY

Contact person

Mr.TaskinTuna
 MinistryofEnvironment
 GeneralDirectorateofEnvironmental
 PollutionandControl
 EskisehirYolu8km
 Ankara

Tel:90-312-285-0941
 Fax:90-312-285-55875

1. Definitions, terms, concepts, and target-setting

In Turkey there is **no formal definition of waste minimisation** in legislation. However, the regulations on the “Control of Solid Waste Management” and the “Control of Hazardous Waste” call for waste minimisation, particularly at source, and include provisions on waste disposal, recycling and re-use. The understanding of the term *waste minimisation* corresponds to the OECD working definition. Waste minimisation denotes the reduction of waste amount and waste export, and the ban of waste import.

The **scope of waste** does not include radioactive waste, mining waste, discarded explosives, dead animals, agricultural waste, liquid wastes or sewage sludge.

Waste minimisation means influencing consumer behaviour, implementing clean technologies, product design and recycling, re-use and recovery (on- and off-site). Incineration processes of any kind are not regarded as waste minimisation measures. The same is true for waste treatment prior to landfilling and landfilling itself.

The **hierarchy of waste minimisation measures** is set out in the Environment Act and the Regulation on Controlling Solid Wastes:

- Waste prevention has priority over waste recovery/recycling;
- Re-use of products/waste has priority over waste recovery/recycling;
- Recycling within the same production process has priority over recycling in other processes;

- Reduction of the quantity of generated waste has no priority over the reduction of waste toxicity;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

This hierarchy must be applied in regard to plant approval and operation, as well as to the selection of disposal procedures.

Turkey's **waste minimisation priorities** in regard to types of waste are:

- waste oils, ash hazardous waste; and
- plastic, glass and metal packaging waste, as Municipal Solid Waste.

2. Political and administrative responsibilities

National bodies	Tasks, responsibilities
Ministry of Environment	Setting of priorities, participation in the enactment of laws, strategic planning (in co-operation with industrial sectors, universities and environmental associations), approval and control, international co-operation.
Universities and non-governmental organisations	Scientific support

Turkey has a central political and administrative system.

Approval and control are fully carried out by local administration and by the Ministry of Environment. Disposal itself, and information provision and PR campaigns, occur at the provincial and local level.

3. Waste legislation

Turkey has separate waste legislation. Key sources are the **Control of Solid Waste Management Regulation** (1991), the **Hazardous Waste Management Regulation** (1995), and the **Medical Waste Control Regulation** (1991). They include provisions on waste minimisation, collection, transport, recycling, recovery and disposal of waste.

Specific waste minimisation provisions are also part of the **Environment Act** (1983). There is no integrated environmental legislation.

There are specific regulations for the following wastestreams:

- Municipal Solid Waste in general;
- medical waste; and
- hazardous waste.

The regulation on the Control of Solid Waste Management includes provisions concerning waste paper and packaging waste.

Experience shows that industry does not have enough information on the existing regulations for the effectiveness of these regulations to be judged. Good experiences are reported in the municipal solid waste area. However, there is insufficient separate collection of different waste streams.

4. Key instruments

a) Plans and programmes

Turkey has several mandatory plans and programmes concerning waste minimisation. These plans and programmes are established on the national, regional and local level.

There are general environmental plans with sections on waste minimisation, as well as waste-specific programmes. They cover MSW, key industrial sectors, and key waste streams. The areas of research and development, consultancy, and implementation and control are also covered.

Plans and programmes are regarded as rather important waste minimisation measures. This is especially true for MSW-oriented programmes on the national and local level and for programmes addressing industrial sectors, R&D, and implementation and control. Programmes that deal with key products and with consultancy are seen as less important.

<u>Plans and programmes</u>— elected examples	1) Waste Minimisation in Industry Programme (1992): Set up by the central government, this mandatory programme aims at promoting the use of clean technologies in the manufacturing industry (glass, metal and plastic). Approximately 200 companies are being investigated.
Experience/ effectiveness	In general, plans and programmes are regarded as effective. 1) Good acceptance by industry. Separate collection rates of up to 45% for glass and plastics can be achieved. Problems with implementation have occurred due to inadequate separate collection.
Is stronger application foreseen?	YES Setting up of programmes for edible liquid oils and laundry softeners

b) Mandatory instruments

Turkey applies legally defined **technical standards** for production and recycling processes. They are mandatory for all plants and production processes and must be considered during approval procedures, plant operation, and disposal. The standards are regularly adapted to the state-of-the-art.

Turkey has **product bans and product restrictions** to promote waste minimisation. The product restrictions include regulations on product use, obligations to label products, deposit-refund schemes, and product take-back obligations for the manufacturers.

The construction of landfills at certain sites is regulated by law.

<p><u>Bans and restrictions</u> – selected examples</p>	<p>1) Regulation on Management of Dangerous Chemicals, Substances and Products (1993): Includes usage ban for PCBs, PCTs and asbestos and obligations regarding product packaging, labelling, storage and handling.</p> <p>2) Regulation on Hazardous Waste Management (1995): Includes obligations for waste generators, transporters, importers and exporters. The importation of waste is prohibited. Waste generation is to be minimised.</p>
<p>Experience/ effectiveness</p>	<p>Generally regarded as effective.</p> <p>1) Enforcement of usage ban is successful. Industry has changed technologies, which in some cases has caused problems in regard to finding alternative products.</p>
<p>Is stronger application foreseen?</p>	<p>No information given in response to the questionnaire</p>

c) Economic instruments

Taxes and duties are used in the area of waste treatment and landfilling. Private households must pay a cleaning tax that supports the municipalities' safe disposal of municipal solid waste. Producers of hazardous waste are charged fees for waste disposal.

No financial aid programmes or economic incentives have been set up to promote waste minimisation.

d) Suasive instruments

Turkey has established information offices for industrial waste producers, including waste-specific information systems and databases, which are run by national, regional and local administrations. The information offices are mandated by law. Demonstration projects carried out by public authorities receive support. Waste exchanges exist for trading recycled goods and end-of-use products.

Instruments for information provision and PR had not proven effective at the time of the survey. Nevertheless, more intensive use was planned in the future.

e) Conclusions

Mandatory and economic instruments are seen as most effective. Suasive instruments have a very low priority.

Deposit schemes and recycling rates are being applied effectively on packaging waste, with rates of up to 65% being achieved at the time of the survey. The main problem for waste producers is how to select and finance appropriate waste minimisation technologies.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsandother NGOs	Wastedisposalindustry
Basicposition onwaste minimisation	Supportiveofmandatory plans,programmesand instruments,including economicinstruments; neutraltowardsvoluntary plansandprogrammes;nosupportofsuasive instruments	Neutral.Legislationand economicinstrumentsare regardedasimportant measures,but informationprovisionis seenasrather unimportant.	Supportive	Supportiveofmandatory plans,programmesand instrumentsincluding economicinstruments; neutraltowardsvoluntary plansandprogrammes;nosupportforsuasive instruments
Participation inwaste legislation obligatory?	NO Legislativeprocessconsiders industry'sviews.	Notapplicable	NO	YES
Supportof waste minimisation by	Industrypromoteswaste minimisationthroughPR campaigns. Industrialassociationsdo researchanddevelopment workonbehalfofindustry.	Willingnesstochange consumptionbehaviour islow.Thereisno acceptanceofexisting recyclingfacilitiesand homecomposting. Separatecollectionof wasteismandatory. Performanceis "average".	Information provisiontothe public, establishmentsand politicians; educational activities,e.g.pilot projectsinschools forwasteseparation; enforcementand controlassistance; contributionto settingrecycling rates,deposit schemes	YES (Nofurtherinformation given)
Hinderingof waste minimisation by	Sometakeactionstodelay measurespromotingwaste minimisation.Thisismainly duetolackofinformationon newlegislation. NoEPRschemesoperating.	Noanswer	None	YES (Nofurtherinformation given)
Influenceon waste minimisation/ overall contribution	30% "Medium"contribution	20% "Minor"contribution.	20% "Medium" contribution	30% "Minor"contribution
Isstronger influence foreseen?	YES Manufacturerstotakemore responsibilityforproducts andtheirdisposal.	YES	YES	YES

6. Key products and waste streams

Past	Present	Future
Plastic, metal and glass packaging	Plastic, metal and glass packaging	Plastic, metal and glass packaging
	Paper packaging	Paper packaging
	Hazardous wastes	Hazardous wastes

This information is set out in the five-year development programme

Turkey has indicated that the following are key waste streams: **oil-contaminated waste , waste paper, and packaging waste .**

Turkish waste legislation includes waste collection rates. There is separate collection of waste glass, scrap metal from private households, and packaging waste (see table below).

Type of waste, component	Collection rate	Recycling rate (of collected total)
Waste glass	45%	60%
Scrap metal from private households	30%	60%
Packaging waste	45%	60%
“Tetrabrick” packaging	7%	60%

7. Costs and benefits

No information provided at the time of the survey.

8. Prospects and future approaches

No information provided at the time of the survey.

References

Specific references were not provided at the time of the survey.

UNITED KINGDOM

Contact persons

Mr. Mark Plummer-Ext. 8771
 Gillian Neville-Ext. 8407
 Department of the Environment
 Waste Policy Division
 Romney House
 43 Marsham Street
 London SW11 3PY

Tel: 44-171-276-8771/8407

Acronyms

BPEO	Best Practicable Environmental Option
EA	Environmental Agency
EMAS	Environmental Management Audit Scheme

Note: While every effort has been made to ensure that the information in this section is correct, the statements on government policy generally refer to policies under the previous administration (i.e. before the election of May 1997). These may not necessarily be the policies that the new administration will want to follow.

1. Definitions, terms, concepts, and target-setting

In the United Kingdom the **definition of waste minimisation** is the reduction in quantity and hazardousness of waste produced at source. At the time of the survey, it was indicated that this definition would be placed on a statutory basis in due course. Re-use, recycling and recovery of wastes produced were not part of this definition of waste minimisation. This definition does not correspond to the OECD working definition.

Waste minimisation is waste prevention via the consumption patterns, implementation of clean technologies, and product design.

For the purpose of the survey (and related work in the OECD) the UK agreed to use the OECD working definition, so that its situation could be meaningfully compared with that of other OECD countries. The scope of this profile therefore includes re-use and recovery options (including recycling, composting, and incineration with energy recovery).

Incineration without energy recovery is considered to be a disposal operation and is placed alongside landfilling. There are no criteria to distinguish thermal treatment (without energy recovery) from energy recovery.

The **scope of waste** does not include radioactive waste, dead animals, agricultural waste, and discarded explosives. Liquid waste, sewage sludge, and mining waste are considered as waste and are thus subject to waste minimisation measures.

The **hierarchy of waste minimisation measures** is set out in the White Paper *Making Waste Work*, which sets out the Government's policy framework. According to this hierarchy:

- Waste prevention at source has priority over waste recycling;
- Re-use has priority over recovery;
- Recovery: recycling, composting, and energy recovery are all considered to be of equal value.
 - Recycling and recovery operations within the original production process have the same priority as operations performed in other processes off-site;
 - It depends on the waste whether minimisation of hazard has priority over minimisation of amount;
 - It depends on the Best Practicable Environmental Option (BPEO) for a particular wastestream whether material recycling has priority over energy recovery.
- Disposal is the final option and the lowest in the hierarchy. Landfilling and incineration without energy recovery are both disposal options.

This hierarchy is not to be applied bindingly. It is flexible, and all choices should be based on the Best Practicable Environmental Option (BPEO). At the time of the survey, it was expected that the White Paper *Making Waste Work* would be placed on a statutory basis in due course.

The United Kingdom's **waste minimisation priorities** for products, waste streams and key players are listed in the following table. Criteria indicate why these priorities/targets have been set.

Priorities	Targets	Criteria
Products: Batteries 1) Lead-acid 2) Nickel-cadmium Newspapers	1) 90% recycling 2) Gradual reduction in municipal wastestream 40% recycled content in feedstock used to manufacture newsprint by 2000	1) Voluntary agreement 2) Required by EU batteries Directive Voluntary agreement
Wastestreams: End-of-life vehicles Waste of electronic and electrical equipment (WEEE) Wastetyres Packaging Construction and demolition waste (CD waste)	Recovery/re-use of 95% of all parts by 2015 None 65% recovery, 25% retreading 50-65% recovery, 25-45% recycling, minimum 15% by 2001 Increasing the use of recycled CD waste as aggregates from 30 mtpa in 1989 to 55 mtpa by 2006	Voluntary target set by industry Voluntary industry collection experiment EU report on priority wastestreams EU Directive on packaging and packaging waste Relief of landfills, reduced environmental impacts of quarrying primary minerals
Key players: Companies with more than 200 employees	75% of companies to have published environmental policies covering waste issues by the end of 1999; 50% of companies to have management systems in place to give effect to their environmental policies by the end of 1999	Promoting in industry the adoption of waste reduction and management strategies, which both save money and benefit the environment; encouraging industry in the development of more sustainable waste management practices

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
Department of the Environment	Setting of priorities, strategic planning, approval and control, scientific support, information provision and public relations, international co-operation, statistics
Department of Trade and Industry	Setting of priorities, development of government strategy, scientific support, information provision and public relations, international co-operation, statistics
Environment Agency (EA)	Approval and control, regulation, scientific support, information and public relations, miscellaneous
Scottish Environment Protection Agency	Approval and control
Engineering and Physical Sciences Research Council	Scientific support

The United Kingdom has a central political and administrative system.

Key tasks are delegated to local authorities, which carry out their duties within the context of the national strategic framework. Local authorities prepare local recycling and disposal plans. They are responsible for collection and disposal, as well as collection of statistics to be fed into the national aggregate.

3. Waste legislation

The United Kingdom's waste legislation is set out in the **Environment Protection Act 1990** and the **Environment Act 1995**. Both include recovery issues. There is no piece of integrated environmental legislation.

There are regulations in force for the following **key wastestreams/products** :

- packaging;
- batteries.

The lead-acid battery recycling rate is high, but little progress has been made in keeping nickel-cadmium batteries out of the municipal wastestream.

While there is no single piece of implementing legislation, the 1990 Environment Protection Act includes provisions for air, land and water.

4. Key instruments

a) Plans and programmes

In the United Kingdom both mandatory and voluntary plans and programmes exist. Mandatory programmes cover municipal waste minimisation and the areas of implementation and control. Voluntary programmes are more widespread and deal with key industrial sectors, key waste streams and products, R&D, and consultancy. Plans and programmes are prepared by national and local authorities.

National and local programmes for MSW and key waste streams are regarded as most important.

<p>Plans and programmes – selected examples</p>	<p>1) Waste Recycling Plans, since 1991: Local waste collection authorities must set up plans for household and commercial waste. It is their duty to define waste streams to be separately collected, and identify plants and equipment needed to deal with the waste. The authorities have to inform the public on the plan.</p> <p>2) ACORD Plan (Automise Consortium on Recycling and Disposal) 1995: This voluntary plan, which comes from industry, aims at reducing the amount of waste from end-of-life vehicles. The target group is industry involved in vehicle manufacturing and disposal.</p> <p>3) ICER Plan (Industry Council for Electrical and Electronic Equipment Recycling) 1995: This voluntary pilot collection experiment, which comes from industry, aims at improving/refining the understanding of arisings of WEEE.</p> <p>4) Real Value from Packaging Waste Programme 1994: Aims at recovery and recycling of packaging. Targets are set to the year 2001. Target groups are the packaging industry, government, local authorities, and the waste management industry. There is supporting legislation. The Programme needs monitoring and enforcement control. The waste management industry will have to expand its capacities.</p> <p>5) Environmental Technology Best Practice Programme: Joint initiative of the Department of Trade and Industry and Department of the Environment. The programme promotes the use of better environmental practices (clean technologies) that reduce costs for industry and commerce. It concentrates on management and technological solutions for reducing waste at source. The programme focuses on specific industrial sectors or pollutants.</p> <p>6) Planning Policy Guidance Notes 23 “Planning and Pollution Control” (PPG23) (draft revision was in consultation at the time of the survey): These notes set out the Government’s policies in respect to waste management and disposal. They must be taken into account by local planning authorities. The draft considers the new government waste strategy, “Making Waste Work”, and the setting up of the Environment Agency in 1995.</p>
<p>Experience/ effectiveness</p>	<p>4) Programme is well accepted by industry, but free-riding occurs.</p> <p>5) Demonstration projects are leading to the reduction of industrial wastes produced by some sectors.</p>
<p>Is stronger application foreseen?</p>	<p>YES Key tasks will be to draw up voluntary agreements with industry</p>

b) Mandatory instruments

The United Kingdom uses legally defined **technical standards** for waste disposal to support waste minimisation. However, it was not indicated that these standards are being regularly adapted to the state-of-the-art.

<u>Technical standards</u> – selected examples	1) Waste management licensing regulations, 1994: Issued by the Department of the Environment, following the EU framework Directive on waste. Sites treating or disposing of waste must obtain a licence or licence exemption. Licence conditions indicate what waste can and cannot be accepted.
Experience/ effectiveness	1) Regulations led to increased costs for the waste management industry and monitoring costs for the Department of the Environment. The level of charges for site licences hindered implementation. Effects on waste minimisation are not known.
Is stronger application foreseen?	Not foreseen The United Kingdom stated that regulations would be used only as a last resort.

The United Kingdom has enacted **product restrictions** to support waste minimisation. They can be found as product user restrictions, take-back obligations, and deposit-refund schemes.

Land use planning guidelines do not permit the construction of landfill sites in Areas of Outstanding Natural Beauty (AONB) or on “green belt” land. The government gives advice concerning those waste streams which should not be landfilled (*Waste Management Paper 26F – Guidance from Government*).

<u>Bans and restrictions</u> – selected examples	1) Batteries and accumulators (containing dangerous substances) regulations, 1994: Issued by the Department of Trade and Industry, this regulation prohibits the sale of all alkaline manganese batteries containing more than 0.0025% mercury, with the exception of batteries used under extreme conditions and of button cells.
Experience/ effectiveness	1) Alkaline manganese batteries are now mercury-free. Regulations had no negative economic impacts on the government. Industry had to do R&D work to produce mercury-free batteries. There were no obstacles to implementation.
Is stronger application foreseen?	Not foreseen The United Kingdom stated that regulations would be used only as a last resort.

c) Economic instruments

Taxes are levied on the landfilling of waste.

<u>Taxes, duties or licenses – selected examples</u>	1) Landfill tax 1996: Tax was introduced 1 October 1996. Landfill operators have to pay, although it is expected that the costs will be passed on to waste producers. All wastes disposed of in sites that need licensing are subject to the tax. Tax rate is £7 per tonne (reduced rate of £2 per tonne for inactive waste). Some of the tax revenues will be used to fund environmental trusts (non-profit distributing bodies). The trusts will disburse their funds to promote sustainable waste management practices, such as remediation of closed landfills, pilot projects, training schemes, re-use of waste.
Experience/ effectiveness	Too early to judge
Is stronger application foreseen?	YES The UK stated that it would be likely to consider further economic instruments in the future.

Financial aid programmes and economic incentives are used extensively for both MSW and hazardous waste minimisation. Financial aid is given for R&D, pilot projects, development of clean technologies, consultancy services, eco-balances and eco-auditing, and recycling of household waste. Financial support is also given for sustainable waste management practices that are unlikely to attract other forms of financial support.

Financial aid is granted by the state, local authorities, and industry. Support takes the form of subsidies and free-of-charge consultancy services. Governmental institutions, local authorities, universities, research institutions, industry (including disposal facility operators), and voluntary organisations apply for financial aid.

<u>Financial aid and economic incentives – selected examples</u>	<p>1) Clean Technology Programme, 1990: From the Engineering and Physical Sciences Research Council (EPSRC). Gives support for research into cleaner technologies in manufacturing and in re-use and recycling of waste products.</p> <p>2) Supplementary Credit Approval Programme for Recycling, 1991/92: Annual programmes from Department of the Environment. Local authorities are assisted in implementing recycling plans through capital investment in infrastructure.</p> <p>3) Environmental Action Fund, 1992/93: Initiated by Department of the Environment. This fund supports voluntary organisations working on recycling/composting projects. Grants are given for projects and to support running the organisation.</p>
Experience/ effectiveness	2) Widely supported and encourages partnerships between local authorities and industry. It assisted recycling initiatives during periods of adverse market conditions.
Is stronger application foreseen?	YES The United Kingdom stated that it would consider instruments of financial support as part of its market-based strategy on waste minimisation.

d) Suasive instruments

In the United Kingdom waste minimisation is promoted through services providing information to private households and industrial waste producers. Local authorities run pilot projects to promote clean technologies. Market facilities for trading recycled goods and end-of-use products exist. They are offered by national and local administrations and by industry, industrial associations, and voluntary organisations.

<p><u>Information provision and public relations – selected examples</u></p>	<p>1) Waste Watch 1991: This organisation gives free advice on recycling and waste minimisation and provides consultancy services. Target groups are industry, businesses and private households.</p> <p>2) Environmental Technology Best Practice Programme – Environmental Helpline: Offers free advice and information for UK businesses on waste minimisation and related environmental matters, such as pollution abatement technologies, emission limits and legislation. Cost-free brochures are available.</p> <p>3) Various organisations: Many industry associations operate information centres that give advice on waste issues.</p>
<p>Experience/ effectiveness</p>	<p>Information services have proven effective.</p>
<p>Is stronger application foreseen?</p>	<p>YES As part of overall strategy on waste minimisation</p>

<p><u>EMS, environmental reports, and eco-labelling – selected examples</u></p>	<p>1) Environmental Management Systems in all industrial sectors: EMS and related instruments are being applied by companies in the UK. They set targets to control and reduce harm to the environment. So far over 500 business sites have set up a voluntary EMS according to BS 7750 or DIN ISO 14001.</p> <p>2) EC Eco-Management Audit Scheme (EMAS) 1995: Participation is voluntary and requires environmental management and reporting. Target groups are certain industry sectors. Registration requires periodic third-party verification.</p> <p>3) Eco-labelling schemes: Target groups are manufacturers of consumer products other than food, retailers. Eco-labels go to products which do less harm to the environment than their alternatives. Criteria for each product group are set at EU level. Voluntary.</p>
<p>Experience/ effectiveness</p>	<p>Good results in particular sectors, but it is too early (or there is insufficient information at national level) to judge effectiveness.</p> <p>1), 2) Interest in EMS and EMAS is increasing. At the time of the survey, 39 industrial sites were registered to EMAS and over 500 to ISO 14001. Companies realised savings in materials and energy and waste disposal costs; other benefits to market share, etc. Some companies have resisted public disclosure of environmental effects. There has been uncertainty over benefits of systems approach. EMAS scheme is extended on a trial basis to local authorities.</p> <p>3) Criteria for eleven product groups available; ten products from three companies carry eco-labels in the UK.</p>
<p>Is stronger application foreseen?</p>	<p>YES As part of overall waste minimisation strategy</p>

e) Conclusions

In the United Kingdom economic and suasive instruments, and voluntary plans and programmes, were clearly the waste minimisation policy priorities at the time of the survey.

The government did not envisage making changes to the waste regulatory systems in place. It was considered important for both operators (the waste management industry) and regulators that there was a period of continuity. Regulations would therefore only be a last resort if voluntary instruments proved ineffective. Economic instruments such as the landfill tax reflected the polluter-pays principle and were considered likely to become more important as part of the approach to waste minimisation through market-based instruments.

5. Keyplayersandtheirrolesinwasteminimisation

	Industryandrelated associations	Consumersandprivate households	Environmental groupsand otherNGOs	Wastedisposalindustry
Basicposition onwaste minimisation	Supportiveofsuasiveand economicinstruments,voluntary plansandprogrammes;neutral towardsmandatoryplansand instruments	Supportive;alreadygood useof,butincreasing demandfor,recycling facilities	Strongly supportive	Supportiveofalltypesof instrumentsandwaste minimisationingeneral; neutraltowardssuasiveand economicinstruments
Participationin waste legislation obligatory?	NO Thereisconsultationofindustry duringthelegislativeprocess.	Notapplicable	NO	NO
Supportof waste minimisation by	Industrialassociationsoffer informationservicestoindustry anddoR&Dontheirbehalf. Wasteminimisationissuesare relevantforproduct advertisementsandPR campaigns. Recyclingactivitiesare performedforprofitreasons. Somecompaniesinitiate loss-leadingactivitiesforPRreasons ortosecuremarketposition.	Consumers´willingness tochangeconsumption patternsis“average”; participationinhome compostingisalso “average”. Thereisnolawthat privatehouseholdshave tocollectwaste separately,but some authoritiesrequire householdstodoso. Uptakeandsuccessare variable.	Providing informationto thepublicand politicians; promotionof largerecycling initiatives; participationin legislation; developmentof waste minimisation conceptsand policies	Providinginformationon wastereductiontechniques, re-use,recycling, compostingandrecovery
Hinderingof waste minimisation by	Delayinwasteminimisation measuresmayoccurwherenet expensesshowup.	Noanswer	None	No
Influenceon waste minimisation/ overall contribution	50% “Major”contribution	10% “Major”contribution	10% “Medium” contribution	30% “Major”contribution
Isstronger influence foreseeninthe future?	YES Greateruseofvoluntary agreementsforwastestreams	YES	YES	YES

6. Key products and waste streams

Past	Present	Future
Aluminium cans	Batteries	Clinical waste
Paper	Oils	Polychlorinated biphenyls (PCBs)
Glass	Packaging waste	
	End-of-life vehicles	
	Waste tyres	
	Waste of electronic and electrical equipment (WEEE)	
	Plastics	

The key waste streams are defined in the White Paper, *Making Waste Work*

The UK provided specific information concerning its waste minimisation policies for three key waste streams: **waste of electronic and electrical equipment (WEEE)**, **end-of-life vehicles**, and **packaging waste**.

	WEEE	End-of-life vehicles	Packaging waste
Reasons for priority	EU priority waste stream; quantity likely to increase	EU priority waste stream; quantity likely to increase	Quantity
Waste minimisation targets	None yet	95% recovery and re-use by 2015	Increase in recovery and recycling rates
Instruments and measures	Practical trials currently in progress with industry	Voluntary initiative from industry	Industry is legally obliged to recover/recycle a certain tonnage (packaging waste regulations)
Success and failure; experience	Too soon to say	Too soon to say	

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Recycling	Consumers	Recycling costs increase product prices; extra local taxation; disposal cost savings
Source reduction of process waste	Many industry sectors	Companies reduce costs and reduce waste

In the view of the government and industry, waste minimisation measures have a positive effect on the economy. Consumers and households share the opinion that waste minimisation measures have neither a positive nor negative impact.

The United Kingdom indicates that **monetary instruments** can be used to positively influence waste minimisation. The impact of the landfill tax on waste minimisation is not yet known.

8. Prospects and future approaches

For the future, the United Kingdom has defined the following strategies:

- The UK has put in place a regulatory framework sufficient to meet the objectives that have been set. It hopes to make further progress through the application of economic instruments, including the new landfill tax.
- Emphasis has been given to the promotion of producer responsibility for all waste produced. In this respect, the UK has sought where possible to use voluntary agreements, combined with an active promotion strategy.

At the time of the survey the UK indicated that in the longer term it would continue to promote voluntary measures combined with more market-based instruments.

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UNITED STATES

Contact person

Mr. Haile Mariam
US Environmental Protection Agency
International Special Projects Branch,
401 M Street, SW (5304)
Washington, D.C. 20460

Tel: 1-703-308-84-39
Fax: 1-703-308-05-22
E-mail: mariam.haile@epamail.epa.gov

Acronyms

CSI Common Sense Initiative
NPI National Pollutant Inventory
OSW Office of Solid Waste

1. Definitions, terms, concepts, and target-setting

The United States EPA's Office of Solid Waste (OSW) generally interprets the term *waste minimisations* similarly to the working **definition of waste minimisation** used on the OECD level. According to Section 1003(a)6 of the Resource Conservation and Recovery Act (RCRA),

the Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

Section 3005(h)(1) further stipulates that:

it shall be a condition of any permit issued under this section for the treatment, storage, or disposal of hazardous waste on the premises where such waste was generated that the permittee certify, no less often than annually, that--the generator of the hazardous waste

has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable.

EPA has defined waste minimisation in guidance. Accordingly, waste minimisation includes source reduction and environmentally sound recycling. *Source reduction* is defined in The Pollution Prevention Act of 1990. Successful waste minimisation is considered to include a reduction in both waste quantity and toxicity.

EPA has active waste minimisation programmes for both municipal solid waste and hazardous waste.

Waste minimisation measures include implementation of clean technologies, product design (eco-balancing, eco-labelling) and recycling, re-use or recovery (on- and off-site). Generally, incineration is not regarded as waste minimisation. But there are exemptions: the burning of hazardous waste fuel that has a heating value of 5000-8000 BTU/lb is considered as legitimate recycling. Other incineration processes are regarded as treatment measures.

Other waste treatment processes prior to landfilling, and landfilling itself, are not regarded as waste minimisation measures.

The **hierarchy of waste minimisation measures** is set out in the Pollution Prevention Act of 1990. According to this law:

- Waste prevention has priority over waste reduction;
- Re-use has priority over recycling;
- Recycling within the same production process has priority over recycling in other processes;
- Reduction of hazard and reduction of waste amount have equal priority;
- Material recycling has priority over energy recovery; and
- Recycling has priority over landfilling.

Although defined in a legal document, this hierarchy is not mandatory. It is relevant for all generators of waste, for waste disposal, and for industrial plant operation.

The Waste Minimisation National Plan (1994) sets out national goals and priorities, such as a 50% reduction in presence of the most persistent, bioaccumulative and toxic constituents in hazardous waste by the year 2005.

Waste minimisation priorities and targets are shown in the table below. Criteria indicate why these priorities/targets have been set.

Priorities	Targets	Criteria
Wastestreams: Persistent, bioaccumulative and toxic wastes 17 priority pollutants (target of the 33/50 Programme)	Reduction by 25% by the year 2000 and by 50% by 2005 Reduction rates of 33% (1992) and 50% (1995)	Persistence, bioaccumulation and toxicity of chemicals in hazardous waste Relative toxicity, volume of use, potential for reduction

The EPA reports a fundamental preference for voluntary measures.

2. Political and administrative responsibilities

National institutions	Tasks, responsibilities
United States Environment Protection Agency (EPA)	Setting of priorities, strategic planning, approval and control, scientific support, information and public relations, international co-operation.
United States Congress	Enactment of laws

The United States has a federal political and administrative system. The states have their own governments and legislation.

State governments are free to establish environmental regulations that are broader in scope or more stringent than federal programmes. States must receive programme approval to implement and enforce federally established regulatory programmes. The states are also responsible for strategic planning, approval, control, information provision, and PR within their territories. Municipalities may develop and enforce local ordinances governing waste management.

3. Wastelegislation

In the United States there is separate waste legislation. This legislation is set out in the **Resource Conservation and Recovery Act (RCRA)** (1984). The title of this law is the **Solid Waste Disposal Act** (1984). It includes provisions concerning waste minimisation, especially requirements, but no minimum standards for waste minimisation. There are no provisions pertaining to waste minimisation for specific waste streams.

The **Clean Air Act Amendments** of 1990, the **Clean Water Act**, and the **Pollution Prevention Act** of 1990 also concern waste minimisation.

The **Pollution Prevention Act (PPA)** of 1990 is a source of integrated environmental legislation. This act is not a voluntary programme.

Most responsibilities concerning waste disposal and waste minimisation measures belong to the state and local governments.

The federal government sees voluntary programmes as having priority in the future. Mandatory waste minimisation through legislation is not regarded as a feasible alternative.

4. Key instruments

a) Plans and programmes

The United States concentrates mainly on voluntary plans and programmes. These programmes cover MSW, hazardous waste, key industrial sectors, key waste streams and products, R&D, provision of information, consulting services, and enforcement control. Several states have established mandatory multi-media pollution prevention requirements.

Plans and programmes are regarded as important instruments. This is particularly true for those at the federal level. There is an emphasis on MSW, key waste streams, key industrial sectors, and R&D

	Plans and programmes	Status
Selected examples	<p>1) The Waste Minimisation National Plan (1994): In this plan are outlined the major goals, objectives and actions for reducing hazardous waste generation. The main emphasis is on formulation of activities. There are definitions of crucial terms in Appendix A and a comprehensive listing of examples of successful waste minimisation actions in Appendix B. Planned for 1996 were: a priority list of persistent, bioaccumulative and toxic (PBT) metals as a guideline for reductions in the metal content of hazardous wastes; screening tools for identifying key waste streams; and a handbook on approaches for including pollution prevention in the permitting process.</p>	Implementation underway
	<p>2) EPA's Common Sense Initiative (CSI): This is a voluntary programme with a multi-stakeholder approach. It focuses on selected industry sectors (e.g. printing, metal finishing) and aims at reviewing and improving existing regulations, promoting pollution prevention and thus waste minimisation, simplifying reporting, permit streamlining, and promoting clean technologies. Activities are carried out in close co-operation with industry, environmental and public interest groups, state regulators and other stakeholders.</p>	ongoing
	<p>3) EPA's 33/50 Programme (1991): Voluntary programme with partnerships between government and industry. Priorities are set for 17 key chemicals/pollutants, e.g. heavy metals, organic solvents. Goal was the reduction of their releases into the environment by 33% (1992) and then by 50% (1995). Target group is all companies that handle target chemicals (approximately 1,300).</p> <p style="text-align: right;"><i>(continued on next page)</i></p>	

	Plans and programmes (continued)	Status
	<p>4) EPA's WASTEWISE Programme (1994): This is a voluntary programme for industrial and service companies, institutions, and non-profit organisations. The target units set their own waste reduction goals, which must include three waste prevention actions, an action to establish a recycling programme, and an action to increase purchase of recycled goods. There are comprehensive information services (hotlines, brochures, personal representatives).</p>	
	<p>5) EPA's Excellence in Leadership Programme (Project XL 1995): Goal is choosing 50 projects (mostly pilot projects) that should be able to achieve environmental performance superior to what would be achieved through compliance with current legislation. Proposals have to meet criteria. EPA must approve proposed projects, protecting project sponsors in the context of litigatory challenges. Integration of stakeholders is an integral part of project proposals. The projects should be transferable to other industries or facilities in the same sector.</p>	<p>Three pilot projects being implemented; several currently undergoing negotiation</p>
Experience/ effectiveness	<p>In general, the voluntary approach has proven effective. Especially strong end-of-pipe control programmes have pushed industry towards voluntary waste minimisation programmes.</p> <ul style="list-style-type: none"> • The 33/50 Programme ended in 1995. Partnerships proved more effective than the prescription of command-and-control regulations. Reduction performance was very good (46% in 1995). Meanwhile, goals have been exceeded. Positive economic results in industry. Only modest success in small and medium-sized enterprises. • WASTEWISE Programme: About 400 companies (in 35 business sectors) and organisations take part in the programme. They receive national recognition for being part of it. Cost savings with many participating units could be achieved. Large reductions were achieved in the area of transport packaging. The amount of recyclables collected increased considerably. 	
Is stronger application foreseen?	<p>YES USEPA plan to actively pursue additional voluntary programmes and initiatives.</p>	

b) Mandatory instruments

In the United States there are no legally defined technical standards on the national level.

Technical standards – selected examples	1) End-of-pipe control regulations: No detailed information given in response to the questionnaire
Experience/ effectiveness	In general, mandatory technical standards are not classified as effective instruments. The high cost of achieving compliance with technical standards has influenced the integration of less expensive waste minimisation alternatives. To some extent, command and control regulations have promoted waste minimisation.
Is stronger application foreseen?	Not applicable

The United States has only very rarely enacted production bans as waste minimisation measures. **Product restrictions** can be found in the form of deposit-refund schemes, product labelling obligations, and product take-back obligations.

There are restrictions referring to the construction of landfills in certain areas and the landfilling of specific wastestreams.

Bans and restrictions – selected examples	<p>1) Land disposal restriction (LDR): Regulation requiring waste treatment prior to landfilling of hazardous waste.</p> <p>2) Landfill “siting” regulations: For both municipal and hazardous waste landfills. The siting of landfills has to comply with conditions existing in certain areas (e.g. airports, floodplains, seismic areas).</p> <p>3) Landfill bans (in some states and municipalities): There is a landfill ban on certain household-generated hazardous wastes such as lead-acid batteries, light bulbs, mercury-containing switches, and tyres.</p> <p>4) Mercury-Containing and Rechargeable Battery Management Act (1996): This act makes the labelling of batteries and battery packaging mandatory. The sale of batteries containing specific contaminants (especially mercury) is prohibited or at least limited.</p>
Experience/ effectiveness	<p>Not applicable</p> <p>1) Stringent requirements have driven industry to pursue waste minimisation alternatives.</p>
Is stronger application foreseen?	Not applicable
Miscellaneous	Deposit schemes for glass containers and aluminium cans exist in some states. There are product take-back schemes for some items.

c) Economic instruments

On the federal government level there are no taxes and duties related to waste minimisation. But states do use taxes and other disposal fees to promote source reduction and waste minimisation.

There are **financial aid and economic incentives programmes**, mostly in the area of Municipal Solid Waste. Financial aid is given for R&D, pilot plant design and construction, development of clean technologies, and consultancy services. Incentives are also used to promote eco-auditing and life-cycle assessments.

Financial aid is granted by federal, state and municipal administrations and by industry. Support can take the form of cost-free consulting services and sureties. Governmental institutions, universities and research institutions, and industry (including the disposal sector) apply for financial aid.

d) Suasive instruments

The United States uses several suasive instruments, e.g. information offices for private households and industrial waste producers, and information systems and databases on the state-of-the-art in waste disposal technology. Public authorities carry out demonstration projects. Waste exchanges and market facilities for trading recycled goods and end-of-use products exist. Information offices are operated by federal, state and municipal authorities and by industry. Information and consultancy offices may be mandatory.

Companies use Environmental Management Systems, environmental reports, waste balances and de-labelling systems.

<p><u>Information provision and public relations – selected examples</u></p>	<p>1) Toxics Release Inventory (TRI): All citizens have access to this information. The TRI is administered by the EPA. It shows which hazardous chemicals are handled by which company. Annual reporting is mandatory for companies (employing more than ten employees) that handle certain chemicals. Those reports give information concerning environmental impacts on water, air and soil and on the treatment and disposal of waste streams.</p> <p>2) Enviro\$en\$edatabase (operational since 1995): This database, run and funded by the EPA and the Strategic Environmental Research and Development Programme, provides information on technical and regulatory issues. Information comes from government, industry, academic and public interest sources. Target group is all those who implement pollution prevention/waste minimisation programmes. Main goals are to reduce costs for research and information gathering and to disseminate experiences of technological leaders.</p>
<p>Experience/ effectiveness</p>	<p>Overall, suasive instruments are seen as effective.</p> <p>US EPA sees a close link between voluntary programmes and suasive instruments, especially the dissemination of information and PR. The latter are integral parts of voluntary programmes. In combination, they have produced good results in a timely and cost-effective (for the waste generator) way.</p> <p>1) Often the bad publicity associated with being known to handle hazardous chemicals forces companies either to seek out processes which minimise their use, or to use alternative chemicals with low toxic potential. Consumers have access to information on products and the environmental impacts of manufacturing processes. As a result, purchasing decisions might change.</p>
<p>Stronger application foreseen?</p>	<p>YES</p> <p>Suasive instruments are inevitable if voluntary programmes are to be successful.</p>

<u>EMS, environmental reports, and eco-labelling – selected examples</u>	<p>1) Environmental Management Systems: Many companies voluntarily institute EMS, mostly together with work on ISO 14,000.</p> <p>2) Environmental/waste reports; the Biennial Reporting System (BRS): Large quantity generators of waste are obliged to report on their efforts to reduce volume and toxicity. Changes in comparison with previous years have to be described as positive.</p>
Experience/ effectiveness	<p>Overall, these instruments have proven effective.</p> <p>1) Information on dissemination in industry not available</p>
Is stronger application foreseen?	YES

e) Conclusions

The EPA clearly emphasises voluntary plans and programmes, together with suasive instruments. It gives low priority to mandatory and economic instruments and has never attempted to mandate waste minimisation. States and local governments might have different views on the importance of instruments.

At the time of the survey, voluntary programmes in close connection with information dissemination (suasive instruments) made up the largest part of waste minimisation actions in the United States. Advantages are seen in the flexibility of voluntary programmes, which give maximum freedom to companies to institute the most effective and economically sound individual waste minimisation measures.

5. Key players and their roles in waste minimisation

	Industry and related associations	Consumers and private households	Environmental groups and other NGOs	Waste disposal industry
Basic position on waste minimisation	Supportive of voluntary programmes and economic instruments; resistant to mandatory plans and instruments	Supportive; the area of information provision and PR is seen as most effective	Strongly supportive	Supportive of voluntary plans and programmes, economic and suasive instruments; resist mandatory actions
Participation in waste legislation obligatory?	NO Stakeholders are included in the process of developing legislation in order to achieve broader consensus (advisory committees)	Not applicable	NO	NO Lobbying is done by associations.
Support of waste minimisation by	Associations assist industry by doing R&D work in the area of clean technologies and by supplying information. Waste minimisation efforts are publicised by industry and trade.	Willingness to change consumption behaviour is "average". Acceptance and use of recycling facilities is good; home composting is indicated as unimportant. Recycling has considerably increased within the last five years due to environmental education efforts.	Information to political and public audiences; participation in legislation: commenting on drafts, taking part in forums; enforcement and control assistance, acting as watchdogs	Support depends on individual economic interests: e.g. recycling facility operators do not support prevention measures. Support of stringent standards, as they can boost business.
Hindering of waste minimisation by	Industry may resist implementation of new solutions if they are not cost-effective and/or result in unwanted product changes (aesthetics). Reluctant to implement technological changes if production processes in use are sufficient to meet product demands.	Consumer demand has not changed in regard to packaged goods.	Not applicable	No interest in closed loop production processes, as they generate less waste to be recycled or disposed of
Influence on waste minimisation/ overall contribution	20% "Minor" contribution	10% "Minor" contribution	50% "Major" contribution	20% "Minor" contribution
Is stronger influence foreseen?	YES More could be done to support innovative studies and research and to publicise new technologies.	YES Consumers could favour environmentally friendly products and manufacturers that have better environmental performance. Private households should make greater efforts to reduce household waste.	YES They could do more to support innovative studies and research, publicise new technologies, and involve the public.	YES R&D in the area of advanced recycling technologies

6. Key products and wastestreams

Past	Present	Future
Batteries	All the wastes of the past, plus thermostats containing mercury	All the wastes of the past, plus some other wastes containing mercury (such as fluorescent light tubes)
Precious metals		
Certain petroleum wastes Used oil Used oil filters		
Industrial ethyl alcohol		
Scrap metal		
Pulping liquors		
Sulphuric acid		
CFC-contaminated refrigerant		

These wastes are exempt from hazardous waste regulation only if recycled properly.

The United States provided specific information concerning its waste minimisation policies for three key waste streams: **waste paper**, **waste electronic and electrical equipment (WEEE)**, and **electroplating sludge**.

	Wastepaper	WEEE	Electroplatingsludge
Reasonsforpriority	Quantity;sustainableuse ofscarceresources; economicreasons	Quantityandtoxicity;CT available;sustainableuse ofscarceresources; economicreasons	Quantityandtoxicity;CT available;sustainableuseof scarceresources;economic reasons
Wasteminimisation target	Reducingamounttobe landfilled	Modificationsofprocesses orequipment,substitution oreliminationofraw materials,waste segregation,recycling	Reducingtoxicpropertiesof waste,reducinglandfillspace necessary,reducing disposal costsforindustry
Instrumentsand measures	Procurementguidelines forallfederalagencies callfor20%recovered fibreand20%post-consumerfibre.	Plansandprogrammes, e.g.theCommonSense Initiative thatproduceda specific <i>Electronicsand ComputerIndustrySector Notebook</i> .	Plansandprogrammes coupledwithsuasive instruments
Successandfailure; experience	Paperisstillthepredominantcomponent ofMSW,somoreeffortscanbemadetopushthesaleofpaperproducts withrecycledcontent.	Wastemanagement practisesemployedarenot alwaysassoundas possible.	Industryhasimplemented manywasteminimisation measures.Customers' stringent specifications(e.g. military)aremajorobstacles tocleanertechnologiesin thisindustrysector.

There is no federal law concerning the separation and collection of waste streams. States and municipalities have varying, but extensive, collection programmes. However, there are no mandatory recovery rates in the US. Some waste recycling rates for 1994 are shown in the following table.

Type of waste, component	Collection rate	Recycling rate (of generated total)
Biological waste	No data available	4.2%
Waste paper	~	35.3%
Waste glass	~	23.4%
Scrap metal from private households (e.g. cans)	~	35.9%
Packaging waste	~	33.5%
Textiles	~	0.4%
Plastics	~	4.7%
Rubber and leather	~	7.1%

7. Costs and benefits

Waste minimisation measures can lead to costs and benefits for different groups. Examples are shown in the table below.

Waste minimisation measures	Affected	Costs and benefits
Modifying production processes, implementing cleaner technologies	All industry sectors	High initial costs for installing new facilities can turn out to be economic barriers. Long pay-back periods are not well accepted.
Use of water-based vs. solvent-based paints New application techniques (less overspray)	Paint manufacturing industries	Large capital costs for changes in technology; lower operating costs; generally better overall product
Reducing sludge by keeping processes clean; enclosing processes in buildings to avoid rainwater contamination	Wood processing industry	Waste to be handled is reduced. Cycle time is extended. Training for personnel is required.
Process modifications aiming at waste minimisation	Petroleum refining industry	High replacement and start-up costs; reduction in the amount of caustic wastes and disposal costs
Process modifications aiming at waste minimisation, especially substitution of toxic chemicals	Metal finishing industry	Lower generation of wastes and thus reduced disposal costs; better product quality

In the view of the federal government, waste minimisation has positive economic effects. Industry and consumers share the opinion that its economic effects are neutral.

The United States indicates that **pricing** of services, etc. can positively influence waste minimisation. "Pay-as-you-throw" fees or unit-pricing requires private households to buy certain bags to dispose of their waste in. These schemes, operated in a few municipalities only, have proved very effective. Whether more illegal dumping also occurred as a negative effect of this scheme is not known.

8. Prospects and future approaches

The United States would like to see the following topics pursued at the OECD level:

- harmonization of the term *waste minimisation* among all countries; decision as to whether the definition should be confined to source reduction or allow for recycling or burning for energy recovery;
- definition of *environmentally sound management*, and requirement that Member countries meet the minimum standards established by this definition;
- identification of information dissemination methods (e.g. using guidance documents, internet, meetings);
- promotion and identification of waste minimisation technologies and corresponding information;
- promotion of effective waste management and enforcement policies in every Member country;
- promotion of information collection for waste tracking purposes; also, promotion of the use of a publicly accessible database for waste management information to increase public knowledge and awareness;
- unified data collection techniques across all countries, for measurement of waste generation and waste minimisation, with the goal of comparing data between countries;
- establishment of a target for waste minimisation across all countries, taking into account differences in cultures and economies.

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