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and Nuclear Safety

Waste Prevention Programme

of the German Government with the Involvement
of the Federal Länder



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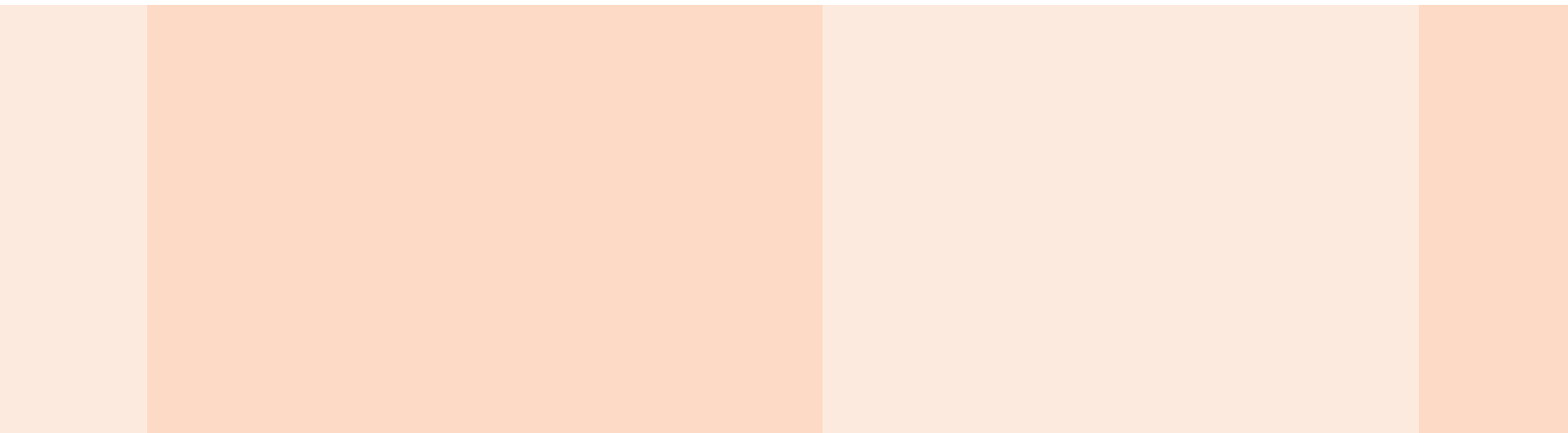
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1 Introduction and fundamental principles

Waste is both the product and a reflection of our wealthy society. Virtually everything that surrounds us and interests us, be it furnishings, vehicles, consumer goods or food, becomes waste at the end of its useful life. For this reason, today's production and consumption society is often (with good reason) referred to as the "throw-away society", because waste expresses the negative side of production. Vast quantities of raw materials and energy resources are extracted from nature, processed and manufactured, then sold as consumer goods to satisfy our needs. After use, they eventually end up as waste. Every product carries collateral ecological damage associated with its production, its use, and ultimately, its disposal; there are also matters of ethics, as well as global and inter-generational justice, to consider.

Ultimately, material wealth rooted in the consumption of environmental resources. The volumes of waste produced offer a striking reflection of this correlation. Germany produces just over 330 million tonnes of waste each year, including some 50 million tonnes of household waste, just under 200 million tonnes of construction and demolition waste, and 40 million tonnes of waste from the extraction and treatment of mineral resources. In 2010, each German resident produced almost 600 kg of household waste.¹ However, there are other ways of creating wealth apart from material consumption – for example, by increasing the share of gross domestic product from services.

A form of wealth creation that consumes fewer resources and produces less waste is not only conceivable – it is essential. Our planet's resources are finite, and with a growing global population, our opportunities for development are increasingly limited. On the one hand, waste is a product's "ecological rucksack", which was often filled elsewhere in the world during its manufacture and supply phase; on the other, it is synonymous with the adverse environmental effects associated with its treatment or final storage – in other words, its "disposal". The sustainable development model provides guidance against this background; not only for government action, but also as a yardstick for decision-making by industry and society. The aforementioned correlations and interactions must be identified, defined and observed if we are to find viable long-term solutions.

Severing the link between the use of resources and economic growth is a pivotal environmental policy goal. Because waste always originates from former raw materials and products, waste prevention can make a significant contribution to this objective. It is worth remembering that the goal of waste prevention must compete with other political objectives (see section 3.3 below for further details). Social and economic aspects must also be taken into account when developing waste prevention measures.

This Waste Prevention Programme, in conjunction and coordination with the German Government's other existing strategies, will help to ensure the coherent, sustainable handling of natural resources and raw materials in Germany. In 2002, the German Government made a commitment to sustainability with the National Strategy for Sustainable Development, as the guiding principle behind its policy-making. As part of this Strategy, it resolved to double raw material productivity by 2020 compared with the base year 1994.

¹ Cf. Federal Statistical Office, Abfallbilanz (Waste Life-Cycle Analysis) 2010.

In adopting the “Raw Materials Strategy” in 2010, the German Government created the framework for a secure, sustainable supply of non-energy mineral resources for German industry. This was followed in 2012 by the adoption of the German Resource Efficiency Programme (ProgRes), which strives to decouple economic growth from resource use, and to reduce the associated environmental impacts, strengthen the future viability and competitiveness of German industry, and thereby promote stable employment and social cohesion. The resource efficiency policy will help us to meet our global responsibility for the ecological and social consequences of resource use. Our goal must be to reduce the use of raw materials.

The Waste Prevention Programme slots into this framework and pursues compatible objectives: The Waste Prevention Programme is designed to sever the link between economic growth and the impacts on man and the environment associated with waste generation (Section 33, para. 3, no. 1 of the Closed Cycle Management Act², KrWG)³.

In this connection, a waste prevention measure is defined as any measure taken before a substance, material or product becomes waste and which is intended to reduce the volume of waste, the harmful effects of waste on man and the environment, and the amount of harmful substances in materials and products (cf. Section 3, para. 20 of the KrWG).

Waste prevention is one aspect of the urgently needed conversion to the more sustainable management of available global resources on a wider scale. It will not succeed if it leads to a reduction in wealth and economic power. It is not a matter of giving the environment priority over the economy, but rather, of using the economy in order to achieve ecological necessities.

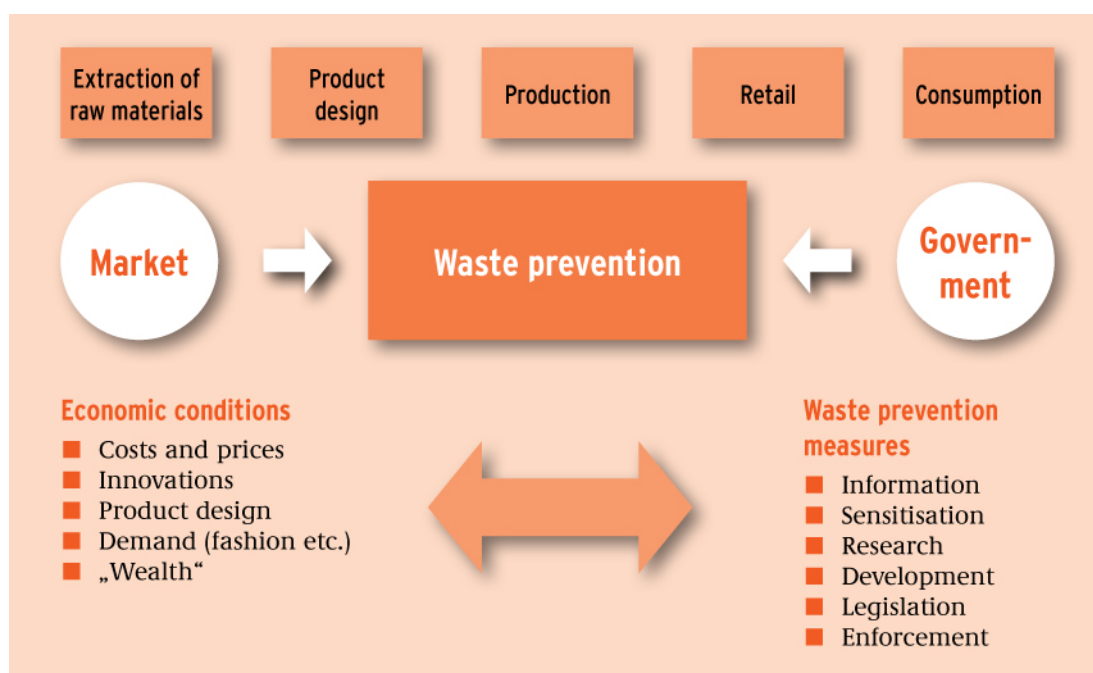
The role of government

In order to accurately assess the waste prevention potential that can be exploited through government measures, it is necessary to appraise the competencies of Government and the political opportunities in this sector.

Government action on waste prevention can take many different forms, including sensitisation of the general public, research and research funding, and statutory measures and enforcement. Government measures with a waste-preventing effect are aimed primarily at market players; the state itself can only directly avoid waste when acting as a private entity.

² Act Reorganising the Law on Closed Cycle Management and Waste of 24 February 2012 (BGBl. (Federal Law Gazette) I page 212) most recently amended by Section 44, para. 4 of the Act of 22 May 2013 (BGBl. I page 1324).

³ The purpose of this Act is to promote closed cycle waste management in order to conserve natural resources and ensure the protection of man and the environment during the generation and management of waste (Section 1 of the KrWG).



As well as observing Government guidelines, market players – producers, retailers and consumers – are also influenced to a large extent in their decision-making by demand, needs, market conditions, advertising, technical innovations, environmental awareness and so on. As such, the Government can only define the framework for the social and ecological market economy and the administrative regulations within which these market players reach their decisions.

Traditionally, the state has regulated aspects of public safety and order, the social security systems, public health and environmental protection.

Conversely, the state cannot and must not intervene in individual decisions by economic players, unless legitimised by a verifiable or precautionary need to avert danger. In view of these restricted opportunities for action by the state, there are limits on what the Government can achieve through waste prevention measures.

Binding waste prevention measures must be clearly based on law, as created by the Closed Cycle Management Act (KrWG) (Section 3, para. 20, Section 6, para. 1 no. 1, Section 7, para. 1, Section 13 and Section 23 et seq.), waste-related product regulations (such as the End-of-Life Vehicle Ordinance⁴, Packaging Ordinance⁵, Electrical and Electronic Equipment Act⁶), and immission control legislation (Section 5, para. 1 no. 3 of the Federal Immission Control Act, BImSchG). Enforcing waste prevention measures can prove difficult in practice, partly due to the complexity of the various production processes, and partly because the law requires measures to be both economically viable and technically feasible.

⁴ End-of-Life Vehicles Ordinance in the version promulgated on 21 June 2002 (BGBl. (Federal Law Gazette) I page 2214), most recently amended by Article 5, para. 18 of the Act of 24 February 2012 (BGBl. I page 212).

⁵ Packaging Ordinance of 21 August 1998 (BGBl. (Federal Law Gazette) I page 2379), most recently amended by Article 5, para. 19 of the Act of 24 February 2012 (BGBl. I page 212).

⁶ Electrical and Electronic Equipment Act of 16 March 2005 (BGBl. (Federal Law Gazette) I page 762), most recently amended by Article 2, para. 48 and Article 4, para. 30 of the Act of 7 August 2013 (BGBl. I page 3154).

In view of these considerations, statutory regulations to promote waste prevention by controlling conduct, other than those already mentioned above, are only suitable in selected cases. Education, advice and support with voluntary measures and voluntary commitments, as so-called “soft” mechanisms, offer a broader spectrum of potential actions.

The political framework for waste prevention

Moving towards a resource-conserving economy and society requires a wide range of individual waste-avoiding actions by the various stakeholders: Every production-related, commercial or consumption decision can contribute to change; the environmental impacts of every single material, substance or object are relevant.

Environmental awareness in Germany is high, and there is considerable support for implementation of closed substance cycle waste management and waste prevention. One of the challenges for policy-makers is that the level of public awareness is not always commensurate with the ecological relevance of various materials. When it comes to waste prevention, the public consciousness tends to focus on waste with powerful associations originating from an ethical (“war on hunger”), aesthetic (“littering the landscape”) or socio-critical (“throw-away society”) context, while certain types of industrial waste are often less prominent, because they are not always visible to or experienced by the general public.

There have been repeated demands for certain products to be banned in conjunction with waste prevention. There are legal barriers to banning selected products or the consumption of certain goods, generally under EU law, because they have the effect of restricting personal freedoms. Social and economic factors may also oppose a ban. Also problematic is the difficulty of identifying the actual environmental relief that can be achieved, for example, by banning a product, which means that there is no basis on which to assess the intervention and its benefits. The scope for government waste prevention measures is very limited in this context.

On the other hand, we would stress that numerous waste prevention measures, especially in production, for example, have been implemented in recent years and decades. Rising disposal costs have often encouraged the more efficient handling of resources and waste prevention. Furthermore, a number of Federal *Länder* have promoted waste prevention through intensive debate and the creation of designated agencies; similarly, many local governments have made similar efforts.

The development of innovative, clean production techniques should be further expanded, not least in order to ensure the market leadership and competitiveness of German companies in this sector.

Role of the Waste Prevention Programme

The Waste Prevention Programme is, firstly, a description of the current situation in terms of waste prevention, and secondly, part of a process to analyse approaches for the more efficient handling of our resources. In this format, it also satisfies a resolution by the German *Bundestag* (Lower House of Parliament),⁷ stating that as well as improving the enforcement of current statutory regulations aimed at waste prevention or further improving existing voluntary avoidance measures, the Waste Prevention Programme should also investigate whether and to what extent new aspects of waste prevention can be exploited, and existing areas extended. The German Government's Waste Prevention Programme was drawn up with the close involvement of the *Länder*.

At this point, we would stress that the Waste Prevention Programme is solely concerned with waste prevention measures in the public sector. Depending on its nature, each individual measure will directly or indirectly impact various different stakeholders (producers, trade and commerce, consumers, public institutions). Furthermore, the Waste Prevention Programme is confined to waste prevention aspects and measures from a legal perspective (see definition of waste prevention in Section 3, para. 20 of the KrWG). Of course, an efficient, targeted closed-cycle management system has a waste-preventing effect, since primary raw materials are replaced by high-quality waste recovery, and the waste that would have been produced from mining and processing these raw materials is avoided. Germany has already implemented far-reaching measures in this area, such as the landfilling ban for untreated household waste. Moreover, a technically and organisationally ambitious waste management system aimed at maximising recycling and recovery rates creates an economic incentive for waste prevention, primarily due to the level of waste disposal costs. This is particularly true of industrial waste and products falling under the producer responsibility regulations vis-à-vis waste management.

Most of these measures and instruments are not waste prevention measures in a legal sense, but rather measures designed to encourage recycling or energy recovery (see comments and explanations in section 2.2).

As per the legal definition of waste prevention, the following types of measures are not covered by the Waste Prevention Programme:

- Measures to encourage preparing for reuse, recycling and other forms of recovery (such as storage bans)
- Measures to improve recovery procedures (such as cascade use)
- Measures for marketing and promoting the use of recycled materials
- Measures by the German Government to promote the use of secondary raw materials are included, *inter alia*, in the German Resource Efficiency Programme (ProgRess)

⁷ Refer to the recommendation and report by the Committee for the Environment, Nature Conservation and Nuclear Safety (16th Committee), No. 17/7507, draft Act Reorganising the Law on Closed Cycle Management and Waste.

2 Initiation, procedure and structure of the Waste Prevention Programme

2.1 Legal foundations for waste prevention and the Waste Prevention Programme

Waste prevention guidelines

The guiding principles of waste prevention are regulated by the Closed Cycle Management Act (KrWG) and by **material flow-specific laws and ordinances**.

Section 3, para. 20 of the KrWG states that prevention within the meaning of this Act shall be any measure taken before a substance, material or product has become waste and that serves to reduce the quantity of waste, the adverse impacts of waste on human health and on the environment, or the content of harmful substances in materials and products (cf. Section 3, para. 20 of the KrWG). This shall include, in particular, the closed-cycle management of substances within plants, low-waste product design, the re-use of products or the extension of the life span of products, as well as consumption patterns aimed at the acquisition of low-pollution, low-waste products, and at the use of reusable packaging.

Aligning production processes with the aim of producing by-products rather than waste, as defined in Section 4 of the KrWG, could be considered a form of waste prevention, provided it complies with the relevant legal requirements.

Since the Waste Avoidance and Management Act of 1986, waste prevention has been a key theme in German waste legislation. The Closed Substance Cycle Waste Management Act of 1994 introduced the three-tier waste hierarchy: Avoidance – Recovery – Disposal. The new Closed Cycle Management Act of 2012 extended this into a five-tier waste hierarchy. Chapter 3 addresses the waste hierarchy and its application.

Numerous other acts and statutory ordinances also contain requirements and regulations relating to waste prevention, such as the **Electrical and Electronic Equipment Act (ElektroG)**⁸, the **Batteries Act (BattG)**⁹, the **Packaging Ordinance (VerpackV)**¹⁰ and the **End-of-Life Vehicle Ordinance (AltfahrzeugV)**¹¹. In particular, the bans and limitations on the use of certain hazardous substances in products, such as selected heavy metals in packaging, batteries, electrical and electronic equipment and motor vehicles, have a direct and enforceable effect.

Banning prohibited substances helps to prevent hazardous waste through substitution with other substances, and thereby contributes to qualitative waste prevention, provided the substituted materials lead to an improvement in the environmental impacts of production and waste.

⁸ Electrical and Electronic Equipment Act of 16 March 2005 (BGBl. (Federal Law Gazette) I page 762), most recently amended by Article 2, para. 48 and Article 4, para. 30 of the Act of 7 August 2013 (BGBl. I page 3154).

⁹ Act Concerning the Placing on the Market, Collection and Environmentally Compatible Waste Management of Batteries and Accumulators of 25 June 2009 (BGBl. (Federal Law Gazette) I page 1582), most recently amended by Article 4 of the Act of 24 February 2012 (BGBl. I page 212).

¹⁰ Packaging Ordinance of 21 August 1998 (BGBl. (Federal Law Gazette) I page 2379), most recently amended by Article 5, para. 19 of the Act of 24 February 2012 (BGBl. I page 212).

¹¹ End-of-Life Vehicles Ordinance in the version promulgated on 21 June 2002 (BGBl. (Federal Law Gazette) I page 2214), most recently amended by Article 5, para. 18 of the Act of 24 February 2012 (BGBl. I page 212).

This potential improvement should be verified and documented when debating substance bans, initially by means of lifecycle analyses of the substituted materials. Moreover, the waste prevention requirements in the various acts and ordinances are often very generalised and more like appeals.

The KrWG contains further guidelines on waste prevention applicable to selected public institutions, plants and facilities, such as Federal Government authorities in the public procurement sector (see Section 45) and the obligation to provide advice specifically concerning waste prevention opportunities, for public disposal agencies and other institutions such as chambers of industry and commerce or agriculture (see Section 46) or company Waste Management Officers (Section 60).

Section 5, para. 1 no. 3 of the Federal Immission Control Act¹² (BImSchG) is an important anchor for waste prevention. This states that installations subject to licensing *“shall be constructed and operated in such a way that, in order to ensure a high level of protection for the environment as a whole ... wastes are avoided, unavoidable wastes are recovered, and non-recoverable wastes are disposed of without impairing the public welfare; wastes shall be deemed to be unavoidable if avoidance is not technically feasible or not reasonable; avoidance shall be deemed to be inadmissible if it leads to more adverse effects on the environment than would be the case with the option of recovery; recovery and disposal of wastes shall be based on the provisions of the Closed Substance Cycle Waste Management Act (Kreislaufwirtschafts- und Abfallgesetz) and on any other provisions applicable to wastes.”*

The Best Available Technology (BAT) Reference Documents likewise contain waste prevention guidelines in varying levels of detail, depending on the type of installation. If specific waste prevention measures are included in the BAT conclusions of revised BAT Reference Documents, these must be implemented accordingly.

The Federal Government’s Waste Prevention Programme

The revised EU Waste Framework Directive¹³ adopted in 2008 reinforces the importance of waste prevention in EU waste legislation. One major new feature is the obligation for Member States to establish **waste prevention programmes** by 12 December 2013 (Article 29, para. 1). Section 33 of the KrWG creates the statutory foundations for a waste prevention programme as required by the Waste Framework Directive, and states that the Federal Government’s shall draw up a waste prevention programme, and the *Länder* may take part in the preparation thereof. In such cases, they shall draw up autonomous contributions for their respective area of competence, which shall be included in the Federal Government’s waste prevention programme. Should the *Länder* opt not to participate in a waste prevention programme of the Federal Government’s, they shall draw up their own waste prevention programmes.

¹² Act on the Prevention of Harmful Effects on the Environment Caused by Air Pollution, Noise, Vibration and Similar Phenomena (Federal Immission Control Act – BImSchG), most recently amended by Article 1 of the Act of 2 July 2013 (BGBl. (Federal Law Gazette) I page 1943).

¹³ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312 of 22 November 2008, page 3, L 127 of 26 May 2009, page 24).

According to Section 33, para. 3 of the KrWG, the waste prevention programme

- Shall define the waste prevention goals
- Shall describe the existing waste prevention measures and evaluate the expediency of the waste prevention measures stated in Annex 4 or other suitable measures
- Shall establish, where necessary, further waste prevention measures, and
- Shall define expedient, specific, qualitative or quantitative standards for established waste prevention activities, by means of which the progress made with these measures shall be monitored and evaluated.

Section 33, para. 5 of the KrWG states that the waste prevention programmes shall be drawn up for the first time by 12 December 2013, evaluated every six years, and updated where necessary.

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety is responsible for preparing the Federal Government's Waste Prevention Programme. The programme shall be drawn up in agreement with other Federal ministries with competence in this area. The general public shall participate in the preparation of the waste prevention programme in accordance with the procedures outlined in Section 32, paras. 1 to 4 of the KrWG.

Strategic environmental impact assessment and Waste Prevention Programme

Under the currently valid provisions for this Waste Prevention Programme, there is no requirement to carry out a strategic environmental impact assessment. This was the conclusion of a pre-evaluation under Section 14b, para. 1, no. 2 of the Environmental Impact Assessment Act (UVPG), whereby an environmental impact assessment would have been required if the waste prevention programme were to set a framework for decisions regarding the admissibility of projects listed in Annex 1 to the UVPG, or projects requiring an environmental impact assessment, or pre-assessment of the individual case under *Länder* law. In this context, the setting of a framework would apply to specifications with relevance for future licensing decisions, particularly regarding the demand, size, location, properties or operating conditions of projects or the utilisation of resources. However, the Waste Prevention Programme does not contain any such guidelines and is therefore exempt from this requirement. Specifically, it does not contain any guidelines that are pre-decisive when examining the admissibility requirements for projects requiring an EIA or which would need to be incorporated into a discretionary decision by the authorities.

2.2 Procedure for establishing the Waste Prevention Programme

This Waste Prevention Programme is the product of an intensive scientific debate and participation process. Together with the Federal Environment Agency and in close collaboration with the *Länder* and other affected Government departments, the Federal Environment Ministry has created a suitable basis on which to draft a waste prevention programme. Extensive public consultation as described in Section 33, para. 5 of the KrWG also took place.

In order to create a credible basis when drafting the Waste Prevention Programme, a number of competent institutions and academics who are active in this field were asked to elucidate the various aspects. The results of their preliminary work are published on the Internet¹⁴, and reference is made to this in the Programme.

Two research projects in particular by the Federal Environment Agency provided the starting-point for the drafting of the Waste Prevention Programme: The first identified existing waste prevention measures at Federal Government, *Länder* and local authority level, as well as measures in other countries and in the literature. The second study (see www.umweltdaten.de/publikationen/weitere_infos/4506-0.pdf) categorises and groups the measures identified in the first study into clusters, then evaluates these clusters of measures. These are typified by a specific material flow, focusing primarily on the waste prevention potential associated with a measure and its overall environmental impacts.

The Waste Prevention Programme builds on the conclusions of these studies, particularly their ecological assessments of sample measures; however, as far as possible, we have endeavoured to separate the measures from specific waste streams, and discuss and evaluate them in general terms. The measures identified were also scrutinised from various other legal, political and socio-economic aspects. Only if comprehensive analysis revealed that a measure would prevent waste and is also, generally speaking, ecologically beneficial, economically and socially viable, and legally enforceable, was it recommended by this Waste Prevention Programme. The measures discussed in this Waste Prevention Programme are strictly based on the KrWG's definition of waste prevention as set out in chapter 2; measures that encourage recycling or other forms of recovery were not generally included, even if they have a waste-preventing effect in practice (for example, the production of secondary raw materials obviates the need for mining, refinement and use of primary raw materials and thus avoids the associated waste generation).

Essentially, the paramount objective of the measures listed in this Waste Prevention Programme is to prevent waste. There are also a wide range of examples that contribute to waste prevention as a secondary effect. For example, bans on certain chemicals (e.g. REACH) aimed at reducing the hazards associated with their handling also lead indirectly to qualitative waste avoidance; similarly, in certain circumstances, increases in value-added tax may lead to lower consumption levels, and hence to reduced waste volumes. Unintentional effects of such indirect measures cannot be included in the Waste Prevention Programme, although viewed overall, they can play a part in waste prevention.

¹⁴ Cf. Scientific-technical foundation for a national waste prevention programme, <http://www.umweltbundesamt.de/uba-info-medien-e/4044.html> .

2.3 Content and structure of the Waste Prevention Programme

In view of the aforementioned statutory requirements, the Waste Prevention Programme is divided into the following sections:

- Formulation of waste prevention objectives (chapter 3.3)
- Specification of appropriate and specific qualitative or quantitative benchmarks (“indicators”) for adopted waste prevention measures, by which to monitor and assess the progress achieved with these measures (chapter 3.4)
- Recommendations for specific waste prevention measures based on an evaluation of the findings of studies and dialogue with the various players (chapter 4)
- Outlook for ancillary actions by the German Government to promote waste prevention (chapter 5)
- Description of existing measures and assessment of the expediency of the waste prevention measures listed in Annex 4 to the KrWG, plus other measures, where applicable (see Annex).

For the first time, the Programme brings together a collection of existing and potential waste prevention measures at Federal Government, *Länder* and local government level, and assesses these measures from an ecological, financial and social perspective. However, given the aforementioned complexities, the measures in this Programme do not address individual, specific waste streams, products and procedures, but instead focus on public sector measures and instruments with general significance as waste prevention tools, and which could be applied to a variety of waste streams following appropriate analysis.

3 Waste prevention objectives

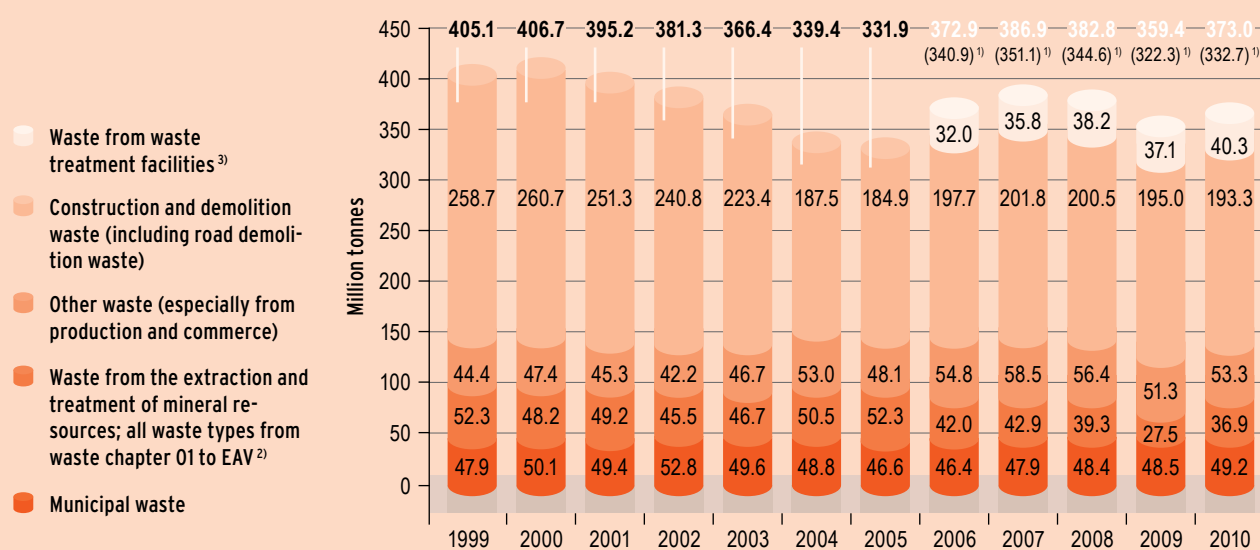
This chapter outlines the status quo of waste generation in Germany. It also discusses the guiding principles for setting waste prevention targets, defines general waste prevention objectives pursuant to Section 33, para. 3, no. 1 of the KrWG, and discusses benchmarks for gauging the success of these measures (in accordance with Section 33, para. 3, no. 4 of the KrWG).

3.1 Status quo of waste generation in Germany

In 2010, the volume of primary waste (including hazardous waste) produced in Germany totalled 332.7 million tonnes, compared with 405.1 million tonnes in 1999 (see chart below).

Between 1999 and 2010, the overall volume of waste fell, but fluctuated between individual years. An all-time low was achieved in 2005, whilst subsequent years saw a further slight increase in waste volumes. In this connection, however, we must point out that there are certain statistical inaccuracies arising from the methodology and subject matter of waste statistics.¹⁵

Waste volume (including hazardous wastes)



1 Net volume of waste excluding waste from waste treatment facilities; included as a component of waste volume for the first time in 2006
 2 Waste from the extraction and treatment of mineral resources
 3 Excluding waste from waste water treatment facilities (EAV 1908), waste from the purification of water for human use or industrial service water (EAV 1909), waste from the reconditioning of soil and groundwater (EAV 1913), and secondary waste that leaves the disposal process as raw materials/products
 Note: The provisions of the 1994 Environmental Statistics Act were not designed for the direct collation of waste volume. Since 1996, records have focused primarily on the quantities of input waste among operators of waste disposal plants.

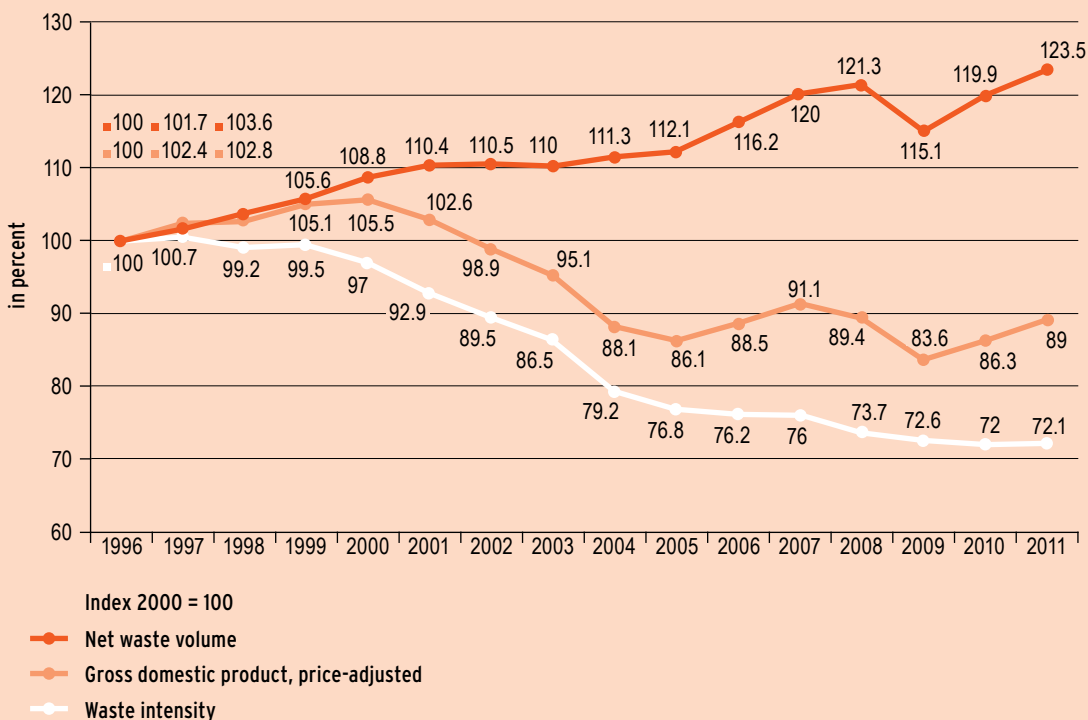
Source: Federal Statistical Office, Abfallbilanz (Waste Lifecycle Analyses) 2009, Wiesbaden 2011

¹⁵ *Inter alia*, data is reported on a voluntary basis; the data is input-related, in other words, the fate of materials in the subsequent disposal chain is not precisely traceable; moreover, the facility-specific measurement techniques and waste lifecycle analyses are sometimes imprecise and unharmonised. These basic problems associated with waste statistics are difficult to resolve. The meaningfulness of waste statistics is in any case limited, since there is no centralised planning of disposal services and structures, and there is little comparability with the statistics of other countries.

The mass of household waste has essentially remained constant, whilst economic growth has continued; this means that we have succeeded to a degree in severing the link between household waste and economic development. The volume of waste from production and commerce has also remained more or less constant, with due regard for statistical effects; here too, the link has been broken in relative terms. By contrast, in the highest-volume sectors of construction and demolition waste plus mining waste, the decoupling has been absolute, partly as a result of structural and economic developments.

However, according to Section 33, para. 3, no. 1 of the KrWG, the purpose of waste prevention and waste prevention goals is not merely to reduce waste per se, but to decouple the **environmental impacts** of waste generation from economic development. In this connection, we can confirm that between 1999 and 2008, the link between total waste volume (i.e. all waste combined, see chart below) and economic output was broken (see illustration below¹⁶). However, this statistical data allows only limited conclusions to be drawn regarding the associated environmental impacts.

Decoupling the volume of waste from economic output, waste intensity



Source: Federal Statistical Office Wiesbaden, various years, Federal Environment Agency, own calculations

¹⁶ In this chart, waste intensity is defined as the ratio between total waste volume and gross domestic product over time.

3.2 General principles regarding target formulation: Waste prevention is the guiding principle

European and national legislation defines a five-tier hierarchy for the prevention and management of waste, namely, waste prevention, preparation for reuse, recycling, other recovery (including energy), and, as a last resort, waste disposal (cf. Section 6, para. 1 of the KrWG). However, this hierarchy is not rigidly applied, but instead prioritises those measures that best guarantee the protection of human health and the environment in the production and management of waste, with due regard for the precautionary principle and the principle of sustainability (cf. Section 6, para. 2, sentence 1 of the KrWG). The requirement set out under Section 33, para. 3, no. 1 of the KrWG, which states that waste prevention shall aim to decouple economic growth from the impact on human health and the environment caused by the generation of waste, should also be viewed in this context.

Consequently, although waste prevention is a key objective, it is not an end in itself. Waste prevention aims to decouple economic growth from the impacts on human health and the environment associated with waste production. As such, waste prevention measures that fail to relieve the overall pressure on the environment are not recommended. However, the environmental impacts of a waste prevention measure should only be extensively and critically reviewed if there is reason to suspect that it does not relieve overall environmental pressures, because of its consequential environmental impacts.

In this regard, waste prevention must not be allowed to displace adverse environmental impacts into other channels – for example, if using appliances for longer would consume significantly more energy than a new device. In all cases, the product lifecycle should be considered in its entirety. Waste prevention measures can help to protect the environment and resources, but that is not necessarily the case. For example, if evasion, substitution or rebound effects cause damage elsewhere which exceeds the environmental relief achieved, they do not fulfil their purpose. One example would be if products are replaced by less ecologically advantageous products, such as miniaturised versions of products which contain more pollutants than their more voluminous counterparts.

The main aim of waste prevention is to decouple economic growth from the impacts on human health and the environment caused by waste production. Such environmental impacts associated with waste production and management include the environmental impacts of waste disposal itself (“downstream”), but also those of upstream chains, i.e. the environmental impacts associated with the manufacturing of products that ultimately become waste. Given the highly developed waste management industry in Germany, the qualitative significance of the latter is far greater. As such, the extent of waste prevention lies not only in the hands of consumers, but is also usually determined to a large extent by the upstream stages (e.g. product designers, producers, retailers) that influence the design of such products. As such, waste prevention extends far beyond waste legislation and waste policy in its narrowest sense.

In addition to the ecological impacts, when assessing waste prevention measures it is also necessary to consider the technical feasibility, financial viability, economic opportunities and risks and social consequences of the measure in question.

As such, waste prevention is not a **categorical obligation** to a set target, but must instead be weighed up against other environmental objectives, and assessed from a technical, economic, social and legal perspective. However, it is important to note that the ecological analysis tools required for a comparative, quantitative assessment of environmental impacts are often lacking, and further development is needed to improve existing methodology.

3.3 Definition of waste prevention goals

Section 33, para. 3, no. 1 of the KrWG states that the Waste Prevention Programme shall define waste prevention goals. The aim is to decouple economic growth from the impacts on human health and the environment caused by the generation of waste. Waste must be prevented in both a quantitative and qualitative sense, provided this helps to reduce overall adverse impacts on human health and the environment.

In this connection, the Act does not specify whether quantified, i.e. numerically formulated and verifiable goals (e.g. “10 percent less waste from households in 5 years” or unquantified goals (e.g. “a trend towards reduced household waste” or “extensive prevention of waste containing mercury”, for example) are required.

The Waste Prevention Programme defines unquantified goals.

Quantified goals would support an associated review of the programme’s success. One possibility would be to set target figures for reduced waste intensities, e.g. as a ratio of waste volumes to economic output (e.g. as price-adjusted GDP, population size, workforce size or similar).

Merely reducing waste volumes is not in itself a sufficient environmental policy target, because the specific quantitative prevention of waste must always be viewed within the context of reducing environmental impacts. There is currently no meaningful set of indicators available incorporating these aspects.

The extent to which waste reduction is actually attributable to waste prevention efforts must also be considered. A decrease in waste production may be linked to numerous structural or economic factors. For example, fluctuations in the economy have a significant impact on construction waste volumes. Similar considerations also apply to other statistical time series in the waste management sector.

By defining unquantified waste prevention goals, we can retain a high degree of flexibility with our choice of waste prevention tools. The aim must always be to develop and implement those waste prevention measures which promise the greatest success, based on an ex ante view of the reduction of environmental impacts.

Alongside waste prevention, it is also important to consider other, more general political objectives, such as the perception of wealth, competitiveness, economic growth, job security, and the best possible way of achieving “social justice”, as well as other environmental policy objectives and environmental protection as a whole. Synergies may exist between some of these, but conflicts can also arise between waste prevention goals and other targets, and compromises will therefore need to be found.

The Waste Prevention Programme pursues the following waste prevention objectives:

Principal and secondary objectives of the Waste Prevention Programme

The principal objective of waste prevention is to decouple economic growth from the impacts on human health and the environment caused by the generation of waste.

This principal objective is supported by a range of operational objectives, but these are only relevant if they actually contribute to attainment of the principal objective in a given case. The operational objectives apply before a substance, material or product has become waste, and are aimed at:

- “Reducing the quantity of waste”
- “Reducing the adverse impacts of waste”
- “Reducing the content of harmful substances in materials and products”, or in extreme cases, substituting products that are harmful to the environment and human health.

Various secondary objectives may be derived in order to achieve the aforementioned operational objectives, including:

- Minimising waste volumes in relation to economic output, size of the workforce and total population
- Improving the level of information and sensitising the general public and stakeholders in industry, commerce, trade and the waste management sector to the need to reduce waste quantities and pollutant levels in materials, products and waste and emissions to air, water and soil in conjunction with the generation and management of waste
- In-plant closed substance cycles
- Encouraging consumption patterns that favour low-waste, low-emission products
- Clean product design
- Increasing the lifespan of products
- Encouraging the reuse of products
- Increasing the usage intensity of products

The aforementioned objectives are **non-specific** with regard to material flows and stakeholders. The most appropriate measure varies depending on the material flow in question. Against the background of these objectives, suitable waste prevention measures must be devised for the various material flows and stakeholders.

The objectives stated here must be viewed in the overall context of sustainable development and the targets set out in the German Government’s sustainability strategy. Due consideration must also be given to social and economic aspects when implementing these measures.

As such, the objectives of the Waste Prevention Programme may be summarised as follows:

Principal objective

To protect the environment and human health by decoupling economic growth from the adverse impacts on human health and the environment caused by the production of waste.

Operational objectives

Provided they contribute in a specific case to the principal objective and act before a substance, material or product has become waste:

- To reduce the quantity of waste
- To reduce the adverse impacts of wastes
- To reduce the content of harmful substances in products and wastes

Secondary objectives (examples)

- To minimise waste quantities in relation to economic output, size of the workforce and overall population
- To improve the level of information and sensitise the general public and stakeholders in industry, commerce, trade and the waste management sector about the need to reduce waste quantities and pollutant levels in materials, products, waste and emissions to air, water and soil in conjunction with the generation and management of waste
- In-plant closed substance cycles
- To encourage consumption patterns that favour low-waste, low-emission products
- Clean product design
- To extend the lifespan of products
- To encourage the reuse of products
- To increase the usage intensity of products

3.4 Indicators for gauging the success of waste prevention measures

Section 33, para. 3, no. 4 of the KrWG states that the Waste Prevention Programme should define expedient, specific, qualitative or quantitative standards for established waste prevention activities by means of which the progress made in the activities shall be monitored and evaluated. Indicators or other suitable, specific, qualitative or quantitative goals may be used as a standard.

Measuring the waste prevention success of selected measures

The KrWG states that indicators and standards must allow the success of waste prevention to be ascribed to given activities, thereby rendering comparisons between the effectiveness of different activities over time, and contributing to the drafting and updating of the Waste Prevention Programme.

The identification and description of indicators to gauge the success of broad-based, i.e. nationwide, state-wide or regional waste prevention measures is a highly complex process.

Waste quantities are often used as indicators for measuring the success of waste prevention activities, particularly in conjunction with the development of individual waste streams (such as household waste, construction waste, packaging waste etc.). However, one of the problems of this indicator is that simply tracking the quantitative development of waste streams over time in isolation does not allow any conclusions to be drawn regarding the success of individual or all waste prevention activities. Although they supply vital data, such indicators cannot adequately gauge the success of waste prevention measures.

It is impossible to verify whether a quantitative decrease in individual waste streams is attributable to the effect of waste prevention measures, or is primarily due to developments outside of the waste prevention programme, such as structural economic developments.

As such, the data obtained from mass flow statistics may give some indication of the success of waste prevention but cannot provide a causal link with the activities implemented and thus verify their success. As such, they are not adequate indicators for monitoring the success of certain activities as required by Section 33, para. 3, no. 4 of the KrWG. However, the more accurate and sector-specific mass flow data is, the more useful it becomes for analysis purposes. The survey by the Federal Statistical Office on “Waste Generation” and the surveys by the Statistical Offices of the Länder are extremely valuable in this connection.¹⁷

¹⁷ Cf. <https://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/Umwelt/UmweltstatistischeErhebungen/UmweltstatistischeErhebungen.html> .

Indicators of individual measures that directly influence waste generation

Indicators can provide useful insights into the effectiveness of activities – provided they are formulated in an **activity-specific way**, and the activity in question has a direct, measurable impact on the generation of waste. Below are some examples:

- Reuse – discarded electrical equipment: Proportion of discarded equipment that is reused in relation to the quantity of discarded equipment in each device category, as well as year-on-year changes and changes in relation to a specific base year (to be defined)
- Reuse – packaging: Development of the reusable proportion of different types of packaging, with due regard for total packaging quantities
- Substance bans: Number of products to which substance bans were applied; how substance bans were implemented; and the substitution of hazardous substances with less hazardous substances
- Licenses: Number of facility licenses stipulating quantitative or qualitative targets for the prevention and reduction of waste with associated success monitoring
- Environmental management systems: Number of companies that have introduced environmental management systems setting out quantitative and/or qualitative targets on the prevention and reduction of waste plus achievement monitoring

These examples show that indicators of specific measures with a direct impact on waste generation can supply meaningful information with regard to:

- The frequency with which a promising measure is applied, and
- The success of waste prevention measures.

This presupposes statistical record-keeping of the operations and/or mass flows associated with the individual measures. By extrapolating the applied measures to the relevant mass flows, it is possible to calculate the mass of waste prevented in that particular sector over time. The more specific the measure is, the more accurately a waste prevention measure's success can be measured, and the easier it becomes to draw conclusions regarding the effectiveness of a measure from changes in waste quantities.

Indicators of individual measures that do not directly influence waste generation

Activity-related indicators may also be defined and applied to measures which do not directly influence the origination of waste streams but which have relevance to waste prevention overall (such as sensitisation, training measures, research funding), for example:

- Number of training measures in a region
- Number of people living in areas where “polluter-pays waste disposal fees” are applied.

In order to calculate these indicators, measures must be equipped with a special monitoring function. The indicators provide information regarding the frequency and penetration level of a given measure that is considered expedient for waste prevention. However, the indicators do not tell us anything about the direct success of waste prevention.

Other specific indicators

Waste intensity

Waste intensity is defined as the volume of waste in individual sectors (such as industry, construction, agriculture and forestry and services) in relation to real net output and number of employees in the respective sectors, plus year-on-year changes and changes in relation to a given base year (to be defined).

The waste intensity in different sectors is more suitable for drawing conclusions with regard to the various production-oriented waste prevention measures in no. 2 of Annex 4 to the KrWG as general waste statistics focusing on commercial/industrial waste. Relating this information to economic data is considered expedient in this context, because unlike overall gross domestic product, the effects of on-going structural change are masked out.

Development of raw material productivity

In its National Sustainability Strategy, the German Government has set itself the target of doubling raw material productivity by 2020 compared with 1994 levels. For this purpose, raw material productivity is defined as the ratio between gross domestic product (GDP) and direct material input. The doubling target refers to real variables (excluding inflation effects). In committing to this quantitative target, the German Government has taken on a pioneering role in resource efficiency efforts across Europe and worldwide. The German Government has reiterated its commitment to this target on several occasions, most recently on 29 February 2012 in its resolution regarding the German Resource Efficiency Programme.

In order to ensure an accurate reflection of import and export developments, the German Government resolved to include the indicator “raw material productivity in raw material equivalents”, covering raw materials flows throughout the entire manufacturing chain, in its reporting¹⁸.

By relating this to GDP, the indicator “raw material productivity” allows us to gauge the decoupling of economic growth from demand for raw materials, and can also be used as an approximation value for environmental impacts.

Conclusion

Indicators which are formulated in measure-specific terms and which verify a measure’s frequency of use (level of penetration) and (in the case of measures with a direct waste-preventing effect) its effectiveness in individual cases can now be linked. The waste intensity indicator in industry may provide an insight into the effect of waste prevention measures in certain sectors of industry.

Success indicators such as the quantitative development of waste streams may be valid indicators of the effects of waste prevention measures, but are not in themselves sufficient for verification purposes. Using indicators and standards to provide empirical verification of the success of waste prevention measures is an area where further research and testing is needed.

¹⁸ ProgRes, page 30

4 Specific waste prevention measures

The core task of the Waste Prevention Programme is to outline and evaluate the waste prevention measures cited in Annex 4 to the KrWG and other suitable measures with regard to their expediency (cf. Section 33, para. 3, no. 2 of the KrWG).

A detailed description and evaluation of the identified waste prevention measures may be found in the Annex to this Waste Prevention Programme. A summarised version of the evaluation results is given in the table at the end of the Annex.

The identification and assessment of measures is the product of intensive groundwork by the study “Substantive implementation of Article 29 of Directive 2008/98/EC”, as well as a dialogue and participation process between the Federal Environment Ministry and the government departments, Länder and participating groups.

The measures outlined and evaluated represent the wide diversity of tools suitable for encouraging waste prevention in the following areas:

- **Information and sensitisation** of the various stakeholders and population groups with regard to the need for and opportunities of waste prevention
- **Research and development** into cleaner product design and less wasteful production methods
- **Legislation and enforcement with a view to promoting waste prevention**, such as legally binding provisions on production techniques, product designs or product properties and the use of economic instruments.

Depending on the outcome of the assessment, the measures are either recommended, rejected, or earmarked for further appraisal. The following aspects are incorporated into the assessment:

- **Waste prevention potential** associated with the measure
- **Overall environmental impacts** of the measure
- **Economic and social impacts** of the measure
- **Administrative pressures** associated with the measure, where applicable
- Where applicable, **legal constraints** with relevance to the measure.

Based on the outcome of the detailed assessments of measures (see Annex), the following summarising recommendations for promoting waste prevention are given and offer a perspective until this Waste Prevention Programme is updated. Depending on the outcome of the assessment, measures are classed into recommended measures and measures requiring further appraisal.

4.1 Recommended measures

Having examined the respective costs and benefits for the relevant stakeholder, the German Government recommends implementing the following measures to promote waste prevention:

General (horizontal) measures

- **Research and development:** The German Government will continue to support waste prevention projects within the pre-existing support programmes and measures. In particular, research will focus on the development and/or optimisation of waste-preventing technologies and usage concepts, including extending the average life span of technical products. One important aspect would be to develop indicators and methods to serve as a basis for awarding eco-labels to waste-saving materials and products. Another area is the identification of success monitoring indicators and the improvement of lifecycle assessment tools to assess the environmental relief effects of selected waste prevention measures.
- **Information and sensitisation:** More practical, easy-to-use **information** on waste prevention should be made available and tailored to the various segments (producers, consumers, companies). Waste prevention campaigns and schemes are crucial for raising awareness among the various target groups. The European Week for Waste Reduction is the principal event at European level, offering an institutional framework for the presentation of various waste prevention-related campaigns and projects in the Member States. This also helps to attract examples of best practices in waste prevention. In 2011 and 2012, many institutions in Germany contributed their own submissions to the European Week for Waste Reduction.

Product design

At European level, the German Government is involved in academic projects to develop criteria for measuring resource use in product design (eco-design). Based on these research results, it will then identify products for which waste-preventing criteria could be included in the implementing ordinances to the EU Ecodesign Directive (2009/125/EC).

Reuse of products

Encouraging the reuse of products is a pivotal aspect of waste prevention. At all levels, the public sector should elucidate the fact, through advertising and educational measures, that using second-hand goods is synonymous with the sustainable management of resources, waste prevention, and minimal adverse environmental impacts. At the same time, the development of quality standards or seals for second-hand goods such as furniture, electrical appliances etc. is to be encouraged, and where such standards already exist, their use should be supported.

At a local level, the creation of structures for the reuse or multiple use of products (second-hand goods), whether by public institutions or private individuals, is very important to waste prevention and reuse. The same applies to networks dedicated to the repair or reconditioning of used products such as furniture, bicycles and electrical appliances, in order to facilitate reuse.

We should continue to examine waste-preventing forms of usage and services, such as “rent rather than buy”, and where necessary publicise and promote them with suitable framework conditions.

For the practical enforcement of waste prevention in product development, regular consideration and ecological assessment of the material streams associated with manufacture, use and disposal throughout a product’s lifecycle are needed in many areas. This will facilitate the further refinement of existing product policy tools, particularly the Ecodesign Directive and eco-labels like the Blue Angel.

Waste prevention in industrial plant operation

In many cases, waste prevention practices in **industrial plant operation** still offer scope for improvement, although many successful efforts have already been made in this connection. To this end, it is necessary to identify the various waste prevention opportunities and potential in different types of plant based on the best available technology, and to elucidate this potential to both the plant operators and the licensing authorities. Over the next few years, it would be expedient to update the relevant enforcement guidelines and codes of practice for licensing authorities (such as sample administrative provisions for the LAI (*Länder* Committee for Air Pollution Control) for selected types of plant, and include specific waste prevention requirements where technically feasible and financially viable.

Further training is also needed within the licensing authorities so that greater consideration can be given to waste prevention aspects in licensing procedures. Dedicated training courses could maximise the waste prevention potential associated with industrial plant operation.

Waste prevention measures in companies

When considering measures aimed at waste prevention in companies, promoting environmental management systems (EMS) that include waste prevention issues is particularly important. Eco-management systems are tried-and-trusted instruments for raising companies' awareness of the waste masses they produce. When implementing environmental management systems such as EMAS or ISO 14001, companies are generally required to ascertain and document their waste volumes. The EMAS¹⁹ environmental management system additionally obligates certified companies to use specific codes for waste and hazardous waste in relation to total annual volumes. Furthermore, EMAS states that targets and measures should specify a mandatory continuous improvement in environmental performance. This includes the waste sector, since it represents a major environmental aspect.

Waste prevention incentives should also be made available to small and medium-sized enterprises (SMEs) that implement simpler, "informal" environmental management systems. Even low-threshold advisory and eco-management system approaches developed specifically for SMEs (such as "Ökoprofit" or "Qualitätsverbund umweltbewusster Betriebe", QuB, for small trade and commerce businesses) should include suitable guidelines and instructions on waste prevention, for example, by incorporating waste prevention aspects into training documents and individual modules. Waste prevention aspects could also be taught within the context of the "EMAS easy" method, which leads to a fully accredited environmental management system under EMAS using a simplified audit and documentation approach.

The competent local authorities should also continue to support the various regional and local training and advisory programmes for companies aimed at improving or optimising resource conservation and waste prevention, and broaden and promote their usage and visibility wherever possible and appropriate.

Regarding the prevention of **food waste**, concerted campaigns and agreements between public institutions and industry/commerce to reduce food waste throughout every stage of the production and supply chain should be encouraged. The aim should be to reduce food waste throughout the entire value chain, i.e. not just consumer behaviour, and minimise wastage.

¹⁹ According to Regulation No. 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC.

Waste prevention measures among consumers

In the segment of consumer waste prevention, we support the more widespread and intensive use of product service systems, whereby selected consumer goods are shared with other individuals, or else temporarily rented (examples include car sharing, or the shared use of lawnmowers, road sweepers etc. by several people). This allows the product's capacity to be more effectively used whilst preventing waste, although the degree of waste prevention will depend on the individual case. These product service systems should be supported by suitable legal and political framework conditions and advertised by the public sector as a specific form of waste prevention. For example, as part of a local government concept to reduce traffic in urban areas, car sharing schemes could be supported by granting organisational assistance, providing suitable parking spaces, or making public land available.

Public education campaigns will be launched or continued as a key element of sensitising consumers to waste prevention aspects. Campaigns focusing on cleaner purchasing habits (quantities, size of packaging, best-before/use-by dates, reuse) will play an important role here. The programme by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV), "Zu gut für die Tonne"²⁰ ("Too Good for the Bin"), is a good example of this in relation to food waste.

Waste prevention in the public procurement sector

Public procurement law already offers a wide range of options for the ecologically sustainable procurement of products and services by the public sector. This generally includes a consideration of waste prevention aspects. In order to make the awarding authorities' work easier, however, it would be expedient to make suitable tools available in the near future (such as specific tendering specifications) and to advertise these accordingly, with due regard for the budgetary principles of economy and efficiency.

The Centre of Excellence for Sustainable Procurement at the BMI Procurement Agency, within the framework of its resources and drawing on the technical expertise of the government departments, will start to develop practical guidance documents for public-sector awarding authorities to give greater consideration to resource efficiency aspects²¹. This should also include a consideration of waste prevention.

²⁰ Cf. <https://www.zugutfuertietonne.de/>

²¹ Resolution by the State Secretary Committee for Sustainable Development of 8 October 2012.

Waste prevention through polluter-pays concepts

In the area of **waste disposal structures**, polluter-pays concepts generally create incentives to avoid waste. Particularly for industrial and commercial producers of large volumes of waste, disposal costs often represent a major cost item, which can be reduced through appropriate rationalisation and the more efficient use of materials. Furthermore, disposal fees help to sensitise consumers to the quantities of waste they produce, and encourages better separation of waste as well as cleaner purchasing habits. Waste prevention effects will not be achieved or additionally reinforced unless the introduction of a polluter-pays scheme is accompanied by specific waste advice. Disposal prices are set by the private disposal companies, while waste fee systems are determined by the public disposal agencies. When enforcing such schemes, care should be taken to ensure that the pricing does not drive waste producers to resort to illegal fly-tipping.

Eco-label

Awarding “Blue Angel” eco-labels or other well-regarded Type I labels to selected product groups in recognition of waste-minimising manufacturing techniques can be enormously helpful to consumers in the selection of cleaner products. For this reason, we would recommend including other relevant product groups in the Blue Angel portfolio as an effective measure to help prevent waste. However, further lifecycle analyses of products will be needed in this connection.

4.2 Measures where further appraisal is needed

When assessing the various waste prevention activities, a number of measures were considered generally expedient but not recommended for general, direct implementation, either because further research is needed, or because the activity's specific effects must be assessed on the basis of specific material flows.

These potential measures will be further investigated by the German Government in collaboration with the Länder and leading local government organisations. These measures include:

Equal treatment of certain installations not subject to licensing and other installations subject to licensing with regard to waste prevention obligations


A case-by-case analysis is required of those installations whose waste prevention potential is so relevant that they could be placed on an equal footing with other installations subject to licensing. In particular, it is necessary to quantify the administrative input for operators such as authorities, and to weigh this up against the environmental benefits.

Extending producer responsibility with the aim of encouraging waste prevention

Producer responsibility is a pivotal instrument for increasing material efficiency through waste management. In order to ensure that product manufacturers and waste producers meet producer responsibility requirements in practice, waste stream-specific incentives must be created, and where necessary, other suitable steering and control mechanisms adopted. To this end, in particular, the German Government will further exploit its existing regulatory powers in connection with product design and the development, manufacture and marketing of products.

At present, the producer responsibility regulations primarily promote the separate collection and recycling of packaging, end-of-life vehicles, used batteries and waste electrical and electronic equipment. The elimination of hazardous substances from such products also has a waste-preventing effect. In terms of quantitative effects, the existing product regulations tend to act indirectly, primarily via the internalisation of disposal costs among manufacturers and distributors with producer responsibility.

It is necessary to investigate whether producer responsibility could focus more strongly on waste prevention, by requiring products to be designed in a way that minimises the incidence of waste during their manufacture and use.



Section 24 of the KrWG contains a number of approaches in this regard, by empowering the Federal Government, inter alia, to specify that “certain products shall be put into circulation only in a specific form that clearly facilitates waste management, especially in a form that permits re-use or facilitates recovery”.

However, the national nature of the statutory ordinances pursuant to Section 24 of the KrWG restricts their implementability and positive prevention effects to a certain extent. The basic freedoms guaranteed by the EU (such as the free traffic of goods) must be observed, and these limit the scope and, in some cases, effectiveness of national product regulations. For this reason, national approaches are viewed somewhat critically. Product design guidelines affecting the product’s circulation should be implemented on an EU-wide basis, given the internal market. The Ecodesign Directive (2009/125/EC) may provide a useful starting-point in this connection. Aspects of resource conservation and waste prevention are already anchored in the Ecodesign Directive (2009/125/EC). It is therefore necessary to investigate at European level the extent to which waste-preventing requirements can be more widely implemented in product-specific enforcement measures in future.

5 Outlook: Ancillary activities by the German Government to implement the Waste Prevention Programme

In order to underscore the future-oriented nature of the Waste Prevention Programme, the German Government will develop a range of ancillary activities to implement the Programme and prepare for its ongoing improvement.

Most of these activities are independent from the measures described in the previous chapter and demonstrate that this Waste Prevention Programme marks the start of a technical and political process designed to support waste prevention. These activities have been devised to support the dialogue and process that will follow on from the programme. Specifically, they include the following:

- Financial support and execution of the European Week for Waste Reduction (EWWR) in Germany

The EWWR has been held twice in Germany so far, under the umbrella of the central European organisation EWWR. It comprises numerous local activities and projects to encourage waste prevention. BMU has tasked NABU e.V. with organising this week. It is becoming increasingly popular and will be continued.

- Assessment of the status of implementation of waste prevention measures and conferences on strengthening waste prevention

Public participation in the Waste Prevention Programme requires further communication and discussion between the various stakeholders. For this reason, the German Government aspires to more in-depth dialogue between the different players and stakeholders regarding the improvement, review and implementation of specific (product and materials flow-related) measures. A joint catalogue of actions and a communications strategy will need to be drafted.

To mark the EWWR, the Federal Environment Agency will be assessing the implementation status of selected waste prevention measures in Germany proposed within the context of this Waste Prevention Programme, and hosting a debate about reinforcing waste prevention for stakeholders with the involvement of the German Government and the *Länder*. Delegates will discuss progress in reviewing those measures and indicators which have not yet been conclusively assessed in this Waste Prevention Programme, together with the results of the dialogue process.

The implementation and application of waste-preventing concepts and technologies will be reviewed and assessed in relation to specific material flows and circumstances.

■ Waste prevention website

A presentation of the Waste Prevention Programme and underlying studies, further information on waste prevention in Germany and abroad, as well as a discussion of waste prevention measures, could be published on a dedicated website or included in the BMU's own website.

■ Reinforcement of public education and consultation activities for preventing food waste

The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) already carries out extensive public education and consultation activities on avoiding food waste (such as the "Zu gut für die Tonne" ("Too good for the bin") programme). The BMELV's existing and planned public education and consultation activities on preventing food waste will be comprehensively communicated and advertised.

■ Discussion with the EU Commission on extending the ecodesign requirements to include waste-preventing aspects

The German Government is participating in the discussion processes initiated by the EU Commission to explore ways of extending the ecodesign requirements to include material efficiency aspects, which could also include waste-preventing components. The Commission is already preparing to incorporate corresponding quality features as well as energy efficiency within the context of the EU Ecodesign Directive (2009/125/EC).

■ Strategies and work aids for incorporating waste prevention aspects into public-sector contracts

The Centre of Excellence for Sustainable Procurement at the BMI Procurement Agency, within the framework of its resources and drawing on the technical expertise of the Federal government department, is developing practical tools to enable awarding authorities in the public sector to give greater consideration to resource efficiency aspects. This should also include a consideration of waste prevention.

6 Appendix: Measures and their assessment

6.1 Procedure for the assessment of measures

Section 33, para. 3, no. 2 of the KrWG specifies that the Waste Prevention Programme shall describe the existing waste prevention measures and evaluate the expedience of the waste prevention activities stated in Annex 4 or other suitable ones.

Annex 4 to the KrWG describes and assesses waste prevention measures according to structure and type. No differentiation is made between “existing” measures and “new measures to be created”, since existing measures could also include those which are only used in one community in Germany and are not widespread. As such, the distinction between “existing” and “not existing” is a relative one. Nevertheless, the tabular overview of measures (at the end of this Annex) includes an indication of their status.

An overview of existing measures at national, *Länder* and local government level, together with full details, can be found in “Development of scientific and technical foundations for a national waste prevention programme” (UBA-Texte 59/2010)²².

The measures outlined and assessed below are based on the in-depth study “Substantive implementation of Article 29 of Directive 2008/98” and a dialogue process between the BMU and stakeholders.

From a purely methodological perspective, the measures cannot reflect all possible measures for all material flows in their entirety. Instead, we have focused on key waste prevention activities from the categories outlined in Annex 4 to the KrWG. Measures were selected based on the study “Substantive implementation of Article 29 of Directive 2008/98”, which grouped the measures into clusters to be applied and evaluated as general instruments for a wide range of waste streams.

Measures that apply general steering mechanisms to globally traded resources in order to prevent waste are not addressed here, given the many unresolved issues and conditions (need for international regulations/EU competency, lack of effect analysis tools, problems relating to the specific formulation of mechanisms)²³.

²² Cf. <http://www.umweltdaten.de/publikationen/fpdf-l/4043.pdf>.

²³ Cf. comments by the German Advisory Council on the Environment (SRU) in its environmental report 2012 „Responsibility in a Finite World”, p. 86, cf. http://www.umweltrat.de/SharedDocs/Downloads/EN/01_Environmental_Reports/2012_05_Environmental_Report_summary.pdf?__blob=publicationFile.

The measures are described and evaluated in the following chapter, but are not generally applied to specific material flows, but rather, discussed in more general terms as basic instruments.

The measures are described and evaluated using the following template:

Concept: A description of the measure (where applicable, with an indication of whether it is mandatory or optional) with an explanation of its objectives and, where applicable, political background.

Initiator: Description of the political level or specific institutions which may initiate the measures.²⁴

Addressees: The group of individuals or institutions at whom a waste prevention measure is aimed.

Assessment: Based on the information currently available, an assessment of the measure's waste prevention potential together with its associated overall environmental impacts, including both downstream and upstream environmental impacts, i.e. the environmental impacts of the prevented waste disposal and the prevented emissions, resource consumption etc. associated with the (fictitious) manufacturing of the product or material that is not produced or does not become waste as a result of the waste prevention measure.

As far as possible, the assessment also incorporates the social and economic impacts of the measures and an assessment of their legal enforceability.

Summary: In conclusion, the measure is either recommended or rejected. Where a measure is considered fundamentally suitable but adequate information for a comprehensive analysis is lacking, further appraisal is recommended.

²⁴ Please note that where local authorities or regional and local authorities are referred to, in view of the different organisational structures of regional and public authorities in individual Länder, the competency regulations in that particular Land shall apply.

6.2 Assessment of measures that could impact the framework conditions related to the generation of waste (no. 1 of Annex 4 to the KrWG).

Measures are listed in the order used in Annex IV to Article 29 of the WFD and Annex 4 of the KrWG, and are largely consistent with the measures identified and assessed in the preliminary study to the WPP.

Use of planning measures or other financial mechanisms to promote the efficiency of resource use
(no. 1 a of Annex 4 to the KrWG; no. 1 of Annex IV to the WFD)

Measure 1:

Development of waste prevention strategies and approaches by local authorities

Concept: District and local governments, as the political level closest to citizens and companies, are very influential in the practical design of waste prevention measures and in sensitising residents to waste prevention issues. They can therefore develop waste prevention strategies and concepts with the involvement of the relevant stakeholders (citizens, environmental organisations, industry associations etc.). Waste prevention strategies should aim to educate residents and local companies in cleaner conduct and encourage them to minimise waste. However, measures may also focus on waste-preventing conduct by the local authorities themselves. Strategies and concepts formulate overarching waste prevention targets, and form the basis for a wide range of individual measures, such as tips on cleaner purchasing or referrals to repair workshops, second hand shops and product service systems such as car sharing. Target group-specific measures, such as offers for nursery schools and schools or joint campaigns with a prominent local industry, may be devised. The waste prevention concepts and strategies may also be integrated into local authority waste management concepts pursuant to Section 21 of the KrWG.

Initiators: Local authorities (district and local governments)

Addressees: Local residents, local government offices, companies

Assessment: By formulating overarching objectives and appropriate rafts of measures, a framework is created, from which specific waste prevention measures will follow. The creation of suitable concepts is extremely important, against a backdrop of raising awareness among local government decision-makers. The measure also helps to put waste prevention on the political agenda. The exact waste prevention potential and environmental impacts are very measure-specific and therefore impossible to quantify; however, the measure aids the political preparation and legitimisation of specific waste prevention measures.

Summary: The measure is recommended.

Measure 2:

Cooperation with stakeholders

Concept: The measure focuses on identifying waste prevention potential throughout value chains. Waste prevention is influenced by many different stakeholders: consumers, who have particular product requirements; suppliers, with the range they offer; the manufacturing industry, with its particular cost considerations and requirements, and so on. Experience has shown that potential often cannot be fully exploited by waste prevention projects because the different stakeholders in the value chain are not sufficiently well-informed about the needs of the next link in the chain.

In order to be able to fully exploit waste prevention potential, therefore, the different stakeholders in a product's value chain should be encouraged to cooperate with one another. The public sector can encourage the exchange of information on waste prevention in selected value chains (supply chains) through research and networking activities. Exchanges between independent engineering firms with specialist expertise and industrial companies should be encouraged, with a view to analysing and optimising production processes in the existing machinery fleet from a waste perspective.

Initiator: Federal Government, *Länder*

Addressees: Representatives of value chains in selected sectors

Assessment: This measure can help to mobilise major waste prevention potential by eliminating information deficits within a supply chain (depending on the sector) and minimising adverse impacts on the environment. Such forms of cooperation between the different stakeholders in a supply chain make sense for waste prevention purposes. Specific cost/benefit analyses should be carried out to identify those areas where the public sector can support cooperation between the stakeholders in a given value chain (for example, because the anticipated waste prevention potential is high), and how such support can be achieved most effectively.

Summary: The measure is recommended.

Measure 3:

Consideration of waste prevention aspects when reviewing the environmental impacts of existing subsidies

Concept: Subsidies refer to “concessions granted by the public sector to businesses without any counter-consideration of a market nature”. Alongside direct financial assistance and price cut subsidies, budget-relevant expenditure mechanisms also include guarantees, sureties etc., as well as liability limits and competitive restrictions. On the revenue side, tax concessions are the principal form of budget-relevant subsidy. With this definition, the insufficient internalisation of external costs is not classed as a subsidy.

The measure centres around reviews of the complex correlations between the ecological, social and economic dimensions of subsidy and support policy with regard to waste generation and prevention. Ideally, this would be followed by political decisions to eliminate subsidies that encourage the generation of waste.

Analysis is based on the study “Environmentally Harmful Subsidies in Germany”.²⁵ Priority should be given to subsidies affecting those material flows which are considered particularly relevant from a waste prevention perspective.

Initiators: Federal Government, *Länder*

Addressees: Producers, consumers, retailers

Assessment: The measure could make an important contribution toward a more sustainable economy and society overall. Although the waste prevention potential of the measure is difficult to gauge, the impacts on other objectives and policies could be far more significant.

Summary: The German Government is committed to phasing out environmentally harmful subsidies. This measure should not be pursued purely for the purposes of waste prevention, but instead should be viewed as part of a comprehensive (ecological) reform of government finance and investment policy. This requires an unbiased analysis of significant subsidies from a waste prevention viewpoint.

²⁵ Cf. Federal Environmental Agency, 2007, Environmentally Harmful Subsidies in Germany, <http://www.umweltdaten.de/publikationen/fpdf-l/3896.pdf> .

Promotion of relevant research and development (no. 1 b of Annex 4 to the KrWG; no. 2 of Annex IV to the WFD)

Measure 4:

Research into waste-preventing technologies and utilisation concepts as an integral part of pre-existing support programmes and measures

Concept: Research projects into waste-preventing technologies and utilisation concepts are aimed at advancing the best available technology and the regulatory environmental framework, and promoting measures that voluntarily offer high demonstration and multiplier effects. This allows us to selectively support best practice examples of waste prevention.

Existing support programmes and measures already fund demonstration projects for preventing waste (including resource conservation) and reducing environmental impacts. Within these existing support programmes and measures, the identification of standards and indicators for gauging the success of waste prevention measures is also considered as an integral component.

Initiators: Federal Government, *Länder*

Addressees: For technological development: research institutions, industry and SMEs; for utilisation concepts: research institutions and stakeholders

Assessment: In the 1980s and 1990s, the Federal Ministry of Education and Research (BMBF), in particular, carried out a wide range of research and support projects with a waste-preventing theme. Some of the technology projects cite success rates of 50 per cent or more with waste prevention. Extensive success with regard to the prevention of particularly hazardous wastes has also been documented. Waste prevention is currently included as an integral component of the BMBF's Framework Programme Research for Sustainable Development (FONA) with the funding priorities r2, r3, KMUi (2008–2016) and its R&D programme "Raw materials of strategic economic importance for high-tech made in Germany" (2013–2020).

It is impossible to quantify the effects achieved from promoting waste-preventing utilisation concepts. Government research funding may be selectively deployed for researching low-waste or waste-preventing technologies, as well as suitable product and usage forms, and tailoring the legal framework conditions to the required ecological action. Support programmes in the area of technological development that include demonstration projects for waste prevention have already achieved significant potential, and for the most part have achieved their aspired reduction in environmental pressures. In many cases, their findings are transferable within the relevant industry, and sometimes beyond. Alongside basic research, the success of waste prevention is largely dependent on whether the research findings are broadly implemented in practice (see measure below).

The required socio-scientific debate on the topic of sustainable consumption is already ensured by the BMBF's existing support programmes and measures within the framework of socio-ecological research. Around € 11 million in government support was awarded in total to the funding priority of sustainable consumption (2007-2012, and further measures on the topic of "sustainable production" are in the pipeline. A waste prevention research priority in addition to current and planned activities could be considered in a follow-up programme FONA III (from 2015) once the evaluation results from the framework programme FONA are available, and provided appropriate funds are made available from the budget.

Summary: The measure is recommended (see chapter 4.1).

Measure 5:

Support programmes and measures to implement waste-preventing concepts and technologies

Concept: The first-time large-scale application of new, innovative, environmentally friendly technologies (BMU Environmental Innovation Programme) and the broad-based application of such technologies and implementation of best practice waste prevention measures (e.g. KfW Environment Programme) receive dedicated government funding. Unlike measure 4, this is not concerned with the **development** of new, low-waste technologies and product designs, but the more **widespread use** (diffusion) and practical application of existing research results. The share of support projects financed via the KfW (Reconstruction Loan Corporation) focusing on waste prevention could be broadened, and promoting the transfer of demonstration projects to reduce environmental impacts through waste prevention (including resource conservation) is particularly recommended. This measure follows on from existing measures and programmes.

Initiators: Federal Government, Länder, KfW group of banks

Addressees: For the application of technologies: industry and SMEs; for utilisation concepts: retailers and stakeholders

Assessment: We welcome the implementation of best practice waste prevention measures and the transfer of demonstration projects from the viewpoint of waste prevention and the implementation of research results. The broad-based application of new waste-preventing technology is particularly significant for its effectiveness.

Focusing on support programmes for the implementation of waste-preventing technologies as a core element of integrated environmental protection is particularly appropriate for the small and medium-sized business structure in Germany. It would also lend vital impetus to the new innovation topic "resource conservation". The measure is therefore recommended, both from an ecological perspective and also from an economic perspective.

Summary: The measure is recommended (see chapter 4.1).

Development of effective, meaningful indicators for the environmental pressures associated with the generation of waste (no. 1 c of Annex 4 to the KrWG; no. 3 of Annex IV to the WFD).

Measure 6:

Development and application of systems of indicators with the aim of benchmarking

Concept: Benchmarking refers to the comparative analysis of results or processes with a fixed reference value or comparison process. The idea is that comparison with the benchmark will incentivise improved performance among competitors and raise standards in general.

One example is to identify best practice examples at local government level by comparing the per capita volume of household waste. This data is already collected by the public waste disposal agencies. Evaluations at *Länder* level is followed by district-specific evaluation and publication, by combining the data from the *Länder* and showcasing the success stories of regional and local authorities with exceptionally low waste volumes.

Sectoral benchmarking is aimed at identifying best practices in production. Waste volumes in individual industrial sectors are recorded and related to the size of the company (turnover, workforce) or the volume of product.

The use of benchmarking presupposes a willingness among companies in a given sector to participate in such a scheme. Where applicable, the data could be collated by the Statistical Offices.

The current indicator systems are very volume-centric and do not allow direct conclusions to be drawn with regard to environmental impacts and environmental relief. Suitable indicators have yet to be developed.

Initiator: Depending on the sector, Federal Government, *Länder* in collaboration with selected industries

Addressees: Industry, public waste disposal agencies, statistical offices of the *Länder*, Federal Statistical Office

Assessment: Specific waste prevention potential cannot be derived from this measure. Its environmental effects are indirect, serving as a role model and creating a reference value for the monitoring and assessment of waste volumes. The volume reduction must always relieve overall environmental pressures; direct environmental impacts cannot be quantified. However, the role model effect is also largely dependent on the number of industries and companies that participate in uniform nationwide benchmarking. Implementation relies on voluntary agreements e.g. between government offices and industry players; as such, there needs to be a dialogue between affected groups, together with an **investigation** into feasibility.

Summary: The measure is **generally recommended** (see chapter 4.1).

6.3 Measures that can affect the design, production and distribution phase (no. 2 of Annex 4 to the KrWG)

The promotion of ecodesign
(no. 2 a of Annex 4 to the KrWG; no. 4 of Annex IV to the WFD)

Measure 7:

Identification of product-specific requirements for clean product design within the context of measures to implement the EU Ecodesign Directive (2009/125/EC)

Concept: Aspects of resource conservation and waste prevention are already anchored in the Ecodesign Directive (2009/125/EC).

Preliminary scientific research is currently underway at European level into the product-specific design of material efficiency aspects in implementing the Ecodesign Directive. Criteria such as the option of repairing products, the interchangeability of components, the opportunity for reusing products and life span all play an important role here. The measurability and enforceability of these criteria is also being investigated. The German Government is accompanying this research work.

Based on the research results, investigations will be conducted at European level to identify those products for which waste-preventing criteria can be included in the implementing ordinances to the EU Ecodesign Directive (2009/125/EC). Measurability and monitorability, as well as their relevance to environmental and consumer protection, are important pre-requisites for such criteria. The German Government will play a constructive role in this process.

Initiators: EU Commission, coordination in Germany: Federal Government

Addressees: Circulators of products

Assessment: Case studies, e.g. on electrical appliances and their components, indicate that a life span-extending design can help to significantly reduce waste volumes and cause fewer greenhouse gas emissions, for example. It is currently impossible to estimate the number of product groups that could (also) expediently be covered by the enforcement measures of the Ecodesign Directive (2009/125/EC) in relation to waste prevention. The anticipated effects in terms of waste reduction volumes and the associated environmental impacts are dependent upon the respective regulations and product groups.

Summary: The measure is recommended (see chapters 4.1 and 5).

Measure 8:

Provision of information and awareness-raising with regard to clean product design

Concept: Showcasing the opportunities as well as the economic and ecological benefits of clean product design may incentivise market players to develop innovative products in their own interests. In particular, describing a concrete, systematic approach for analysing existing framework conditions and potential improvement measures will make this easier to implement, since it entails coordinating a large number of decision-makers within industrial companies and trade or supply chains. Government agencies initiate and promote the preparation of basic information or specific technical presentations on the potential and concrete implementation of clean product design. If the product solutions developed are subsequently implemented commercially, corresponding waste-preventing effects will be achieved; however, these cannot be quantified, due to the indirect nature of the measure.

One tool could be to raise awareness of clean product innovations through well-publicised activities (such as competitions). Identifying competitive advantages acts as an incentive for market players to focus on clean product design at their own responsibility. Government agencies (where applicable, in collaboration with industry organisations) initiate and support competitions, inviting the submission of ideas and practical examples of low-waste, low-pollutant and resource-conserving product design.

Initiators: Government agencies in collaboration with industry and environmental organisations.

Addressees: Product designers, product developers, product manufacturers and supply chains

Assessment: The measure lends impetus through accompanying, supporting activities; its primary objective is not waste prevention per se, but sensitisation and consultation. It may inspire innovations and new markets, and encourage cooperation. If these measures are implemented, they may significantly relieve environmental pressures.

Essentially, the success and effectiveness of such measures is dependent upon the quality of the contributions, their visibility and media presence. Given its broad nature, it is impossible to assess the waste prevention potential for the measure as a whole. Conceivable indicators for the intended effect (degree of innovation incentive, number of emulations etc.) would be very difficult to implement.

Summary: Qualified measures for sensitisation to and visibility of clean product design are **recommended**. Tangible waste prevention success should also be rewarded under the Waste Prevention Programme (cf. chapters 4.1 and 5).

Measure 9:

Measures aimed at producer responsibility for waste management

Concept: Product manufacturers and waste producers should be encouraged to meet the practical producer responsibility requirements through waste stream-specific incentives and, where required, other suitable steering and control mechanisms. To this end, in particular, the German Government could exploit its existing regulatory powers in relation to product design and the development, manufacture and marketing of products.

Producer responsibility obligates producers to design products in a way that minimises waste during production and use, for example through multiple reuse or technical longevity (Section 23 of the KrWG). Other obligations pertaining to producer responsibility focus on the financing and organisation of the return, re-use and recovery (recyclability) of product waste. Assigning the costs associated with the return, re-use, recovery and disposal of residual wastes to product manufacturers and distributors creates a financial incentive to reduce waste volumes. Regulations on producer responsibility in Germany currently apply to end-of-life vehicles, waste oil, batteries, electrical and electronic equipment, and packaging.

Additionally, Section 24 of the KrWG now empowers the German Government to mandate that “certain products shall be put into circulation only in a specific form that clearly facilitates waste management, especially in a form that permits re-use or that facilitates recovery”. The Federal Government could adopt statutory ordinances stipulating minimum requirements with generally binding validity for defined product groups (such as maximum admissible levels of problematic substances).

Initiator: Federal Government

Addressees: Manufacturers and distributors of certain products

Assessment: The current producer responsibility provisions are aimed initially at closing the cycles; they also directly address waste prevention with regard to minimising toxic materials as well as reusability. Indirect waste prevention incentives are created by the internalisation of disposal costs. Regulations on producer responsibility are currently confined to the aforementioned material flows. Including other products or product groups in producer responsibility regulations is linked to various general and specific framework conditions; for example, regulation is only expedient where products have a certain degree of homogeneity, the manufacturers constitute a clearly defined group, a satisfactory recycling system has not yet been established, and the associated costs are reasonable. Overall, when it comes to waste prevention regulations within the context of producer responsibility, regulatory content must be technically feasible and financially viable.

The aforementioned producer responsibility regulations have led to a significant and verifiable increase in recycling. Waste prevention efforts vary among the individual regulatory sectors, and are also very difficult to quantify and prove empirically. The internalisation of external disposal costs, as attempted by the Packaging Ordinance and the so-called license fee under the dual systems, initially led to a reduction in packaging volume in absolute terms, and succeeded in decoupling this from economic growth.

Bans and restrictions on hazardous substances in products, such as the heavy metal restrictions in electrical and electronic equipment legislation based on European guidelines, battery legislation or the packaging ordinance, achieve significant qualitative waste prevention effects.

Regarding the ordinances referred to in Section 24 of the KrWG, the waste prevention potential of producer responsibility concretised by such ordinances depends on its range (number of products covered) and depth (level of formulated minimum requirements compared with the ACTUAL status). The potential may be considerable in some cases.

However, the national nature of the statutory ordinances referred to Section 24 of the KrWG means that their implementability and positive prevention effects are limited. The basic freedoms afforded by the EU (such as the free movement of goods) must be observed, and limit the scope and, in some cases, effectiveness of national product regulations. For this reason, national approaches tend to be viewed somewhat critically.

Resource conservation and waste prevention aspects are already anchored in the Ecodesign Directive (2009/125/EC). The extent to which waste-preventing requirements can be more widely implemented in product-specific enforcement measures in future should be investigated.

Summary: Initially, producer responsibility measures can only be recommended from a waste prevention perspective insofar as they create an awareness among producers for the waste streams they produce and reduce waste disposal volumes by encouraging recovery. Producer responsibility regulations demonstrably have a waste-preventing effect provided they are more than just an appeal, and, for example, prohibit the use of certain substances or materials. However, such prohibitions must be examined in depth from a financial and legal viewpoint. National regulations based on Section 24 of the KrWG with the **sole** purpose of waste prevention (unlike guidelines under EC law) are **not generally recommended**.

Measure 10:

Standardisation in support of waste-preventing and resource-conserving product design

Concept: The waste prevention programme can be strengthened by anchoring waste-preventing aspects in product standards; when drafting or updating standards, greater consideration should be given to waste prevention aspects (in particular, extending life span, upgrading, reuse and continued use).

Initiators: Federal Government; authorities represented in the CEN or DIN standardisation committees

Addressees: Producers, retailers

Assessment: The origins, supporting bodies, content and scope of application of standards give them the character of recommendations, whose observation and application is voluntary; product standards are not in themselves legally binding. However, product standards may become de facto binding through statutory and administrative provisions or by means of agreements committing to their observance.

Government authorities and other stakeholders committed to the principles of waste prevention are represented in numerous standardisation committees, insofar as this is relevant to the subject matter of the standard in question.

Summary: Incorporating waste-preventing criteria more widely into waste-preventing standardisation processes is **recommended**.

Providing information to facilitate the use of best available technologies in industry (no. 2 b of Annex 4 to the KrWG; no. 5 of Annex IV to the WFD)

Measure 11:

Adapting the enforcement aids and guidance tools for installations subject to licensing in line with the best available technology on waste prevention

Concept: Volumes of process-specific waste are to be significantly reduced; this can be achieved either by reducing waste volume or by reducing the content of harmful substances. Requirements in this connection should be included in the relevant enforcement aids and guidance tools (such as the sample LAI administrative provisions on the prevention and recovery of waste pursuant to Section 5, para. 1, no. 3 of the Federal Immission Control Act (BImSchG)). These enforcement aids and guidance tools (such as the sample administrative provision for phosphating plants) will be adapted to the best available technology (as described, for example, in Code of Practice DWA-M 358) with regard to the descriptions and assessments of waste prevention measures.

This entails assessing the potential of waste prevention measures as well as their feasibility and viability. Another approach would be to incorporate corresponding guidelines into the process of drafting the BAT sheets (BAT = best available technology) under Directive 2010/75/EU (IED) at EU level, so that they become standards with binding European-wide validity via BAT conclusions.

Initiators: Federal Government

Addressees: Licensing authorities; operators of facilities requiring a license

Assessment: By adapting the operation of production plants in line with the best available technology – to varying degrees depending on the industrial sector – quantitative and/or qualitative material savings can be achieved, which in turn reduces waste volumes. However, given the wide range of input products treated, it is impossible to gauge the total potential of input materials and overall environmental relief that could be achieved. The majority of prevention measures under consideration do not entail any counter-productive effects (i.e. those causing additional environmental burdens). In some cases, energy use might be increased. However, current estimates suggest that the prevention effects more than compensate for the additional input.

The work involved in implementing the actual measure (adaptation of the legislative provisions and guidance documents) will vary depending on the installation type.

The number of installations in a sector implementing the best available technology should successively increase and compensate for any initial competitive disadvantages. The a priori focus of this measure should be on installations where a significant waste prevention potential has been identified.

Summary: Implementation of the measure is **recommended** where there are very close links with immission control-related measures (waste air and wastewater) (see chapter 4.1).

Measure 12:

Advice to companies by public institutions on waste prevention potential

Concept: Advising companies and facilities on resource efficiency matters can take various forms, particularly in the areas of energy and material efficiency. Parallel and complementary to energy efficiency advice, advice on resource and material efficiency and waste prevention should also be intensified and incorporated as standard. At the heart of this measure is optimised efficiency advice to make companies more competitive, particularly with regard to waste prevention. In order to maximise cost-cutting potential at company level through waste prevention and the more efficient production of low-waste products, a more integrated approach to efficiency consulting for SMEs should be developed, following on from existing programmes such as the German Agency for Material Efficiency (demea), the VDI Centre for Resource Efficiency, and the Chambers of Industry and Commerce and trade boards. Efficiency advice should only recommend those waste prevention measures that relieve environmental pressures overall.

It is necessary, where applicable in collaboration between the Federal Government and *Länder*, to investigate ways of enhancing the efficiency of advice given to companies on production-integrated environmental and resource efficiency in general, and waste prevention in particular. Specifically, this can be achieved by interlinking the various different advice services to exploit synergies and facilitate the exchange of experiences.

Initiators: Federal Government, *Länder*, local authorities

Addressees: Industrial sectors and SMEs in the manufacturing industry, especially companies that use large quantities of primary resources.

Assessment: Many plants and procedures still have the potential to save materials and hence prevent waste. Studies suggest that a 20 percent improvement in material efficiency is achievable by 2015 (cf. German Agency for Material Efficiency, 2011). These savings would reduce adverse environmental impacts.

Advice and adaptation to the best available technology would also be financially beneficial, assuming that corresponding resource savings are achieved from this technology, leading to savings in both resource procurement and waste disposal in the production process.

Summary: The measure is recommended (see chapter 4.1).

Training of competent authorities as regards the consideration of waste prevention requirements when issuing licenses

No. 2 c of Annex 4 to the KrWG; no. 6 of Annex IV to the WFD

Measure 13:

Training licensing authorities to give better consideration to waste prevention aspects

Concept: The relevance of different production and industrial sectors varies in terms of waste volume and waste properties, and the different sectors offer varying opportunities and potential for waste prevention.

Often, licensing authority staff would benefit from further training with regard to the waste-preventing aspects of facility licensing.

The *Länder* could offer or mandate training events for licensing authority personnel aimed at the discussion and mediation of waste prevention aspects in the licensing procedure. This should include a discussion of best practice examples should be discussed, and experiences of handling waste prevention aspects in the licensing procedure. It is also important to ensure that successful waste prevention does not merely displace adverse environmental impacts into other channels (e.g. air, water etc.). Appropriate negative examples should also be discussed.

Initiators: *Länder*, highest authorities

Addressees: Licensing authorities of the *Länder*

Assessment: Reinforcing the competency and awareness of the licensing personnel vis-à-vis the opportunities for waste prevention in selected industrial sectors makes it more likely that these aspects will be considered to maximise the waste prevention potential in the licensing procedure. Provided the waste prevention guidelines are not followed to the detriment of other environmental aspects in the licensing procedure, they will help to relieve environmental pressures.

The licensing conditions must be financially viable and technically feasible.

Summary: The measure is recommended (see chapter 4.1).

Inclusion of measures to prevent waste production at installations not requiring a license in accordance with Section 4 of the Federal Immission Control Act (BImSchG) (No. 2 d of Annex 4 to the KrWG; no. 7 of Annex IV to the WFD)

Measure 14:

Insisting on the uniform implementation of waste prevention obligations at installations requiring a license as well as those not requiring a license

Concept: Section 22, para. 1, sentence 2 of the BImSchG authorises the Federal Government to place the operators of installations not subject to licensing on an equal footing with those subject to licensing vis-à-vis the obligations outlined in Section 5, para. 1, no. 3 of the BImSchG (waste prevention). Section 5, para. 1, no. 3 states that installations shall be constructed and operated in such a way that wastes are avoided and, where unavoidable, wastes are recovered; as a last resort, non-recoverable waste shall be disposed of. Until now, the legislators have not made any use of this authority. Based on the new obligations for waste prevention under the KrWG, however, it is worth investigating whether such a transfer of obligations from Section 5, para. 1, no. 3 might be appropriate in individual sectors, bearing in mind that certain types of installation not subject to licensing produce considerable volumes of both hazardous and non-hazardous waste (certain printing presses, for example).

If the obligations from Section 5, para. 1, no. 3 were to be transferred, guidance tools and enforcement aids for the waste prevention options in a given sector would also need to be made available.

Initiators: Federal Government

Addressees: Licensing authorities of the *Länder*, installation operators

Assessment: Waste prevention potential varies according to the type of installation, and would need to be assessed in each individual case when deciding whether or not to transfer the obligations pursuant to Section 5, para. 1, no. 3. Similarly, the environmental impacts of waste prevention must be assessed for each type of installation. From a financial perspective, the operators of installations not subject to licensing would be confronted with additional administrative and technical work. The administrative work of the licensing and monitoring authorities (*Länder*) would also increase. As such, the installations to which Section 5, para. 1, no. 3 is to be applied must be carefully selected according to the achievable waste prevention success, given the additional administration work and investment this entails for the installation operators. Any such analysis should carefully gauge the waste prevention potential and the associated environmental impacts, and weigh this up against the additional work for the installation operators.

Summary: Careful **investigation** is needed to determine precisely whether and to which types of installation Section 5, para. 1, no. 3 could be applied. In this regard, the additional administrative work and investment for installation operators and *Länder* must be weighed up against the potential environmental benefits of the measure (see chapter 4.2).

**Sensitisation measures and financial / decision-making support to businesses
(No. 2 e of Annex 4 to the KrWG; no. 8 of Annex IV to the WFD)**

Measure 15:

Establishment, continuation and interlinking of existing programmes to sensitise companies and advise them on waste prevention

Concept: Many companies do not have the capacity and funds to identify waste prevention potential in their company or production processes themselves. One solution is for public institutions such as the chambers of industry and commerce, or consultants appointed by them, to advise companies on the identification of waste prevention potential and highlight opportunities for financing investments in new technologies.

Programmes currently exist at various levels to help companies to improve their material efficiency. At Federal level, for example, demea (German Agency for Material Efficiency) and the VDI-ZRE (VDI Centre for Resource Efficiency) were set up for this purpose. Similar projects also exist at *Länder* level, such as the PIUS Check by the NRW Efficiency Agency, or Effnet in Rhineland-Palatinate. The BMU's Environmental Innovation Programme (EIP) and the KfW Environment Programme offer investment funding for waste-preventing technologies (see measure 5).

Initiators: The main initiators of the consulting programmes are the Länder Environment Ministries and Ministries of Economics.

Addressees: Companies

Assessment: Waste prevention measures in the commercial sector address the full spectrum of commercial waste. Specifically, the measures are aimed at the prevention of hazardous wastes by substituting hazardous substances in the production process. The effects of the measures already implemented are not always well-documented, but there is no doubt that a significant level of waste prevention has occurred. The environmental impacts of waste prevention must be reviewed in each individual case, a task for the consulting services. A wide range of sensitisation and consulting measures are already in place. These measures should be continued, and where they do not yet exist at a regional level, introduced.

Summary: The measure is **recommended**.

Voluntary agreements

(No. 2 f of Annex 4 to the KrWG; no. 9 of Annex IV to the WFD)

Measure 16:

Waste-preventing cooperation among industrial companies

Concept: Cross-company cooperation and alliances can help to prevent production waste by sharing by-products from production processes which one producer does not need with another producer who is able to process and/or market them. The *Länder* and local government associations can assist with suitable cooperation arrangements. In various *Länder* and regions, efforts have been underway for some time to interlink and utilise the material flows from different industrial companies more effectively in a given region, even on a cross-industry basis. Reference examples include the regional networking of material and energy flows in the Henstedt-Ulzburg industrial area of Schleswig-Holstein.

Initiators: *Länder* in collaboration with regional industrial companies as the operating force.

Addressees: Industrial companies, SMEs

Assessment: The direct use of “by-product” material flows from one producer as input materials by other producers means that waste generation can be prevented, and environmental pressures relieved by substituting primary input materials, provided the transport routes are designed in such a way that transport emissions do not cancel out the positive environmental effects.

The measure helps to add value, and is also recommended from an economic and social viewpoint.

Summary: The measure is **recommended**.

Measure 17:

Voluntary agreement with retail and gastronomy on training measures aimed at a more targeted supply of foodstuffs to shops and restaurants.

Concept: This measure is designed to achieve a voluntary agreement between the Federal Government or *Länder* and industry associations in retail and gastronomy, whereby industry associations or chambers of industry and commerce undertake to organise training courses for their members aimed at optimising smart procurement strategies. Inter alia, the aim of such optimisation should be to significantly reduce the volume of food waste in gastronomy and food retailing.

Initiators: Federal Government, *Länder* in collaboration with public institutions and/or industry associations for retail and gastronomy.

Addressees: Retail

Assessment: Recent studies e.g. on behalf of the BMELV (Stuttgart University 2012) estimate that the retail sector produces around 550,000 tonnes of food waste per annum. There is therefore significant potential for waste prevention by adopting a variety of measures, including the demand-based supply of foodstuffs. Preventing food waste in this way would significantly relieve the environmental pressures associated with agricultural food production. Financially speaking, it is difficult to supply shops precisely according to demand, since customers expect a sufficiently large range to choose from at all times of the day. General guidelines in this regard often fail because every sector and every location is different. For this reason, specific training measures for retail and gastronomy aimed at optimising smart supply and purchasing strategies while focusing on waste prevention would appear to be a promising way of reducing food waste in gastronomy and in retail.

Summary: The measure is **recommended**.

Measure 18:

Agreements between industry/commerce and government agencies on waste prevention

Concept: Voluntary agreements between the various Federal/*Länder* Ministries and industry associations or retail chains could be used to set waste prevention targets.

The agreements could focus on selected waste streams, such as certain types of production waste, packaging waste and food waste, and could apply to production, distribution/logistics and retail.

These agreements could encourage industry and commerce to reduce their waste, and to measure and monitor the waste streams they produce.

Initiators: Federal Government, *Länder* in collaboration with industry associations, logistics companies, trade chains etc.

Addressees: Various types of companies

Assessment: The waste prevention potential that can be tapped using voluntary measures varies according to sector. This tool should primarily be used when the waste prevention potential and achievable environmental impacts are large.

The environmental impacts of the agreement must be weighed up in each individual case. Agreements are particularly effective, and their success or failure transparent, when evaluation mechanisms are also in place. Generally, the advantage of voluntary agreements is that there is a desire to implement the agreement on both sides.

Since monitoring compliance with and measuring the success of voluntary agreements between government agencies and industry/commerce entails a certain degree of administrative work, the use of “voluntary agreements” as a potential measure should be carefully assessed.

Summary: Signing voluntary agreements on waste prevention may be effective and successful in individual cases. It is necessary to investigate which cases this applies to.

**Promotion of creditable environmental management systems
(No. 2 g of Annex 4 to the KrWG; no. 10 of Annex IV to the WFD)**

Measure 19:

Extending existing environmental management systems to include waste prevention aspects

Concept: Extending existing management systems to include waste prevention aspects so as to prevent and reduce production and commercial waste is supported, making the introduction of such systems in companies eligible for public funding. Environmental management systems help companies to recognise origination correlations for waste, calculate the cost of waste disposal, and identify the technical possibilities for waste prevention. Environmental management systems ensure regular recording of waste masses, thereby enabling success monitoring of waste prevention measures. Annex IV of the EU Environmental Audit Regulation, updated in 2009, stipulates that the total annual waste volume plus the volume of hazardous waste must be declared in an environmental statement, citing the waste type and quantity; additionally, environmental performance, of which waste volume is one aspect, must also be continuously improved. There are also various simplified environmental management system approaches available which were designed specifically for SMEs, including the EMAS easy method or Ecoprofit, which are to be extended to include waste prevention aspects.

The cost of introducing environmental management systems may be partly counter-financed by granting certain concessions to the companies concerned. The *Länder* and local authorities could support the introduction of environmental management systems e.g. by making them easier to implement.

Initiators: *Länder*, local authorities in collaboration with private consulting firms.

Addressees: Companies

Assessment: Preventing production and commercial waste is expedient in many sectors, both from a financial and an environmental perspective. Many plants, companies and institutions still have untapped waste prevention potential. This potential can be maximised with targeted environmental management systems. Environmental management systems, with their integrated view of the environment, are designed to ensure that positive environmental effects are achieved through specific waste prevention, and the ongoing success of the measures is guaranteed through continuous monitoring. This measure is also recommended from a social and financial viewpoint.

Summary: The measure is **recommended** (see chapter 4.1).

6.4 Measures that can affect the consumption and use phase (no. 3 of Annex 4 to the KrWG)

Economic instruments

(no. 3a of Annex 4 to the KrWG; no. 11 of Annex IV to the WFD)

Measure 20:

Taxes on waste-intensive products

Concept: Products that are considered “waste-intensive” could be made less attractive by imposing consumption taxes or special duties on these products. Various statutory provisions must be observed in this connection:

Article 106, para. 1, no. 2 of the Basic Law (GG) authorises the German Government to levy consumption taxes on products. Consumption taxes must be proportionate and must not have a prohibitive effect, i.e. must not have the sole purpose of modifying behaviour (such as reducing the consumption of sales packaging) and must not render consumption impossible due to high rates of taxation. Consumption taxes must also comply with European law, particularly the principle of the free movement of goods.

Special duties are only permissible under narrowly defined legal conditions and must meet various requirements, including (1) the charge must apply to a homogeneous group; (2) there must be a specific material correlation between the person liable to pay the duty and the purpose of the duty; (3) communal use of the revenues from the duty; (4) limited duration (review and adjustment obligation); (5) budgetary documentation.

Initiator: Federal Government

Addressees: Marketers of products (including importers) and consumers

Assessment: The waste-preventing effects of a product tax or duty are largely dependent on the specific formulation of the tax/duty and the product to be taxed, and are impossible to predict on an abstract basis. Often, however, the tax/duty rates would need to be set very high in order to achieve a corresponding steering effect and thus achieve waste prevention success. For legal reasons, however, the respective tax/duty must not be designed as a “strangulation tax/duty” which would make consumption of the goods prohibitively expensive. Overall, it is often difficult to predict whether taxes are sufficiently effective to achieve relevant waste prevention success.

For example, in the past, a tax/duty on disposal drinks packaging was discussed, with critics doubting that the proposed level of the duty would have an adequate steering effect; at the same time, there were considerable legal reservations about imposing a duty of this level.

In order to justify the tax/duty, furthermore, it would be necessary to prove that the positive environmental impacts of waste prevention are not negated by displacement effects and/or cross-subsidising, something which is generally very difficult to prove.

The administrative work involved in the setting, levying and collection of the tax/duty should be taken into account when assessing this measure and must be justified by the effect of the tax/duty.

Summary: The levying of taxes/duties on products as a waste prevention is **not generally recommended**.

Measure 21:

The promotion of waste-preventing product service systems

Concept: Durable consumer goods are often only used by one household, which means that optimum use is not being made of the product's full capacity. Product services that supply such consumer goods to consumers as and when needed and on a temporary basis (for example, to rent) can maximise the use of consumer goods ("renting rather than buying"). Product service systems can be used in various areas, such as mobility, household appliances, sports or IT.

They may be offered by companies or residential communities, and can be promoted by the public sector in various ways, either by promoting the concept (e.g. through advertising, inclusion in waste prevention concepts etc.) or, for example, by granting loans or providing public spaces (such as parking spaces for cars used for car sharing).

Initiators: *Länder*, local authorities

Addressees: Companies, associations, clubs, consumers

Assessment: Product service systems are an important approach for the economical consumption of goods and resources and may therefore offer considerable waste prevention potential. The aforementioned product services help to maximise the use of consumer goods. By using products more intensively, fewer products are needed and waste is therefore reduced; this leads to a considerable reduction in environmental pressures. In conclusion, although service systems increase the number of users, a reduction in waste volumes and relief of environmental pressures can generally be assumed.

The growing popularity of product service systems is part of a structural transformation of the economy. Production losses are offset by positive employment prospects in the services sector. Additionally, the product service systems also create new market segments. In the car sharing sector, for example, vehicle manufacturers are responding to trends and securing customer loyalty early on, particularly among young people. As such, in addition to its waste-preventing effect, it seems likely that this measure could also act as an important signal for the ecological modernisation of society. The macro-economic impacts of this dynamic transformation process cannot yet be conclusively assessed.

Summary: The measure is **generally recommended** (see chapter 4.1).

Measure 22:

Support of waste disposal structures and systems that encourage waste prevention

Concept: Waste management and fee systems are designed to be as closely linked to the originator as possible and create incentives for waste prevention. For example, waste measurement systems may calculate waste fees on the basis of weight or volume, especially if a waste container can be clearly allocated to a particular household. In other systems, households can choose their preferred frequency of waste collection (for example, once a week or once a fortnight), and waste charges are calculated accordingly. Identification systems allow waste disposal usage to be ascribed to individual households, even in large apartment blocks. The fees comprise a fixed basic charge plus a variable pay-as-you-throw charge for residual waste and biowaste. The introduction of such waste measurement and fee systems is also accompanied by intensive consumer advice on the opportunities for waste prevention.

Initiators: Local authorities, public waste disposal agencies.

Addressees: Waste producers and owners

Assessment: Generally speaking, the allocation of externalised environmental costs on a polluter-pays basis incentivises eco-friendly conduct. Initially, however, “pay-as-you-throw waste measurement and fee systems” will encourage better sorting of waste streams with the primary aim of reducing the volume of discarded residual waste and increasing the proportion of recoverable materials and recycling. Waste volumes overall will only decrease as a secondary effect, particularly when accompanied by professional advice on waste prevention, and provided the cost and fee level is designed in such a way that a reduced volume of waste produces tangibly lower costs or fees for the waste owner. Generally speaking, this measure raises awareness among waste producers about the volume of waste they create. In enforcing this measure, it is important to ensure that the waste is actually prevented, and not fly-tipped illegally in order to save money.

The measure does not have any adverse social or economic impacts.

Summary: The measure is recommended (see chapter 4.1).

Sensitisation and information measures

(no. 3b of Annex 4 to the KrWG; no. 12 of Annex IV to the WFD)

Measure 23:

Strengthening the aspect of waste prevention in purchase recommendations

Concept: The aim is to enable consumers to make informed consumption decisions with regard to waste prevention. Various sources of information (such as specialist magazines, flyers etc.) are available in this connection. One measure would be for government stakeholders (Federal Government, *Länder*) to support/promote the creation of an Internet platform, for example, assessing numerous different products from a broad range of sectors from various perspectives, especially from the viewpoint of resource conservation and waste prevention (an existing advice platform could also be used). As well as purchase recommendations, tips on the “cleaner handling” of products could also be provided.

Initiator: Consumer organisations as operational players, supported by the Federal Government or *Länder*.

Addressees: Consumers

Assessment: The platform could promote sustainable consumption and encourage waste-preventing consumption decisions.

Summary: The measure is **recommended** (see chapter 4.1).

Measure 24:

Educational measures and public participation in waste prevention

Concept: Awareness of waste prevention can be raised through various environmental education measures. These may be implemented in various different areas and take a number of different formats, for example:

- Training teaching staff at primary and secondary schools in the field of resource conservation and waste prevention, and incorporating teaching modules on resource conservation and waste prevention into the curriculum
- Extra-curricular training courses (e.g. at secondary schools, academies etc.) by staff from environmental and waste agencies

Initiators: Culture Ministries of the *Länder* in collaboration with BMU and the BMBF

Addressees: Teaching staff, pupils, trainees

Assessment: This measure, as a “cross-sectional measure”, is intended to raise public awareness of resource conservation and highlight the opportunities for waste prevention. Although it is impossible to precisely quantify the waste prevention potential and the environmental impacts, the measure helps to bring waste prevention closer to the people and elucidate the potential of waste prevention.

Summary: The measure is **recommended**.

Measure 25:

Practical introduction and implementation of sustainable, resource-conserving waste concepts in schools

Concept: Holistic waste concepts may be implemented in schools. As well as introducing or optimising separate collection systems, the school’s own waste prevention potential should be identified, and specific waste prevention measures drafted and implemented. The waste concepts should be drawn up with the pupils’ involvement.

Initiators: The Education Ministries of the *Länder* prescribe the requirements, but individual schools formulate their own concepts.

Addressees: Local authorities, teaching staff at primary and secondary schools, pupils

Assessment: Implementing this measure could produce significant savings, for example with waste paper (a typical waste fraction for schools), by converting the various communication processes, where educationally appropriate, to paperless options (such as e-mail). Significant savings could also be achieved with waste electronic equipment, by purchasing computers, printers, televisions, projectors etc. with a long life span. No adverse social or economic effects are anticipated from this measure. Involving the pupils helps to raise awareness of resource conservation and waste prevention.

Summary: The measure is **recommended**.

Measure 26:

Encouraging local authorities and environmental and consumer organisations to develop waste prevention campaigns

Concept: The local authorities receive financial and organisational support from the waste authorities of the *Länder* or the public waste disposal agencies to organise waste prevention campaigns themselves, or in collaboration with environmental and consumer organisations, for example in the form of information materials, theatre projects, dedicated events, pilot projects or lifestyle campaigns.

Initiators: Federal Government, *Länder* authorities, local authorities

Addressees: Companies, consumers

Assessment: The waste prevention potential of this measure, which is aimed purely at sensitisation, cannot be quantified. The measure has positive ecological impacts by strengthening awareness of waste prevention, provided measures are communicated that relieve environmental pressures overall and are economically and socially viable. There are no major social or economic barriers to this measure.

Summary: The measure is **recommended**.

The promotion of eco-labels

(no. 3c of Annex 4 to the KrWG; no. 13 of Annex IV to the WFD)

Measure 27:

Using product labels for resource-conserving, “waste-preventing” products

Concept: Labelling particularly environmentally-friendly products for consumer information purposes can make a major contribution towards encouraging eco-friendly consumption. In Germany, the “Blue Angel” is a long-established eco-label. When the Blue Angel is awarded in the “resource conservation” cluster, greater consideration is now given to waste prevention aspects alongside resource conservation aspects. Products that are already eligible for labelling as low-waste (waste-preventing) include reusable bottles and jars, interchangeable brush heads and rechargeable alkaline/manganese batteries.

The Blue Angel is a tried-and-trusted eco-label that justifiably enjoys a high level of trust among consumers, but whose visibility could be further enhanced. Labelling products with the Blue Angel could lead to higher sales of “waste-preventing and resource-conserving products”.

Within the framework of this measure, government offices initiate and promote the independent assessment and labelling of waste-preventing products within the framework of the “Blue Angel” and its use within the context of public procurement. The aim is also to raise awareness of the Blue Angel still further.

As well as “best of class” labelling systems like the Blue Angel and the EU environment symbol, binding labels may also be used for all products in a given class for better consumer information on resource aspects that aid waste prevention. This could include elements such as products from lightweight materials, easier dismantling of components, the prevention of pollutants or products with an extended service life (e.g. thanks to improved supply of spare parts, warranties, easy battery replacement). The German Government should participate in the drafting of methodological principles for contribution at EU level.

Initiator: Federal Government and *Länder*

Addressee: Manufacturers, consumers, EU Commission

Assessment: The Blue Angel is a well-known, trusted eco-label that enjoys a high level of consumer confidence. Labelling products with the Blue Angel may lead to higher sales of “waste-preventing and resource-conserving products”. However, recent studies suggest that suitable indicators or methods on which to base verifiable criteria for the award of an eco-label for “waste-preventing” materials and products are often lacking.

Summary: The measure is **recommended**. Further lifecycle studies should be conducted into new product groups.

Agreements with industry

(no. 3d of Annex 4 to the KrWG; no. 14 of Annex IV to the WFD)

Various agreements can be reached with industry in the waste prevention section. Food waste is one important aspect in this connection:

Measure 28:

Concerted actions to prevent food waste

Concept: Public institutions and industry/trade can sign agreements to reduce waste throughout the production and supply chain. Food waste is one relevant example in this connection. The aim is to reduce food waste throughout the entire value chain, i.e. not just consumer behaviour.

Concerted actions and agreements between the authorities responsible for agriculture and food safety on the one hand, and farmers, the food industry and retailers on the other, can help to identify optimisation potential in the value chain. One aim could be to review guidelines, trade regulations and standards that favour the origination of food waste and amend them where necessary (one potential starting-point could be to examine best-before dates on food and their implications for food waste).

Initiators: Authorities at Federal Government, *Länder* and local authority level on the one hand; representatives of agriculture, the food industry and retailers on the other.

Addressees: Food industry, retailers

Assessment: This measure helps the various players in the value chain to consider the reasons for the origination of food waste and reach agreements to counteract this. Given the extent of the measure and the involvement of different stakeholders, it is impossible to predict the extent to which food waste can be prevented by this measure; however, it is suitable for tapping into significant waste prevention potential, provided the relevant stakeholders are willing.

Summary: The measure is recommended (see chapter 4.1).

Waste prevention and public procurement system (no. 3e of Annex 4 to the KrWG; no. 15 of Annex IV to the WFD)

Measure 29:

Consideration of waste prevention aspects in public procurement

Concept: The public sector could make a significant contribution to waste prevention by focusing its procurement on resource-conserving, waste-preventing products and services, and also by serving as a role model for other sectors. Given the public sector's considerable market power, industry is likely to adapt its production processes and product specifications quite quickly to the relevant requirements.

Section 45, para. 1 of the KrWG already obligates the authorities of the Federal Government to prevent waste. Comparable provisions are found in most *Länder*. Moreover, some *Länder* already have binding provisions on eco-friendly procurement, and a subsidiary set of regulations specifying guidelines on resource conservation and waste prevention, as well as lifecycle calculations for various product groups (such as fluorescent lamps, cooling units etc.).

Documents of this kind provide a uniform and reliable basis for purchasers and suppliers with a view to environmentally friendly procurement. Against this background, further tender specification requirements on waste prevention aspects should be drawn up for relevant products and services. The budgetary principles of economy and efficiency must be taken into account.

The BMVBS guidance and assessment system on sustainable construction introduced comprehensive guidelines on sustainable construction for Federal Government buildings. Under the assessment system, records are kept of all material and energy streams at construction level, and extensive consideration is given to the aspects of resource efficiency and waste prevention. The sustainable construction guide and the information portal ENOB help builders and planners to achieve innovative, resource-conserving construction projects cost-effectively. The development and implementation of waste prevention strategies is particularly important in the construction of new properties and renovation of existing structures. Using best practice examples, the information provided could boost demand for resource-conserving building practices. The guidelines and information are also available to the *Länder* and private developers.

Initiators: Federal Government, *Länder*

Addressees: Awarding authorities at Federal Government, *Länder* and local authority level, and where applicable, public companies, the building authorities of the Federal Government and *Länder*; property developers

Assessment: At present, waste prevention potential can only be assessed for selected material streams. The construction sector is highly relevant, given the large volumes involved and the associated waste prevention potential. Integral planning approaches and a process management system to accompany construction could be more effectively implemented across the board if we aspire to high standards of building certification. In this connection, the role model function of public authorities is particularly significant.

Office materials also have a high waste prevention potential, for example by selecting equipment with an extended service life or using paper-saving mode. Insisting that wearing parts in electrical appliances should be easily replaceable can likewise make a significant contribution towards extending the use of appliances and preventing waste. The extended use of appliances is assumed to have positive environmental impacts, provided these do not counteract the decisive benefits of modern appliances, e.g. with regard to energy consumption. The specific environmental impacts can only be ascertained on a case-by-case basis.

This measure can ensure that those in charge of procurement have generally recognised, technically coordinated implementation strategies and work aids to implement the existing, binding guidelines on waste-preventing procurement.

Summary: Implementation of this measure is **recommended** (see chapter 4.1).

Promotion of the reuse and repair of appropriate discarded products (no. 3f of Annex 4 to the KrWG; no. 16 of Annex IV to the WFD)

Measure 30:

Promotion of the reuse or multiple use of products (second-hand merchandise)

Concept: Local authorities provide technical, organisational or financial support to private and charitable institutions for the sale or exchange of second-hand goods. Alternatively, the public disposal agencies may also set up or support facilities to enable the use of second-hand goods. Where applicable, producers may be involved in corresponding projects.

Players: Local authorities, public waste disposal agencies

Addressees: Organisations, private trade structures for second-hand goods, public waste disposal agencies.

Assessment: The reuse of goods and products is a “traditional” form of waste prevention, which extends the life span of products. Every reusable product is avoidable waste, and replaces new products which would otherwise be used. As such, the waste prevention potential for this measure must be specifically allocated and quantified in each individual case. However, the environmental impacts differ significantly depending on the product. For example, products such as textiles, components or electrical appliances can considerably relieve environmental pressures. However, the ecological impacts depend on the product in question. With electrical appliances in particular, it is necessary to investigate on a case-by-case basis whether new appliances could be preferable to second-hand, given their superior ecodesign or reduced energy consumption.

Summary: The measure is **recommended** (see chapter 4.1).

Measure 31:

Support of repair networks

Concept: Second-hand products and goods often have considerable usage potential remaining. After suitable reconditioning, these goods can be resold and used as tested products. This measure aims to support initiatives and networks dedicated to the guaranteed reconditioning of second-hand goods such as furniture, electrical appliances, clothes or bicycles. The aim is to create networks which can vouch for the quality of reconditioned second-hand goods and thus promote their acceptance within the general population. One example of an existing network is “Ecomoebel”, which reconditions furniture to a high standard and resells it. Inter alia, the furniture is checked for its pollutant content, giving potential purchasers peace of mind that furniture from “Ecomoebel” is low in heavy metals and formaldehyde.

Initiators: *Länder*, local authorities

Addressees: Private and charitable initiatives

Assessment: The measure may be either waste prevention or preparation of waste for reuse. Strictly speaking, the latter is not a waste prevention measure in the eyes of the law. On a purely functional level, however, both variants are clearly aimed at reusing/extending the life span of existing products and are therefore considered equal for the purposes of this Waste Prevention Programme.

The measure may refer to a large number of product groups. Since the reuse of reconditioned second-hand products can be assumed to reduce the production and sale of new goods (although not to an equivalent extent), and the life span of the goods is extended, a clear waste prevention effect is achieved. The ecological impacts are dependent on the chosen target products. Particularly in the case of electrical appliances, it is necessary to consider on a case-by-case basis whether new appliances are actually preferable to second-hand ones, given their superior ecodesign or reduced energy consumption.

The measure is suitable for creating qualified jobs. Similar to “product service systems”, production losses are offset by a new market for high-quality second-hand products.

Summary: The measure is **generally recommended**. Individual product streams should be analysed to determine whether the measure leads to environmental relief (see chapter 4.1).

Measure 32:

Development of quality standards for reuse

Concept: By developing uniform quality standards for reuse, it is possible to raise acceptance for the reuse of products and increase opportunities for stakeholders to create and document high quality standards. Quality criteria and guidelines for second-hand goods define the required minimum standards. Guidelines should be developed on a sector-specific basis; a training profile could also be developed for personnel (one example is the Leonardo da Vinci project “*QualiProSecondHand*”, which analyses the precise sector-specific requirements for employees in the second-hand goods sector and devises concepts for a European training profile).

Initiators: The Federal Government and *Länder* support processes for the setting of minimum product and training standards for personnel.

Addressees: Repair workshops

Assessment: This is an additional measure designed to strengthen consumer confidence in second-hand appliances. No direct waste prevention potential can be ascribed to this measure, nor is it possible to gauge the extent of environmental relief.

Summary: The measure is **recommended**.

Measure 33:

Cleaner events at public institutions (reuse over disposal)

Concept: This measure obligates event organisers in public institutions or in the public sector to use reusable crockery and cutlery as a general principle. This could be achieved, for example, by means of a law at *Länder* level or local authority statute, given that Section 2, para. 3 of the Packaging Ordinance explicitly does not assume conclusive regulation at Federal Government level. Contracts for the leasing of premises (school-rooms etc.) could include waste prevention measures as well as the obligation to use only reusable items as a binding contractual provision. Where applicable, this obligation may need to be included in the respective local authority statutes.

Initiators: *Länder*; local authorities (where applicable, supported by (LAGA) sample statutes)

Addressees: Public and private event organisers

Assessment: The conversion from disposable to reusable items is a clearly allocable waste prevention measure. Each “substituted” disposable beaker or plate is directly prevented waste. The waste that will eventually arise from the reusable crockery must also be taken into account; but given the large volumes of reusable crockery in circulation, the ratio is favourable.

In terms of overall ecological impacts, reusable crockery is generally considered preferable to disposable crockery. For example, studies covering all types of reusable beakers indicate lower environmental pressures compared with their disposable counterparts (cf. Österreichisches Ökologie-Institut/Öko-Institut/Carbo-Tech et al., 2008, Vergleichende Ökobilanz verschiedener Bechersysteme beim Getränkeausschank an Veranstaltungen).

Summary: The measure is **generally recommended**.

Measure 34:

Support of research and development into lifespan-extending measures

Concept: Extending the average life span of products such as household appliances or IT equipment would reduce the quantitative demand for products and, in turn, reduce waste. BMU and UBA have supported and continue to support research and development into new concepts and implementation measures to extend the life span of products and for the waste-preventing repair and reuse of second-hand products.

Initiators: Federal Government and *Länder*

Addressees: Research institutions, companies

Assessment: Implementing the research results should help to extend the life span of appliances and products. This implies a direct contribution to waste prevention, because the appliances and products concerned are replaced less frequently. The impacts on the environment would need to be gauged according to the product or appliance type, including a comparison of the old product's specific energy demand with the new model. Manufacturers should be involved in the research.

Summary: The measure is **recommended**.

6.5 Brief overview of the assessment results

The results of the preceding assessment of measures are summarised in tabular form below.

| Measure | | Description | Exists/ does not exist ²⁶ |
|---------|--------------------------|---|---|
| Number | No. Annex to KrWG/WFD | | |
| 1 | 1a/1 | Development of waste prevention concepts and plans by local authorities | Exists |
| 2 | 1a/1 | Cooperation with stakeholders | Exists |
| 3 | 1a/1 | Reduction of subsidies | – |
| 4 | 1b/2 | Research into waste-preventing technologies and usage concepts | Exists |
| 5 | 1b/2 | Support programmes and measures to implement waste-preventing concepts and technologies | Exists |
| 6 | 1c/3 | Development and application of systems of indicators for benchmarking | – |
| 7 | 2a/4 | Identification of product-specific requirements relating to waste-preventing product design within the context of implementing the EU Ecodesign Directive | – |
| 8 | 2a/4 | Provision of information and awareness-raising about clean product design | Exists |
| 9 | 2a/4 | Regulation of producer responsibility for waste management | Exists |
| 10 | 2a/4 | Standardisation to support waste-preventing, resource-conserving product design | Exists |

²⁶ Existing measures could include those that are only used by one local authority in Germany, for example.

| | Initiator | Adressee | Summary |
|--|--|--|---|
| | Local authorities | Residents of communities, local government offices, companies | Recommended |
| | Federal Government, <i>Länder</i> | Representatives of the value chain in a given sector | Recommended |
| | Federal Government, <i>Länder</i> | Producers, consumers, retailers | Not recommended purely as a waste prevention measure, further appraisal needed |
| | Federal Government, <i>Länder</i> | For technological development: Research institutions, industry and SMEs; for utilisation concepts: Research institutions and interest groups | Recommended |
| | Federal Government, <i>Länder</i> , KfW group of banks | For the application of technologies: industry and SMEs; for utilisation concepts: retailers and stakeholders | Recommended |
| | Bund, <i>Länder</i> | Industry, public waste disposal agencies, statistical offices of the <i>Länder</i> , Federal Statistical Office | Further appraisal needed, recommended in principle |
| | EU Commission, coordination: Federal Government | Circulation of products | Recommended |
| | Various government offices in collaboration with industry and environmental organisations. | Product designers, developers and manufacturers, and retail chains | Recommended |
| | Federal Government | Manufacturers and distributors of certain products | Fundamentally recommended, investigate on a case-by-case basis; not generally recommended for ordinances pursuant to Section 24 of the KrWG |
| | Federal Government; authorities represented in the CEN or DIN standardisation committees | Producers, retailers | Recommended for product standards |

| Measure | | Description | Exists/ does not exist ²⁶ |
|---------|--------------------------|--|---|
| Number | No. Annex to KrWG/WFD | | |
| 11 | 2b/5 | Adaptation of the implementation aids and guidance tools for installations subject to licensing in line with the best available technology on waste prevention | – |
| 12 | 2b/5 | Public institutions advising companies on waste prevention potential | Exists |
| 13 | 2c/6 | Training of competent authorities in waste prevention requirements when issuing licenses | Exists |
| 14 | 2d/7 | Enforcing the uniform implementation of waste prevention obligations in installations subject to and not subject to licensing | – |
| 15 | 2e/8 | Establishment, continuation and linking of existing programmes to sensitise and advise companies on waste prevention | Exists |
| 16 | 2f/9 | Cooperation among industrial companies on waste prevention | Exists |
| 17 | 2f/9 | Voluntary agreement with retail and gastronomy on training measures aimed at the more targeted supply of food-stuffs to shops and restaurants. | – |
| 18 | 2f/9 | Agreements between industry/commerce and government offices on waste prevention | – |
| 19 | 2g/10 | Extending existing environmental management systems to include waste prevention aspects | Exists |
| 20 | 3a/11 | Taxes on waste-intensive products | – |
| 21 | 3a/11 | Promotion of waste-preventing product service systems | Exists |
| 22 | 3a/11 | Promotion of cleaner waste disposal structures and systems | Exists |
| 23 | 3b/12 | Strengthening the waste prevention aspect of purchase recommendations | Exists |

²⁶ An existing measure may also be a measure just existing in one German municipality.

| | Initiator | Adressee | Summary |
|--|---|---|---|
| | Federal Government | Licensing authorities; operators of facilities requiring a licenc | Recommended (provided emission protection measures are also taken into account) |
| | Federal Government, <i>Länder</i> , local authorities | Industrial sectors and SMEs in the manufacturing industry, especially companies that use large quantities of primary resources. | Recommended |
| | <i>Länder</i> | Licensing authorities | Recommended |
| | Federal Government | Licensing authorities of the <i>Länder</i> , installation operators | Further appraisal required |
| | The principal initiators of the programmes are the <i>Länder</i> Environment and Economics Ministries | Businesses and companies | Recommended |
| | Industrial companies in a region as the operating force; <i>Länder</i> may accompany and support processes | Industrial companies, SMEs | Recommended |
| | Federal Government, <i>Länder</i> in collaboration with public institutions and/or industry associations for retail and gastronomy. | Retail, gastronomy | Recommended |
| | Federal Government, <i>Länder</i> in collaboration with industry associations, logistics companies, trade chains etc. | Various types of companies | Investigate on a case-by case basis, fundamentally recommended |
| | <i>Länder</i> , local authorities in collaboration with private consulting firms | Companies | Recommended |
| | Federal Government | Circulators of products (including importers) and consumers | Not recommended |
| | <i>Länder</i> , local authorities | Companies, associations, clubs, consumers | Fundamentally recommended |
| | Local authorities, public waste disposal agencies | Waste producers and owners | Recommended |
| | Federal Government and <i>Länder</i> as sponsors; consumer organisations as operational players | Consumers | Recommended |

Appendix: Measures and their assessment

| Measure | | Description | Exists/ not exists ²⁶ |
|---------|--------------------------|--|-------------------------------------|
| Number | No. Annex to KrWG/WFD | | |
| 24 | 3b/12 | Educational measures and public participation in waste prevention | Exists |
| 25 | 3b/12 | Practical introduction and implementation of sustainable, resource-conserving waste concepts in schools | Exists |
| 26 | 3b/12 | Encouraging local authorities and environmental and consumer organisations to develop waste prevention campaigns | Exists |
| 27 | 3c/13 | Use of product labels for resource-conserving, “cleaner” products | Exists |
| 28 | 3d/14 | Concerted actions to minimise food waste | Exists |
| 29 | 3e/15 | Consideration of waste prevention aspects in public procurement | Exists |
| 30 | 3f/16 | Encouraging the reuse or multiple use of products (second-hand merchandise) | Exists |
| 31 | 3f/16 | Support of repair networks | Exists |
| 32 | 3f/16 | Development of quality standards for reuse | Exists |
| 33 | 3f/16 | Cleaner events at public institutions (reuse over disposal) | Exists |
| 34 | 3f/16 | Support of research and development into lifespan-extending measures | Exists |

²⁶ An existing measure may also be a measure just existing in one German municipality.

| | Initiator | Adressee | Summary |
|--|---|---|-------------|
| | Culture Ministries of the <i>Länder</i> in collaboration with BMU and BMBF | Teaching staff, pupils, trainees | Recommended |
| | Education ministries of the <i>Länder</i> set the requirements, but individual schools formulate their own concepts | Teaching staff at primary and secondary schools, pupils, local authorities | Recommended |
| | Federal Government, <i>Länder</i> , local authorities | Consumers, companies | Recommended |
| | Federal Government, <i>Länder</i> | Manufacturers, consumers, EU Commission | Recommended |
| | Authorities at Federal Government, <i>Länder</i> and local authority level on the one hand; representatives of agriculture, the food industry and retailers on the other. | Food industry, retailers | Recommended |
| | Federal Government, <i>Länder</i> | Awarding authorities at Federal Government, <i>Länder</i> and local authority level, and where applicable, public companies, building authorities of the Federal Government and <i>Länder</i> ; property developers | Recommended |
| | Local authorities, public waste disposal agencies. | Organisations, private trade structures for second-hand goods, public waste disposal agencies | Recommended |
| | <i>Länder</i> , local authorities | Private and charitable initiatives | Recommended |
| | The Federal Government and <i>Länder</i> support the setting of minimum product and training standards for personnel. | Repair workshops | Recommended |
| | <i>Länder</i> , local authorities | Event organisers (public and private) | Recommended |
| | Federal Government, <i>Länder</i> | Research institutions, companies | Recommended |

