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**Matters related to the implementation of the Convention:
strategic issues: Cartagena Declaration on the Prevention,
Minimization and Recovery of Hazardous Wastes and
Other Wastes**

**Draft guidance to assist Parties in developing efficient strategies
for achieving the prevention and minimization of the generation
of hazardous and other wastes and their disposal**

Note by the Secretariat

As referred to in the note by the Secretariat on the Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes (UNEP/CHW.13/5), the annex to the present note contains the draft guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal, prepared by the expert working group on environmentally sound management on the basis of the comments received from Parties and others. The present note, including its annex, has not been formally edited.

* UNEP/CHW.13/1.

Annex

Draft guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal

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1. Introduction

1.1. Context

1. The objective of this document is to provide guidance to assist Parties in developing efficient strategies for achieving prevention and minimization of the generation of hazardous and other wastes. The guidance may also be helpful to municipal and other authorities, private companies, non-governmental organizations (NGOs), academia, among others; all of which could provide significant contributions to efforts towards developing and implementing a waste prevention and minimization strategy.
2. This document has been developed in accordance with the Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes (the 'Cartagena Declaration')¹, adopted by the tenth meeting of the Conference of Parties to the Basel Convention (COP-10) in 2011. In the Cartagena Declaration, Parties noted that prevention and minimization of hazardous wastes and other wastes at source is a critical stage of the waste management hierarchy and declared a commitment to enhancing the active promotion and implementation of more efficient strategies to achieve prevention and minimization of the generation of hazardous wastes and other wastes and their disposal.
3. The Strategic Framework for the implementation of the Basel Convention for 2012-2021², adopted by decision BC-10/2 of COP-10 in 2011, recognized the waste management hierarchy as a guiding principle and included the objective "to pursue the prevention and minimization of hazardous waste and other waste generation at source, especially through supporting and promoting activities designed to reduce at the national level the generation and hazard potential of hazardous and other wastes".
4. Furthermore, COP-11 adopted by decision BC-11/1, the Framework for the environmentally sound management of hazardous wastes and other wastes³ which highlights the importance of prevention and minimization of hazardous wastes and other wastes.
5. Waste prevention and minimization has also been addressed in a broader context. It is addressed in Goal 12 of the 2030 Agenda for Sustainable Development⁴, adopted by General Assembly resolution 70/1 in September 2015, to ensure sustainable consumption and production⁵ patterns. Here it states that by 2030, waste generation should be substantially reduced through prevention, reduction, recycling and reuse.
6. Resolution 7 on the sound management of chemicals and waste adopted by the second session of the United Nations Environment Assembly (UNEA2)⁶, requested the Executive Director to address, in the 2019 update of the Global Waste Management Outlook, strategies for increasing waste prevention, reduction, reuse, recycling and other recovery, including energy recovery, leading to overall reduction of final disposal⁷. Furthermore, resolution 11 on marine plastic litter and microplastics stressed that prevention and environmentally sound management of waste are keys to long-term success in combating marine pollution, including marine plastic debris and microplastics and called on Member

¹ The Cartagena Declaration is available at: <http://www.basel.int/Portals/4/Base%20Convention/docs/meetings/cop/cop10/CartagenaDeclaration.pdf>.

² The Strategic Framework is available at: <http://basel.int/Implementation/StrategicFramework/Overview/tabid/3807/Default.aspx>.

³ The Framework for the environmentally sound management of hazardous wastes and other wastes is available at: <http://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMFramework/tabid/3616/Default.aspx>.

⁴ The Sustainable Development Goals are available at: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

⁵ The promotion of resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and a better quality of life for all. The implementation of SCP as an integrated approach helps to achieve overall development plans, reduce future economic, environmental and social costs, strengthen economic competitiveness and reduce poverty (<http://www.unep.org/resourceefficiency/Home/WhatisSCP/tabid/105574/Default.aspx>).

⁶ Resolution 7 on the sound management of chemicals and waste is available at: <http://web.unep.org/unea/list-resolutions-adopted-unea-2>.

⁷ See <http://web.unep.org/ietc/what-we-do/global-waste-management-outlook-gwmo>.

States to establish and implement necessary policies, regulatory frameworks and measures consistent with the waste hierarchy⁸.

7. In response to the abovementioned developments, by its decision BC-12/2, the twelfth meeting of the Conference of the Parties mandated the development of the current guidance that aims to assist Parties to the Basel Convention in developing efficient strategies to achieve the prevention and minimization of the generation of hazardous and other wastes and their disposal.

1.2. Scope

8. This document focuses on the upper elements of the waste management hierarchy⁹, namely prevention, minimization and reuse. It provides guidance on developing strategies and measures, both mandatory and voluntary, to achieve the prevention, minimization and reuse of hazardous wastes and other wastes. Prevention may include strict avoidance, source reduction and direct reuse. Minimization includes reuse, recycling and recovery. Recycling and recovery, however, are not addressed in this document as they are the subject of a large number of other guidance documents under the Basel Convention, such as technical guidelines¹⁰.

9. The Basel Convention addresses hazardous waste and other wastes. In the context of the Convention, “other wastes” include wastes collected from households. This document therefore also addresses the prevention and reuse of wastes from households. Most of the guidance provided in this document is of a general nature and could apply to both hazardous wastes and wastes from households.

1.3. Terminology¹¹

10. The terms referred to within the present guidance document are to be read in a manner consistent with Article 2 of the Basel Convention, the set of practical manuals on the promotion of the environmentally sound management of wastes developed by the expert working group on environmentally sound management, in particular the practical manual on terminology¹², as well as the Glossary of Terms developed by the small intersessional working group on legal clarity¹³.

1.4. Objectives of waste prevention and minimization

11. A key strategic objective of strengthening the environmentally sound management (ESM) of hazardous and other wastes under the Basel Convention is to pursue the prevention and minimization of hazardous waste and other waste generation at source, especially through supporting and promoting activities designed to reduce at the national level the generation and hazard potential of hazardous and other wastes (objective 2.2 in the Strategic Framework for the implementation of the Basel Convention for 2012–2021).

12. Waste prevention and minimization strategies or measures may have the overall objective of decoupling waste generation from economic growth. Other objectives may include improving material and resource efficiency, decoupling resource use from economic growth, preventing the use of primary materials and shifting towards a circular economy¹⁴. Waste prevention and minimization may also target the reduction of harmful substances as part of its overall objectives. Job creation is another possible objective.

⁸ Resolution 11 on marine plastic litter and microplastics is available at: <http://web.unep.org/unea/list-resolutions-adopted-unea-2>.

⁹ Recognized by decision BC-10/2 as prevention, minimization, reuse, recycling, other recovery including energy recovery, and final disposal.

¹⁰ Basel Convention technical guidelines are available at: <http://basel.int/Implementation/Publications/TechnicalGuidelines/tabid/2362/Default.aspx>.

¹¹ Some specific terms in this guidance document are footnoted with a description. These descriptions are merely examples for the clarity of the reader, others may exist.

¹² UNEP/CHW.13/4/Add.1.

¹³ UNEP/CHW.13/4/Add.2.

¹⁴ An economy where the value of products, materials and resources is maintained for as long as possible and the generation of waste minimized. Definition extracted from the EU Circular Economy Strategy http://ec.europa.eu/environment/circular-economy/index_en.htm.

1.5. Approaches

1.5.1. Approaches to strategies

13. A waste prevention and minimization strategy¹⁵ should not be a mere list of top-down measures but should also integrate the interests and concerns of affected stakeholders based on a commitment to implement the strategy.

14. There are several potential waste prevention and minimization measures, instruments and initiatives that could be integrated into national, sub-national, local or corporate strategies. The main purpose of a waste prevention and minimization strategy is therefore to provide a broad vision and framework which seeks to build on existing initiatives and to embrace the most efficient and effective complementary measures, both binding and voluntary.

15. It is essential to follow a multi-step approach of:

- a) Providing a vision on the scope and timeframe of the strategy;
- b) Defining the specific objectives which should drive the waste prevention and minimization strategy;
- c) Setting priority areas on which the waste prevention and minimization strategy should focus; and,
- d) Selecting and combining measures that will bring about low environmental impacts and efficient material systems.

16. In each of the above steps, all potential efficient options should first be identified and then narrowed down to the most effective options.

17. The selected objectives and measures should allow the waste prevention and minimization strategy to fulfil its task, namely to:

- a) Motivate interested and affected stakeholders to become more resource efficient and use fewer pollutants;
- b) Get interested and affected stakeholders involved and encourage them; and,
- c) Enable action by interested and affected stakeholders by providing them with useful examples and other means.

18. Waste prevention and minimization strategies fall into four broad categories, implying different levels of involvement by public authorities, namely: strategies focusing on information exchange, promotion, regulation and technology.

A. Information exchange strategies

19. Informational strategies aim at changing behaviour and enabling informed decisions, including through:

- a) Information on chemicals in products;
- b) Awareness campaigns;
- c) Information on waste prevention and minimization techniques;
- d) Education and training programmes for involved stakeholders; and,
- e) Eco-labelling¹⁶.

20. Knowledge of the presence of hazardous substances in products is crucial for their proper management, including the prevention and minimization of waste, recycling and disposal of these products. Greater access to information and knowledge of flows, risks and the management of chemicals in products will improve the possibilities for substitution of hazardous substances and enable producers, suppliers and consumers within the supply chain to make informed choices.

¹⁵ Strategies may be implemented by programmes, plans, specific measures, etc., either mandatory or voluntary.

¹⁶ The practice of marking products with a distinctive label so that consumers know that their manufacture conforms to recognized environmental standards.

B. Promotional strategies

21. Promotional strategies involve providing incentives for behavioural change as well as providing financial and logistical support for beneficial initiatives, including:

- a) Support for voluntary agreements;
- b) Promotion of reuse, refurbishment and repair;
- c) Promotion of environmental management systems;
- d) Sustainable consumption and production incentives; and,
- e) Promotion and dissemination of research and development.

C. Regulatory strategies

22. Regulatory strategies involve enforcing limits on waste generation, expanding environmental obligations and imposing environmental criteria on public contracts, including:

- a) Planning measures;
- b) Taxes and incentives, such as pay-as-you-throw (PAYT) schemes;
- c) Extended Producer Responsibility (EPR) policies;
- d) Green Public Procurement¹⁷ policies; and,
- e) Eco-design¹⁸ requirements.

D. Technology strategies

23. Technology strategies involve the development and use of specific technologies that aim at preventing and minimizing waste generation, e.g. when manufacturing new products or when providing services to consumers; these strategies include:

- a) The use of cleaner production;
- b) Innovative ways of resource-efficient manufacturing; and,
- c) Industrial symbiosis models¹⁹.

24. The abovementioned strategies are complementary and can be integrated into other relevant existing policy areas, such as sustainable consumption and production policy, environmental or waste management policy, or can compose a standalone national waste prevention and minimization strategy. Economic instruments, if well designed and accompanied by complementary measures, can contribute very effectively to waste prevention and minimization and should be taken into consideration.

25. In section 1.6, the possible benefits of waste prevention and minimization are outlined. More specifically in relation to the abovementioned strategies, arguments, both in favour or against, may be identified. For example, an information strategy such as an awareness campaign can alert people to the need to minimise waste by reusing products or changing their consumer behaviour. Such a campaign may however not always lead to behavioural change or other desired changes. Another example is the development of regulations that may shift production through design, but where administrative overburden, for companies, consumers, as well as authorities, should be avoided or balanced versus the expected achievement of the targets that were set.

1.5.2. Approaches per sector

26. A waste prevention and minimization strategy has its origins in the waste management sector. Its scope, however, comprises the whole economy, all material flows and products used by a state, from their respective origins to their disposal. Thus, a comprehensive waste prevention and minimization

¹⁷ Public authorities exercising their purchasing power to choose environmentally friendly goods, services and works, thereby making an important contribution to sustainable consumption and production. Also called green purchasing. Definition extracted from the EU Green Public Procurement policy http://ec.europa.eu/environment/gpp/index_en.htm.

¹⁸ Designing a product or service so as to minimize its impacts on the environment. Eco-design applies at every stage in a product's life: raw material extraction, production, packaging, distribution, use, recovery, recycling, incineration, etc. Definition extracted from World Business Council for Sustainable Development www.wbcsd.ch.

¹⁹ For example, by supplying residues or by-products from one entity to be used as raw materials in the other. Also described as initiatives in which two or more industrial entities develop mutually beneficial relationships (www.sustainabledevelopment.un.org).

strategy should not only concern the waste management sector but also the mining sector and other production industries, designers and service providers, the public and private consumers.

27. Strategies may cover all sectors and approach prevention and minimization in a general manner, but some sectors may benefit from a specific approach.

28. Sectors that are typically linked with the generation of hazardous and other waste that could benefit from specific strategies include households, construction/infrastructure, manufacturing, private service activities/hospitality, the sale, retail and transport sectors, and the mining and primary raw material processing sectors.

29. Generic action on resource efficiency can be expected to encompass other sectors, as it reduces the demand for primary resources. For example, prevention and minimization of construction waste might reduce demand for the quarrying of new aggregate/stone in the mining sector.

30. Waste prevention and minimization affects and depends on a wide range of stakeholders, involves a variety of activities and can be achieved in some specific waste streams. In attempting to reach the widest possible audience, it is useful to address certain groups of stakeholders who share similar consumption patterns and can be targeted through specific channels. In general, approaches aimed at promoting waste prevention and minimization are principally initiated at government level, and take place at the level of waste generation by enterprises and private persons to prevent and minimize waste at source.²⁰

A. Governments

31. To promote waste prevention and minimization consistently within their respective domestic settings, governments should ensure the provision and incorporation of certain policies into their legislative and regulatory frameworks, infrastructure and institutions. At the national level, governments could take the following measures²¹:

- a) Establishment of integrated policies on waste prevention and minimization, including regulations and policies on eco-design, EPR and green purchasing²² strategies;
- b) Development of a comprehensive waste prevention and minimization strategy;
- c) Organization of public and corporate education and awareness-raising campaigns on waste prevention and minimization;
- d) Development of guidance tools for installations concerned, in line with the best available techniques (BAT) and best environmental practice (BEP), on waste prevention and minimization;
- e) Development and implementation of economic instruments such as price incentives to promote and stimulate sorting at source, tax incentives for facilities, clean consumption incentives, recognitions or awards; and,
- f) Cooperation with relevant industry, associations, research institutes and other stakeholders, to establish public-private partnerships on waste prevention and minimization.

B. Business and industry

32. Implicated at the conception and production phases of the life-cycle of products, business and industry stakeholders make decisions that determine the environmental impact of products throughout their lifespan. The opportunities for designers and manufacturers to prevent and minimise waste at multiple levels are immense, through:

- a) Ecological or cleaner design and production by implementing industrial conversion processes where feasible;
- b) Research and design prior to production and innovation in production and delivery of services, especially impact assessment throughout the life-cycle, and integrated design for reuse, repair, disassembling (when appropriate), recovery and recycling;

²⁰ EU Waste Prevention Guidelines, see <http://ec.europa.eu/environment/waste/prevention/pdf/Waste%20prevention%20guidelines.pdf>.

²¹ EU Waste Prevention Guidelines; Practical manual on waste prevention (see Appendix V of document UNEP/CHW.13/4/Add.1) and Framework for the environmentally sound management of hazardous wastes and other wastes.

²² Stakeholders exercising their purchasing power to choose environmentally friendly goods, services and works, thereby making an important contribution to sustainable consumption and production.

- c) Extending existing environmental management systems to include waste prevention and minimization policies, methods and reporting;
- d) Changing procurement and consumption patterns to purchase greener, less wasteful or less toxic products;
- e) Promotion and facilitation of reuse and preparation for reuse, e.g. through repair, and development of quality standards and manuals for reuse and preparation for reuse;
- f) Providing accessible information, education and training on waste prevention and minimization methods and techniques; and,
- g) Agreements or partnerships between industry and government on waste prevention and minimization.

C. Households

33. Households produce waste in the consumption phase of the life-cycle of products, generating specific wastes, such as food waste, waste paper, waste plastic bags and other packaging waste, waste batteries, waste electrical and electronic equipment (WEEE), waste furniture, waste clothing and so on. There is scope to extend the life of many products used in households e.g. by developing or expanding initiatives and activities concerning reuse and preparation for reuse. This could also be done through:

- a) Raising awareness of waste prevention and minimization in households through dissemination of information and communication campaigns; and,
- b) Taking action to prevent and minimize wastes, e.g. by implementing related policies and requirements, such as pay-as-you-throw (PAYT) schemes and eco-design requirements, changing behaviours in reduction of household wastes and participation in relevant programmes.

1.5.3. Link to the Chemicals in Products Programme

34. In prevention and minimization strategies, a link may be made to the Chemicals in Products (CiP) Programme²³. This is a global programme providing information on hazardous substances in products that has been developed within the framework of the UN Strategic Approach to International Chemicals Management (SAICM). The CiP Programme is aimed at businesses, in particular manufacturers, organizations and other stakeholders who are involved in a product's life-cycle and are seeking to introduce improved and efficient procedures for the exchange of information on chemicals in products. The goal of the CiP Programme is for stakeholders to have access to information on chemicals in products to assist them in making decisions and taking appropriate action on chemicals exposure, risk and management.

1.6. Benefits of waste prevention and minimization

35. Waste prevention and minimization contributes to the protection of human health and the environment, provides sustainable solutions, encourages good socio-economic and business practices and helps to better understand the environmental and health risks associated with waste. Waste prevention and minimization specifically contributes to, amongst other things:²⁴

- a) *Protection of human health and the environment:* Sustainable and eco-friendly approaches to the prevention and minimization of waste (especially hazardous wastes) will reduce the environmental impacts of resource extraction, manufacturing and distribution, as well as contribute to reductions in global warming e.g. greenhouse gas emissions such as methane released from landfill sites and carbon dioxide from incineration. Another example is the substitution of chemicals categorized as Ozone Depleting Substances (such as CFCs and halons), which improves public health conditions.
- b) *Efficient production practices:* Waste prevention and minimization will improve resource efficiency through energy savings and material use reduction, as well as promote the development and use of cleaner processes and techniques.
- c) *Economic returns:* More efficient use of products will reduce the costs of purchasing new materials and energy consumption, and get more output of product per unit of input of natural resources.
- d) *Sustainable consumption patterns:* Waste prevention and minimization promotes national targets and local authority engagement. It also stimulates fundamental changes in business / consumer attitudes and behaviour; as well as new paradigms in industrial processes and product design.

²³ For further information:

http://www.saicm.org/index.php?option=com_content&view=article&id=454&Itemid=707.

²⁴ EU Waste Prevention Guidelines available at: <http://ec.europa.eu/environment/waste/prevention/guidelines.htm>.

2. Planning strategies for achieving waste prevention and minimization

2.1. Preparation/getting started

36. There are three main factors which contribute to the success of a waste prevention and minimization strategy:

- a) A clear and concise strategic view of the multiple advantages of waste prevention and minimization;
- b) The commitment of relevant decision makers, including those of a high-level, as well as interested and affected stakeholders to implement the strategy; and,
- c) The quality of available knowledge and information, including both quantitative and qualitative data.

37. As such, the preparation of a waste prevention and minimization strategy should be initiated with the following four steps:

- a) *Establishment of the overall strategic view:*
 - i. Highlight “quick wins” and other advantages; and,
 - ii. Determine medium and longer term goals.
- b) *Establishment of a project team which includes:*
 - i. Relevant decision makers;
 - ii. Experts to carry out the technical/socio-economic analyses, project organization and workshop moderation; and,
 - iii. Stakeholders, who on the one hand represent a broad range of opinions, concerns and interests and on the other hand, are willing to identify common ground and to contribute to waste prevention and minimization.
- c) *Establishment of a knowledge base on:*
 - i. The historic and expected future development of material and waste flows and their environmental impacts;
 - ii. Efficiencies of material use, potential efficiency improvements and ecological/technological/economic/social barriers which inhibit improvements; and,
 - iii. Instruments to overcome such barriers and their effectiveness.
- d) *Establishment of an operational plan which:*
 - i. Sets timelines;
 - ii. Budgets the respective activities; and,
 - iii. Identifies and assigns roles and responsibilities to the various stakeholders.

38. The size of the project team should be large enough to cover a broad range of views and interests, but small enough to allow discussions and integration of opinions. It is not necessary for stakeholder experts to represent the official opinion of their organizations. They should rather feed in their own expert opinion. However, they should be among the opinion leaders of their respective organizations.

2.2. Assessing the situation

39. In assessing the situation, the following steps might be considered:

a) *Initial assessment*

An initial assessment of current waste prevention and minimization performance, using available data on waste / waste prevention and minimization, is an important starting point. There are evident difficulties in measuring waste prevention and minimization, but certain statistics can be reliable in charting progress on defined objectives. The following statistics are helpful in assessing the current status of waste prevention and minimization and for creating baselines:

- i. Quantities of waste collected per person, quantities of hazardous waste generated per person;
- ii. Public awareness of, and declared actions for, waste prevention and minimization;

- iii. Use of waste prevention and minimization services, e.g. repair and reuse centres, home composting;
- iv. Consumption of eco-labelled products;
- v. Percentage of citizens covered by pay-as-you-throw (PAYT) schemes; and,
- vi. Products covered by producer responsibility schemes.

b) *Collection of information*

In addition to waste cycle data, information on national demographics, socio-economic characteristics, available infrastructure, existing waste management systems, reuse opportunities and trade and manufacturing activities should be collected.

c) *Analysis of policies*

An analysis of existing policies in place at the national, regional and local level is crucial in determining which policies are working and in identifying thematic areas which have not yet been addressed. The range of initiatives used and their results so far should be considered in assessing what works well locally and what should be expanded. An inventory of existing producer responsibility policies, for example, will be essential before expanding this policy area. There may be opportunities to forge partnerships between waste prevention and minimization strategies operating at different administrative levels and to develop synergies between regional strategies. Trade-offs between measures, unintended consequences of existing measures, and competition for existing infrastructure and services, should also be considered here.

d) *Identification of key barriers and drivers for change*

National authorities have much to gain by identifying the key barriers and drivers for change in waste prevention and minimization behaviour that are specific to their country as these will help guide the selection of measures implemented.

e) *Involvement of stakeholders: how and when*

The involvement of stakeholders from the outset is essential both in gathering data and taking stock of measures already in use. Through the launch of a formal consultation, stakeholders involved in existing waste prevention and minimization activities or relevant fields will be identified or will identify themselves. The participants in the consultation will be key resources in the subsequent phases of strategy development and their continuous involvement will ensure that the strategy designed will be relevant, useful and achievable.

2.3. Setting priorities

40. The preliminary phase in the development of a waste prevention and minimization strategy allows authorities to define their overall approach, the role of participating bodies and the goals the strategy will pursue. This is also the time to further elaborate the strategic vision of the strategy and how waste prevention and minimization fit into and contribute to a sustainable society.

41. The following sections provide guidance on priorities, scope and targets when formulating a strategy.

2.3.1. Scope

42. Determine whether the waste prevention and minimization strategy will be an integrated part of a national or regional waste management plan, or a national or a regional environmental strategy, or if it will exist independently.

43. Determine whether the strategy will address waste prevention and minimization by addressing:

- a) Key stakeholders (e.g. households, businesses);
- b) Waste streams (e.g. biodegradable waste, waste paper, hazardous waste);
- c) Phases of the life-cycle (design, production, consumption).

2.3.2. Key stakeholders

44. When developing a waste prevention and minimization strategy, as well as specific initiatives or measures, it is recommended to identify the key stakeholders, such as:

- a) consumers, or more specifically, households;

- b) specific industry sectors, whereby actors in the design phase, combined with those active in the waste management phase, play a prominent role;
- c) workers and trade unions;
- d) local authorities;
- e) dedicated non-governmental organisations;
- f) academia; and,
- g) other dedicated actors, such as reuse centres, schools, etc.

2.3.3. Waste streams

45. It is particularly useful to address certain waste streams if they account for large proportions of the total waste burden or if they can be easily and efficiently reduced. The proportion that these wastes account for will vary to some extent based on national circumstances. Therefore, it is important to look at a breakdown of waste generation before setting priorities. Various waste streams are addressed in the sections below. The most pertinent policies for tackling these wastes may be referred to in the section below, and more detail can be found in [the Annex to this document] [a database (website reference) with specific case examples].

2.3.3.1. Hazardous wastes

46. Hazardous waste may be generated by both industries and households. Often in developing countries and countries with economies in transition, structures for the management of hazardous waste may be lacking or inadequate. Even if Parties have these structures in place for the management of hazardous waste, strategies to reduce its generation and to increase its safe collection and disposal should be actively pursued for their very relevant environmental, economic and social benefits.

2.3.3.2. E-waste

47. Electrical and electronic waste or e-waste is a rapidly growing waste stream, having reached up to 42 million metric tonnes by 2014, with only part of this being recycled and recovered²⁵. Thirty million units of e-waste are sent to developing countries in Latin America, Asia and Africa²⁶, which often do not have appropriate legislation and facilities to manage this waste.

48. E-waste is addressed by legislative measures in developed countries, for example the European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)²⁷ which, inter alia, sets targets for the collection, recovery, recycling and preparation for reuse of electrical and electronic equipment.

2.3.3.3. Healthcare or medical waste

49. Healthcare or medical waste may consist of a range of different types of waste, including non-hazardous, infectious, pathological, chemical, pharmaceutical or even radioactive waste. Of the total amount of waste generated by healthcare activities, about 85% is general, non-hazardous waste comparable to domestic waste. The remaining 15% is considered hazardous that may be infectious, toxic or radioactive²⁸. Major sources of healthcare waste include:

- a) Hospitals and other health facilities;
- b) Laboratories and research centres;
- c) Mortuary and autopsy centres;
- d) Animal research and testing laboratories;
- e) Blood banks and collection services; and,
- f) Nursing homes for the elderly.

50. Certain waste prevention and minimization measures may be relevant to some of the types of healthcare and medical waste.

²⁵ According to United Nations University (Balde et al. 2015; UNODC 2013) and published in “Waste Crimes-Waste Risks: Gaps in Meeting the Global Waste Challenge” (UNEP, 2015).

²⁶ <http://www.nature.com/news/take-responsibility-for-electronic-waste-disposal-1.20345>.

²⁷ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0019>.

²⁸ <http://www.who.int/mediacentre/factsheets/fs253/en/>.

2.3.3.4. *Mercury waste*

51. Mercury occurs naturally in the earth's crust, but human activities, such as mining and fossil fuel combustion, have led to widespread global mercury pollution. Mercury waste should be managed in an environmentally sound manner taking into account BAT, BEP, as well as the provisions of the Minamata Convention on Mercury, the objective of which is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds, and the relevant guidelines of the Basel Convention.

52. In addition, the UNEP Global Mercury Partnership has been established to protect human health and the global environment from the release of mercury and its compounds by minimizing and, where feasible, ultimately eliminating global, anthropogenic mercury releases to air, water and land.

2.3.3.5. *Packaging waste*

53. Packaging refers to all materials whose purpose is the containment, protection, shipping or presentation of goods, from their natural condition to saleable form, as handled by the producer or the consumer. Packaging is often divided into three broad categories: primary packaging referring to the principal material enveloping the product, secondary packaging for grouping products together and tertiary packaging for shipping and handling. Packaging waste is generated at all levels of the supply chain, but principally by consumers as the end user. Packaging waste policies may address tertiary packaging use with distinct measures as it is involved in a specific phase of the life-cycle and may implicate different stakeholders.

2.3.3.6. *Plastic waste*

54. Plastic waste is an emerging waste stream because of the attractive characteristics of plastic that makes it a rapidly growing material in many products. Plastic use multiplied by 20 times from 1964 to 2014, up to 312 million metric tonnes, and it is expected to double in the next 20 years. It is estimated that only 14% of plastic is collected for recycling, which leaves up to 267 million metric tonnes which is buried, burned or dumped into the natural environment. It is estimated that 8 million tonnes of plastic waste ends up in the oceans.²⁹ Recently, a number of strategic initiatives on the subject have been taken, such as a proposal for a new plastic economy³⁰ or the EU Plastic Waste Strategy to be published in 2017³¹. These initiatives are based on the concept of a circular economy.

2.3.3.7. *Paper waste*

55. Paper waste is produced primarily by households, offices, businesses and organisations, and within this waste stream specific products are prevalent or easily targetable, such as unaddressed mail, catalogues, office paper, newspapers and magazines. A key waste paper product at household level, the ubiquity of junk mail can be undermined through the implementation of comprehensive, easily accessible and well publicized opt-out strategies, in addition to mailbox labels to be mandatorily honoured by postal services. Using paper more efficiently and advancing towards digitalization of information files are other ways that can effectively reduce paper waste and paper use. Reducing the use of hazardous substances in inks is another option to reduce the negative impacts on human health and the environment.

2.3.3.8. *Biodegradable waste*

56. Biodegradable waste originates from plant or animal matter and distinguishes itself by its characteristic to be broken down by living organisms. Biodegradable waste includes food scraps and garden waste. Biodegradable wastes are generated by most societal actors and present enormous waste prevention potential. Food waste can be used to produce valuable animal feed, by applying simple processes like boiling. Other options may include strategies to reduce crop losses or garden waste.

2.3.4. **Phases of the life-cycle**

57. Waste prevention and minimization can be achieved in any phase of the life-cycle of a product or material. In each of the life-cycle phases, specific initiatives and measures should be identified and taken in order to progress towards the objectives of waste prevention and minimization, taking into account BAT and BEP.³²

²⁹ See

https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_TheNewPlasticsEconomy_19012016.pdf.

³⁰ Ibid. World Economic Forum/Ellen MacArthur Foundation.

³¹ http://ec.europa.eu/environment/waste/plastic_waste.htm

³² See <http://www.ciwem.org/wp-content/uploads/2016/02/Less-is-More.pdf>.

58. The design of a product will have a significant impact on its life-cycle, including in the waste phase. During the manufacture of a product, waste can be avoided and material losses can be reduced. The same can be realised in the distribution and consumption of a product, for example, through focusing on the service a product delivers instead of merely selling it, reducing or avoiding unnecessary packaging during transport, etc.

2.3.5. Targets

59. In waste prevention and minimization strategies, the general aim of decoupling economic growth and the environmental impact of waste generation should be taken into account. Within this framework, quantitative goals with clear deadlines are helpful in mobilizing a shift towards waste prevention and minimization attitudes and practices or towards more efficient management of materials.

60. In this context, it should be taken into account that, due to structural and economic trends, the decline of the amount of certain waste streams may not be directly related to the impact of waste prevention and minimization strategies. Targets should take into account existing trends in waste generation, as well as the existing infrastructure and services that can help public authorities and others achieve selected goals. Managing the expectations of stakeholders with respect to any potential target is also important to ensure the success of both the development and implementation of the strategy.

61. Any evaluation or assessment of the targets and their achievement should be independent and credible in order to safeguard the support and engagement of all involved stakeholders.

62. The following steps may be useful in determining the appropriate targets:

a) *Geographical scale of targets*

Targets may be helpful at national, regional and local levels. Countries with strong regional authorities may wish to operate waste prevention and minimization strategies at this level. An ambitious national target accompanied by a major awareness-raising campaign can be useful in increasing the visibility of the measure and in stimulating the collection and monitoring of waste prevention and minimization data.

b) *Quantitative or qualitative targets*

Quantitative targets, reductions in collected waste and increases in declared public awareness for example, are useful targets at all geographical levels. Results might be gauged by measuring the weight of avoided waste or greenhouse gas emissions, or a combination of both. There is not necessarily the same direct ratio between avoided waste generation and avoided emissions for all waste types. The benefits of one tonne of avoided aluminium waste and one tonne of avoided concrete waste, for example, differ significantly.

Qualitative targets are particularly helpful when targeting difficult waste streams. Goals of preventing the use or creation of hazardous materials and of reducing the hazardous content of waste generated in production processes specifically address business and industry.

c) *Data collection*

When determining any type of target, it should be considered whether the data required to substantiate results is already available. Does this data exist at national, regional or local levels? If data is currently unavailable, would it be difficult to collect?

d) *Timeframe*

The timeframes for the strategy and the initiatives should be considered. It should also be considered whether these timeframes relate to other relevant plans or initiatives. In addition, it should be considered if the timeframes are sufficient to achieve the desired results. Furthermore, it should be considered whether ambitious targets over a longer timeframe or achievable short-term targets suit the general approach and priorities of the national strategy.

e) *Voluntary or obligatory targets and instruments*

Targets may be shared goals committed to through voluntary agreements, or requirements for certain sectors accompanied by penalties for non-compliance.

f) *General or focused targets*

General targets may be expressed in terms of reductions in waste collected by authorities for landfill and recycling, or reductions in greenhouse gas emissions created through waste management (in million tonnes of carbon dioxide equivalent).

63. Sector specific targets may focus on households and businesses separately, as the waste burden produced and the channels for providing information and training may differ. In general, the smaller the sector of focus chosen, the more accurately results can be measured and the greater the proportion of individuals affected by the campaign.

64. Targets may focus on waste streams, accompanied by strategic awareness campaigns or regulatory measures. Waste paper, packaging waste, waste electric and electronic equipment, biodegradable waste and construction and demolition waste lend themselves well to individual targets.

2.4. Identifying means of implementation

65. This phase involves a careful listing of all necessary resources required and mechanisms for mobilising them with the aim of safeguarding their supply for the longer term, as waste prevention and minimization strategies will typically require a longer period of implementation.

66. Different types of waste prevention and minimization strategies or measures call for different means of implementation. State-driven strategies will need careful budgeting on that level beforehand in order to safeguard the success of the strategy in the longer term. Strategies implemented by or with private stakeholders will require means of implementation that are delivered in a shared or even specifically dedicated effort.

67. It is recommended that opportunities created by new national and regional waste and chemicals initiatives are tapped into to advance the promotion of waste prevention and minimization³³.

2.5. Developing a waste prevention and minimization strategy

68. This phase involves the development of measures to ensure that the strategy is well suited to the particular circumstances of the country or region and that it will be widely accepted and engaging.

69. Stakeholder involvement is crucial to the success of the strategy and the achievement of its goals. Early involvement in the process is very important in order to secure ownership of the strategy. Stakeholder involvement may be undertaken as follows:

- a) *Invite key stakeholders* to brainstorming sessions or workshops at the developmental stage;
- b) *Identify the stakeholders involved in each sector and at each administrative level:* This may include: relevant policy makers, regional and local authorities, communities, non-profit organizations, researchers, behaviour change specialists, business and industry professionals, trade organizations, and consumer groups;
- c) *Determine the role for key stakeholders:* Advisory committees or sector panels, involving all concerned key stakeholders, may give the best interaction between stakeholders and public authorities. However, since such committees or panels can be time consuming and costly, it is important to decide whether this type of involvement is helpful for all activities. This assessment might best be done in the phase of identifying means of implementation;
- d) *Consider whether there should be a permanent or temporary role for key stakeholders;*
- e) *Consider which other stakeholders should be consulted* during the design stage of the strategy; and,
- f) *Consider how the general public may be involved* in the development of the proposed strategy.

70. A list of practical questions that could help identify opportunities in developing a waste prevention and minimization strategy from the perspective of policy integration and coherence is provided below:

- a) What are the relevant priorities in possible overarching strategies or policies, such as in the sustainable development strategy, the national environment policy and/or the waste management plan, of the country in question?

³³ For example, efforts to set up general waste and chemicals laws and regional initiatives on waste and chemicals like the one launched in Latin America and the Caribbean, coordinated by UNEP/ROLAC.

- b) Which policy areas are under revision or development (or will be under revision or development soon) and what opportunities exist for the integration of the aspects of waste prevention and minimization in these areas? What bottlenecks might impede the achievement of the strategy, both now and in the future?
- c) Which institutions are in charge of the relevant policy areas? Which relevant strategies or action plans have been prepared in these areas and what are the objectives, targets and indicators defined in them that are relevant to waste prevention and minimization? Are there institutions or sectors that require capacity building or skill development?
- d) How could these different policy areas contribute to the achievement of waste prevention and minimization objectives and targets? What particular policies are in place in the areas in focus and what gaps and opportunities exist for integration of waste prevention and minimization aspects into these policies? What technologies are relevant, available and affordable and what requires development?
- e) Are policies in place to address a particular waste stream or product group coherent? Are there policies in place which particularly hinder waste prevention and minimization?
- f) What are the opportunities for creating synergies amongst the relevant policies and to improve their coherence? What are the associated trade-offs to be tackled? What is the next opportunity for the revision or amendment of the relevant policies?
- g) What relevant initiatives are in place by business, civil society or academia and which of these could be supported by governmental policies?

71. Methods for improving policy integration and coherence through waste prevention and minimization strategies include:

- a) Expert groups or committees in charge of the development of waste prevention and minimization strategies should schedule meetings or form sub-groups to discuss and explore opportunities for policy integration and the improvement of the coherence of policies. The ultimate objective of this dedicated work should be to design a work programme with strategic goals and mechanisms to monitor them on the issue of policy integration and the improvement of the coherence of policies (environmental, economic, social, etc.). This work programme should clearly identify policy areas in the focus of policy integration work in the short-, medium- and long-term and form the centre of waste prevention and minimization strategies.
- b) One of the main tools for the integration of waste prevention and minimization aspects into other policy areas is impact assessment. It is therefore recommended that relevant impact assessment guidelines and training cover waste prevention and minimization issues.
- c) National sustainable development strategies are also an important vehicle of policy integration as they usually connect a large number of relevant policy areas with the ultimate aim of achieving sustainable development. The topic of waste prevention and minimization therefore should clearly be identifiable in any national sustainable development strategy.

2.6. Adopting the strategy

72. Once the draft strategy is developed, a critical analysis should be undertaken to ensure its objectives are met. A process for adoption should be pursued through the relevant channels. For example, the government might present the strategy to the parliament for adoption.

73. A process for periodic review of the strategy and its adjustment should be developed.

2.7. Implementing the strategy

74. Given the general approach selected in section 2.3 above (Setting Priorities), authorities should determine, depending on the activities and measures included in the strategy, at which levels they should be implemented.

75. A timeframe showing the expected duration of the different stages and the expected finalization date of the strategy should be agreed. The timeframe should pay special attention to the different stages of the waste prevention and minimization strategy.

76. The annex to this guidance document provides detailed information on possible good practices and examples for implementation.

2.8. Monitoring progress

77. In tracking progress and ensuring the transparency and credibility of any strategy, programme or measure, it should be identified who will do the tracking and what verification mechanisms might be employed.

78. Possible monitoring approaches include:

- a) Self-monitoring with regular reporting;
- b) Government monitoring and reporting;
- c) Third-party monitoring through an accreditation or certification scheme; or
- d) A combination of the abovementioned approaches is also possible.

79. There is often an inherent difficulty in measuring 'prevented' waste, as opposed to measuring waste recycled or waste sent to landfill. Addressing the different environmental impacts associated with the quantity of waste (e.g. tonnage) in certain waste streams presents another problem.

80. Developing indicators and benchmarks is therefore important in tracking progress on objectives and targets and to evaluate the efficacy of waste prevention and minimization strategies.

2.8.1. Background on waste prevention and minimization indicators

2.8.1.1. Main goals of waste prevention and minimization indicators

81. Indicators for waste prevention and minimization should allow authorities, businesses and the public to:

- a) Identify the priority waste streams to be tackled; and,
- b) Monitor the degree to which policy objectives are achieved.

82. A waste prevention and minimization indicator should measure and demonstrate whether certain activities (e.g. food consumption, housing construction activities) are improving over a period of time in terms of material and waste intensity throughout their life-cycle. Benchmarks, furthermore, are useful in establishing baselines or reference points enabling countries or organizations to evaluate their performance in relation to the best practice.

2.8.1.2. Current situation

83. Waste prevention and minimization indicators are in demand but widely accepted models do not yet exist on an international scale. There are, however, increasing initiatives on a local and sometimes national level, targeting different waste streams and using a variety of methodologies. Usually tonnage of waste generated, waste recycled and waste sent to landfill per person or household per year, as well as gross domestic product (GDP), provide an initial basis for analysis.

84. If quantitative targets are included in the strategy, the indicator is often defined at the same time. If quantitative targets cannot be defined or if they need to be made more precise, indicators, showing whether the qualitative and quantitative objectives are met, are important to monitor progress in the adopted strategy. Note that changes in the annual generation of waste can be caused by a wide range of factors, including changes in population size and GDP. As such, reductions cannot be automatically attributed to waste prevention and minimization activities.

2.8.1.3. Principles for effective indicators

85. Effective indicators should focus on clearly defined waste streams and use an accepted protocol for measurement. Indicators designed for monitoring progress should, to the greatest extent possible, be:

- a) *Relevant* (when considering the objective which is to measure waste prevention and minimization results);
- b) *Accepted* (in particular by targeted stakeholders);
- c) *Credible* (the confidence that the users and stakeholders place in the indicator);
- d) *Easy* (in terms of quantification and follow-up over time with regard to data availability issues and in terms of communication towards the targeted group);
- e) *Robust* (in terms of data quality, scope and representativeness).

86. In some cases more than one indicator is necessary to monitor an objective.

2.8.1.4. *Typology of waste prevention and minimization indicators*

87. Indicators may be categorised as:
- a) *Descriptive indicators*, describing the development of a variable over time if presented on an absolute scale. These are typically state, pressure or impact indicators.
 - b) *Performance indicators*, often demonstrating the distance to the target. These are typically state, pressure or impact indicators clearly linked to policy responses; for example, an indicator measuring the amount of biodegradable waste landfilled compared to a base year or a diversion target.
 - c) *Efficiency indicators*, relating drivers to pressures. These provide insight into the efficiency of products and processes in terms of resources, emissions and waste per unit of output.
 - d) *Policy effectiveness indicators*, relating the actual change of environmental variables to policy efforts. As such, they are a link between response indicators on one hand, and state, pressure or impact indicators on the other.

88. Another manner of categorizing indicators is through the 'Pressure-State-Response' Model, developed by the Organisation for Economic Co-operation and Development (OECD)³⁴:

- a) *Pressure indicators*, including material flow analysis (MFA) indicators, 'total waste generation', 'direct material input' and relative pressures are revealed by plotting GDP or population against waste generation;
- b) *State indicators*, measuring the change in the impact of waste on environmental factors such as air, water or soil quality; and,
- c) *Response indicators*, measuring the impact of introduced strategies or policies on waste generation.

89. A combination of the indicators outlined above may be utilised.

2.8.2. **Examples of indicators for three waste streams**

2.8.2.1. *Waste prevention and minimization indicators for household waste*

90. A household waste prevention and minimization indicator should demonstrate whether certain household activities (such as the consumption of food or durable goods) are improving in terms of material and waste intensity throughout their life-cycle. It should also indicate whether effective prevention and minimization policies creating incentives for prevention and minimization have been adopted. The following core elements can be used to create several different indicators to monitor progress and make comparisons between countries or regions:

- a) The amount in tonnes of total waste generated (preferably without garden waste);
- b) Household expenditures on selected consumption categories;
- c) Total number of households and the number of single households; and,
- d) Number of households covered by incentive schemes, such as PAYT schemes.

91. These indicators will provide information on the waste intensity of daily household activities expressing whether the typical functions in a household are achieved with less waste generation and if households respond to different policy measures.

2.8.2.2. *Waste prevention and minimization indicators for biodegradable waste*

92. A biodegradable waste prevention and minimization indicator should measure and demonstrate whether the activities in the society regarding the production and consumption of biodegradable products are improving in terms of material and waste intensity throughout their life-cycle.

93. As a first step, given data availability and considerations combining best available and best wanted indicators, it is suggested to apply a combination of the following core elements in order to cover pressures in relation to drivers and measuring effects of policy responses as appropriate:

- a) Consumption of food products;

³⁴ Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997; <https://stats.oecd.org/glossary/detail.asp?ID=2105>.

b) Generation of food waste (excluding food industry)/or generation of biodegradable waste from households; and,

c) Total number of households and single person households.

94. By using these three core elements, it is possible to create several different indicators in order to monitor progress and make comparisons between different countries or regions. These indicators will provide information on the bio-waste intensity of households expressing whether the amount of food and bio-waste from households are avoided by buying less food that is disposed of unused.

2.8.2.3. Waste prevention and minimization indicators for construction and demolition waste

95. The following core elements can form the basis of several different indicators to measure and monitor progress on construction and demolition waste prevention and to enable comparisons between countries or regions:

a) Domestic extraction of construction materials;

b) Construction and demolition waste generated; and,

c) Physical activity of the construction sector.

96. These indicators will provide information on the waste intensity of the construction industry expressing whether ongoing construction activities are conducted using less materials and generating less waste in contrast to the economic and/or physical functions provided by the sector.

Annex to the guidance

Good practices and examples of elements for waste prevention and minimization strategies

Outline for presenting practices and examples

In this annex, good practices and examples of waste prevention and minimization strategies are provided in order to give practical information and concrete elements for developing similar strategies or measures.

The practices and examples in this annex are provided following the same structure in order to give the core elements of information for every example or practice. Where information on the core elements was either not relevant or not available, the respective section is not included for the example or practice in question. For more detailed or in-depth information, reference is made to useful documents, websites, etc.

A. Sectoral or target group approach: good practices

1. Eco-design requirements

Description and status of the measures or programme:

Legally binding eco-design requirements aim at setting benchmarks for products' environmental performance, as relates to both energy and resource efficiency.

These requirements may be imposed in legal instruments such as legislation, regulations or administrative decisions. Eco-design requirements may also be based on voluntary implementation with appropriate incentive structures to support their uptake.

For such eco-design requirements, the EU Directive 2009/125/EC establishes a framework for the setting of eco-design requirements for energy-related products (the Eco-design Directive³⁵) and is provided as example.

Duration:

Due to technological and scientific progress, requirements may need to be updated or adapted over time. Adequate revision clauses are included in the specific regulations to ensure that they reflect accurately development in the market. A tiered approach may also be used to gradually tighten requirements following market development.

Approach:

Usually a certain product group and, through that a certain industrial sector, is targeted. Under the Eco-design Directive, implementing measures (mandatory minimum requirements) can be set for energy-related products defined as any good that has an impact on energy consumption during use which is placed on the market and/or put into service, including parts intended to be incorporated into products covered by the Directive.

Baseline for this case:

Energy-related products account for a large proportion of the consumption of natural resources and energy in the European Union. They also have a number of other important environmental impacts. In the interest of sustainable development, continuous improvement in energy use as well as in the overall environmental impact of those products should be encouraged.

Goals and/or targets:

The goal of the EU Directive itself is to contribute to increased energy efficiency, security and savings and help reach climate policy goals and the implementation of the circular economy.

Stakeholders involved:

According to a work plan, preparatory studies are conducted on a product group basis. The preparatory studies assess if and what type of implementing measures (including energy labelling) would be appropriate. Stakeholders from research institutions, the industrial production and/or distribution sector related to the product group, environmental NGOs and government experts are invited to participate in this process and to provide technical or other input, allowing for exchange of knowledge and views.

³⁵ http://ec.europa.eu/growth/industry/sustainability/ecodesign_en.

Means of implementation:

The implementation of the requirements is taken up in the first instance by the producers of the involved product group. But it is for verification authorities to ensure that products allowed on the market comply with the criteria. Criteria should be set so that there is no significant impact on consumers, in particular as regards the life-cycle cost of the product, and no significant negative impact on the functionality of the product, from the perspective of the user.

Challenges and incentives:

With the European Commission's action plan on the circular economy there has been increased focus on the contribution to the circular economy³⁶. While for some product groups requirements have been established, it has proven more difficult for other product groups to set requirements to ensure better material efficiency, particularly since these should be enforceable and verifiable. For this reason, among others, the European Commission issued a standardisation mandate to CEN³⁷, CENELEC³⁸ and ETSI³⁹ under the Eco-design Directive to develop horizontal standards for material efficiency. Such standardisation should, in the future, make it easier to address issues such as recycled content, modularity, reparability and durability.

Monitoring of implementation and performance:

The existing measures are monitored by competent member States' authorities that monitor the placing on the market of goods.

Available information (reports, policy documents, etc., including hyperlinks to online material):

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02009L0125-20121204&qid=1480602324623&from=EN>

2. Promotion of eco-design through the provision of tools**Description and status of the measures or programme:**

Designers and other actors involved in the first phases of the life-cycle of a product can be stimulated to voluntarily incorporate eco-design principles when designing and marketing new products. By providing them with tools to calculate the environmental impact of the products they design, or tools to provide suggestions on material use or alternative systemic approaches, they will be incentivised to further find their own way in the design of their products, services and even systems.

Approach:

Usually a certain product group and through that a certain industrial sector is approached.

Baseline for this case:

Informing involved stakeholders on the options and potential of substitute materials, on more efficient use of materials and on modulating design, accompanied by standardizing this information puts designers on track to develop products in a way that materials are more efficiently used and waste is eventually prevented.

Goals and/or targets:

An example that was developed in the Flanders region of Belgium is the Ecolizer, which at first was a paper tool, but is now also digitally available online. The website (www.ecolizer.be) aims at quickly and easily calculating the environmental impact of a product.

Stakeholders involved:

Typically eco-design is promoted for designers and students following training in design or product development. The intention is that the eco-design experiences of these designers then flows back to update existing tools and develop new tools.

Challenges and incentives:

It appears that designers, through their training or through tools like the Ecolizer, become increasingly aware of the added value of eco-design and are incorporating it in the products they design. It remains, however, a continuing effort to provide insight into the resulting benefits or added value, and to make this information available to designers and companies.

³⁶ See http://ec.europa.eu/environment/circular-economy/index_en.htm.

³⁷ <https://www.cen.eu/Pages/default.aspx>.

³⁸ <https://www.cenelec.eu/>.

³⁹ <http://www.etsi.org/>.

Evaluation:

A tool like the Ecolizer, or the provision of good practices and eco-design examples, have proven to cause behavioural changes in a certain group of designers and producing companies. Merely promoting the concept however will not cause a paradigm shift towards more widespread eco- or even sustainable design. Binding requirements seem indispensable and inevitable.

Available information (reports, policy documents, etc., including hyperlinks to online material)

<http://www.ecodesignlink.be/en>

Ecolizer: <http://www.ecodesignlink.be/en/ecolizer-1>

For specific international examples of eco-design please refer to:

<http://www.ecodesignlink.be/en/examples-database>

3. Packaging**Description and status of the measures or programme:**

In the Republic of Korea, packaging waste has been strictly regulated to minimize its generation. Since July 1993, the Government of the Republic of Korea has banned the use of polystyrene in packaging of toys and other products. This marked the start of the Government of the Republic of Korea's effort to curb packaging waste generation. Specific regulations have been issued on categories of products. For example, the ratio of total volume packaged to spare volume should not exceed 20% in most cases, and packaging should be less than two layers.

Duration:

To date, measures continue to be undertaken and continuous improvements made.

Approach:

This measure is meant to minimize packaging waste, as part of the overall goal of general waste minimization in the Republic of Korea.

Baseline for this case:

Before the first regulation was implemented in July 1993, there was no regulation on packaging waste, which resulted in a tremendous quantity of packaging waste generation.

Goals and/or targets:

No information is available at the present time.

Stakeholders involved:

In the Republic of Korea's approach to packaging waste minimization, multiple stakeholders are involved, with different responsibilities:

- a) Consumers are responsible for recognising the waste that they produce and recycle according to instructions given by local government;
- b) Producers are responsible for carrying out duties stipulated by the authorities, such as packaging products according to regulations and labelling recyclable contents;
- c) Local and central government are responsible for producing guidance documents, formulating regulations and designing implementation schemes.

Means of implementation:

According to the polluter pays principle, producers manufacturing packaging waste that levy an extra burden to process (such as plastic and metal containers that are used to contain pesticides and diapers) are charged extra fees. In 2004 alone, USD 34 million was collected from such packaging waste. Also, container deposit schemes not only incentivize consumers to voluntarily recycle packaging products but also charge extra fees to consumers not recycling. On the other hand, fees collected will be used to manage the waste minimization system itself, by way of technological innovation, technical knowledge transfer to local authorities and building waste processing infrastructure, so that the measure requires a minimum additional monetary input to sustain itself.

Challenges and incentives:

In the course of promoting such a measure at the early stage, the Government of the Republic of Korea took efforts to raise awareness among the public so that they adapted to this measure. The result of implementing such a measure over the years has been promising. Landfilled and incinerated waste has decreased to 44%, the recycling rate increased from 15.4% to 45.2%, and the landfill rate decreased from 81.1% to 40.3%

Monitoring of implementation and performance:

As it is more difficult to monitor individual consumers' behaviour, the focus of work on consumers is an awareness-raising campaign, with occasional law enforcement on individual cases. Producers are the main focus of monitoring in packaging waste minimization in the Republic of Korea. Packaging waste producers are required to develop executive plans on extended producer responsibility and submit these to the relevant authority. If an executive plan is not submitted on time, a fine is imposed.

Evaluation:

Years of implementation has shown that packaging waste generation in the Republic of Korea has decreased drastically after implementation of the measure. It shows that such management systems can serve as a reference for other countries.

Available information (reports, policy documents, etc., including hyperlinks to online material):

http://www.me.go.kr/eng/file/readDownloadFile.do;jsessionid=Xg7NzXmxEcWGvGRrKFYVTp2ji64Ga4m5uTI5lqrBhwdfTxQvSgmhmDH1YxTN8pHA.meweb1vhost_servlet_engine1?fileId=92574&fileSeq=1

<http://www.eiatrack.org/s/664>

Jin Yaning, Zhou Bingyan, Hai Reti. Packaging Waste management in Republic of Korea [J]. Recycling Resources and Circular Economy 2008, 1(10): 37-40

4. Reuse centres**Description and status of the measures or programme:**

Reuse centres are legally anchored in Belgium, inter alia, in the Flemish waste and materials legislation. Requirements and conditions on the management of a centre are legally established. The sector is partly financed through subsidies and is also explicitly part of the local (municipal) waste policy.

Duration:

Sector professionalized since the 1990s. Legally anchored since 2003.

Approach:

Mostly furniture, clothes and electrical and electronic equipment is being collected, often refurbished and put for sale. Specifically for electronic and electrical equipment, a quality label for repaired or refurbished appliances was developed.

Baseline for this case:

In the early 1990s, advanced training was offered on how to manage a reuse centre. Shortly after, the Public Waste Agency for Flanders (OVAM) requested the training centre to assess the feasibility of a reuse sector and how this sector could contribute to waste policy goals. The assessment showed good feasibility and clarified the needs towards the policy framework.

Goals and/or targets:

Three main pillars can be identified:

- a) Social economy, where the main aim is to create jobs for low-skilled and long-term unemployed persons;
- b) Reuse centres were also established with the aim to contribute to waste prevention targets by making reusable goods available and raising public awareness on this aspect of the waste hierarchy; and,
- c) To fight poverty and offer lower-price goods to people in vulnerable societal target groups.

Stakeholders involved:

Through the social goals of most reuse centres, low-skilled and long-term unemployed workers are targets. Local authorities, through their municipal waste collection centres, are expected to collaborate closely with the reuse centres and ensure access to potentially reusable goods. Specifically as regards electrical and electronic equipment, collaboration exists with Original Equipment Manufacturers (OEMs) on training, information exchange and collection of reusable equipment.

The target audience of reuse centres is the general public.

Means of implementation:

Making profits is not a goal as such for subsidized reuse centres. Sound financial management, however, is key in order to be able to keep reaching the environmental and job creation targets.

Centres that rely on heavy subsidies or mainly work with volunteers are not likely to be sustainable. By offering a broad range of products and keeping the prices low, the reuse centres succeed in achieving decent turnovers.

Total revenue in a reuse centre consists typically of approximately 40% in sales of the reused goods, approximately 14% in sales of materials to recycling and approximately 45% in subsidies, mainly for social job creation and a small part environmental (1%). The subsidy share decreases year after year.

Capacity-building, skills development and technical assistance aspects:

Employees get in-house training on specific skills, like furniture restoring or electrical and electronic equipment refurbishment. Training and information on aspects such as white goods repair and refurbishment is sometimes offered by OEMs, specifically for reuse centre employees.

Challenges and incentives:

An obvious challenge for reuse centres is maintaining sound financials. Another challenge is to keep knowledge and skills in the centres, as it is inherent in the social economy that employees are expected to work temporarily in the centre and then move into the regular economy. Often subsidy regulation also stipulates this. Intensive knowledge exchange and in-house training in the sector has provided a way to cope with this challenge.

Over the last few decades, reuse, repair and refurbishment, and the role of reuse centres has become socially accepted and established in Flanders. Compared with the approximately 5,000 to 10,000 tonnes of goods processed in the 1990s, nowadays over 65,000 tonnes are being collected, repaired, refurbished and furthered to reuse. On average, a person in Flanders reused approximately half a kilo in the 1990s. Today approximately 5 kg of goods coming through reuse centres per inhabitant are reused. With the acceptance of reuse in society, unsurprisingly more reuse occurs but remains unrecorded.

Monitoring of implementation and performance:

Before receiving a licence, a number of conditions need to be fulfilled: e.g. the area served by the centre should include at least 75,000 inhabitants, the shops should be opened at least 30 hours per week, a certain shopping surface is required per inhabitant of the served area (1m²/2000 inhabitants), at least six product categories are offered: electrical and electronic equipment, clothes, furniture, leisure goods, dishes and other goods.

OVAM provides a reporting tool in order to gather data on the reuse and preparation for reuse in the centres.

Evaluation:

Four success factors have been identified over the years:

- a) Fairly quickly social economy and reuse was linked;
- b) The incorporation of the reuse centres in the regional Flemish waste policy anchored reuse also in the municipal waste policy;
- c) A reuse association grouped almost all reuse centres and catalyzed the reuse policy in Flanders;
- d) Professionalizing the centres was key to consolidating their place in the policy landscape.

Available information (reports, policy documents, etc., including hyperlinks to online material):

http://www.ovam.be/sites/default/files/atoms/files/2015_Folder-Kringloop-engels_LR.pdf

5. Prevention of packaging in the sticker industry

Description and status of the measures or programme:

This case is a private initiative. The investment led to a reduction of 54% on the final cost of the packages, 6% of reduction on the total costs and a 12% increase in sales.

Duration:

Permanent

Approach:

In Sumare city (Sao Paulo/Brazil), there is a Brazilian branch of an international company that produces synthetic rubber based stickers. These stickers have been used in the manufacture of diapers and sanitary napkins.

To provide adequate transportation for these stickers to the diaper or sanitary napkin factories, the company used to use cardboard boxes lined with silicone. Thus the boxes could not be recycled because of the silicone lining, which made the process infeasible economically. Because of that, the stickers' buyers had an amount of 24 tonnes per year of cardboard boxes that needed to be managed afterwards.

Baseline for this case:

The company developed a new kind of packaging based on the synthetic rubber that matches the stickers. This new packaging is incorporated into the stickers when they are manufactured, removing the previous issue of disposal of the silicone lined boxes.

Stakeholders involved:

Stickers producer; the diaper and sanitary napkin industries.

Means of implementation:

The investment made by the company for implementation of the project was R\$ 95,000 (approximately USD 29,400).

Capacity-building, skills development and technical assistance aspects:

The research to implement the project was done by specialized staff.

Evaluation:

The implementation of this project has been positive. The manufacturer has had production costs reduced, the commercial customers have not had packages to manage and the total amount of waste was reduced.

Available information (reports, policy documents, etc., including hyperlinks to online material)

The document used as a base for the text is available at (in Portuguese):
<http://consumosustentavel.cetesb.sp.gov.br/wp-content/uploads/sites/39/2015/01/caso04.pdf>

6. Perchloroethylene reduction in industrial laundry

Description and status of the measures or programme:

This case is a private initiative. By avoiding the use of 3,600 kg of perchloroethylene per month, which costs the company around R\$ 9,000 (USD 2,786) per month, a return on investment was achieved within 36 months. Searching for more efficient laundry equipment, the company found new equipment which uses a litre of perchloroethylene to wash 32 kg of clothes, resulting in an efficiency of 2.7 times that of the previous equipment.

Duration:

Permanent

Approach:

Waste prevention can be promoted by substituting part of a production process for another more efficient process. Dry processes of laundries use perchloroethylene to remove oil or grease from the textiles. However, this substance generates hazardous waste which is sent for co-processing in cement kilns.

Baseline for this case:

In Taboão da Serra city (Sao Paulo/Brazil) there is a company which consumed one litre of perchloroethylene per 12 kg of washed clothes.

Stakeholders involved:

The owner of the company.

Means of implementation:

The investment for buying the new machine was R\$ 350,000 (approximately USD 110,000).

Capacity-building, skills development and technical assistance aspects:

Technical assistance for the equipment must be available.

Evaluation:

The implementation of this project has been positive. The laundry manufacturer has seen both reduced operational costs and the amount of hazardous waste generated.

Available information (reports, policy documents, etc., including hyperlinks to online material):

The document used as a base for the text is available at (in Portuguese):
<http://consumosustentavel.cetesb.sp.gov.br/wp-content/uploads/sites/39/2015/01/caso50.pdf>

B. Waste stream approach: good practices**1. Reduction of waste sand discharged from foundries****Description and status of the measures or programme:**

The initiative here described, was taken by an industry located in São Paulo, Brazil, and was a voluntary, private enterprise. A reduction in the volume of sand discharged, besides representing a significant gain for the environment, provided an annual saving of approximately USD 300,000. This is due to a reduction in the need to purchase new sand. Moreover, the costs associated with the disposal of sand wastes within industrial landfills represented a great saving for the industry.

Nowadays, the Brazilian company in this example disposes approximately 200 to 300 tonnes per month of wastes in industrial landfills. The training of the personnel involved in the sand discharge operation led to an additional gain to the company, because the workers started to adopt a more positive and careful attitude to their activities: they felt more valued in their activity and more involved in environment protection.

Duration:

The initiative is permanent.

Approach:

The industry produces machine tools for turning and drilling operations, plastic injectors and blowers using sand to manufacture moulding material.

Baseline for this case:

The factoring of casted pieces generally uses a large amount of sand to manufacture moulding material. The use of sand, depending on the kind and the size of the piece, varies from 800 to 1000 kg of sand to each 1000 kg of produced piece. The sand is usually extracted from riverbeds or through mining and is available in varying grain sizes.

To prepare the moulds, the sand is mixed with a binder, usually bentonite, other additives and water to obtain "green sand"⁴⁰ used in the production of the low weight and smaller sized pieces. To produce bigger pieces, the manufacture process generally uses core and moulds. These moulds are made from a mix of sand and a catalyst that increases the resistance of the pieces.

Besides the green sand, the industry previously used sand combined with phenolic resin, which made it difficult to reuse and recover and consequently generated a large amount of waste to be disposed of – approximately 1,000 tonnes of waste sand per month.

The proper disposal of such waste within industrial landfills costs approximately USD 160,000 per year.

Goals and/or targets:

The initiative aims to reduce the volume of sand discharged in addition to leading to significant benefits for the environment.

Stakeholders involved:

The stakeholders are the private sector that established the initiative and the society in general, which benefits from the enterprise.

Means of implementation:

In order to reduce the costs of the industrial process as well as to avoid the excessive generation of industrial wastes the industry took the following measures:

- a) The replacement of phenolic resin for furan resin to produce the moulds and cores using cold curing and an organic-based catalyst. The process of preparation of the moulds, generally uses about 0.8 to 1.0% of resin in relation to the weight of the mixed sand and approximately 30 to 40% of a catalyzer substance in relation to the weight of the resin;

⁴⁰ The name "green sand" comes from the fact that the sand mould is not "set"; it is still "green" or in an uncured state even when the metal is poured in the mould. Green sand is not green in color, but "green" in the sense that it is used in a wet state.

- b) The recovery of used sand (containing furan resin) through a mechanical process at room temperature. Currently, the industry uses 98% of reused sand and about 2% of new sand to produce moulds and cores through a furanic process. Also, the industry manufactures a large quantity of cores using the cold-curing process;
- c) The green sand recovered by a mechanical process is used to manufacture cores through a process using 85% of recovery sand and 15% of new sand. These cores are used in moulds produced by the “green sand” process.

To obtain an improvement of the abovementioned processes, the company invested an estimated USD 15,000. This amount was spent mostly on personnel training, acquisition of batches used in the mixing process of recovery sand and new sand, as well as in the fabrication of boxes to anatomic moulding used to manufacture the larger volume items of the factory.

Through the implementation of these improvements, consumption of new sand decreased from 800 kg to 200 kg to produce an amount of 1,000kg of manufactured pieces. Such developments indicate a reduction of 80% of the use of new sand and, consequently, a reduction of 80% of discharge of foundry sand.

2. Food waste

Description and status of the measures or programme:

At the domestic level, the prevention of food waste can be addressed first of all by raising public awareness of the quantities of usable food discarded, the financial losses this represents, and the environmental impact of collecting and treating this waste. Constructive information on waste prevention techniques can help households better plan their food purchases, keep food supplies fresher for longer periods, make better use of leftovers and can make a noticeable difference to household expenses. The “Love Food Hate Waste” Campaign (www.lovefoodhatewaste.com), selected as a best practice in the prevention of biodegradable waste, can be taken here as a model of the range of guidance that can be provided.

Effective awareness campaigns on the prevention of food waste will integrate waste prevention habits into individual behaviour so that actions at home, in the workplace and at leisure are consistent. Good practices are often linked to specific situations and are often abandoned when they become less convenient.

The hospitality industry faces specific waste prevention challenges. Hotel guests can generate up to a kilo of waste per person per day, making the environmental impact of tourism substantial. Food scraps make up almost 40% of total waste in the hospitality industry, often near 50% in restaurants. For example, the Porto region launched a project initiated by waste management company Lipor presenting reduced serving sizes providing for nutritional balance, in addition to economic benefits. Given its elevated waste prevention potential, the hospitality industry has been targeted separately by some waste prevention programmes, including, for example, Ireland’s Green Hospitality Award.

Changes in public behaviour, relating to the efficiency of consumption of purchased food, can be monitored using surveys of household and workplace practices and indicators demonstrating changes in habits, and these can direct further investments in specific measures based on their success in the region of implementation.

The promotion of home composting, along with the preparation of guidelines and the provision of composting bins, and separate collection programmes may help to reduce the amount of food waste – by raising citizens awareness about the amounts and types of food waste disposed.

Duration:

Many of these initiatives are temporary in nature (e.g. awareness campaigns). Others like home composting are by nature indefinite.

Approach:

Broad

Goals and/or targets:

Qualitative: food losses in terms of volumes and weight to be reduced.

Stakeholders involved:

Broad: In particular those in the hospitality industry, restaurants, catering, food production.

Available information (reports, policy documents, etc., including hyperlinks to online material):

More information on identification and analysis of existing initiatives on food waste prevention may be found in the report: Preparatory Study on Food Waste across EU-27 available at: http://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf

3. Paper waste**Description and status of the measures or programme:**

Measures to reduce junk mail should include:

- a) A well-executed awareness campaign, reaching the widest possible target audience, in this case, households. Campaigns will clearly explain the amount of junk mail produced nationally and by household per year and the environmental impact of those statistics;
- b) The provision of practical, systematic information on waste prevention techniques, in this case the distribution of 'no junk mail' stickers and clear guidance on how to remove your name from mass mailing databases.

For example, the Stop Pub campaign (www.ademe.fr/stoppub) in France provides a model of activity in this area, organising information for use by non-governmental organizations, individuals and businesses and elaborating extensively on the context of the problem.

Much more effectively, 'opt-in' systems attempt to eliminate junk mail by allowing households to select and receive only mail they are interested in. Having worked well in reducing spam in email inboxes, this measure has significant potential to reduce paper waste.

Catalogues and telephone books add to the paper waste burden of households and can be avoided using measures similar to unaddressed mail, specifically through the creation of a publicly accessible database allowing households to choose which publications they receive.

There are numerous practical steps that can be taken to significantly reduce office paper waste, from double-sided paper policies, making revisions online, printing envelopes without labels, preventing paper jams, and reusing one-sided paper as notepaper. Office paper reduction campaigns can be effective in offices of any size and should be encouraged in offices of all sizes. Precise guidance on setting up an office campaign should be made widely available; an excellent example is provided by the California Integrated Waste Management Board⁴¹.

The structured promotion of online books, newspapers and magazines has not yet been widely adopted as a waste prevention policy, but the dematerialisation of the news media, as well as the promotion of electronic book devices, could be very helpful as part of the prevention of paper waste.

Duration:

Some of these measures themselves are not limited in time, but of course need specific action by companies or consumers (e.g. set mail preferences, reduce paper use at the office).

Approach:

Broad: paper users in companies and consumers, amongst others.

Stakeholders involved:

Broad: paper users in companies, consumers, etc.

Means of implementation:

Support from paper and printing industry necessary. Financing of campaigns and information to the public

Challenges and incentives:

As a significant problem in the United States, Catalog Choice (www.catalogchoice.org) has made it easy to set mail preferences for retail catalogues, which currently are distributed in the region of 19 billion per year and account for 53 million trees in the market in the United States alone.

Available information (reports, policy documents, etc., including hyperlinks to online material):

www.ciwmb.ca.gov/BizWaste/FactSheets/Campaign.htm

⁴¹ See <http://www.calrecycle.ca.gov/>.

4. Packaging waste

Description and status of the measures or programme:

At the consumer level, informational strategies motivating consumers to buy products with minimised packaging content are appropriate, as well as efforts to normalise the purchase of bulk goods and expand facilities for their purchase. Waste prevention measures to address packaging waste will be organised mostly at national or supranational level. Local authorities play a role in stimulating public awareness and interest in packaging minimisation or avoidance and can support national efforts by demonstrating the demand for lower levels of packaging to manufacturers.

There are ample opportunities for tertiary packaging reduction that have not yet been widely adopted. The use or optimisation of reusable distribution materials can lead to notable waste reduction and financial savings; plastic pallets for example are much more durable than wooden models, offering ANG Newspaper Company in California a 125% return on their investment as well as the prevention of 37 tonnes of wood waste⁴². Increasing the longevity, reducing the volume and eliminating single use shipping and handling materials can provide waste prevention opportunities in very large quantities and a shift towards this approach can be required or encouraged through incentives and subsidies. Reductions in tertiary packaging should however ensure that this does not result in a high level of damaged products.

Regulatory options for authorities include extended producer responsibility policies, as proposed recently in Canada⁴³, and taxes by volume, as introduced in 2007 on primary and secondary packaging in the Netherlands⁴⁴.

Approach:

Various approaches may be relied on including those based on: type of packaging, material flow to be packaged, user of the packaging (consumer or a certain industry).

Goals and/or targets:

Enabling target setting through voluntary agreements provides a major opportunity for national authorities to further industry-wide change on packaging at all levels. Bringing manufacturers, packaging associations and major retailers together under a shared goal of packaging reduction has already had effective results in the UK⁴⁵.

Stakeholders involved:

Consumers, the packaging industry, industry sectors that use packaging.

Challenges and incentives:

The conception phase holds the widest possibilities for prevention, as quantities of waste can be designed out at every step of a product's life-cycle and at all three levels of the packaging that accompanies it (primary, secondary, tertiary). The two main options for public authorities here will be requirements for eco-design criteria in the development of new products and the promotion of eco-design using online tools, training programmes and incentives created by extended producer responsibility policies. Both types of policy should encourage packaging minimisation at all levels.

It should be noted, however, that some primary packaging contributes to the reduction of food waste. For example, Morrisons supermarkets in the United Kingdom have conducted packaging research which identifies which fresh produce lasts longer when wrapped and which does not. The Public Waste Agency for Flanders, Belgium, conducted a study on the subject:

<http://ovam.be/sites/default/files/atoms/files/2015-Report-OVAM-Food-loss-and-packaging-DEF.pdf>.

Available information (reports, policy documents, etc., including hyperlinks to online material):

www.morrisons.co.uk/Corporate/Press-office/Corporate-releases/Morrisons-launch-Great-Taste-Less-Waste-campaign-to-save-families-up-to-600-per-year-

<http://ovam.be/sites/default/files/atoms/files/2015-Report-OVAM-Food-loss-and-packaging-DEF.pdf>

⁴² See <http://www.pdqplastics.com/pdf/cost-savings-case-study.pdf>.

⁴³ <https://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=FB8E9973-1>.

⁴⁴ http://ec.europa.eu/environment/waste/prevention/pdf/Netherlands_Factsheet.pdf.

⁴⁵ <http://www.wrap.org.uk/content/packaging-3>.

5. Electrical and electronic waste (E-waste)

Baseline for this case:

Some e-waste is classified as hazardous waste, notably those products containing cadmium, asbestos, PCB, lead, ozone depleting substances and cathode ray tubes.

Goals and/or targets:

Qualitative: to reduce the amount of hazardous substances in products that are used, in materials derived from recycling of e-waste and in the environment.

Quantitative: the longevity of products increases, the amount of appliances being reused, close link with eco-design (promotion of eco-design, recycled content, modularity, etc.).

Challenges and incentives:

The reuse of equipment is important, as the environmental impact of a product is minimised by using it for as long as possible. The demand for used electrical and electronic equipment is significant throughout the world. For example, the expansion of reuse networks can help meet this demand. Simplified access of reuse networks to collection sites furthermore facilitates the identification of those products that can be most easily prepared for reuse.

Extended producer responsibility (EPR) policies help internalise the cost of managing e-waste. EPR policies that link producers directly to the products they have created, rather than those imposed on the industry as a whole, can significantly reward those producers who take steps to green their supply chain and increase the durability, reparability and recyclability of their products. EPR is thus an essential incentive for eco-design, promoting waste prevention across product life-cycles.

6. Hazardous waste

Description and status of the measures or programme:

The separate collection of hazardous waste in the EU is required by the Waste Framework Directive⁴⁶ (Article 18: Ban on the mixing of hazardous waste) and contributes to reducing the quantity of hazardous material in the residual waste fraction, see further http://ec.europa.eu/environment/waste/hazardous_index.htm.

Cities like Copenhagen and Helsinki have developed specific collection infrastructure and services for household hazardous waste (e.g. stationary containers, door-to-door collection vehicles). Local authorities may also offer specific low-cost collection services to businesses qualifying as “small quantity generators”, a measure, currently in use in California, available to producers of 99 kilos or less of hazardous waste per month.

In addition to better management of existing hazardous wastes, the promotion of less or non-hazardous alternatives through informational campaigns should be part of any household hazardous waste strategy. Alameda County in California, for example, provides a range of recipes for homemade alternatives to normally toxic household products, including oven cleaners, paint strippers and pesticides, on its Stop Waste website.

Baseline for this case:

Reducing the hazardous content of products is qualitative waste prevention insofar as it decreases the total quantity of hazardous waste released. Eliminating hazardous substances from products altogether remains an overarching objective to be pursued by public authorities and by industry.

Stakeholders involved:

Effective collection or drop-off facilities are essential to the management of household and small and medium-sized enterprises (SME) hazardous waste management.

Means of implementation:

A description of the required means of implementation, including human and financial resources is provided. Aspects of transparency of the financing systems are elaborated upon.

Challenges and incentives:

Requirements or incentives for eco-redesigns of products with hazardous content are a positive initial step. The promotion of environmental management systems (EMS) that help identify inputs and generation points of hazardous waste, furthermore, can help companies measure and reduce their hazardous waste production. Training and subsidies for the establishment of targeted EMSs are two ways public authorities can encourage their incorporation into manufacturing processes.

⁴⁶ <http://ec.europa.eu/environment/waste/framework/>.

Eco-labelled products furthermore limit the toxic content of products and are easily identifiable by the consumer. Campaigns at any administrative level to increase the visibility of eco-labelled products will thus have a positive impact in reducing consumer exposure to and disposal of hazardous waste.

Available information (reports, policy documents, etc., including hyperlinks to online material):

www.stopwaste.org/home/index.asp?page=585#All-Purpose

7. Plastic waste

Description and status of the measures or programme:

This initiative has its origins in a paper entitled “The New Plastics Economy: Rethinking the future of plastics” which was presented at the World Economic Forum in 2016. It applies circular economy principles to global plastic packaging flows with the objective of transforming the plastics economy. It aims at 70% reuse, drastically reducing negative externalities such as leakage into oceans, decoupling plastics from fossil feedstocks and thus reducing the use of the global carbon budget.

“The New Plastics Economy: Rethinking the future of plastics” provides, for the first time, a vision of a global economy in which plastics never become waste, and outlines concrete steps towards achieving the systemic shift needed.

The report acknowledges that while plastics and plastic packaging are an integral part of the global economy and deliver many benefits, their value chains currently entail significant drawbacks. Assessing global plastic packaging flows comprehensively for the first time, the report finds that most plastic packaging is used only once: 95% of the value of plastic packaging material, worth USD 80-120 billion annually, is lost to the economy. Additionally, plastic packaging generates negative externalities, valued conservatively by UNEP at USD 40 billion. Given projected growth in consumption, in a business-as-usual scenario, by 2050 oceans are expected to contain more plastics than fish (by weight), and the entire plastics industry will consume 20% of total oil production, and 15% of the annual carbon budget.⁴⁷

Achieving such systemic change will require major collaboration efforts between all stakeholders across the global plastics value chain – consumer goods companies, plastic packaging producers and plastics manufacturers, businesses involved in collection, sorting and reprocessing, cities, policymakers and NGOs. The report proposes the creation of an independent coordinating vehicle to set the direction, establish common standards and systems, overcome fragmentation, and foster innovation opportunities at scale. In line with the report’s recommendations, the Ellen MacArthur Foundation will establish an initiative to act as a cross-value-chain global dialogue mechanism and drive the shift towards a New Plastics Economy.

In May 2016, the Ellen MacArthur Foundation launched the New Plastics Economy initiative – a three-year project to mobilise the report’s recommendations together with partners from a broad group of participant companies, cities and governments across the value chain.

Baseline for this case:

1964-2014

Stakeholders involved:

The World Economic Forum, Ellen MacArthur Foundation, McKinsey Company, supported by 40 leaders from multinational companies, cities, and others.

Means of implementation:

In January 2017, a new paper “Catalyzing Action”, was presented by the New Plastics Economy initiative at the World Economic Forum. This paper identified five building blocks – dialogue, harmonisation, innovation, analysis and outreach – each of them containing catalytic actions planned for 2017. Three transition strategies have been identified to help move forward the initiative:

- a) Fundamental redesign and innovation. Without fundamental redesign and innovation, about 30% of plastic packaging will never be reused or recycled.
- b) Reuse. For at least 20% of plastic packaging, reuse provides an economically attractive opportunity.

⁴⁷ <https://www.ellenmacarthurfoundation.org/news/new-plastics-economy-report-offers-blueprint-to-design-a-circular-future-for-plastics>.

- c) Recycling with radically improved economics and quality. With concerted efforts on design and after-use systems, recycling would be economically attractive for the remaining 50% of plastic packaging.
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