NACHHALTIG FÜR NATUR UND MENSCH
SUSTAINABLE FOR NATURE AND MANKIND

Lebensqualität / Quality of life
Wir schaffen und sichern die Voraussetzungen für eine hohe Qualität des Lebens in Österreich.
We create and we safeguard the prerequisites for a high quality of life in Austria.

Lebensgrundlagen / Bases of life
We stand for a preventive preservation and responsible use of the bases of life, soil, water, air, energy, and biodiversity.

Lebensraum / Living environment
Wir setzen uns für eine umweltgerechte Entwicklung und den Schutz der Lebensräume in Stadt und Land ein.
We support an environmentally benign development and the protection of living environments in urban and rural areas.

Lebensmittel / Food
Wir sorgen für die nachhaltige Produktion insbesondere sicherer und hochwertiger Lebensmittel und nachwachsender Rohstoffe.
We provide for the sustainable production in particular of safe and high-quality foodstuffs and of renewable resources.
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The Federal Minister of Agriculture, Forestry, Environment and Water Management is required to draft a Federal Waste Management Plan (FWMP) at least once every six years and to publish it on the Internet, in order to implement the objectives and principles of the Waste Management Act of 2002 (AWG 2002). Following the Plans of 1992, 1995, 1998, 2001 and 2006, the present Federal Waste Management Plan is now the fifth amended version reporting on the measures taken and their efficiency.

The FWMP serves to support achievement of the objectives and principles of the Waste Management Act of 2002. For specific areas, the state-of-the art is described in the spirit of an „objectified opinion“, which should also provide support to the enforcement authorities. This applies in particular to the shipment of waste.

A notification pursuant to the Notification Act, Federal Law Gazette I No 183/1999 and pursuant to Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations of the European Commission was effected under reference number BM-LFUW-UW.2.1.7/0010-VI/2/2011.

1.1. General

The Federal Waste Management Plan and its periodic amendments describe the dynamism and development in the area of waste management. The Federal Waste Management Plan is considered the “White Paper” of Austrian waste management and must include the following (sec. 8 (2) of the Waste Management Act of 2002):

1. An analysis of the waste management situation and an estimation of the future development of waste streams
2. The regional distribution of waste disposal facilities and of significant facilities for the recovery of waste
3. Assessment of the need to decommission facilities
4. Assessment of the need for additional plant infrastructure for the purpose of establishing and maintaining a network of facilities to ensure waste disposal self-sufficiency and to ensure the treatment of waste in one of the closest appropriate facilities
5. Existing waste collection systems and assessment of the need for new collection systems
6. In the case of cross-border projects within the frame of the establishment of the Federal Waste Management Plan, an illustration of the cooperation with concerned Member States and the European Commission
7. Specific targets derived from sec. 1 of the Waste Management Act
   – for the reduction of quantities of waste and pollutant content and detrimental effects on environment and health,
   – for the promotion of preparation for re-use, of recycling and otherwise recovering waste, in particular with a view to resource conservation,
   – for the utilisation of waste in an environmentally sound and economically viable manner,
   – for the disposal of unavoidable or non-recoverable waste,
   – for the shipment of waste to or from Austria for recovery or disposal
8. The federal measures planned to achieve these targets

To the extent required by EU legal standards, the content of the Federal Waste Management Plan should also be regarded as a programme to be implemented.
All planning is based on taking stock of the present situation in the most detailed manner possible, especially by means of a description of the quantities of waste generated and its quality, as well as a list of the existing treatment plants (recovery and disposal).

The targets of the Federal Waste Management Plan shall be based on the objectives of the Waste Management Act of 2002. Accordingly, waste management should be based on the precautionary principle and sustainability and be geared toward:

1. Preventing harmful or adverse effects on humans, animals, and plants, their life support system and their natural environment, and generally reduce any negative effects on human well-being to a minimum.
2. Keeping the emission of air pollutants and climate-relevant gases as low as possible.
3. Conserving resources (raw materials, water, energy, landscapes, land areas, landfill volumes).
4. Ensuring, in the case of recovery, that the materials reclaimed do not present a greater risk than do the comparable primary raw materials or products from primary raw materials and
5. Ensuring that only such waste remains as can be deposited without danger to future generations.

The following hierarchy should be the basis for the achievement of the objectives laid out in the Waste Management Act of 2002 and thus in the Federal Waste Management Plan:

1. waste prevention
2. preparation for re-use
3. recycling
4. other utilization, e.g. energy recovery
5. disposal

In so doing, the following should be considered:

- Application of this hierarchy presupposes consideration of ecological soundness and technical feasibility as well as being vigilant that the resulting additional costs are not disproportionate to other waste treatment processes, and that a market for the recovered substances or energy already exists or can be created.

- Deviation from this hierarchy is justified if an all-embracing view in terms of the overall effects of the production and use of a product and the collection and treatment of the subsequently resulting waste in specific waste streams shows that a different option produces the best result in terms of environmental protection.

- Depending on its particular composition, non-recoverable waste should be treated with biological, thermal, chemical or physical processes. Solid wastes should be deposited in a proper manner that is suited to minimise their reactivity.

- The orientation of waste management should focus on achieving Community objectives, in particular in terms of recycling.

For the first time, a Waste Prevention Programme has been included as a crucial component of the Federal Waste Management Plan. The Waste Prevention Programme must include at least (sec. 9a of the Waste Management Act of 2002):

1. Objectives of the waste prevention measures;
2. A description of existing waste prevention measures;
3. An assessment of the appropriateness of the exemplary measures listed in Annex 1 (Waste Management Act of 2002) or other appropriate measures;
4. Qualitative or quantitative benchmarks to monitor and assess the progress made with the measures;
5. In the case of cross-border projects, an illustration of the cooperation with concerned Member States and the European Commission.

The aim of the Waste Prevention Programme is to decouple economic growth from environmental effects associated with waste production.

Other main elements of the Federal Waste Management Plan are ultimately the federal measures devised to achieve the targets, along with special precautions for particular wastes.

Online publication of the Federal Waste Management Plan (web page of the Ministry of Life and on www.bundesabfallwirtschaftsplan.at) provides an additional form of publication and extended possibilities for use and distribution. The figures and dates provided in this online publication will be updated regularly.

References to studies, directives and legal standards, etc., should not be considered an integral part of the Federal Waste Management Plan 2011.
1.2. Revision of the EU Waste Framework Directive and its implementation in Austria


Five-step versus three-step waste hierarchy
Waste rules and policies shall no longer be organised in a three-step hierarchy (prevention before recovery before disposal) but in a five-step hierarchy (prevention before preparation for recovery before recycling before other use, such as e.g. energy recovery, before disposal). This hierarchy may be departed from if there is an option that is better for the environment justified by the application of lifecycle thinking.

Focus waste prevention
The Waste Framework Directive gave the European Commission a mandate for the elaboration of measures in the framework of waste prevention including e.g. the formulation of a product eco-design policy, action plans to change consumption patterns and the setting of objectives. Member States have an obligation to develop waste prevention programmes.

Quantitative targets for household and similar waste and for construction and demolition waste
By the year 2020, the Member States shall have achieved a quota of
- 50% by weight for preparing for re-use and the recycling of waste materials such as at least paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households and
- 70% percent by weight for preparing for re-use, recycling and other material recovery (including backfilling operations) of non-hazardous construction and demolition waste – excluding naturally occurring materials defined in category 17 05 04 of the European List of Waste.

As of the end of 2014, the measures for the achievement of these targets shall be reviewed by the Commission.

Definitions
The new Waste Framework Directive has introduced several definitions (e.g. “waste prevention”, “recycling”, “preparing for re-use”) and amended definitions such as in particular for “recovery” and “disposal”. It also clarifies the “by-product” concept, also in distinction to the concept of “waste”.

Energy efficiency formula
The new Waste Framework Directive has amended recovery operation R1 “Use principally as a fuel or other means to generate energy” by an energy efficiency formula. Recovery operation R1 now includes incineration facilities for treatment of mu-
nicipal solid waste which comply with this formula. However, in order to prevent an increase of waste shipments to these facilities, the principles of self-sufficiency and proximity have been extended to include these facilities, even though they are considered recovery installations.

End-of-waste
The option of creating end-of-waste provisions on EU level was newly introduced, which declare waste to be non-waste earlier. These provisions must comply with criteria established in the Waste Framework Directive. National end-of-waste provisions can be established, provided there are no provisions on EU level. The Directive gave the Commission a mandate to evaluate different waste streams for which end-of-waste provisions are possible on an EU level. These waste streams are aggregates, paper, glass, metal, tyres, biogenic waste and textiles. An EU end-of-waste provision is already in force. Council Regulation (EU) No 333/2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2009/98/EC of the European Parliament and of the Council entered into effect on 28 April 2011. This Regulation shall apply as of 9 October 2011 and shall regulate when iron, steel and aluminium cease to be waste in a consistent manner for the entire EU.

Waste Management Plan
Moreover, the mandatory contents of the Waste Management Plan were complemented and the term for updating the plan was extended to 6 years.

1.3. The Definition of Waste
The definition of the concept of “WASTE” is central to describing the waste management situation and the conclusions to be drawn from it. A final assessment as to whether the concept of “waste” applies in a specific case is not possible in a generalised manner but only on an individual, case-by-case basis and must be based on an examination of all the facts. Waste status cannot end until after recovery has actually taken place or until product status has been legally established.

Waste as defined by the Waste Management Act of 2002

Subjective definition of waste – Intention to discard
“To discard" means to abandon custody of an object or substance that is no longer or can no longer be used for its purpose. The fact that no monetary proceeds can be earned from an object or substance is an indication that the object or substance in question constitutes waste in the subjective sense of the term, but waste can still have an economic value. The definition of discarding under waste management law is clearly applicable whenever an object or substance is carried off for disposal or recovery.

Objective definition of waste – Public interest
In order to evaluate whether something is waste in the objective sense of the term, it is necessary to consider the environmental hazards that originate from the object or substance and that could be minimized by identifying the object or substance as waste and treating it accordingly. The decisive factor is the actual threat potential the materials pose to the environment, taking into account the disposal and recovery options.

Movables
As a general rule, the concept of waste implies the mobility of an object or substance. However the waste status can also apply if an object or substance has entered into environmentally harmful association with the soil (e.g. oil-polluted soil). An object or substance is defined as waste if there is either the intention of discarding them or if it is in the public interest to identify them as waste and treat them accordingly.

By-product
A substance or object is considered a by-product if it is not the primary product of a method of manufacture or production but is produced as an integral part of a method of manufacture and will be further used with certainty and with no further processing beyond normal industrial processes. This further use must be permissible, the substance or object must be safe for its intended meaningful use and no objects worthy of protection (within the meaning of sec. 1 (3) Waste Management Act of 2002) may be harmed and all legislation must be complied with. If these criteria are complied with, the intention to discard shall be deemed absent and such substance or object shall not be considered waste.
The European Commission has issued a Communication on this topic, summarising the rulings of the European Court of Justice and giving examples of by-products (Communication of 17 October 2007, 6868/1/07 REV 1 (en), COM(2007) 59 final/2).

1.3.1. ECJ case law on the definition of waste
Below follows a brief summary of the major rulings of the European Court of Justice concerning the definition of waste:

- The concept of “waste” within the meaning of the Directive on Waste is not to be understood as excluding substances and objects which are capable of economic re-utilisation (C-206/88 and C-207/88 “Zanetti et al”).
- The concept of “waste” should not be understood to exclude substances and objects that are suitable for economic re-utilisation (C-304/94, C-330/94, C-342/94, and C-224/95 “Tombesi”).
- A substance is not excluded from the definition of waste by the mere fact that it directly or indirectly forms an integral part of an industrial production process (C-129/96 “Wallonia”).
- The scope of the concept of “waste” depends on the meaning of the concept of “discard” (C-129/96 “Wallonia”).
- It may not be inferred from the mere fact that a substance (in the present case LUWA-Bottoms) undergoes an operation listed in Annex II B of the Directive on waste that that substance was discarded and that it is to be regarded as waste for the purposes of the Directive (C-418/97 and C-419/97 “ARCO”).
- The concept of “waste” must not be defined too narrowly. Whether a certain substance is, in fact, waste must be examined in the light of all the circumstances, taking into account the aims of the Directive on waste. In the absence of Community provisions, Member States are free to choose the modes of proof of the various matters defined in the Directives which they have transposed, provided that the effectiveness of Community law is not thereby undermined (C-418/97 and C-419/97 “ARCO”).
- By-products from an extraction process are not waste if they are certain to be re-used directly without any prior processing and as part of the continuing process of production (C-9/00 “Palin Granit Oy”).
- In principle, leftover rock and residual sand are intended to be discarded, unless the holder uses them lawfully for the necessary filling in of the galleries of that mine and provides sufficient guarantees as to the identification and actual
use of the substances to be used for that purpose (C-114/01 “AvestaPolarit Chrome Oy”).

- The definition of waste cannot be construed as covering exclusively substances or objects intended for, or subjected to, the disposal or recovery operations mentioned in Annexes II A and II B to that Directive or in the equivalent lists, or to which their holder intends or is required to subject them (C-457/02 “Niselli”).

- The concept of “waste” is not to be interpreted as excluding all production or consumption residues which can be or are used in a cycle of production or consumption, either without prior treatment and without harm to the environment, or after undergoing prior treatment without, however, requiring a recovery operation within the meaning of Annex II B to the Directive on waste (C-457/02 “Niselli”).

- Fuels that are unintentionally spilled and cause soil and groundwater contamination are waste within the meaning of the Directive on waste. The same is true for soil contaminated by fuels, even if this soil has not been excavated (C-1/03 “Van der Valle”).

- Waste water which escapes from a sewerage network maintained by a statutory sewerage undertaker pursuant to Directive 91/271 concerning urban waste water treatment and the legislation enacted to transpose that Directive constitutes waste within the meaning of the Waste Framework Directive. The escape of waste water from a sewerage network constitutes an event by which the sewerage undertaker, the holder of that waste water, ‘discards’ it. The fact that the waste water is spilled accidently does not alter the outcome (C-252/05, “Thames Water Utilities”).

- Hydrocarbons accidentally spilled at sea following a shipwreck, mixed with water and sediment and drifting along the coast of a Member State until being washed up on that coast, constitute waste within the meaning of the Waste Framework Directive, where they are no longer capable of being exploited or marketed without prior processing (C-188/07 “Commune de Mesquer”).

- Processed packaging waste ceases to be waste when it has been reprocessed to obtain a new material or a new product possessing characteristics comparable to those of the material of which the waste was composed. Metal packaging waste no longer constitutes waste when it has been processed to sheets – ingots and coils of steels (C-444/00 “Mayer Parry”, see also Chapter 1.2. “End-of-waste regulation for metals”).

- Ferrous waste must continue to be classified as waste until it has actually been recycled into iron or steel products, that is to say, until the constitution of the finished products derived from the treatment process for which they are intended (C-457/02 “Niselli”).

1.3.2. Rulings of the Austrian Administrative Court (VwGH) on the definition of waste

Time and again, the Austrian Administrative Court takes up the issue of whether an object or substance constitutes waste within the meaning of the Waste Management Act of 2002. Taking into account the legal amendments, the rulings of the Austrian Administrative Court on the Waste Management Act of 1990 can be referred to for assessment of the definition of waste in the Waste Management Act of 2002.

- Moreover, in its findings, the Austrian Administrative Court also refers to the judgments of the European Court of Justice (cf. VwGH 28.4.2005, 2003/07/0017; VwGH 29.1.2004, 2000/07/0074). In accordance with ECJ case law, the Austrian Administrative Court ruled that “the concept of waste must not be defined too narrowly and whether a certain substance is, in fact, waste must be examined in light of all the circumstances. Group Q16 corresponds to a broad catch-all definition, so that the groups of waste have no decisive relevance to its assessment as waste” (VwGH ZI. 2003/07/0017-7 “RÜF Transporte”). An object or substance ceases to be classified as waste only when it satisfies the requirements of sec. 5 (1) of the Waste Management Act of 2002. This means the end-of-waste status applies only upon its actual use as raw material and not merely upon its acceptance as excavated material for the purposes of refilling or transport to other buyers.

- According to the wording of the law, it is sufficient to comply with either the subjective or objective concept of waste used in the Waste Management Act of 2002 in order for an object or substance to qualify as waste within the meaning of the Waste Management Act of 2002 – the cumulative satisfaction of the criteria for both waste concepts is not required (cf. VwGH 23.4.2009, 2006/07/0164).

- An object or substance that constitutes waste within the meaning of the Waste Management Act of 2002 must be mobile (with the exception of soil that has entered into an inseparable association with the waste).

- Compliance with the subjective waste concept does not depend only on the last owner’s intention to discard. It suffices if one of the previous
owners had the intention to discard (cf. VwGH 23.4.2009, 2006/07/0164).

- An object or substance is deemed “discarded” within the meaning of sec. 2 (1) (1) of the Waste Management Act of 2002 only if the primary aim of its transfer is to get rid of it (VwGH 25.2.2009, 2008/07/0172; on the Waste Management Act of 1990: VwGH 4.7.2001, 99/07/0177).

- An object or substance that objectively constitutes waste within the meaning of the Waste Management Act of 2002 must also be capable of impairing public interests. Furthermore, such object or substance must no longer be new within the meaning of sec. 2 (3) (1) of the Waste Management Act of 2002 and no longer suitable for its intended use (cf. to Waste Management Act of 1990: VwGH 18.1.1994, 93/05/0018). An object or substance is new within the meaning of sec. 2 (3) Waste Management Act of 2002 if it awaits its intended use. The authoritative standard is the standard applied by the persons who operate in the respective market in which the object or substance is traded (cf. to the Waste Management Act of 1990: VwGH 18.1.1994, 93/05/0018).

2. Overview of Waste Management in Austria
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2.1. Waste management data in Austria

The sources for taking stock of our waste quantities and the data on all the waste recovery and disposal plants in Austria include the following:
- statistical surveys of the Federal Government (EDM – Electronic Data Management of the Federal Ministry of Agriculture, Forestry, Environment and Water Management, veterinary reports, Green Reports, etc.)
- the government offices of the Provincial Government (provincial waste management plans, provincial waste management reports, etc.)
- individual waste management associations
- documents from the Austrian administration (documents from administrative procedures for approval of facilities, from waste flow controls carried out by the authorities, etc.)
- expert studies conducted to solve individual waste management issues
- the Austrian Federal Economic Chamber (WKÖ)
- specialised expert institutes (e.g., Altstoff Recycling Austria (ARA), the Austrian Association for the Recycling of Building Materials (BRV), the Association of Austrian Waste Disposal Companies (VOEB), Statistics Austria, etc.)
- operators of waste recovery and disposal facilities (waste management programmes, personal specifications by operators)
- databases managed by Umweltbundesamt (Environment Agency Austria)

The analysis of the situation is based on the data and information available until November 2010. Since this information was used as the basis for calculating the composition of wastes included in the tables and graphics for forecasting future developments in waste management, and other things, more recent information could be taken into account only to a limited extent. The weights indicated generally refer to the years 2008 and 2009, data on the plants refer to the period from 2008 to 2010.

The information available on non-hazardous waste from trade and industry and intra-company waste flows continues to be insufficient. This information was therefore supplemented through intensive research, extrapolations, estimates, educated guesses, and evaluation of the available information, which is sometimes incomplete.

2.2. Summary of our analysis of the waste management situation in Austria

Compared to the surveys of the last Federal Waste Management Plan 2006, current waste quantities have decreased by some 500,000 tonnes and, taking into account excavated materials of some 23.47 million tonnes, currently amounts to 53.54 million tonnes.

Generally, it should be noted that the total mass is not composed merely of primary waste accumulated but also of secondary waste resulting from the treatment of primary waste (e.g., slag and ash from the combustion of residual waste, bulky waste, residues from mechanical and biotechnological waste treatment, meat-and-bone meal, and animal fat from the processing of animal by-products as well as shredder wastes).

The quantity of primary waste generated totalled approx. 51.72 million tonnes in 2009.

Significant developments in waste management can be seen in the following selected waste streams:

1. Wastes from households and similar establishments (residual waste, bulky waste, hazardous household waste and waste electrical and electronic equipment, recoverables and biogenic wastes)

The occurrence of wastes from households and similar establishments has risen by about 13.9% over the last five years.

In this context, collection results in the separate collection of hazardous household waste and waste electrical and electronic equipment, recoverables and biogenic wastes have improved by over 24%.

2. Home and community composting

The composting potential of biogenic wastes from households – these include biodegradable catering
waste as well as plant residues and biogenic waste from home gardens – is currently assumed to be approx. 1.5 million tonnes. Overall estimates of the waste mass generated in Austria do not take into account the waste that goes to home and community composting.

3. Waste from green areas
For several years, a decrease in the quantity of municipal waste from green areas, particularly garden and park waste from municipalities, has been observed. Since the tending of municipal green spaces is already organised consistently throughout the country, no significant change is to be expected in the current quantities.

4. Municipal sewage sludges
An increase in municipal sewage sludge and a decline in the occurrence of faecal sludge has been observed. The essential cause for these trends was the increase in the percentage of public sewer connections among the Austrian households, with a resulting decrease in the generation of faecal sludge from cesspools.

5. Separately collected recoverables from trade and industry
The continuously high collection levels of recoverables from trade and industry over years is significant. A decline in the collection of iron and steel waste (scrap and packaging) and a sharp increase in the collection of waste paper, cardboard, paperboard and corrugated cardboard have been observed.

6. Excavated materials
Excavated materials – the major share of the total quantity of waste generated – have for the most part declined in quantity compared to the surveys conducted for the last Federal Waste Management Plan. Decisive factors that contributed to this include
- the increased construction activity of the Austrian Federal Railways;
- the varying quantities of contaminated soils that primarily result from sporadic primary events.

7. Waste from construction
The quantity of waste from construction activities has also increased massively over the last few years.

The waste stream depends on the developments in civil and structural engineering in Austria.

8. Ash, slag and dust from incineration
A differentiated view must be taken with respect to the generation of ash, slag and dust. While waste from the incineration of carbon is declining in energy recovery owing to a decrease in the use of lignite and mineral coal, the occurrence of wood and straw ash is rising due to the increased use of biomass for energy generation. The quantities of ash, slag and dust resulting from the incineration of waste have been steadily increasing due to the rise in the input of wastes and sorted waste fractions into thermal treatment over the years.

9. End-of-life vehicles
In 2009, some 91,200 end-of-life vehicles with a total weight of some 85,000 tonnes underwent treatment. The re-use and material recovery rate of collected end-of-life vehicles was at approx. 84%. The fact that over 250,000 passenger cars have been withdrawn from circulation gives rise to the assumption that a lion’s share of the vehicles that have been withdrawn from circulation but not shredded in Austria will be exported as used vehicles.

10. Waste electrical and electronic equipment
In 2009, some 75,600 tonnes of waste electrical and electronic equipment was collected from households and trade. According to the EU Directive on waste electrical and electronic equipment, the Member States were required to ensure that an average collection of at least four kilograms per inhabitant was ensured by the end of 2007. With the current 9.32 kg per inhabitant, Austria has markedly outperformed the target stipulated by the EU.

11. Wood waste
The amount of wood waste generated in Austria is consistently high. This waste undergoes material recovery in the entire wood-processing industry and in the paper and pulp industry; sawing by-products are used in composting as structural material, as chips for energy recovery or as biomass for local and district heating.
12. Animal by-products
In 2009, approx. 1,739,000 tonnes of animal by-products were generated.
Approx. 29,000 tonnes of animal by-products representing the highest risk for humans, animals and the environment (category 1) have been generated; this waste was disposed of in its entirety, i.e. pre-treated and/or processed and/or incinerated.
Around 97,000 tonnes of materials were generated that do not come from risk sectors but originated from critical origins relevant to animal health (category 2).
Apart from incineration following appropriate pre-treatment, these materials were also processed in authorised recovery facilities or in biogas or composting facilities and used as organic fertiliser or soil conditioners.
Approx. 1,613,000 tonnes of materials belonging to category 3 were generated that originate from manufacturing processes and do not give any indications of communicable diseases.
Specialised operations or rendering plants further processed these into various products (e.g. into dog and cat food, bone fat, into bone, blood and feather meal, into leather or gelatine).

13. Asbestos
Asbestos quantities (asbestos cement and asbestos dust – not including electrical and electronic equipment with their corresponding shares) have increased considerably, particularly since 2004. This may be attributable to the fact that asbestos-containing materials, which in Austria were used primarily in construction between 1960 and 1990, are now reaching the end of their service life and an increasing amount is being replaced and deposited in landfills.
Since 1 July 2007, the import of asbestos waste has been banned.

14. Hazardous waste
In 2009, around 957,000 tonnes of hazardous waste were generated in Austria and transported to treatment facilities in the country.
The decline in the quantity of hazardous waste compared to 2008 (approx. 250,000 tonnes less) can be attributed to the diminished generation of contaminated soils and slag, ash, dust, etc. from industry.
### Amounts of waste generated in 2009 (primary and secondary waste)

**Classification by waste group pursuant to ÖNORM S 2100 (in tonnes)**

<table>
<thead>
<tr>
<th>Group designation pursuant to ÖNORM S 2100 (2005)</th>
<th>Waste from households and similar establishments</th>
<th>Recoverables from trade and industry</th>
<th>Excavated materials</th>
<th>Waste from construction</th>
<th>Selected secondary wastes</th>
<th>Other wastes</th>
<th>Total quantity generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Food, beverage, and tobacco waste</td>
<td>836,000</td>
<td>836,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Waste plant and animal fat products</td>
<td>284,000</td>
<td>284,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Waste from animal husbandry and slaughtering</td>
<td>312,000</td>
<td>312,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Skin and leather waste</td>
<td>119,000</td>
<td>119,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Wood waste</td>
<td>212,000, 70,000</td>
<td>23,345,000</td>
<td>6,570,000</td>
<td>1,311,000</td>
<td>3,964,000</td>
<td></td>
<td>35,472,000</td>
</tr>
<tr>
<td>18 Pulp, paper and cardboard waste</td>
<td>677,000, 873,000</td>
<td>212,000</td>
<td>70,000</td>
<td>23,345,000</td>
<td>6,570,000</td>
<td>1,311,000</td>
<td>3,964,000</td>
</tr>
<tr>
<td>19 Other waste from the processing and refinement of animal and plant products</td>
<td>118,000, 930,000</td>
<td>182,000</td>
<td>70,000</td>
<td>23,345,000</td>
<td>6,570,000</td>
<td>1,311,000</td>
<td>3,964,000</td>
</tr>
<tr>
<td>31 Waste of mineral origin (not including waste metal)</td>
<td>118,000, 930,000</td>
<td>182,000</td>
<td>70,000</td>
<td>23,345,000</td>
<td>6,570,000</td>
<td>1,311,000</td>
<td>3,964,000</td>
</tr>
<tr>
<td>35 Waste metal</td>
<td>118,000, 930,000</td>
<td>182,000</td>
<td>70,000</td>
<td>23,345,000</td>
<td>6,570,000</td>
<td>1,311,000</td>
<td>3,964,000</td>
</tr>
<tr>
<td>39 Other waste of mineral origin as well as waste from refining processes</td>
<td>10,000</td>
<td>10,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>51 Oxide, hydroxide, salt waste</td>
<td>50,000</td>
<td>50,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>52 Waste of acids, alkalines, concentrations</td>
<td>50,000</td>
<td>50,000</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>53 Waste of plant treatment agents and pesticides as well as pharmaceutical products and disinfectants</td>
<td>4,000</td>
<td>4,000</td>
<td></td>
<td></td>
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<tr>
<td>54 Waste of mineral oil and coal upgrading products</td>
<td>120,000</td>
<td>120,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55 Waste of organic solvents, paints, lacquers, glues, bonding agents and resins</td>
<td>68,000</td>
<td>68,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57 Plastic and rubber waste</td>
<td>105,000</td>
<td>105,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58 Textile waste (natural and chemical fibre products)</td>
<td>26,000</td>
<td>26,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59 Other waste of chemical conversion and synthesis products</td>
<td>11,000</td>
<td>11,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>91 Solid household waste including similar commercial waste</td>
<td>1,809,000</td>
<td>1,809,000</td>
<td>36,000</td>
<td>300,000</td>
<td>289,000</td>
<td>748,000</td>
<td>3,182,000</td>
</tr>
<tr>
<td>92 Waste for biological recovery</td>
<td>752,000</td>
<td>752,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>94 Waste from water treatment, waste water treatment and water use</td>
<td>570,000</td>
<td>570,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95 Liquid waste from waste treatment plants</td>
<td>25,000</td>
<td>25,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>97 Waste from the medical sector</td>
<td>49,000</td>
<td>49,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous household waste</td>
<td>23,000</td>
<td>23,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste electrical and electronic equipment</td>
<td>72,000</td>
<td>72,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Other recoverables from households and similar establishments”</td>
<td>23,000</td>
<td>23,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total (rounded)</strong></td>
<td><strong>3,895,000</strong></td>
<td><strong>2,246,000</strong></td>
<td><strong>23,465,000</strong></td>
<td><strong>6,870,000</strong></td>
<td><strong>1,822,000</strong></td>
<td><strong>15,245,000</strong></td>
<td><strong>53,543,000</strong></td>
</tr>
</tbody>
</table>
The table shows the approx. 53.54 million tonnes of waste generated in 2009 classified by their two-digit code number groups of the Waste Catalogue.

The allocations for selected waste streams (waste from households and similar institutions, waste from construction, etc.) are shown; separately collected waste paper from households, for example, are allocated to code number group 18 or the separately collected waste metals (packaging and scrap) from households to group 35.

The designation „other wastes“ is used for the waste stream that forms part of the total amount of waste generated but is not further specified (e.g. ferrous wastes from industry or waste batteries as part of the „remaining“ 557,000 tonnes of group 35).

The waste is recovered and disposed of in some 2,200 facilities, with a considerable share being treated within the business operation generating the waste.

<table>
<thead>
<tr>
<th>Waste treatment facilities in Austria in 2010</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal waste incinerators</td>
<td>10</td>
</tr>
<tr>
<td>Thermal treatment facilities (not incl. incineration plants for household waste)</td>
<td>49</td>
</tr>
<tr>
<td>Physico-chemical treatment facilities</td>
<td>43</td>
</tr>
<tr>
<td>Selected processing plants for specific waste (fats and frying oil, asbestos waste, chemicals, batteries, etc.)</td>
<td>93</td>
</tr>
<tr>
<td>Plants for the treatment of waste electrical or electronic equipment</td>
<td>40</td>
</tr>
<tr>
<td>Shredder plants for scrap metals (incl. post shredders)</td>
<td>9</td>
</tr>
<tr>
<td>Treatment plants for construction and demolition waste</td>
<td>400</td>
</tr>
<tr>
<td>Biotechnological treatment facilities for pre-processing residual waste and other waste (MBT)</td>
<td>16</td>
</tr>
<tr>
<td>Plants for aerobic biotechnological treatment of separately collected biogenic waste, etc. (composting facilities)</td>
<td>466</td>
</tr>
<tr>
<td>Plants for anaerobic biotechnological treatment (biogas facilities)</td>
<td>157</td>
</tr>
<tr>
<td>Plants for sorting and processing separately collected recoverables and other waste</td>
<td>182</td>
</tr>
<tr>
<td>Recovery plants for separately collected recoverables</td>
<td>48</td>
</tr>
<tr>
<td>Landfills</td>
<td>666</td>
</tr>
</tbody>
</table>

2.3. Assessing the future development of waste streams

General conditions and objectives

Chapter V „Plans and Programmes“, Art. 28, of the Waste Framework Directive of the European Union (Directive 2008/98/EC of the European Parliament and the Council of 19 November 2008 on waste and repealing certain Directives) provides, among other things, that the waste management plan of the Member States must contain an evaluation of the „type, quantity and source of waste generated within the entire geographical territory of the Member States“ and the „waste likely to be shipped from or to the national territory“ as well as an estimate of the „development of waste streams in the future“.

Against this backdrop, an estimate was made of the change in waste generated and the recovery and disposal of the waste streams described in the Federal Waste Management Plan 2011 up to the year 2016, the base data year for the preparation of the next Federal Waste Management Plan for 2017.

This forecast is also required for the following reasons:

- the continuously changing general conditions in waste management
- the varying changes in the generated quantity of various wastes
- the construction of new disposal plants
new findings relating to waste treatment
updated national and international rules in the area of waste

The following core indicators are needed to make the forecasts:
- the „National Accounts“ of „Statistics Austria“;
- the estimates
  - of the Austrian Institute of Economic Research (WIFO)
  - of the Federal Ministry of Finance
  - of the Institute of Advanced Studies in Vienna (IHS)
  - of the International Monetary Fund (IMF)
  - of Bank Austria (BA)
  - of the Organisation for Economic Co-operation and Development (OECD)
  - of Österreichischen Nationalbank (OeNB)
  - of the EU Commission
with regard to Austria’s economic growth expected in the years to come;
- the calculations by Statistics Austria of population and housing developments (household sizes, forms of heating used, ...) in Austria until 2016;
- the information provided by the operators of landfills on the landfilling of waste between 1998 and 2008;
- the assessable change in selected waste streams taking waste management developments and measures into account
- the current level of knowledge with assumptions on future changes in the quantity of waste generated and waste treatment in Austria.

Basis
Statistics Austria bases its calculations on the economic growth achieved in 2009 which was determined in the spring of 2010 and amounted to approx. minus 3.6 percent.

The Austrian Institute of Economic Research (WIFO) based its calculations on the assumption that GDP grew 1.3% in 2010 and is expected to grow 1.5% in 2011.
As of 2012, expectations are for the economy to grow at a steady 1.8 percent.
These assumptions are based on WIFO forecasts from March 2010 and forecasts of the Federal Ministry of Finance from January 2010.
Based on the forecasts made by Statistics Austria on population development in Austria, it is assumed that the population will number about 8,609,000 in 2016.

The estimates on the development of waste management with regard to the selected waste streams were made
- in analogy to the production statistics provided by Statistics Austria;
- in analogy to the annual statistics on tourism;
- using information provided by experts, technical bureaus, civil engineering offices, ...;
- using information from specialised departments of the Federal Provinces and the Federal Government (inventories, envisaged measures, ...);
- using information from the operators of waste management facilities;
- using information from specialised organisations (chambers, recycling companies for branches of industry, representations of interest, ...);
- using information from specialist literature (studies, industry concepts, ...);
- in accordance with plans to relocate waste from contaminated sites and landfills and from the remediation of contaminated sites;
- on account of the effects resulting from the increased rate of connection to the public sewer system;
- on account of the effects resulting from improved prevention and recovery measures in businesses.

In a nutshell
The waste streams described in the chapters of the Federal Waste Management Plan 2011 were examined in order to provide the waste forecast.
A material datasheet with indications of the current and future quantities generated and a specification of current treatments and treatments expected for the future was drawn up for each individual waste stream.
The observation period will last until 2016, the base data year for the preparation of the next Federal Waste Management Plan for 2017.
The overall quantity of waste and waste streams resulting in 2016 lies above 56 million tonnes.
In 2016, the waste and waste streams with the largest amounts are

<table>
<thead>
<tr>
<th>The wastes and waste streams with the largest amounts generated in 2016 [in tonnes, rounded]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavated materials</td>
</tr>
<tr>
<td>Waste from construction</td>
</tr>
<tr>
<td>Wood waste</td>
</tr>
<tr>
<td>Waste from households and similar establishments</td>
</tr>
<tr>
<td>Recoverables from trade and industry</td>
</tr>
<tr>
<td>Ash, slag and dust</td>
</tr>
</tbody>
</table>

An overview of the quantities expected in 2016 for the waste streams described in the inventory taken by the Federal Waste Management Plan 2011:

**Waste from households and similar establishments**
(sum total of residual waste, bulky waste, hazardous household waste [not including waste electrical and electronic equipment, recoverables and biogenic waste])
Approx. 3,933,000 tonnes of waste are expected to undergo the following treatments:
- the material recovery of sorted recoverables from the processing of residual waste and bulky waste as well as the separately collected hazardous household waste, recoverables and biogenic waste
- thermal treatment of untreated residual waste, the high-calorific fraction of residual waste after splitting, of bulky waste and of separately collected hazardous household waste, recoverables and biogenic waste for recovery of the energy value
- physico-chemical treatment of separately collected hazardous household waste
- mechanical-biological treatment of the low-calorific fraction in residual waste
- biotechnological treatment of separately collected recoverables and biogenic waste
- landfilling of residual waste resulting from the processing of bulky waste and of separately collected recoverables

**Residual waste from households and similar establishments**
Approx. 1,442,000 tonnes of waste are expected to undergo the following treatments:
- recovery of sorted recoverables from processing

- thermal treatment (waste incineration plant) of the untreated fraction for recovery of the energy value
- thermal treatment (co-incineration) of the high-calorific fraction after splitting for recovery of the energy value
- biotechnological treatment of low-calorific fraction after splitting

**Bulky waste from households and similar establishments**
Approx. 267,000 tonnes of waste are expected to undergo the following treatments:
- recovery of sorted recoverables from processing
- thermal treatment for recovery of the energy value
- landfilling of residual waste resulting from regeneration

**Recoverables from households and similar establishments**
Approx. 1,426,000 tonnes of waste are expected to undergo the following treatments:
- material recovery
- biotechnological treatment (e.g. frying oils and fats)
- thermal treatment for recovery of the energy value
- landfilling of residual waste resulting from regeneration.

**Biogenic waste from households and similar establishments**
Approx. 774,000 tonnes of waste are expected to undergo the following treatments:
- biotechnological treatment in composting and biogas facilities
- thermal treatment of sub-fractions for recovery of the energy value

**Home and community composting**
Approx. 1,550,000 tonnes of waste are expected to undergo the following treatments:
- composting of biogenic waste from households and home gardens

**Hazardous household waste from households and similar establishments**
Approx. 24,000 tonnes of waste are expected to undergo the following treatments:
- material recovery
- physico-chemical treatment
- thermal treatment for recovery of the energy value
Waste electrical and electronic equipment (including that from households and similar establishments)
Approx. 88,000 tonnes of waste are expected to undergo the following treatments:
- material recovery
- thermal treatment for recovery of the energy value
- landfilling of residual waste resulting from regeneration

Waste from green areas
Approx. 733,000 tonnes of waste are expected to undergo the following treatments:
- biotechnological treatment (for the production of compost)
- thermal treatment for recovery of the energy value (homogenous dry waste from trees, roots, ...)
- a small – non-quantifiable – share is left as cuttings from mowing at source

Market waste
Approx. 20,000 tonnes of waste are expected to undergo the following treatments:
- recovery of sorted recoverables from processing
- thermal treatment (waste incineration plant) of the untreated fraction for recovery of the energy value
- thermal treatment (co-incineration) of the high-calorific fraction after splitting for recovery of the energy value
- biotechnological treatment of low-calorific fraction after splitting

Street cleaning residues
Approx. 200,000 tonnes of waste are expected to undergo the following treatments:
- material recovery („grit“)
- the contents of public wastepaper baskets – insofar as they are separated from grit – are subjected to the customary local treatment method for residual waste and are contained in this amount
- landfill
- the largest part of street cleaning residues consists of non-measurable fractions, including road salt, other de-icing agents or non-collectible grit

Municipal sewage sludges
Approx. 274,000 tonnes of waste are expected to undergo the following treatments:
- (material) recovery in agriculture (spread out to improve soil)
- biotechnological recovery
- other treatment (in landscaping)
- thermal treatment

Recoverables from trade and industry
Approx. 2,524,000 tonnes of waste are expected to undergo the following treatments:
- material recovery
- biotechnological treatment (partly waste wood as aggregate for composting)
- thermal treatment for recovery of the energy value
- landfilling of residual waste resulting from regeneration

Excavated materials
Approx. 25,863,000 tonnes of waste are expected to undergo the following treatments:
- material recovery in the form of re-use
- landfilling

Waste from construction
Approx. 7,395,000 tonnes of waste are expected to undergo the following treatments:
- material recovery
- thermal treatment for recovery of the energy value
- intermediate storage
- landfilling

Ash, Slag and Dust
Approx. 1,422,000 tonnes of waste are expected to undergo the following treatments:
- material recovery (usually used in the cement industry)
- biotechnological recovery of wood ash
- landfilling

End-of-life vehicles
Approx. 85,000 tonnes of waste are expected to undergo the following treatments:
- material recovery (of metals, plastics, rubber, textiles and others)
- thermal treatment of residual waste from the treatment for recovery of the energy value
- re-use and continued use of vehicle parts
- landfilling of residual waste resulting from regeneration
- re-use and continued use (of a non-quantifiable quantity) of vehicles and vehicle parts after export (the mass of these end-of-life vehicles is not included in the forecast quantity)
Waste pneumatic tyres
Approx. 53,000 tonnes of waste are expected to undergo the following treatments:
- material recovery (recovery of crumb rubber, tyre wire, steel and textile fibres)
- retreading
- thermal treatment for recovery of the energy value

Wood waste
Approx. 5,033,000 tonnes of waste are expected to undergo the following treatments:
- material recovery (for the production of chipboards and fibreboards, as raw material in the paper and pulp industry and in the brick industry, and others)
- thermal treatment for recovery of the energy value

Medical waste
Approx. 51,000 tonnes of waste are expected to undergo the following treatments:
- thermal treatment for recovery of the energy value

Animal by-products (including residual materials from animal by-products)
Approx. 1,873,000 tonnes of waste are expected to undergo the following treatments:
- material recovery (in animal feed, cosmetics, pharmaceutical, apparel and chemical industry, and others)
- biotechnological treatment (in composting and biogas facilities and others)
- thermal treatment for recovery of the energy value

Catering waste
Approx. 138,000 tonnes of waste are expected to undergo the following treatments:
- biotechnological treatment (in biogas facilities and others)

Asbestos (without electrical and electronic equipment with components made of asbestos)
Approx. 92,000 tonnes of waste are expected to undergo the following treatments:
- landfilling after treatment and solidification

Hazardous waste and waste oil

Approx. 824,000 tonnes of waste are expected to undergo the following treatments:
- material recovery
- biotechnological treatment
- physico-chemical treatment
- thermal treatment for recovery of the energy value
- landfilling after treatment and solidification

2.4. Structure of Austrian waste management

General legal situation
Materials governed at Federal level
The Federal Constitutional Act sets forth that legislation on hazardous waste falls exclusively under the jurisdiction of the Federal Government. With regard to other, non-hazardous waste, the Federal Government’s jurisdiction only applies if there is a need to issue uniform requirements (also termed “authority in case of need”). Whenever the Federal Government does not make use of its authority in case of need, Provincial legislators are in charge. The Federal Government’s authority in case of need for non-hazardous waste has also been implemented wherever a uniform regime applicable across the entire nation was required. Therefore, the Waste Management Act of 2002 and regulations derived therefrom bring together essential regulatory areas related to hazardous and non-hazardous waste.

Below a brief overview of the collection and treatment responsibilities regarding municipal waste and the most common wastes in commerce and industry regulated at national level:
- If need be, the municipalities (municipal associations) are obliged to implement or commission the implementation of a separate collection (collection points) of hazardous household...
waste, with the exception of waste electronic and electrical equipment, at least twice a year.

- The originator of biogenic waste is obliged to deliver the waste either to home or community composting facilities or make it available for separate collection or bring it to a collection point collecting this type of waste.
- The parties placing packaging, electronic equipment, motor vehicles and batteries on the market are obliged to at least set up and operate a collection and recovery point to which the end user can deliver these products – once they have become waste – free of charge. They must also ensure that recovery and/or disposal complies with the pertinent requirements.
- The originator of waste from commerce and industry that is not similar to household waste is responsible for its collection and disposal or recovery. The originator, and as a consequence the contracted collector and processor must ensure – where this is ecologically expedient, technically feasible and economically viable – recovery or else environmentally sound disposal.
- Waste collectors and processors need to meet a wide range of requirements in order to perform their activities and operate their plants. Among other things, their task is to ensure that the location of waste is documented and that no avoidable risk for humans and nature arises from the transport, storage and treatment of waste as well as from the manufactured secondary products but also from the substances disposed of.

Materials governed by Provincial and municipal requirements

The Austrian Federal Provinces have jurisdiction over municipal waste collection, the associated levying of waste collection fees and the planning of plants, particularly of plants for the disposal of this waste. All nine Federal Provinces have their own pertinent waste laws, some of which have given rise to associated ordinances. They essentially govern municipal waste, insofar as this waste is not covered by legal statutes of the Federation, and thus primarily residual and bulky waste. To a lesser extent, they also cover recoverables and biogenic waste. With respect to commercial and industrial waste, the focus is on waste similar to household waste and partly to recoverables.

In detail, the Provincial laws and ordinances contain provisions for the following areas:

- for the drafting of Provincial waste management plans, to some extent also regional waste management plans (e.g. in Styria);
- for the responsibilities of the municipalities and associations formed by them;
- to some extent with regard to the formation of associations;
- for the organisation of waste collection;
- for the obligation to participate in and provide waste to municipal collection systems;
- for waste collection containers, their installation and emptying;
- for regulatory pricing and fee collection;
- for the plants required to treat the collected municipal waste (in individual Federal Provinces, including specific sites and catchment areas).

Generally, the laws of the Federal Provinces allocate the obligation to ensure an orderly disposal, especially of residual and bulky waste, to the municipalities. These responsibilities are implemented by the municipalities through appropriate waste collection codes and other means.

To perform interregional waste management tasks – most of which are prescribed by the laws and ordinances of the Federal Provinces – the municipalities have formed waste associations. Usually, these associations comprise all the municipalities belonging to a political district. The tasks of the waste associations vary between the different Federal Provinces and, to some extent, also between the different associations. In most Federal Provinces, public procurement for the treatment of residual and bulky waste is one of the responsibilities. To some extent, the associations have also taken on the operation of disposal plants. Moreover, they are frequently in charge of organising the collection of recoverables and the recovery of recoverables. In Burgenland and in parts of Lower Austria, the waste associations have also taken on the task of prescribing and levying waste disposal charges. Waste associations, in turn, are often combined to form regional associations for specific Federal Provinces.

Costs and funding

The costs for collecting, transporting and treating waste are subject to major fluctuations, which depend on a number of factors, and therefore do not really lend themselves to comparisons.

Depending on the specific waste at hand, the costs incurred for the management of municipal waste are paid for as follows:

- municipal “residual waste charge”
- separate municipal biowaste charge
- disposal contributions by the citizens when providing their waste
- proceeds generated from the marketing of recoverables
- funds from the general budget of the municipalities
The following figure illustrates the prorated funding sources for various types of waste from a nationwide perspective.

In addition to the proceeds from the marketing of recoverables, the two most important sources of funds are the fees charged by the communities and the contributions to the ARA system from the parties placing the packaging on the market. Moreover, the infrastructure costs for the collection of waste electrical and electronic equipment and waste batteries from the collection and recovery systems are reimbursed to the communities. The change in the amount of waste fees charged by all the municipalities of Austria over time is shown in the figure above.

The increase in fees over recent years can be attributed to the enhanced services provided by the communities, e.g. increase of the number of recycling yards and higher standards in waste treatment.

Using Upper Austria as an example (reference year: 2004), the following graph illustrates the costs per household, on the one hand, and the significance of various cost components, on the other.

In addition to the money paid by the marketers in collective systems (licensing fees), the following sources are used for waste disposal:

1. Additional payments of the ARA system to the residual waste disposal costs in regions with agreements for the thermal utilization of packaging waste
2. Disposal contributions at handover of bulky waste in a part of the municipalities
3. Cap of the costs for the collection in regions with a "pouring system"
4. Additional payments in regions with agreements for a mutual collection of non-packaging waste in the collection system for packagings

The amount of the municipal waste fee varies from municipality to municipality, not least due to the different services provided, and is therefore not suitable for comparisons.

In addition to some relatively large disposal companies (with a domestic turnover in the order of €200 m/a), most of the approx. 850 private disposal companies are small and medium-sized companies (incl. spun-off municipal enterprises).

### Key indicators on turnover and number employees in the Austrian waste management industry

<table>
<thead>
<tr>
<th>Private waste management, including spun-off municipal enterprises</th>
<th>Municipal enterprises (including associations) and public administration</th>
<th>General waste management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>approx. € 4,000 m/a</td>
<td>approx. € 1,000 m/a</td>
</tr>
<tr>
<td>Number of employees</td>
<td>approx. 25,000</td>
<td>approx. 6,000</td>
</tr>
</tbody>
</table>

### The waste incineration plants in Austria, their approximate throughput and ownership structure

#### Plant Details

- **Incineration plant Arnoldstein**: 96,000 T/a | Verbund, KELAG, Port, Siemens³
- **Incineration plant Dürnrohr**: 525,000 T/a | EVN 100%
- **Incineration plant Zistersdorf**: 130,000 T/a | ASA 100%
- **Incineration plant Wels**: 300,000 T/a | AVE (100% subsidiary of Energie AG)
- **Incineration plant Spittelau**: 250,000 T/a | Wien Energie GmbH 100%
- **Incineration plant Flötzental**: 200,000 T/a | Wien Energie GmbH 100%
- **Fluidised bed furnace Lenzing**: 300,000 T/a | RVL, GmbH 50% AVE GmbH 50% LAG
- **Incineration plant Pfaffenhofen**: 250,000 T/a | WIKU GmbH 100% (through EbS and MA 48 100% municipality of Vienna)
- **Fluidised bed furnace Nickelsdorf**: 100,000 T/a | ENAGES, UEG, Frohnleiten³
- **Fluidised bed furnace Vienna 4**: 110,000 T/a | Wien Energie GmbH 100%

#### Ownerships

1. at least 50% in direct or indirect ownership of Federal Provinces through energy utilities
2. with large stakes held by the energy utilities of the Federal Provinces or the Federal Government
3. 40.7% VERBUND-BeteiligungsgmbH, 40.7% KELAG – Kärntner Elektrizitäts-Aktiengesellschaft, 13.6% Port Infrastruktur GmbH, 5% Siemens Aktien-gesellschaft Österreich

### The mechanical-biological plants in Austria

- **Umwelt Dienst Burgenland GmbH**: 82,000
- **Ing. Rudolf Rötter GmbH**: 27,000
- **Abfallbehandlung „Am Ziegelofen“**: 42,000
- **Wiener Neustädter Stadtwerke und Kommunal Service GmbH**: 24,000
- **AWV Hartberg**: 4,500
- **ABL Abfallbehandlung Lavant GmbH**: 17,000
- **Linz Service GmbH**: 65,000
- **Salzburger Abfallbeseitigung GmbH**: 154,000
- **ZEMKA Gesellschaft m.b.H.**: 40,000
- **AWV Schlachming**: 15,250
- **AWV Mürzverband**: 17,100
- **AWV Murau**: 4,000
- **A.S.A. Abfallservice Halbenrain**: 70,000
- **AWV Liezen**: 25,000
- **Servus Abfall Dienstleistungs GmbH**: 65,000
- **Thöni Industriebetriebe GmbH**: 9,500

### Source

- Key indicators on turnover and number employees: Denkstatt, data from 2006 and 2008
- The waste incineration plants: Denkstatt, data from 2006 and 2008
As collectors, municipal operations concentrate on municipal waste. Their market share (in this case incl. spun-off enterprises with legal forms from the private sector and PPP operations) is rather low in terms of the number of municipalities covered, but because they are mainly active in the large municipalities, their share is markedly higher in terms of the collected waste. However, measured against the total mass of waste, incl. waste from commerce and industry, this market share is once again reduced.

The public sectors holds a large share of the plants treating residual and bulky waste. Waste incineration plants are usually fully or partly owned by energy utilities, which in turn are usually owned by the respective Federal Province. Mechanical-biological treatment plants, however, are usually owned by the municipalities themselves and the associations they belong to.

With other plant types, the share held by municipalities and Federal Provinces is much lower; organic waste treatment, for instance, is in the hands of agricultural composting while sorting and splitting plants as well as physico-chemical treatment facilities are dominated by private disposal management.

2.4.1 Collection and recovery systems

Collection and recovery systems are legal entities that, when it comes to collecting and treating specific products or wastes, can effectively take on the obligations set forth by a regulation in accordance with sec.13a and sec. 14 (1) of the Waste Management Act of 2002 and keep the pertinent records (these obligations primarily involve product take-back and recovery duties).

These ordinances are:
- Ordinance on Waste Prevention, Collection and Treatment of End-of-Life Vehicles (End-of-Life Vehicle Ordinance),
- Ordinance on Waste Prevention, Collection and Treatment of Waste Electrical and Electronic Equipment (WEEE Ordinance),
- Ordinance on Waste Prevention, Collection and Treatment of Waste Batteries and Waste Accumulators (Battery Ordinance).

Collection and recovery systems require accreditation by the Federal Minister of Agriculture, Forestry, Environment and Water Management pursuant to

2. Overview of Waste Management in Austria
sec. 29 Waste Management Act of 2002 and are also subject to his supervision. In particular, proof must be provided that collection, recovery and/or treatment can actually be organised on a nationwide scale and that the required funds are available. A key principle here is the equal treatment of all stakeholders, which also excludes and rebates and therefore puts all marketers on an absolutely equal footing. Generally, these collection and recovery systems can be classified into those for the collection and treatment of waste generated in households and those for the collection and treatment of commercial waste.


In terms of packaging, the task of collection and recovery systems is to organise the pick-up of packaging across Austria either from the point of generation (private households or commercial operations) or from collectors within a reasonable distance to the end consumer. The latter, in particular, is ensured by installing decentralised collection points or “collection islands” or by setting up collection points in political districts for packaging from commercial operations. In addition, the collection and recovery systems are required to ensure specific collection rates measured by the weight of packaging per packaging type included in the waste and are expected to provide specific material recovery rates also measured by the respective weight of packaging included in the waste. These rates stipulated in the respective approval certificates warrant compliance with the requirements of the EU Packaging Directive.

The following collection and recovery systems have been accredited for packaging waste:

### Accredited collection and recovery systems for packaging

<table>
<thead>
<tr>
<th>SYSTEM OPERATOR</th>
<th>PACKAGING MATERIALS</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARA Altstoff Recycling Austria AG</strong></td>
<td>plastic, composites, wood, textile fibres, ceramics, biogenic packaging and metal</td>
<td>Assumption of the duties for parties obligated under the Packaging Ordinance, provided the packaging they use is generated in private households and institutions generating a similar amount of packaging. <em>(household system)</em></td>
</tr>
<tr>
<td></td>
<td>plastic, composites, wood, textile fibres, ceramics and metal</td>
<td>Assumption of the duties for parties obligated under the Packaging Ordinance, provided the packaging they use is generated in commerce (retail, trade, industry and institutions). <em>(commercial system)</em></td>
</tr>
<tr>
<td></td>
<td>paper, cartons, cardboard and corrugated cardboard as well as composites</td>
<td>Assumption of the duties for parties obligated under the Packaging Ordinance, provided the packaging and product rests are generated in private households and institutions and companies whose packaging is comparable to that of private households in terms of type and quantity. <em>(household system)</em></td>
</tr>
<tr>
<td></td>
<td>paper, cartons, cardboard and corrugated cardboard as well as composites</td>
<td>Assumption of the duties for parties obligated under the Packaging Ordinance, provided the packaging used is not generated in private households and not generated in institutions or companies whose packaging is comparable to that of private households in terms of type and quantity. <em>(commercial system)</em></td>
</tr>
<tr>
<td><strong>AGR Austria Glas Recycling GmbH (in the ARA system)</strong></td>
<td>glass</td>
<td>Assumption of the duties for parties obligated under the Packaging Ordinance with regard to glass packaging generated in households and commerce.</td>
</tr>
<tr>
<td><strong>GUT – Galle Umwelttechnik GmbH</strong></td>
<td>paper, cartons, cardboard, corrugated cardboard, plastics, composites, metal, glass, wood and biogenic packaging</td>
<td>Assumption of the duties under the Packaging Ordinance &lt;a&gt;with regard to packaging waste in the commercial sector, including disposable tableware&lt;/a&gt; and &lt;a&gt;with regard to packaging waste, including disposable tableware, generated at McDonald’s restaurants in the commerce and households&lt;/a&gt;</td>
</tr>
<tr>
<td><strong>Öko-Box Sammel GmbH</strong></td>
<td>laminated beverage cartons</td>
<td>Assumption of the duties for parties obligated under the Packaging ordinance with regard to beverage composite board generated in households and commerce</td>
</tr>
</tbody>
</table>
### Accredited collection and recovery systems for packaging

<table>
<thead>
<tr>
<th>SYSTEM OPERATOR</th>
<th>PACKAGING MATERIALS</th>
<th>AREA</th>
</tr>
</thead>
</table>
| **Bonus Holsystem Gesellschaft m.b.H. & Co KG** | paper, cartons, cardboard, corrugated cardboard, including composite paper bags, wood, metals, plastics and textile fibres, especially jute bags | Assumption of the duties for parties obligated under the Packaging Ordinance, provided the packaging they use is **not** generated in private households or companies whose packaging is comparable to that of private households in terms of type and quantity and which are used in the following areas of business (commercial system):  
- construction products (including products from ancillary trades)  
- chemical products  
- agricultural products  
- shoes  
- food, beverages and tobacco  
- repair services for machines and devices  
- general retail  
- transport and forwarding |
| **UFH Verpackung Systembetreiber GmbH** | paper, cartons, cardboard, corrugated cardboard, including composite paper bags, wood, metals, plastics and textile fibres, especially jute bags | Collection and recovery in compliance with the ordinance of transport packaging (commercial packaging) and waste products subject to approval and assumption of the duties for parties obligated under the Packaging Ordinance. |
| **EVA Erfassen und Verwerten von Altstoffen GmbH** | paper, cartons, cardboard, corrugated cardboard, wood, metals, plastics, ferrometals, wood and textile fibres | Assumption of the duties for parties obligated under the Packaging Ordinance for packaging generated in commerce (commercial system). |

### Ordinance on Waste Prevention, Collection and Treatment of End-of-Life Vehicles (End-of-Life Vehicle Ordinance)

The original task was to assume the duties of the producer and importer of vehicles (passenger cars and lightweight utility vehicles with a maximum permissible weight of up to 3.5 tonnes). This essentially involves the take-back duty and fulfilling material recovery requirements already determined in the End-of-Life Vehicle Directive.

By virtue of the amended Ordinance, which took effect in July 2010, initial collection centres are permitted to assign their record-keeping and documentation duties and the organisation of the treatment in shredder operations to collection and recovery systems. These operations, too, must ensure the material recovery rates and the overall recovery rate (including other recovery), just like the manufacturers and importers.

For end-of-life vehicles, the following collection and recovery system has been approved:

<table>
<thead>
<tr>
<th>SYSTEM OPERATOR</th>
<th>VEHICLES</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ÖCAR Automobile-cycling GmbH</strong></td>
<td>Daihatsu, Ferrari, Honda, Hyundai, Lotus, Maserati, MG, Mitsubishi, Rover, KIA, Chrysler, Jeep, Dodge und Nissan (Datsun)</td>
<td>Collection and recovery of end-of-life vehicles of the given brands and classes M1 and N1 according to the Motor Vehicle Act (KFG) and three-wheeled vehicles but no motorcycles</td>
</tr>
</tbody>
</table>

### Ordinance on Waste Prevention, Collection and Treatment of Waste Electrical and Electronic Equipment (WEEE Ordinance)

The duty to collect waste electrical and electronic equipment was assigned to the municipalities by virtue of the Waste Management Act of 2002. The task of the collection and recovery systems is therefore to organise a pick-up service from the respective municipal collection points. Furthermore, final distributors of electrical and electronic equipment are obliged to take back one piece of waste electrical or electronic equipment for every piece of equipment they sell. For any such waste that has been generated, every political district usually has at least one collection point.

Further down the stream, the waste electrical and electronic equipment must be treated in compliance with the Waste Treatment Obligations Ordinance and, depending on the category, specific material recovery rates and overall recovery rates must be achieved in line with the WEEE Directive; this too must be ensured and demonstrated by the collection and recovery systems.

The following collection and recovery systems have been approved for waste electrical and electronic equipment:
Accredited collection and recovery systems for waste electrical and electronic equipment

<table>
<thead>
<tr>
<th>SYSTEM OPERATOR</th>
<th>CATEGORIES</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERA Elektro Recycling Austria GmbH</td>
<td>all</td>
<td>collection and recovery of household and commercial waste electrical and electronic equipment</td>
</tr>
<tr>
<td>UFH Elektroalt-geräte System Betreiber GmbH</td>
<td>all, except for gas discharge lamps</td>
<td>collection and recovery of household and commercial waste electrical and electronic equipment, with the exception of gas discharge lamps</td>
</tr>
<tr>
<td>UFH Altlampen Systembetreiber GmbH</td>
<td>gas discharge lamps</td>
<td>collection and recovery of household and commercial gas discharge lamps</td>
</tr>
<tr>
<td>EVA Erfassen und Verwerten von Alttstoffen GmbH</td>
<td>all</td>
<td>collection and recovery of household waste electrical and electronic equipment</td>
</tr>
<tr>
<td>European Recycling Platform (ERP) Österreich GmbH</td>
<td>all</td>
<td>collection and recovery of household waste electrical and electronic equipment</td>
</tr>
</tbody>
</table>

Ordinance on Waste Prevention, Collection and Treatment of Waste Batteries and Waste Accumulators (Battery Ordinance),
This Ordinance distinguishes between equipment batteries, vehicle batteries and industry batteries. For the first two categories, manufacturers and importers are obliged to participate in collection and recovery systems.

Municipalities are obliged to collect equipment batteries, while final distributors are obliged to collect equipment batteries and vehicle batteries (without limitation 1-for-1). The collection and recovery systems must therefore also ensure the pick-up from municipal collection points in this area and provide delivery points for the final distributor. The following collection and recovery systems have been accredited for waste batteries:

Accredited collection and recovery systems for waste batteries

<table>
<thead>
<tr>
<th>SYSTEM OPERATOR</th>
<th>CATEGORIES</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERA Elektro Recycling Austria GmbH</td>
<td>all</td>
<td>collection and recovery of waste batteries</td>
</tr>
<tr>
<td>European Recycling Platform (ERP) Österreich GmbH</td>
<td>all</td>
<td>collection and recovery of waste batteries</td>
</tr>
<tr>
<td>EVA Erfassen und Verwerten von Alttstoffen GmbH</td>
<td>all</td>
<td>collection and recovery of waste batteries</td>
</tr>
<tr>
<td>UFS Umweltforum Startbatterien GmbH</td>
<td>waste automotive batteries</td>
<td>collection and recovery of waste batteries</td>
</tr>
<tr>
<td>UFH Elektroalt-geräte System Betreiber GmbH</td>
<td>waste equipment and industrial batteries</td>
<td>collection and recovery of waste batteries</td>
</tr>
</tbody>
</table>
2.5 Provincial Waste Management Plans

The respective waste management acts of the Austrian Federal Provinces provide for the creation of a provincial waste management plan, report and programmes. Some Federal Provinces draw up updated annual – partly electronic – reports on their waste management that are available on the website of the respective specialised departments of the Provincial Government offices.

### Burgenland
- Provincial Waste Management Plan for Burgenland – 2006 Update
- Current waste data of the Burgenland Waste Association until 2009

### Carinthia

### Lower Austria
- Lower Austrian Waste Management Report 2009

### Upper Austria
- Upper Austrian Waste Management Plan 1999 (promulgated in Provincial Law Gazette No 104/1999 as an ordinance)
- Upper Austrian Waste Management Plan 2009

### Salzburg
- Salzburg Waste Management Plan 2006
- Salzburg Waste Balance Sheets until 2009

### Styria
- Provincial Waste Management Plan 2010
- Current waste management data, projects and publications of Styria until 2010

### Tyrol
- A legally binding Waste Management Programme was drawn up based on the Tyrolean Waste Management Act.
- Ordinance of the Provincial Government of 1 December 1992 by which a waste management programme is enacted
- Current waste data until 2008

### Vorarlberg
- Vorarlberg Waste Management Plan – 2nd 2006 Update
- Waste management data of Vorarlberg 2008

### Vienna
- The Vienna Waste Management Programme 2007
- Activity Report 2009 of Municipal Department 48 – Waste Management, Street Cleaning and Vehicle Fleet
3. Selected Waste Streams
| 3.   | SELECTED WASTE STREAMS                              | 3.11. | Municipal sewage sludge      | 55  |
| 3.1. | Waste from households and similar establishments   | 3.12. | Separately collected recoverables from trade and industry | 56  |
| 3.2. | Residual waste from households and similar establishments | 3.13. | Excavated materials          | 59  |
| 3.3. | Bulky waste from households and similar establishments | 3.14. | Waste from construction      | 62  |
| 3.4. | Separately collected hazardous household waste and waste electrical and electronic equipment from households and similar establishments | 3.15. | Ash, slag and dust from incineration | 64  |
| 3.5. | Separately collected recoverables from households and similar establishments | 3.16. | End-of-life vehicles         | 68  |
| 3.6. | Separately collected biogenic waste from households and similar establishments | 3.17. | Waste pneumatic tyres        | 69  |
| 3.7. | Home and community composting in home gardens      | 3.18. | Waste electrical and electronic equipment | 70  |
| 3.8. | Waste from green areas                             | 3.19. | Wood wastes                  | 74  |
| 3.9. | Catering waste                                     | 3.20. | Medical waste                | 76  |
| 3.10. | Street-cleaning residues                           | 3.21. | Animal by-products           | 78  |
|       |                                                     | 3.22. | Asbestos waste               | 81  |
|       |                                                     | 3.23. | Hazardous waste              | 83  |
|       |                                                     | 3.24. | Waste oils and waste lubricants (including specifically contaminated soil) | 89  |
|       |                                                     | 3.25. | Selected other waste         | 91  |
3.1. Waste from households and similar establishments

Waste characteristics

Definition and origin

“Waste from households and similar establishments” is made up of the following components: residual waste, bulky waste, recoverables (paper, glass, metal, plastic, textiles, etc.), biogenic waste, and hazardous household waste and waste electrical and electronic equipment and basically corresponds to the definition of “household waste” under sec. 2 (4) (2) of the Waste Management Act of 2002.

Such waste comes from households, administrative bodies of trade, industry or public administration, from kindergartens, schools and hospitals, small businesses and agriculture, from markets and other sites of waste generation, insofar as they are connected with municipal waste collection or waste collected contracted by the municipality/ies.

Composition

The composition of waste from households and similar establishments was calculated based on the analyses of residual waste in Styria in 2008 and an analysis of bulky waste in Upper Austria in 2009 and the current state of knowledge with regard with regard to the separately collected fractions in the years 2008 and 2009.

<table>
<thead>
<tr>
<th>Sub-fractions</th>
<th>Mass in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogenic waste</td>
<td>26.7</td>
</tr>
<tr>
<td>Paper, cardboard and cardboard packaging</td>
<td>21.8</td>
</tr>
<tr>
<td>Lightweight fraction</td>
<td>11.5</td>
</tr>
<tr>
<td>Glass</td>
<td>7.0</td>
</tr>
<tr>
<td>Wooden packaging and bulky wood</td>
<td>6.7</td>
</tr>
<tr>
<td>Metal packaging and bulky metals</td>
<td>4.1</td>
</tr>
<tr>
<td>Inert materials</td>
<td>2.0</td>
</tr>
<tr>
<td>Sanitary articles</td>
<td>3.0</td>
</tr>
<tr>
<td>Textiles</td>
<td>3.2</td>
</tr>
<tr>
<td>Waste electrical and electronic equipment</td>
<td>1.9</td>
</tr>
<tr>
<td>Hazardous household waste</td>
<td>1.0</td>
</tr>
<tr>
<td>Mattresses and carpets</td>
<td>0.8</td>
</tr>
<tr>
<td>Other recoverables</td>
<td>0.6</td>
</tr>
<tr>
<td>Residual fractions</td>
<td>9.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Quantities generated

In 2009, households and similar establishments generated approx. 3,895,000 tonnes of waste. Of this amount, public waste collection services removed about 1,402,100 tonnes of residual waste and some 259,100 tonnes of bulky waste.

Some 2,233,800 tonnes or about 57% of the total amount accumulated was collected through separate collection.

Factors influencing the amount generated and composition

- statutory provisions (e.g. on separate collection of recoverables, biogenic waste, hazardous household waste and waste electrical or electronic equipment)
- controls (e.g. by waste advisors or employees of the municipality)
- information activities (e.g. municipal newsletter) and awareness building (e.g. influencing purchase and disposal through personal values and opinions [“environmental awareness”])
- socio-economic factors (e.g. age, sex, vocation, income, level of education, purchasing power)
- spatial-structural factors (e.g. population density, demographic development, household structure, municipal structure, garden share, purchasing behaviour, participation in separate collection, seasons, tourism, secondary residences)
- waste-logistical influencing factors (e.g. prevailing container size, waste charges, waste collection intervals, packaging component in residual waste contingent on the various types of separate collections, participation of commerce, trade and industry in municipal waste collection)

### Waste from households and similar establishments in 2009

<table>
<thead>
<tr>
<th>Main fractions</th>
<th>Quantities generated</th>
<th>in kg/capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual waste</td>
<td>1,402,100</td>
<td>168</td>
</tr>
<tr>
<td>Bulky waste</td>
<td>259,100</td>
<td>31</td>
</tr>
<tr>
<td>Recoverables, collected separately</td>
<td>1,386,000</td>
<td>166</td>
</tr>
<tr>
<td>Biogenic waste, collected separately</td>
<td>752,100</td>
<td>90</td>
</tr>
<tr>
<td>Hazardous household waste and WEEE, collected separately</td>
<td>95,700</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,895,000</strong></td>
<td><strong>466</strong></td>
</tr>
</tbody>
</table>
Waste from households and similar establishments in 2009
Nationwide quantities by individual fraction

<table>
<thead>
<tr>
<th>Individual fractions</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual waste</td>
<td>1,402,100</td>
</tr>
<tr>
<td>Bulky waste</td>
<td>259,100</td>
</tr>
<tr>
<td>Biogenic waste and green waste</td>
<td>752,100</td>
</tr>
<tr>
<td>Waste paper</td>
<td>677,000</td>
</tr>
<tr>
<td>Waste glass</td>
<td>211,600</td>
</tr>
<tr>
<td>Lightweight fraction</td>
<td>148,100</td>
</tr>
<tr>
<td>Waste wood</td>
<td>183,200</td>
</tr>
<tr>
<td>Scrap metal – household scrap (bulky waste collection)</td>
<td>86,800</td>
</tr>
<tr>
<td>Waste metals</td>
<td>30,600</td>
</tr>
<tr>
<td>Waste textiles</td>
<td>26,000</td>
</tr>
<tr>
<td>Other recoverables</td>
<td>22,800</td>
</tr>
<tr>
<td>Hazardous household waste</td>
<td>23,200</td>
</tr>
<tr>
<td>Waste electrical and electronic equipment</td>
<td>72,600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,895,000</strong></td>
</tr>
</tbody>
</table>

The share of separately collected packaging out of total recoverable waste amount generated by households and similar establishments (excl. packaging in residual waste), taken as a constituent of the recoverables, amounts to barely 11% or approx. 435,300 tonnes composed of “waste paper, cardboard and cardboard packaging”, “waste glass”, “waste metals” (not incl. household scrap), “lightweight fraction” and selected “other recoverables” such as waste wooden packaging or sorted plastic fractions such as EPS, plastic hollow parts and film.

The rise in waste quantities generated by households and similar establishments are, as was already observed in previous years, is caused by the

Waste from households and similar establishments in 2009
Amount generated by Austrian Federal Provinces (rounded)

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Quantity generated in tonnes</th>
<th>Quantity generated in kg per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>90,900</td>
<td>321</td>
</tr>
<tr>
<td>Carinthia</td>
<td>208,800</td>
<td>373</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>838,600&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>522</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>632,900&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>449</td>
</tr>
<tr>
<td>Salzburg</td>
<td>251,300&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>475</td>
</tr>
<tr>
<td>Styria</td>
<td>492,800</td>
<td>408</td>
</tr>
<tr>
<td>Tyrol</td>
<td>368,200&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>522</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>112,500</td>
<td>306</td>
</tr>
<tr>
<td>Vienna</td>
<td>899,000&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>531</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td><strong>3,895,000</strong></td>
<td><strong>466</strong></td>
</tr>
</tbody>
</table>

<sup>1</sup> including green waste

Separately collected packaging in 2009
Quantities generated (calculated and rounded)<sup>1)</sup>

<table>
<thead>
<tr>
<th>Packaging fractions</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste paper, cardboard and cardboard packaging</td>
<td>87,300</td>
</tr>
<tr>
<td>Waste glass</td>
<td>205,900</td>
</tr>
<tr>
<td>Waste metals (not incl. household scrap)</td>
<td>23,900</td>
</tr>
<tr>
<td>Lightweight fraction</td>
<td>117,000</td>
</tr>
<tr>
<td>Waste wood</td>
<td>100</td>
</tr>
<tr>
<td>Other recoverables</td>
<td>1,100</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td><strong>435,300</strong></td>
</tr>
</tbody>
</table>

<sup>1)</sup> extrapolated from data provided by ARA "Net total packaging" as part of household waste collections by Federal Province, 2009

Waste from households and similar establishments in 2004 and 2009
Separated by main fractions for the sake of comparison

<table>
<thead>
<tr>
<th>Main fractions</th>
<th>2004 in tonnes</th>
<th>2009 in tonnes</th>
<th>Change in tonnes</th>
<th>Change in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total waste quantities from households and similar establishments</td>
<td>3,418,700</td>
<td>3,895,000</td>
<td>+ 476,300</td>
<td>+ 13.9</td>
</tr>
<tr>
<td>of which: residual waste</td>
<td>1,382,600</td>
<td>1,402,100</td>
<td>+ 19,500</td>
<td>+ 1.4</td>
</tr>
<tr>
<td>of which: bulky waste</td>
<td>236,400</td>
<td>259,100</td>
<td>+ 22,700</td>
<td>+ 9.6</td>
</tr>
<tr>
<td>Separately collected waste from households and similar establishments</td>
<td>1,799,700</td>
<td>2,233,800</td>
<td>+ 434,100</td>
<td>+ 24.1</td>
</tr>
<tr>
<td>of which: hazardous household waste and WEEE&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>41,300</td>
<td>95,700</td>
<td>+ 54,400</td>
<td>+ 131.7</td>
</tr>
<tr>
<td>of which: recoverables&lt;sup&gt;2)&lt;/sup&gt;</td>
<td>1,212,100</td>
<td>1,386,000</td>
<td>+ 173,900</td>
<td>+ 14.3</td>
</tr>
<tr>
<td>of which: biogenic waste</td>
<td>546,300</td>
<td>752,100</td>
<td>+ 205,800</td>
<td>+ 37.7</td>
</tr>
</tbody>
</table>

<sup>1)</sup> A coordinated nationwide collection of waste electrical and electronic equipment was not implemented until August 2005; as a result, comparability of the quantities of “Hazardous household waste and WEEE” for 2004 and 2009 is limited.
<sup>2)</sup> excluding sorted recoverables from mechanical biological treatment and splitting
The waste from households and similar establishments weighs approximately 3,895,000 tonnes and corresponds to a volume in bulk of approx. 35.7 million m³ in the waste containers.

### Treatment

In 2009, the recovery and disposal of the approx. 3,895,000 tonnes of waste from households and similar establishments was ensured by means of the following treatment methods:

**Waste from households and similar establishments in 2009**

**Recovery and disposal – First treatment stage after sorting and splitting**

<table>
<thead>
<tr>
<th>Designations of waste types</th>
<th>Quantities in tonnes</th>
<th>Converted to kg/m³</th>
<th>Volumes in m³ (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual waste</td>
<td>1,402,100</td>
<td>130</td>
<td>10,785,000</td>
</tr>
<tr>
<td>Bulk wastes</td>
<td>259,100</td>
<td>100</td>
<td>2,591,000</td>
</tr>
<tr>
<td>Hazardous household waste</td>
<td>23,200</td>
<td>100</td>
<td>232,000</td>
</tr>
<tr>
<td>Waste electrical and</td>
<td>72,600</td>
<td>125</td>
<td>581,000</td>
</tr>
<tr>
<td>electronic equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper – packaging /</td>
<td>677,000</td>
<td>150</td>
<td>4,513,000</td>
</tr>
<tr>
<td>printed matter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass – packaging</td>
<td>211,600</td>
<td>280</td>
<td>756,000</td>
</tr>
<tr>
<td>Metal – packaging</td>
<td>30,600</td>
<td>50</td>
<td>612,000</td>
</tr>
<tr>
<td>Metal – household scrap</td>
<td>86,800</td>
<td>200</td>
<td>434,000</td>
</tr>
<tr>
<td>(bulky waste collection)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lightweight fraction –</td>
<td>148,100</td>
<td>30</td>
<td>4,037,000</td>
</tr>
<tr>
<td>packaging</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td>26,000</td>
<td>200</td>
<td>130,000</td>
</tr>
<tr>
<td>Wood – packaging /</td>
<td>183,200</td>
<td>370</td>
<td>495,000</td>
</tr>
<tr>
<td>bulky wood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other recoverables,</td>
<td>22,600</td>
<td>100</td>
<td>226,000</td>
</tr>
<tr>
<td>incl. packaging</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biogenic waste</td>
<td>464,200</td>
<td>80</td>
<td>3,803,000</td>
</tr>
<tr>
<td>Green waste</td>
<td>287,900</td>
<td>80</td>
<td>3,599,000</td>
</tr>
<tr>
<td>Total</td>
<td>3,895,000</td>
<td></td>
<td>35,694,000</td>
</tr>
</tbody>
</table>

1 Conversion factors in acc. with the “2009 Lower Austrian Waste Management Report”

Compared to 2004, the overall quantities deposited in landfills (i.e. the sum total of residues from the treatment of fractions from separate collection and residues from the thermal and biotechnological treatment of waste) have declined by around 277,000 tonnes or approx. 34% (from around 814,000 tonnes to approx. 537,000 tonnes) – and this in spite of a rise in the quantities of waste generated in households of approx. 476,300 tonnes. As a result, only approx. 13.8% of the waste from households and similar establishments was landfilled in 2009.

### Comments on the following tables and graphs

- Figures on the waste generated are based on information from the Provincial Governments (partly calculated or extrapolated by Umweltbundesamt GmbH)
- The survey was carried out in November 2010.
- The population-based shares of quantity generated, recovery and disposal of waste from...
The data on separately collected waste electrical and electronic equipment is based on information provided by the Austria Waste Electrical and Electronic Equipment Coordination Point. In addition to the separately collected 72,556 tonnes, 2,229 tonnes of waste electrical and electronic equipment were collected for which no regional allocation is possible.

Some of the waste from separate collection contains residual waste and non-packaging made of the same material.

<table>
<thead>
<tr>
<th></th>
<th>Residual waste</th>
<th>Bulk wastes</th>
<th>Hazardous household waste</th>
<th>Waste electrical and electronic equipment</th>
<th>Paper pressure</th>
<th>Glass</th>
<th>Metals</th>
<th>Metals scrap</th>
<th>Textiles</th>
<th>Light-weight fraction</th>
<th>Bulky waste wood</th>
<th>Other recoverables</th>
<th>Bulky waste</th>
<th>Green waste</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>28,782</td>
<td>7,586</td>
<td>560</td>
<td>1,932</td>
<td>21,472</td>
<td>8,517</td>
<td>1,574</td>
<td>N.A.</td>
<td>800</td>
<td>7,157</td>
<td>N.A.</td>
<td>N.A.</td>
<td>12,524</td>
<td>N.A.</td>
<td>90,904</td>
</tr>
<tr>
<td>C</td>
<td>97,453</td>
<td>17,197</td>
<td>1,715</td>
<td>3,193</td>
<td>46,898</td>
<td>14,000</td>
<td>1,953</td>
<td>N.A.</td>
<td>3,000</td>
<td>6,508</td>
<td>N.A.</td>
<td>450</td>
<td>16,350</td>
<td>N.A.</td>
<td>208,817</td>
</tr>
<tr>
<td>LA</td>
<td>218,300</td>
<td>75,280</td>
<td>6,979</td>
<td>14,802</td>
<td>127,426</td>
<td>36,973</td>
<td>6,801</td>
<td>20,308</td>
<td>6,057</td>
<td>143,962</td>
<td>113,082</td>
<td>838,557</td>
<td>84,653</td>
<td>632,901</td>
<td>935,117</td>
</tr>
<tr>
<td>UA</td>
<td>170,418</td>
<td>40,067</td>
<td>2,712</td>
<td>14,576</td>
<td>113,559</td>
<td>35,222</td>
<td>4,748</td>
<td>22,408</td>
<td>33,328</td>
<td>45,368</td>
<td>55,569</td>
<td>54,541</td>
<td>32,977</td>
<td>368,193</td>
<td>492,809</td>
</tr>
<tr>
<td>S</td>
<td>92,000</td>
<td>17,000</td>
<td>870</td>
<td>5,427</td>
<td>43,750</td>
<td>13,400</td>
<td>1,300</td>
<td>6,600</td>
<td>9,850</td>
<td>13,200</td>
<td>15,500</td>
<td>31,450</td>
<td>25,125</td>
<td>121,533</td>
<td>212,225</td>
</tr>
<tr>
<td>St</td>
<td>151,227</td>
<td>48,288</td>
<td>3,112</td>
<td>10,607</td>
<td>97,825</td>
<td>36,302</td>
<td>5,706</td>
<td>13,597</td>
<td>3,515</td>
<td>26,642</td>
<td>25,734</td>
<td>29,047</td>
<td>67,350</td>
<td>492,809</td>
<td>518,193</td>
</tr>
<tr>
<td>T</td>
<td>96,381</td>
<td>23,832</td>
<td>5,689</td>
<td>6,929</td>
<td>64,849</td>
<td>28,407</td>
<td>3,660</td>
<td>4,592</td>
<td>20,754</td>
<td>15,010</td>
<td>3,699</td>
<td>51,852</td>
<td>32,977</td>
<td>368,193</td>
<td>492,809</td>
</tr>
<tr>
<td>V</td>
<td>31,609</td>
<td>4,674</td>
<td>511</td>
<td>3,858</td>
<td>30,791</td>
<td>12,302</td>
<td>2,562</td>
<td>N.A.</td>
<td>2,999</td>
<td>9,904</td>
<td>N.A.</td>
<td>106</td>
<td>13,230</td>
<td>N.A.</td>
<td>112,513</td>
</tr>
<tr>
<td>Vie</td>
<td>515,931</td>
<td>25,175</td>
<td>1,903</td>
<td>11,232</td>
<td>130,350</td>
<td>26,479</td>
<td>2,332</td>
<td>14,279</td>
<td>8,151</td>
<td>45,595</td>
<td>2,944</td>
<td>72,898</td>
<td>41,708</td>
<td>899,003</td>
<td>3,894,954</td>
</tr>
</tbody>
</table>
### Waste from households and similar establishments in 2009 – Recovery and removal by Federal Province and Fraction (in tonnes)

<table>
<thead>
<tr>
<th>Composting and fermentation</th>
<th>Material recovery</th>
<th>Special treatment</th>
<th>Incineration plants and thermal treatment of prepared fractions</th>
<th>Biotechnological treatment</th>
<th>Landfills</th>
<th>QUANTITIES GENERATED (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biogenic waste from separate collection</strong></td>
<td><strong>Recoverables from separate collection</strong></td>
<td><strong>Recoverables from separate collection</strong></td>
<td><strong>Sorted recoverables from the preparation of residual waste and bulky waste</strong></td>
<td><strong>Hazardous household waste and WEEE from separate collection</strong></td>
<td><strong>Direct Supply from residual waste and bulky waste</strong></td>
<td><strong>High-calorific fraction from the preparation of residual waste and bulky waste</strong></td>
</tr>
<tr>
<td>B</td>
<td>11,900</td>
<td>0</td>
<td>33,700</td>
<td>4,000</td>
<td>2,500</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>15,600</td>
<td>400</td>
<td>65,800</td>
<td>2,200</td>
<td>4,900</td>
<td>95,000</td>
</tr>
<tr>
<td>LA</td>
<td>244,200</td>
<td>3,800</td>
<td>220,400</td>
<td>10,900</td>
<td>20,900</td>
<td>195,200</td>
</tr>
<tr>
<td>UA</td>
<td>132,200</td>
<td>1,300</td>
<td>214,000</td>
<td>16,900</td>
<td>17,300</td>
<td>0</td>
</tr>
<tr>
<td>S</td>
<td>44,600</td>
<td>700</td>
<td>73,300</td>
<td>12,100</td>
<td>6,300</td>
<td>0</td>
</tr>
<tr>
<td>St</td>
<td>64,000</td>
<td>1,400</td>
<td>175,100</td>
<td>22,200</td>
<td>13,700</td>
<td>0</td>
</tr>
<tr>
<td>T</td>
<td>80,600</td>
<td>3,300</td>
<td>122,200</td>
<td>13,000</td>
<td>12,600</td>
<td>3,000</td>
</tr>
<tr>
<td>V</td>
<td>12,500</td>
<td>100</td>
<td>50,200</td>
<td>4,000</td>
<td>4,400</td>
<td>800</td>
</tr>
<tr>
<td>Vie</td>
<td>108,900</td>
<td>1,700</td>
<td>195,000</td>
<td>0</td>
<td>13,100</td>
<td>54,100</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>714,500</td>
<td>12,700</td>
<td>1,149,700</td>
<td>85,300</td>
<td>95,700</td>
<td>835,100</td>
</tr>
</tbody>
</table>

This tabular overview provides purely constructed values. The quantity generated originates from the Federal Province; however, the place of treatment may be inside or outside the Federal Province or even abroad.
Waste from households and similar institutions in 2009: approx. 3,895,000 t

Residual waste and bulky waste: approx. 1,861,000 t
Separate collection: approx. 2,234,000 t

Input in splitting
Input in sorting
Input in sorting

Thermal treatment
Biotechnical treatment
Material recovery

TT
ST

Residual materials approx. 34,000 t
Residual materials approx. 16,000 t
Residual materials approx. 2,000 t

Landfilling
approx. 537,000 t

Residual materials approx. 214,000 t
Residual materials approx. 271,000 t
Residual materials approx. 16,000 t
Residual materials approx. 2,000 t

Metals approx. 18,000 t

ST special treatment
TT thermal treatment
R recovery
MR material recovery
* including 13,000 tonnes of biodegradable recoverables from separate collection.

Source: Environment Agency Austria, December, 2010
3. Selected Waste Streams

Waste from households and similar establishments
Quantity generated, recovery and disposal between 1989 and 2009
in % by mass

First treatment pathways:
- recovery of biogenic waste, particularly from separate collection and from green waste
- recovery of recoverables, especially from separate collection
- treatment of hazardous household waste and waste electrical and electronic equipment from separate collection
- thermal treatment (incineration or co-incineration)
- biotechnical treatment in (mechanical-)biological treatment plant
- landfilling

Source: Environment Agency Austria, April, 2011
3.2. Residual waste from households and similar establishments

Waste qualities
Definition and origin
Residual waste is defined as all the solid waste that is normally generated by households and similar establishments, except for bulky waste and separately collected waste, such as recoverables (paper, glass, metal, plastics and other), biogenic waste and hazardous household waste.

Composition
Relative to the total accumulation of residual waste, “paper, cardboard, corrugated board and cardboard packaging” and “biogenic or organic waste” represent the main components. Other significant components of residual waste are “plastics and composite materials”, “sanitary articles”, “textiles”, “glass”, “metal”, “wood”, and “hazardous household waste”. Another insignificant fraction consists of the non-classifiable “fine and coarse component” of residual waste.

Residual waste from households and similar establishments
Composition

<table>
<thead>
<tr>
<th>Fractions</th>
<th>Mass by %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic/biogenic waste</td>
<td>20.5</td>
</tr>
<tr>
<td>Paper, cardboard and cardboard packaging</td>
<td>12.4</td>
</tr>
<tr>
<td>Sanitary articles</td>
<td>8.2</td>
</tr>
<tr>
<td>Plastics and lightweight fraction</td>
<td>9.7</td>
</tr>
<tr>
<td>Composite materials</td>
<td>9.5</td>
</tr>
<tr>
<td>Textiles</td>
<td>5.8</td>
</tr>
<tr>
<td>Glass</td>
<td>4.3</td>
</tr>
<tr>
<td>Inert materials</td>
<td>3.4</td>
</tr>
<tr>
<td>Metals</td>
<td>2.9</td>
</tr>
<tr>
<td>Hazardous household waste</td>
<td>1.2</td>
</tr>
<tr>
<td>Other</td>
<td>2.5</td>
</tr>
<tr>
<td>Residual fine fraction</td>
<td>19.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Residual waste from households and similar establishments (net weight)

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Mass in %</th>
<th>Mass in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and cardboard packaging</td>
<td>2.7</td>
<td>37,500</td>
</tr>
<tr>
<td>Glass</td>
<td>3.4</td>
<td>47,800</td>
</tr>
<tr>
<td>Metals</td>
<td>1.5</td>
<td>21,500</td>
</tr>
<tr>
<td>Plastics</td>
<td>5.5</td>
<td>75,900</td>
</tr>
<tr>
<td>Composite materials</td>
<td>1.1</td>
<td>15,900</td>
</tr>
<tr>
<td>Packaging components in residual waste</td>
<td></td>
<td><strong>14.3</strong></td>
</tr>
</tbody>
</table>

Quantities generated
In 2009, households and similar establishments generated some 1,402,100 tonnes of residual waste.
Waste similar to household waste from agriculture, trade, industry and from public institutions and markets is also mainly collected by the municipal waste collection services.

The bulky waste component in residual waste depends on the size of the containers provided for residual waste collection, i.e., the bigger the available container volumes, the greater the share of bulky waste that is collected in those containers.

In 2009, residual waste was treated as follows in the first treatment stage or after sorting and splitting:

- some 24.4% (around 341,400 tonnes) was treated biotechnologically (“low-calorific fraction from splitting”);
- some 70.5% (around 988,700 tonnes) underwent thermal treatment (“untreated residual waste directly in the incineration plant” [around 704,800 tonnes] and “high-calorific fraction from splitting” [around 283,900 tonnes]);
- the recoverables separated from the residual waste (around 5.1% of the quantity or approx. 72,000 tonnes) underwent recovery.

3.3. Bulky waste from households and similar establishments

Waste characteristics
Definition and origin
Bulky waste consists of waste that by nature (size or weight) cannot be collected through the ordinary local residual waste collection systems.

Composition
The composition of bulky waste is extremely heterogeneous and depends on the type of collection (street collection, collection on request, collection by central collection sites such as recycling yards, waste collection points, etc.), the container size for residual waste, statutory regulations, etc. The predominant material groups in bulky waste are composite materials, wood and metals.

Quantities generated
In 2009, households and similar establishments generated approx. 259,100 tonnes of bulky waste.
In 2009, each Federal Province generated between 13 and 47 kilograms per inhabitant. The specified weights are comparable only to a limited degree, since not all municipalities or Federal Provinces carried out organised preliminary collection of recoverable fractions.

The separated materials are only partially included in bulky waste and are for the most part found in individual recoverable fractions of the Federal Provinces. If the total bulky waste weight specified by the Federal Provinces for 2009 (approx. 259,100 tonnes) is added to the specified separately collected bulky waste (“household scrap” of approx. 86,800 tonnes or “bulky waste wood” of approx. 183,200 tonnes), the resulting nationwide accumulation of bulky waste amounts to approx. 529,100 tonnes or approx. 63 kg per inhabitant (2004: approx. 456,000 tonnes or approx. 56 kilograms per inhabitant).

Since the late 1980s, the weights of collected bulky waste – like those of separately collected recoverables from bulky waste – have been steadily on the rise.
This increase is due to the rising standard of living, the increasing number of households and the associated increase in the quantity of goods consumed – and, in the specific case of furniture and household goods, a reduction in product service life.

### Bulky waste from households and similar establishments in 2009
(not including “bulky waste metal” and “bulky waste wood”)

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>7,600</td>
</tr>
<tr>
<td>Carinthia</td>
<td>17,200</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>75,300</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>40,000</td>
</tr>
<tr>
<td>Salzburg</td>
<td>17,000</td>
</tr>
<tr>
<td>Styria</td>
<td>48,300</td>
</tr>
<tr>
<td>Tyrol</td>
<td>23,800</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>4,700</td>
</tr>
<tr>
<td>Vienna</td>
<td>25,200</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td><strong>259,100</strong></td>
</tr>
</tbody>
</table>

### Treatment
Separately collected waste metal from bulky waste ends up in material recovery plants for this fraction.
Sorted untreated and treated waste wood is mostly incinerated in thermal plants for recovery of its energy content.
Bulky waste that can no longer be subjected to material recovery – usually after a reduction process – is thermally treated.

Further optimisation in the separate collection of bulky waste wood and waste metal will presumably prevent a further rise in the quantity of bulky waste generated.

### 3.4. Separately collected hazardous household waste and waste electrical and electronic equipment from households and similar establishments

#### Waste characteristics

**Definition and origin**
Hazardous household waste are hazardous waste usually generated by private households. Hazardous household waste are also considered to include the hazardous waste from all the remaining waste generators and are comparable in terms and quantity to the hazardous waste generated by private households. In both cases, such waste is classified as belonging to the group of hazardous household waste so long as they are in the care of the waste generator.

In order to ensure comparability with the quantities specified in the Federal Waste Management Plan 2006, this chapter also looks at the waste fraction “waste electrical and electronic equipment from households and similar establishments”.

3. Selected Waste Streams

Hazardous household waste as well as waste electrical and electronic equipment from households and similar establishments in 2004 and 2009

<table>
<thead>
<tr>
<th>Hazardous household waste and WEEE</th>
<th>2004</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous household waste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WEEE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantities generated</td>
<td>41,300</td>
<td>23,200</td>
</tr>
<tr>
<td>Kg per inhabitant</td>
<td>5.0</td>
<td>2.8</td>
</tr>
<tr>
<td>Share in the quantities generated</td>
<td>1.2</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Composition

The following hazardous household waste are collected in Austria:
- old stocks of plant protection products and pesticides
- waste lacquer and paint
- medicinal products
- batteries
- lead storage cells (starter batteries)
- aerosol cans (spray cans)
- lab waste and left-over chemicals
- alkalines
- solvents
- medical waste
- liquid mineral oil waste (waste oils)
- solid waste contaminated with grease and oil
- waste containing mercury
- acids
- waste electrical and electronic equipment (incl. cooling devices and fluorescent lamps)

Quantities generated

The quantity of separately collected hazardous household waste as well as waste electrical and electronic equipment from households and similar establishments in 2009 – compared to that of 2004 – is as follows (data on the weights of waste electrical and electronic equipment were provided by the Austria Waste Electrical and Electronic Equipment Coordination Point [Elektroaltgeräte Koordinierungsstelle Austria GmbH]).

Treatment

The hazardous household waste need to be brought from the waste generator (household) to stationary collection points, mobile collection points or specialized businesses (companies placing the substance on the market that accept the return of various wastes) or else picked up from the established places of collection or households by authorised waste collection services.

Non-recoverable hazardous household waste, such as residue waste from separate collection or sorting, are treated, depending on the fraction involved, in physico-chemical or thermal plants – for recovery of their energy content.

In view of the diversity of the group “hazardous household waste”, no indications can be made on the recovery and disposal options implemented after collection.

Hazardous household waste as well as waste electrical and electronic equipment in 2009

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Hazardous household waste in tonnes</th>
<th>Hazardous household waste</th>
<th>WEEE in tonnes</th>
<th>WEEE in kg / capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Austria</td>
<td>2,710</td>
<td>1.9</td>
<td>14,580</td>
<td>10.3</td>
</tr>
<tr>
<td>Salzburg</td>
<td>870</td>
<td>1.6</td>
<td>5,430</td>
<td>10.3</td>
</tr>
<tr>
<td>Styria</td>
<td>3,110</td>
<td>2.6</td>
<td>10,610</td>
<td>8.8</td>
</tr>
<tr>
<td>Tyrol</td>
<td>5,690</td>
<td>8.1</td>
<td>6,930</td>
<td>9.8</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>510</td>
<td>1.4</td>
<td>3,860</td>
<td>10.5</td>
</tr>
<tr>
<td>Vienna</td>
<td>1,900</td>
<td>1.1</td>
<td>11,230</td>
<td>6.6</td>
</tr>
<tr>
<td>Austria</td>
<td>23,170</td>
<td>2.8</td>
<td>72,560</td>
<td>8.7</td>
</tr>
</tbody>
</table>

1) Coordinated nationwide collection of waste electrical and electronic equipment did not commence until August 2005; therefore, the quantities of “Hazardous household waste and WEEE” of 2004 and 2009 are only comparable to a limited extent.
3.5. Separately collected recoverables from households and similar establishments

Waste characteristics
Definition and origin
Recoverables are waste that is collected separately from other types of waste, or substances that are reclaimed from waste through treatment, in order to deliver such waste in a certifiable manner for admissible recovery.

Composition
Recoverables include the following components:
- paper, cardboard and cardboard packaging – packaging and printed matter
- glass (white glass and coloured glass) – packaging
- metal – packaging
- metal – household scrap
- textiles
- lightweight fraction – packaging
- wood – packaging
- bulky wood
- other recoverables such as fats/frying oil, flat glass, waste pneumatic tyres, other plastics, etc.

Quantities generated

Recoverables from households and similar establishments in 2004 and 2009 (not incl. sorted recoverables from mechanical-biological treatment and splitting)

<table>
<thead>
<tr>
<th>Separately collected recoverables</th>
<th>2004</th>
<th>2009</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity generated in tonnes</td>
<td>1,212,100</td>
<td>1,386,000</td>
<td>+174,000</td>
</tr>
<tr>
<td>Change in percent</td>
<td>+14.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity generated in kg per inhabitant</td>
<td>148</td>
<td>166</td>
<td>+18</td>
</tr>
<tr>
<td>% share in the total quantity of waste generated by households and similar establishments</td>
<td>35.5</td>
<td>35.6</td>
<td>+0.1</td>
</tr>
</tbody>
</table>

The biggest increases in separate collection of the various fractions in 2009 as compared to 2004 are found in:
- paper/cardboard/cardboard packaging: +75,900 tonnes or +13%
- bulky waste wood: +61,900 tonnes or +51%
- waste glass: +20,900 tonnes or +11%
- lightweight fraction: 21,100 tonnes or +17%

The collection of metal packaging and metal scrap has been declining strongly since 2004 (total decline approx. 13,800 tonnes or approx. –11%), the collection of other recoverables has changed only negligibly.

Nationwide quantities generated by individual fraction

<table>
<thead>
<tr>
<th>Fractions</th>
<th>in tonnes</th>
<th>in kg per inhabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper, cardboard and cardboard packaging, packaging, printed matter</td>
<td>677,000</td>
<td>81</td>
</tr>
<tr>
<td>Glass – packaging</td>
<td>211,600</td>
<td>25</td>
</tr>
<tr>
<td>Metals – packaging</td>
<td>30,600</td>
<td>4</td>
</tr>
<tr>
<td>Metals – scrap</td>
<td>86,800</td>
<td>10</td>
</tr>
<tr>
<td>Textiles</td>
<td>26,000</td>
<td>3</td>
</tr>
<tr>
<td>Lightweight fraction – packaging</td>
<td>148,100</td>
<td>18</td>
</tr>
<tr>
<td>Wood – packaging – bulky wood</td>
<td>183,200</td>
<td>22</td>
</tr>
<tr>
<td>Other recoverables</td>
<td>22,600</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total recoverables (rounded)</strong></td>
<td><strong>1,386,000</strong></td>
<td><strong>166</strong></td>
</tr>
</tbody>
</table>
3.6. Separately collected biogenic waste from households and similar establishments

**Waste characteristics**

**Definition and origin**

Separately collected biogenic waste consists of:

- plant residues and biodegradable wastes from home gardens, such as grass cuttings, foliage, flowers, windfall fruit or bulky green waste such as cuttings from shrubs and trees,
- organic kitchen waste, particularly from cooking and eating (left-over food).

**Composition**

The composition varies according to the place the waste was generated at and the time of year.

**Quantities generated**

The quantities of separately collected biogenic waste are given below for 2009 – and compared to the quantities of 2004:

<table>
<thead>
<tr>
<th>Biogenic waste from households and similar establishments in 2004 and 2009</th>
<th>Quantities generated in a comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogenic waste 2004</td>
<td>2009</td>
</tr>
<tr>
<td>Total quantity in tonnes</td>
<td>546,300</td>
</tr>
<tr>
<td>kg per inhabitant</td>
<td>67</td>
</tr>
<tr>
<td>% share of total quantity generated of waste generated by households and similar establishments</td>
<td>16</td>
</tr>
</tbody>
</table>

### Treatment

Approx. 1,386,000 tonnes of separately collected recoverables from households were treated using the following methods in 2009:

<table>
<thead>
<tr>
<th>Recoverables from households and similar establishments in 2009 (not incl. sorted recoverables from mechanical-biological treatment and splitting)</th>
<th>Recovery and disposal methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material recovery: approx. 83.0%</td>
<td>Depending on the fraction, approx. 10% to approx. 97% of the recoverables underwent material recovery.</td>
</tr>
<tr>
<td>Biotechnological recovery: approx. 0.9%</td>
<td>Component of the fractions &quot;waste wood&quot;, &quot;edible oils and fats&quot; as well as &quot;Christmas trees&quot; underwent biotechnological treatment.</td>
</tr>
<tr>
<td>Thermal recovery: over 15.0%</td>
<td>Between approx. 3% and approx. 90% of the &quot;light packaging&quot;, &quot;wood – packaging&quot;, &quot;bulky wood&quot;, &quot;textiles&quot;, &quot;waste pneumatic tyres&quot; and &quot;dirty paper&quot; was treated in thermal plants.</td>
</tr>
<tr>
<td>Disposal in landfills: approx. 1.1%</td>
<td>Between approx. 1% and approx. 5% of non-recoverable components in the recoverables (residual waste, non-packaging made of similar material, improperly sorted materials) and the residual materials from sorting prior to recovery of recoverables was landfilled.</td>
</tr>
</tbody>
</table>
The organic waste container has now become established throughout Austria as the predominant collection system for biogenic waste (in the pick-up system). Pruning and grass cuttings from home gardens are mainly taken to existing collection points by the households. 

The separately collected biogenic waste is recovered through agricultural composting (spread out on agricultural and forestry land), composting in municipal facilities, commercial composting facilities commissioned by the waste management associations, by the municipalities, or others, or by means of biogas plants. Compost is given by the municipalities or the recovery facilities to the population and allotment associations or used for cultivation (gardens, parks, cemeteries, sports facilities, etc.) in commercial gardening operations, in landscape design or in public green areas of the municipalities. Non-recoverable residuals from separate collection or sorting of biogenic waste is incinerated.

### 3.7. Home and community composting in home gardens

#### Waste characteristics

##### Definition and origin

Home and community composting is the permitted method of producing and recovering composts from biogenic waste originating from single households and home gardens and private allotments on the appertaining land.

#### Composition

In home and community composting, waste that is very similar to the separately collected biogenic waste from households, i.e. biodegradable kitchen waste from households, especially from cooking and eating (left-over food) as well as plant residues and natural, organic waste from home gardens, such as grass cuttings, foliage, flowers, windfall fruit or bulky green waste, such as cuttings from shrubs and trees. The composition varies according to the residential structure and time of year. In urban areas, the percentage of organic kitchen waste is higher than in rural areas.

#### Quantities generated

The quantities generated are estimated on the basis of:

- a study conducted by the specialised department “Environmental Protection” of the Federal Province of Upper Austria in collaboration with the statistical office of Upper Austria;
- calculations on the nationwide number of “houses / households with garden” / “private allotments” and the number of “acting persons”. 

In 2009, the biogenic waste that found its way into the home and community composting of the households is estimated to have totalled approx. 1.505 million tonnes. 

On average, 2009 saw some 180 kilograms of biogenic waste from households and home gardens per inhabitant composted in Austria’s home gardens.

---

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>“Organic waste” in tonnes</th>
<th>“Green waste” in tonnes</th>
<th>Total in tonnes</th>
<th>Total in kg per inhabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>12,500</td>
<td>N.A.</td>
<td>12,500</td>
<td>44</td>
</tr>
<tr>
<td>Carinthia</td>
<td>16,400</td>
<td>N.A.</td>
<td>16,400</td>
<td>29</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>144,000</td>
<td>113,100</td>
<td>257,100</td>
<td>160</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>54,500</td>
<td>84,600</td>
<td>139,100</td>
<td>99</td>
</tr>
<tr>
<td>Salzburg</td>
<td>31,500</td>
<td>15,500</td>
<td>47,000</td>
<td>89</td>
</tr>
<tr>
<td>Styria</td>
<td>67,400</td>
<td>N.A.</td>
<td>67,400</td>
<td>56</td>
</tr>
<tr>
<td>Tyrol</td>
<td>51,800</td>
<td>33,000</td>
<td>84,800</td>
<td>120</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>13,200</td>
<td>N.A.</td>
<td>13,200</td>
<td>36</td>
</tr>
<tr>
<td>Vienna</td>
<td>72,900</td>
<td>41,700</td>
<td>114,600</td>
<td>68</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td><strong>464,200</strong></td>
<td><strong>287,900</strong></td>
<td><strong>752,100</strong></td>
<td><strong>90</strong></td>
</tr>
</tbody>
</table>
Overall estimates of the waste mass generated in Austria do not take into account the waste that goes to home and community composting. In 2004, the calculations based on data and studies available at the time show that some 800,000 tonnes of biodegradable waste was brought into home and community composting. At the time, data of Statistics Austria and the Federal Provinces was used to estimate the quantities generated. This data has not been used for the current calculation of amount of waste brought into home and community composting since an updated study is now available.

**Treatment**

Such waste is collected in home gardens and private allotments. It is used to produce compost that is applied in the immediate vicinity of these gardens.

### 3.8. Waste from green areas

#### Waste characteristics

**Definition and origin**

Waste from green areas includes:
- municipal garden and park waste;
- some green cuttings from private land;
- cemetery waste;
- roadside greenery.

Municipal garden and park waste are vegetable residues from the municipalities’ green areas, parks and sports facilities. A smaller portion of the waste originates from green areas in home gardens and private allotments. Estimates are provided for the amounts of waste from green areas coming from Federal Provinces that had not collected data on the amounts generated.

Cemetery waste consists of separately collected – largely biogenic – waste from cemeteries. Roadside greenery refers to all green area waste that comes from tending roadsides or riversides (“waterways”).

**Composition**

Green area waste consists of grass, foliage, cuttings from shrubs and trees, waste from the tending of graves, wreaths, bouquets, etc., as well as, to a small extent, from non-composting undesirables such as glass and plastic containers, packaging, candles, etc.

**Quantities generated**

According to estimates, approx. 728,500 tonnes were generated in 2009.

<table>
<thead>
<tr>
<th>Waste from green areas in 2009</th>
<th>Quantity by individual fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractions</td>
<td>in tonnes</td>
</tr>
<tr>
<td>Garden and park waste</td>
<td>199,500</td>
</tr>
<tr>
<td>Green cuttings from private areas</td>
<td>117,000</td>
</tr>
<tr>
<td>Cemetery waste</td>
<td>207,900</td>
</tr>
<tr>
<td>Roadside greenery (cuttings and foliage)</td>
<td>204,100</td>
</tr>
<tr>
<td>Total waste from green areas</td>
<td>728,500</td>
</tr>
</tbody>
</table>

For several years, a decrease in the quantity of municipal waste from green areas, particularly garden and park waste from municipalities, has been observed. This shift can have several causes.
Statistics usually only include the amounts treated within the scope of organised recovery.

- An unquantifiable share of the waste from green areas may have got into biomass incineration (instead of composting) – without any specific indication of the amounts, however.
- Another portion of this waste that cannot be measured was directly used by agriculture for mulch.
- The rising cost pressure in the municipalities has forced them to economise – also in composting; i.e. some green areas and planted areas are no longer being tended or have been abandoned, some of the generated green area waste is left lying on the land after mowing (“roadside greenery”) or composted on site (“cemetery waste”) without being brought to the composting facilities at all. Since the tending of municipal green spaces is already organised consistently throughout the country, no significant increases are to be expected in the generation of this type of waste.

**Treatment**

In central residential areas, “bulky” garden and park waste is mostly brought to collection points or composting facilities as part of the carry-in system. Certain municipalities still provide a pick-up service for such waste from the property. Green area waste from public areas is generally collected through the collection logistics of the municipalities, their contractors or the road administration. Depending on the season or location, green area waste may also be chopped up on site (mobile chopping services provided by the municipalities or by contractors in their employ) or directly hauled away. Such green area waste, like the separately collected biogenic waste from households, is recovered partly in green waste composting facilities, partly as structural material in recovery facilities for other biogenic waste – through agricultural composting, composting in municipal facilities or private or commercial composting plants commissioned by waste management associations and communities.
3. Selected Waste Streams

In addition, some cuttings from shrubs and trees are used for (municipal) biomass heating plants.
A non-negligible portion is left on site where it has been generated and rots there without being brought to recovery facilities.
In the meantime, the non-recoverable components, usually consisting of cemetery waste, are collected and forwarded for treatment by the residual waste collection services. This waste is not included in the above-indicated quantities.
Compost from green area waste – just as compost from separately collected biogenic waste – is mainly produced in agricultural composting facilities and recovered through use on farmland. It is usually given to forestry offices and allotment associations.
Another part of the compost is used by municipal administrations in their own public green spaces (gardens, parks, cemeteries, sports facilities, etc.) and sometimes in private gardens or for landscaping.

3.9. Catering waste

Waste characteristics
Definition and origin
Such waste is generated by catering businesses, accommodation services, catering establishments as well as industrial kitchens in schools, hospitals, barracks, hostels, etc.

Composition
Catering waste consists of plant and animal waste from cooking and left-over foodstuffs (mainly scraps from cooking or leftovers on the plate), including used edible oil.
The composition of the separately collected kitchen and food waste depends on the collection system, consumer behaviour, and geographical location of the place of waste generation and on the time of the year, so that the data is difficult to compare.

Quantities generated
For 2009, the quantity generated was determined at 97,500 tonnes (not including catering waste from international transport).
Indications on the quantities generated as well as the recovery and disposal of animal by-products as part of catering waste, which the Federal Waste Management Plan 2006 had classified under this category, are included in “Chapter 3.21 – Animal by-products”.

Treatment
Collection is performed at regular intervals by licensed waste disposal operators or by authorized farmers through a pick-up system. The following left-over food is collected in small amounts:
- food that is unspoiled but past the best-before date;
- left-over raw meat scraps from kitchens (no of-fal), sausage scraps;
- left-over sweets (cakes, pastries);
In all Federal Provinces, waste edible oils and fats are collected separately, both in the private and in the commercial sector, and undergo recovery. Thus waste is recovered in aerobic and anaerobic biotechnological treatment facilities (composting and biogas plants).
3.10. Street-cleaning residues

Waste characteristics
Definition and origin
Street cleaning residues refer to waste that accumulates from street sweeping and from the cleaning of large areas in business enterprises (sometimes including the contents of public wastepaper baskets).

Composition
Overall, street-cleaning residues consist of materials such as grit, dust, abraded particles of the carriageway, interspersed with organic components of soil, roadside greenery, foliage, needles, etc., as well as of harmful substances from motor vehicles and streets, such as salts and non-slipping agent (de-icing agent), abraded particles from tyres and brake linings, from the wear and tear of carriageways and road markings, to a lesser extent of heavy metals from motor exhaust fumes, of the residues of engine leaks and one-off incidents (usually accidents) as well as – usually in rural areas – of waste left lying on the roads and from collection containers along the curb, in parks and public squares.

Swept-up grit (as part of the street-cleaning residues) largely consists of mineral, sharp-edged broken rock (limestone, dolomite, diabase, etc. with a grain size of between 2 and 8 mm). Subsidiary matter includes foliage, grass, roots and soil materials from adjacent fields. There is only a very small amount of materials such as salt and de-icing agent, abraded material from the carriageway, tyres and brakes.

Street-cleaning residues in urban areas is markedly different from swept-up grit collected outside larger villages. Swept-up grit in rural settlements is virtually identical with swept-up grit in the open country.

Quantities generated
Approx. 200,000 tonnes were generated in 2009. The amounts accumulated, the composition and the hazardous contents of street-cleaning residues (ranging from “non-contaminated” to “heavily contaminated”) depend on various factors such as the time of year, the weather, the places of collection (urban or rural, heavily or less travelled streets, etc.), the method of sweeping, the use of different types of grit (grit, de-icing materials, etc) in snow clearing services, etc. These vary from year to year.

Treatment
There are recycling facilities that process swept-up grit for re-use in Feldkirch, Dornbirn, Linz, St. Pölten and Vienna.

Through separate collection, up to 70% of the grit can be collected again for recovery. In the best case, approx. 2/3 of the swept-up grit is available for re-use after appropriate processing.

Another portion of the re-processed amount is used to build pathways or for banks.

To the extent necessary, grit is disposed of in the appropriate landfill class depending on how contaminated it is.

The contents of public wastepaper baskets – insofar as they are separated from pure street cleaning waste – are subjected to the customary local treatment methods for residual waste (mechanical-biological or thermal treatment after splitting and sorting).

In the years to come, treatment will aim to further separate the mixture of substances into a recoverable fraction, a thermal fraction whose residues will subsequently be deposited in a landfill and a fraction solely intended for landfilling.
3.11. Municipal sewage sludge

Waste characteristics

Definition and origin

Sewage sludge is a mixture of water and solids that results from the cleaning of waste water. Municipal sewage sludge originates from sewage treatment plants, faecal sludge from small private sewage treatment and collection plants.

Composition

Sewage and faecal sludge consist of a mixture of solids (primary sludge) removed from the waste water and the bacterial sludge (excess sludge) resulting from the treatment of microbial waste water, which is usually subject to anaerobic treatment with subsequent condensation, drainage, and drying. However, most of the (smaller) municipal treatment plants only have an aerobic treatment stage to stabilise the sludge.

Sewage sludge contains nutrients such as nitrogen, phosphorus, sulphur and calcium. In addition, sewage sludge may be contaminated with organic substances that are not easily biodegradable and contain high concentrations of heavy metal pathogens – such as viruses and bacteria – and hormonally active substances.

Quantities generated

Across Austria, a total of approx. 256,000 tonnes of sewage sludge accumulated as dry matter (DM) in the 639 municipal sewage treatment plants with a capacity of at least 2,000 per 60 inhabitants.

Households not hooked up to the sewer system generated approx. 22,400 tonnes DM of faecal sludge.

At the end of 2009, approx. 92% of the Austrian population was connected to a public sewer system and to a municipal sewage treatment plant.

The further development of the public sewer system will lead to a further slight increase in the amount of sewage sludge.

Some 8% of the Austrian population is connected to an alternative sewage collection or treatment system. In these cases, the sewage is collected in home treatment facilities, in cesspools, etc.; the

### Municipal sewage sludge in 2009

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Quantities of dry matter in tonnes</th>
<th>Recovery and disposal in tonnes of dry matter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Landfilling</td>
<td>Other recovery</td>
</tr>
<tr>
<td>Burgenland</td>
<td>8,100</td>
<td>500</td>
</tr>
<tr>
<td>Carinthia</td>
<td>23,200</td>
<td>0</td>
</tr>
<tr>
<td>LA</td>
<td>47,200</td>
<td>0</td>
</tr>
<tr>
<td>UA</td>
<td>43,500</td>
<td>17,000</td>
</tr>
<tr>
<td>Salzburg</td>
<td>13,200</td>
<td>0</td>
</tr>
<tr>
<td>Styria</td>
<td>22,800</td>
<td>2,500</td>
</tr>
<tr>
<td>Tyrol</td>
<td>21,200</td>
<td>800</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>9,700</td>
<td>0</td>
</tr>
<tr>
<td>Vienna</td>
<td>67,500</td>
<td>0</td>
</tr>
<tr>
<td>Total (t/a)</td>
<td>256,400</td>
<td>20,900</td>
</tr>
<tr>
<td>Total (%)</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>
sewage is then usually disposed of by transporting the contents of the pits to the larger municipal treatment plants.

**Treatment**

Of the approx. 256,000 tonnes DM of sewage sludge generated in 2009

- some 8% was spread out on agricultural land (part of which after biotechnological treatment);
- approx. 35% underwent other recovery (e.g. in landscaping or as aggregate, part of this after biotechnological treatment);
- some 16% underwent thermal treatment for the use of waste heat (also decentralised);
- approx. 16% is landfilled;
- some 24% underwent other treatment in Austria and neighbouring countries.

According to the Organic Waste Action Plan of ARGE Kompost & Biogas, some 40,000 tonnes DM underwent biotechnological treatment in composting plants.

Sewage sludge contains a significant amount of phosphorus that can be recovered and used as fertiliser in agriculture. The processes used to reclaim phosphorus can be divided into two categories:

- processes that use wet chemical processes to extract the phosphorus from waste water or extract it from the sludge water by way of precipitation;
- processes that use thermo-chemical processes to separate the ash from sewage sludge mono-incineration plants from heavy metals.

In the German-speaking world, a great deal of research is currently being done into such processes, also by Austrian companies and research institutes.

Most of the recoverables listed below come from trade and industry, and to a lesser degree from agriculture and forestry as well as public institutions. They are very heterogeneous and differ in terms of type, composition, place of generation, collection logistics, etc.

**Composition**

Recoverables from trade and industry consist of the following fractions (partly including waste from production):

- paper, cardboard, and corrugated board – packaging and printed matter
- glass (white glass and coloured glass) – packaging
- flat glass
- metal – packaging (ferrous and non-ferrous packaging / mostly of aluminium)
- metal – scrap (ferrous and non-ferrous scrap / mostly of aluminium)
- residual cloth and fabric or waste textiles
- lightweight fraction – packaging
- wood – packaging, e.g., boxes, barrels, pallets, fruit trays and other loading containers
- other wood wastes, such as bulky waste wood and waste furniture
- other plastics

### 3.12. Separately collected recoverables from trade and industry

**Waste characteristics**

**Definition and origin**

According to the Waste Management Act of 2002 sec. 2 (4), recoverables include waste that is collected separately from other types of waste, or substances that are reclaimed from waste through treatment, in order to deliver such waste in a certifiable manner for permissible recovery.
In terms of mass, the most important waste stream in terms of “recoverables from trade and industry” is the waste stream “paper, cartons, cardboard, corrugated cardboard” accounting for 39%. Some 38% of the total amount consists of “iron and steel waste”.

Quantities generated

In 2009, approx. 2.245 million tonnes of recoverables from trade and industry were collected separately.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Fractions</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>17201</td>
<td>wooden packaging and wood wastes, not contaminated</td>
<td>324,000</td>
</tr>
<tr>
<td>18718</td>
<td>waste paper, cardboard and corrugated board, uncoated</td>
<td>873,300</td>
</tr>
<tr>
<td>31408</td>
<td>glass (flat glass)</td>
<td>36,000</td>
</tr>
<tr>
<td>31468</td>
<td>white glass (packaging glass)</td>
<td>15,600</td>
</tr>
<tr>
<td>31469</td>
<td>coloured glass (packaging glass)</td>
<td>18,400</td>
</tr>
<tr>
<td>351</td>
<td>iron and steel waste (scrap)</td>
<td>846,400</td>
</tr>
<tr>
<td>35105</td>
<td>ferrous packaging and containers</td>
<td>28,500</td>
</tr>
<tr>
<td>35315</td>
<td>non-ferrous metal scrap, non-ferrous metal packaging</td>
<td>54,700</td>
</tr>
<tr>
<td>58107</td>
<td>residual cloth and fabric or waste textiles</td>
<td>12,500</td>
</tr>
<tr>
<td>91207</td>
<td>lightweight fraction</td>
<td>35,700</td>
</tr>
<tr>
<td><strong>Total recoverables</strong></td>
<td><strong>2,245,100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Treatment

Recoverables from separate collection generated by trade and industry are re-used as secondary raw materials by way of material recovery or used as fuel in thermal recovery – to the extent possible – within the business enterprises.

If recovery in the business enterprises is not possible, such waste is disposed of by way of sorting and collection from the business enterprises, also known as “Geschäftsstraßenentsorgungen” or “commercial kerbside disposal” (e.g., cardboard and waste paper), and taken to recycling yards, designated collection points for commercial and industrial waste or – if warranted by the amount of waste – directly at the business enterprise. Such sorted collection generally requires time-consuming removal of undesirables at the corresponding recovery facilities.

In analogy to separately collected recoverables from households and similar establishments, over 97% of the separately collected recoverables from commerce, trade and industry was used for material and energy recovery in 2009. A small share of the non-recoverable residuals from sorting was landfilled.

Wooden packaging and wood wastes

The recoverable “wood wastes” from trade and industry consists of shavings, wood wool, boards, fruit and vegetable trays, boxes, wooden barrels, and pallets.

Most of the wooden waste stream (2009: approx. 324,000 t) was recovered in the wood-processing industry, especially the chipboard and fibreboard industry, and in the paper and pulp industry, but also to a lesser degree through composting. Most of the wood wastes that is untreated is used for thermal recovery within the business enterprises.

Once the undesirables (nails, metal staples, etc.) have been separated out, wooden packaging is processed into shavings in wood milling and wood treatment plants. These shavings are used in the wooden materials industry to make chipboard, in incineration plants to generate energy and in biogenic waste composting as a structural material.

Waste paper, cardboard, paperboard and corrugated board – uncoated

In 2009, the approx. 873,300 tonnes of printed matter and paper packaging that was collected separately (newspaper, printed matter and stationery, as well as paper and cardboard packaging) from trade and industry was brought to 8 production sites to undergo material recovery in their entirety and used to create new products (sanitary paper, newspaper printing paper, pre-products for the production of packaging).

Flat glass and glass packaging

The recoverable “glass” from trade and industry includes packaging made of white and coloured glass (2009: approx. 34,000 t) as well as flat glass (2009: approx. 36,000 t).

Once sorted (separating out glass crockery, drinking glass, flat glass, mirror glass, etc.) and prepared, the separately collected glass packaging is processed in the two Austrian glassworks, exclusively for the purpose of material recovery and making new glass products. The remaining quantities, which can no longer be accepted by the national facilities because of requirement- and quality-related issues, are exported.
for recovery to the neighbouring countries Italy, German and the Czech Republic. Some 90% of the flat glass collected in Austria comes from industry and trade. For this fraction, it can be assumed that all of the waste generated is recovered (e.g., to make fibre glass, especially for use as heat insulation). Recovery is no option, unless large quantities of homogeneous panes accumulate. Otherwise, disposal in landfills is the only possibility.

The following types of sorted flat glass (without any dirt and undesirables adhering to it) are collected separately and delivered for recovery:

- window glass
- laminated glass of windshields
- safety glass
- insulating glass
- mirror glass
- wired glass

Iron and steel waste (scrap)
The ferrous waste from Austrian business enterprises (2009: approx. 846,400 tonnes) is roughly classified as internal scrap from glassworks, which accumulates during steel-making, new steel scrap that remains behind after industrial production, and waste steel scrap, which comes from steel products that are no longer recoverable.

The steel scrap is classified using what is known as scrap-type lists which provide information about their quality and composition. According to the criteria contained in the relevant decisions of the EU Court of Justice, such scrap may in certain cases be considered a by-product.

The internal scrap from glassworks is clean and its composition is known, so it can be directly recycled.

New steel scrap from industrial production can be re-used after sorting and bundling.

Waste steel scrap consists of used consumer and industrial goods that are sometimes contaminated or combined with other materials (copper, plastics, glass and wood).

Before waste steel scrap can be used, it needs to undergo appropriate processing.

For physical processing, the scrap is crushed and the non-ferrous parts are separated out. The ferrous fraction is condensed into bundles and reused in steel production.

Iron packaging and containers
This waste stream (2009: approx. 28,500 tonnes) contains metal packaging from both small- and medium-sized enterprises and from large-scale operations and industry.

This fraction includes barrels, drums, tins, buckets, steel bottles, straps, fasteners, etc., made of various materials such as blackplate, tin plate, steel and stainless steel.

The collected material is machine-sorted in sorting facilities by way of magnetic separation or separated from other materials and foreign matter and undesirables in shredder plants, conditioned, and processed in order to facilitate charging in the steelworks.

This recycling process results in car and train parts, high-speed rails, reinforcing grates and cases for technical devices.

Non-ferrous metal scrap and non-ferrous metal packaging
This waste fraction (2009: approx. 54,700 tonnes) includes non-ferrous metal scrap and non-ferrous metal containers that are used mainly in construction, transport and packing.

The waste stream is dominated by the aluminium fraction. About 75% of all waste aluminium is collected separately in Austria. This waste material is either collected directly and homogeneously, or hand-sorted from a mixture of waste (e.g. residual waste) or separated out by means of eddy current separators that separate electrical conductors from non-conductors. This latter process is used by Austrian shredder operations.

The re-melting of aluminium requires only about 5% of the energy needed to make the same quantity of primary material. Moreover, aluminium has the advantage of being infinitely reusable and recoverable, without losing any of its specific properties such as strength, ductility, corrosion resistance and physiological safety.

The products of such recovery are cast moulded parts and, in packaging, etc. plain, enamelled, or printed sheets, packaging and parts made of composite materials.

Aluminium is recovered almost exclusively in domestic business enterprises.

Residual cloth and fabric or waste textiles
The waste stream made up of textiles (2009: approx. 12,500 tonnes) mainly includes residual cloth and fabric from the textile processing industry (natural fibres, blended fabrics, synthetic fibres, residual knitted and woven fabric and yarns) and to a lesser extent old clothes, which are collected primarily by welfare organisations at local collection points. When collected at collection points, however, most of the parts coming from small
business enterprises cannot be clearly classified.

About two thirds of the waste from the textile industry (knitting, hosiery, weaving, equipment and the garment businesses) is delivered for material recovery.

Apart from using mechanical and chemical processes for the processing of textile waste with the aim of returning various components to the production cycle, other possibilities for material recovery include:

- manufacture of recycling yarn from yarn and twisted thread waste
- re-use of residual textile cuttings as cleaning rags within the business enterprise
- internal re-granulation of spinning residues from synthetic fibre production and re-use
- processing of mixed cutting waste for the production of insulation boards
- processing of cutting waste for filler material
- processing of natural fibres for mattress filling or filling for quilts
- greening fabric as protection against erosion and for the greening of slopes
- secondary recovery of textile paper machine clothing as geo-textiles
- recycled hosiery as plant support in vegetable and ornamental plant gardening

non-recoverable textile waste is burned for its energy value; a small portion of it is also processed into cleaning rags for workshops.

### Lightweight fraction

The “lightweight fraction” from trade and industry (2009: 35,700 tonnes) includes only plastic packaging from separate in-company collection. It is usually collected in homogeneous groups, i.e. separated by type of plastic into polyethylene (HDPE/LDPE), PET, polystyrene (also: expanded polystyrene/EPS) and polypropylene at the place of waste generation and consists, among other things, of the following sub-fractions: film, cups, bottles, tins and buckets.

Most of this waste is recovered as packaging (film and containers), installation materials, building components, gardening articles, components for the electrical and automotive industry, etc.

A small percentage of undesirables that is sorted out, of residual waste or similar non-packaging, is treated thermally for the energy content.

### 3.13. Excavated materials

#### Waste characteristics

**Definition and origin**

Excavated materials accumulate when soil or subsoil is excavated or removed. The following excavated materials are distinguished:

- **Excavated material**: Material that accumulates as a result of excavation or removal and mostly (>50%) consists of soil or earth.
- **Excavated earth**: excavated earth includes the material that accumulates as a result of excavation or removal and mostly (>50%) consists of soil or earth.
- **Excavated soil material**: Material that accumulates as a result of excavation or removal of naturally produced soil or subsoil – also after relocation – insofar as the portion of inorganic, non-soil components, e.g. mineral construction and demolition waste, accounts for no more than 5% by volume and the portion of organic non-soil components, e.g. plastics, paper, accounts for no more than 1% of the volume.

These foreign components must be present in the soil or subsoil before excavation or removal.

- **Dangerously polluted and dangerously contaminated excavated material**: Excavated material that meets one or several hazard criteria (H criteria) or this eligibility cannot be excluded due to earlier utilisation, known or obvious pollution with environmentally relevant substances.

Generally, excavated material becomes “dangerously polluted” as soon as one or several hazard criteria are met. In the case of known, suspected or obvious pollution with environmentally relevant substances (organic substances and compounds, heavy metals, and the like) the material may be assumed to be dangerously polluted (also in acc. with the List of Waste Ordinance); the non-hazardousness, however, can be proven by analysis.

- **Not dangerously polluted and dangerously contaminated excavated material**: Excavated material that, pursuant to the Landfill Ordinance of 2008, is not eligible for disposal in a landfill for excavated material or in a landfill for inert waste.

- **Not polluted and not contaminated excavated material**: Excavated material that, pursuant to the Landfill Ordinance of 2008, is eligible for disposal in a landfill for excavated material or in a landfill for inert waste.
Technical fill material

Technical fill material is excavated material from structural layers, such as gravel layers, antifrost layers, and drainage layers, which, unlike excavated soil material, is not made of naturally produced soil or subsoil but is made to meet technical specifications, as by sifting, and to be used as fill material.

Composition

Excavated material mostly consists of mineral constituents. Unpolluted fractions may exist in pure form or as a mixture, such as broken stone, broken rock, sand, gravel, earth, humus, loam, etc. Excavated materials may also contain the impurities such as the remains of roots or pieces of wood or anthropogenic impurities such as pieces of pipe, plumbing, foundations, etc.

Current waste analyses

Where hazardous contamination is suspected due to the origin or upon visual inspection, or where hazardous contamination is determined through analysis, such waste must be classified as a hazardous type of waste, e.g., “oil-contaminated soils” (SN 31423), “other contaminated soil” (SN 31424) or “building debris and/or incineration debris with hazardous contaminants” (SN 31441). These types of waste are discussed in detail in the Chapter “Hazardous waste”.

Quantities generated

In 2009, approx. 23.5 million tonnes of excavated materials were produced. Of this amount, an estimated 15 million tonnes were used for terrain corrections as well as for underground backfilling, embankments, etc. This data are fraught with uncertainty, however, since this material is often not considered waste. Some 8.5 million tonnes were landfilled. The lion’s share of the excavated materi-
als is used for specific construction measures near the excavation site for the purpose of earthwork balance and for engineering purposes. This portion is not classified as waste and is therefore not included in the indicated quantities.

The quantity of excavated materials depends on the performance of civil engineering in Austria. Waste from such projects therefore varies year on year and is difficult to predict.

**Treatment**

More than 60% of the excavated materials was re-used in 2009. Homogeneous excavated materials (broken rock, gravel, sands and the like) are generally recovered as filler and piling material in terrain corrections. Soils, humus and loam are used in gardening and landscape design.

Across Austria, some 490,000 tonnes of recycled rock was produced in the Austrian Association for the Recycling of Building Materials. In addition, 790,000 tonnes of contaminated, non-hazardous soil excavation materials were processed.

In 2008, approx. 8.5 million tonnes of non-hazardous, de-classified or treated excavated materials were deposited in landfills. The largest share consisted of SN 31411 29 “Excavated soil material with background contamination”. Waste with codes SN 31482, 31482 88, 31482 91, 31483, 31483 91, 31484, 31484 91 were not landfilled.

### Excavated materials, amount generated in 2009

Types of waste acc. to the List of Waste Ordinance (ÖNORM S 2100 of 2005)

<table>
<thead>
<tr>
<th>Code</th>
<th>Specification</th>
<th>Designation of the code</th>
<th>Designation of the code</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31411 29</td>
<td>Excavated soil Class BA</td>
<td>4,700,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31411 30</td>
<td>Excavated soil Class A1</td>
<td>1,400,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31411 31</td>
<td>Excavated soil Class A2</td>
<td>1,300,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31411 32</td>
<td>Excavated soil Class A2G</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31411 33</td>
<td>Excavated soil Inert waste quality</td>
<td>1,700,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31411 34</td>
<td>Excavated soil Technical fill material that contains less than 5% by volume of non-soil constituents</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31411 35</td>
<td>Excavated soil Technical fill material that contains more than 5% by volume of non-soil constituents</td>
<td>4,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31423 36</td>
<td>Oil-contaminated soils</td>
<td>800,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31424 37</td>
<td>Other contaminated soils</td>
<td>400,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31484 88</td>
<td>Excavated soil material from physico-chemical treatment</td>
<td>41,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54504 88</td>
<td>Crude-oil-contaminated earth, excavated soil, and demolition material</td>
<td>120,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimated amount of excavated material used for terrain corrections, underground backfilling, production of embankments, etc. 12,800,000

**Total** 23,465,000
Hazardous excavated material is treated biologically, physico-chemically or, to a lesser extent, thermally. In 2009, approx. 133,000 tonnes of hazardous excavated materials were generated (contaminated with oil and other contaminated soils as well as crude-oil contaminated earth). Twenty-four plants with a total capacity of at least one million tonnes are currently available for the treatment of contaminated excavated soil material.

3.14. Waste from construction

Waste characteristics
Definition and origin
Waste from construction includes materials that accumulate during construction, conversion and demolition activities. The lion’s share originates from the demolition, conversion and reconstruction of building structures. Only some 10% originate directly from the construction of new building structures.

Waste from construction originates from structural engineering, geotechnical engineering as well as road and bridge building. In civil engineering, this waste primarily includes concrete, brick and other demolished masonry, making up some 70% to 90% of the overall amount. The remainder consists of wood, metals and various types of construction site waste. Geotechnical engineering produces excavated soil, the lion’s share of the material, and mixtures consisting of formwork timber and iron reinforcing and concrete debris. In road construction, asphalt and concrete debris as well as excavated soil are usually produced. When building or disassembling tracks, ballast is produced in addition to the above specified waste.

Composition

In the main, waste from construction consists of the following waste streams:

<table>
<thead>
<tr>
<th>Composition of essential waste from construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste from construction</td>
</tr>
<tr>
<td>Excavated materials</td>
</tr>
<tr>
<td>– topsoil</td>
</tr>
<tr>
<td>– sand, gravel</td>
</tr>
<tr>
<td>– loam, clay</td>
</tr>
<tr>
<td>– stones, rocks</td>
</tr>
<tr>
<td>Mineral waste</td>
</tr>
<tr>
<td>– building debris</td>
</tr>
<tr>
<td>– road rubble</td>
</tr>
<tr>
<td>– concrete rubble</td>
</tr>
<tr>
<td>– track ballast</td>
</tr>
<tr>
<td>– bitumen, asphalt</td>
</tr>
<tr>
<td>Organic / ferrous waste</td>
</tr>
<tr>
<td>– construction site waste</td>
</tr>
<tr>
<td>– building/ demolition wood</td>
</tr>
<tr>
<td>– packaging</td>
</tr>
<tr>
<td>– metals</td>
</tr>
<tr>
<td>Hazardous waste</td>
</tr>
<tr>
<td>– asbestos and asbestos cement</td>
</tr>
<tr>
<td>– polluted soil</td>
</tr>
<tr>
<td>– oil-contaminated soil</td>
</tr>
<tr>
<td>– waste containing tar</td>
</tr>
</tbody>
</table>

“Excavated materials” and “asbestos” are each discussed in their own chapter, while “construction and demolition wood” is examined in the section “Wood wastes”. Hazardous waste from construction is discussed in the Chapter “Hazardous waste”.

The main constituents of waste from construction are shown in the following table:

<table>
<thead>
<tr>
<th>Selected waste from construction – Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designations acc. to ÖNORM S 2100 (2005)</td>
</tr>
<tr>
<td>Building debris</td>
</tr>
<tr>
<td>bricks, concrete, ceramic, rocks, tiles, mortar, rendering</td>
</tr>
<tr>
<td>Road rubble</td>
</tr>
<tr>
<td>demolition asphalt, concrete, base materials</td>
</tr>
<tr>
<td>Concrete demolition waste</td>
</tr>
<tr>
<td>construction components or ready-made concrete parts, concrete carriageways, screed</td>
</tr>
<tr>
<td>Track ballast</td>
</tr>
<tr>
<td>aggregate from railroad tracks</td>
</tr>
<tr>
<td>Bitumen, asphalt</td>
</tr>
<tr>
<td>demolition asphalt</td>
</tr>
<tr>
<td>Construction site waste (no building debris)</td>
</tr>
<tr>
<td>insulation material, gypsum board, rock, plastic pipes, cuttings of various construction materials, composite materials</td>
</tr>
</tbody>
</table>

1 In practice, non-mineral waste from construction activities were also subsumed under this type of waste (cf. also Chapter 7.11).
### Quantities generated

In 2009, approx. 6.9 million tonnes of waste from construction were generated. The amount produced depends on the developments in civil and structural engineering in Austria. The waste from such projects therefore varies from year to year and is difficult to predict.

#### Waste from construction in 2009 – Quantities generated

<table>
<thead>
<tr>
<th>Code</th>
<th>Designations acc. to ÖNORM S 2100 (2005)</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31409</td>
<td>building debris (no construction site waste)</td>
<td>3,200,000</td>
</tr>
<tr>
<td>31410/54912</td>
<td>road rubble/bitumen and asphalt</td>
<td>1,300,000</td>
</tr>
<tr>
<td>31427</td>
<td>concrete demolition waste</td>
<td>1,700,000</td>
</tr>
<tr>
<td>31467</td>
<td>Track ballast</td>
<td>370,000</td>
</tr>
<tr>
<td>91206</td>
<td>construction site waste (no building debris)(^1)</td>
<td>300,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>6,870,000</strong></td>
</tr>
</tbody>
</table>

\(^1\) In practice, non-mineral waste from construction activities were also subsumed under this type of waste (cf. also Chapter 7.11).

### Treatment

Most of the waste generated in construction is recovered. In 2009, it amounted to some 5.5 million tonnes.

This waste is usually collected directly from the construction site using skips. Most of the times, a disposal and demolition operator takes care of this. Small amounts, e.g. building debris, is also collected at municipal collection points for recoverables.

In order to warrant an appropriate processing of the waste, separate collection is indispensable. Therefore, the “Ordinance on the Separation of Waste Generated During Construction” (Federal Law Gazette No 259/1991) describes the separation of the produced waste streams as a function of specific threshold quantities.

#### Threshold quantities according to the Ordinance on the Separation of Construction and Demolition Waste

<table>
<thead>
<tr>
<th>Material streams</th>
<th>Quantity threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavated soil</td>
<td>20 t</td>
</tr>
<tr>
<td>Concrete demolition waste</td>
<td>20 t</td>
</tr>
<tr>
<td>Demolition asphalt</td>
<td>5 t</td>
</tr>
<tr>
<td>Wood wastes</td>
<td>5 t</td>
</tr>
<tr>
<td>Metal wastes</td>
<td>2 t</td>
</tr>
<tr>
<td>Plastic waste</td>
<td>2 t</td>
</tr>
<tr>
<td>Construction site waste</td>
<td>10 t</td>
</tr>
<tr>
<td>Mineral building debris</td>
<td>40 t</td>
</tr>
</tbody>
</table>

The table below shows the respective recovery options for waste from construction.

The Austrian Association for the Recycling of Building Materials issued a series of guidelines providing the quality criteria and limit values for various certified recycled building materials. These guidelines are a valuable contribution towards exhausting the recovery potential of construction and demolition waste.

#### Waste from construction measures treated in recovery plants since 1995, in tonnes

<table>
<thead>
<tr>
<th>Year</th>
<th>Mass in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
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<td>1999</td>
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<td>2004</td>
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<td>2005</td>
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<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
</tr>
</tbody>
</table>

### Waste from construction – Recovery in 2009

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31409</td>
<td>Building debris</td>
<td>Aggregates for the production of masonry, concrete and lightweight concrete, backfill, tipping, cement production, substrates</td>
<td>2,100,000</td>
</tr>
<tr>
<td>31410/54912</td>
<td>Road rubble/Bitumen and asphalt</td>
<td>Aggregates for asphalt production, road and parking place construction, agricultural pathways</td>
<td>780,000</td>
</tr>
<tr>
<td>31427</td>
<td>Concrete demolition waste</td>
<td>Aggregates for concrete production, road and pathway construction, utility lines, trench backfilling</td>
<td>2,200,000</td>
</tr>
<tr>
<td>31467</td>
<td>Track ballast</td>
<td>Return of track ballast once it has been cleaned</td>
<td>340,000</td>
</tr>
<tr>
<td>91206</td>
<td>Construction site waste (no building debris)</td>
<td>Sorting and subsequent material and thermal recovery</td>
<td>96,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>5,516,000</strong></td>
</tr>
</tbody>
</table>
The existing facilities for recovery and disposal of waste from construction are sufficient. According to the Waste Framework Directive (2008/98/EC), 70% of non-hazardous construction and demolition waste must be re-used or recycled by 2020. In addition, materials, such as asphalt layers are removed, processed and used for construction purposes. This saves transportation time and costs. Approx. 510,000 tonnes of non-recyclable waste from construction was deposited in landfills due to the heterogeneity of the waste streams.

### Whereabouts of waste from construction in 2009

<table>
<thead>
<tr>
<th>Code</th>
<th>Designation acc. to ÖNORM S 2100 (2005)</th>
<th>Landfilled in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31409</td>
<td>building debris</td>
<td>442,000</td>
</tr>
<tr>
<td>31409 18</td>
<td>building debris (only mixtures from selected waste from construction and demolition activities)</td>
<td>8,000</td>
</tr>
<tr>
<td>31410</td>
<td>road rubble</td>
<td>2,000</td>
</tr>
<tr>
<td>31427</td>
<td>concrete demolition waste</td>
<td>21,000</td>
</tr>
<tr>
<td>31427 17</td>
<td>concrete demolition waste (only mixtures with selected waste from construction and demolition activities)</td>
<td>2,000</td>
</tr>
<tr>
<td>31467</td>
<td>track ballast</td>
<td>27,000</td>
</tr>
<tr>
<td>54912</td>
<td>bitumen, asphalt</td>
<td>5,000</td>
</tr>
<tr>
<td>91206</td>
<td>construction site waste (no building debris)</td>
<td>3,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>510,000</strong></td>
</tr>
</tbody>
</table>

**In summary:**

- Approx. 510,000 tonnes of non-recyclable waste from construction was deposited in landfills due to the heterogeneity of the waste streams.

### 3.15. Ash, slag and dust from incineration

**Waste characteristics**

**Definition and origin**

Ash, slag and dust from code group 313 (ÖNORM S 2100) originate mainly from:

- Facilities for the incineration of waste (especially from waste incineration plants);
- Combustion plants, in which high-calorific materials are also burned:
  - thermal power plants and combined biomass heating and power plants;
  - fluidised bed firing in the paper and pulp industry;
  - plants for the chipboard and fibreboard industry as well as the wood industry.

**Composition**

The composition and hazardous contents of ash and slag and other residues is determined both by the properties of the waste and fuels used and by the technologies employed (incineration, aggregates and process control).
Quantities generated
The above ash, slag and dust examined primarily originate from the incineration of coal, biomass and waste.
Ash from the incineration of biomass can be classified as wood/straw ash (SN 31306) (if primary wood/straw is burned in biomass-fired power plants or heating plants) or as fly ash and dust from waste incineration plants (SN 31309) whenever waste biomass is combusted as substitute fuel in industrial plants.

As late as in 2005, some 1.1 million tonnes of lignite was used in Austria's power plants and cogeneration plants. By 2007, this figure had levelled out at zero. As a result, the quantity of fly ash and dust generated from other combustion plants (SN 31301), which had amounted to some 520,000 tonnes in 2004, decreased to approx. 229,000 in 2008. For the same reason, the amount of gypsum from flue gas desulfurising plants (SN 31315) declined from some 130,000 tonnes to approx. 71,000 tonnes.

<table>
<thead>
<tr>
<th>SN</th>
<th>Waste designations in acc. with ÖNORM S 2100 (2005)</th>
<th>Qualifier</th>
<th>Amounts generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2004</td>
</tr>
<tr>
<td>31301</td>
<td>Fly ash and dust from other firing systems</td>
<td></td>
<td>520,000</td>
</tr>
<tr>
<td>31301</td>
<td>Fly ash and dust from other firing systems</td>
<td>haz. cont.</td>
<td>2,000</td>
</tr>
<tr>
<td>31305</td>
<td>Brown coal ash</td>
<td></td>
<td>67,000</td>
</tr>
<tr>
<td>31305</td>
<td>Brown coal ash</td>
<td>sol.</td>
<td>0</td>
</tr>
<tr>
<td>31306</td>
<td>Wood ash, straw ash</td>
<td></td>
<td>100,000</td>
</tr>
<tr>
<td>31306</td>
<td>Wood ash, straw ash [bottom ash]</td>
<td>Bottom ash</td>
<td>24,800</td>
</tr>
<tr>
<td>31306</td>
<td>Wood ash, straw ash [fly ash]</td>
<td>Fly ash</td>
<td>7,000</td>
</tr>
<tr>
<td>31306</td>
<td>Wood ash, straw ash [finest fly ash]</td>
<td>finest fly ash</td>
<td>5,000</td>
</tr>
<tr>
<td>31306</td>
<td>Wood ash, straw ash [hazardous]</td>
<td>haz. cont.</td>
<td>0</td>
</tr>
<tr>
<td>31307</td>
<td>Boiler slag</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>31307</td>
<td>Boiler slag</td>
<td>haz. cont.</td>
<td>6,400</td>
</tr>
<tr>
<td>31308</td>
<td>Slag and ash from waste incineration plants</td>
<td>haz.</td>
<td>400</td>
</tr>
<tr>
<td>31308</td>
<td>Slag and ash from waste incineration plants</td>
<td>ex.</td>
<td>380,000</td>
</tr>
<tr>
<td>31309</td>
<td>Fly ash and dust from waste incineration plants</td>
<td>haz.</td>
<td>28,800</td>
</tr>
<tr>
<td>31309</td>
<td>Fly ash and dust from waste incineration plants</td>
<td>ex.</td>
<td>310,000</td>
</tr>
<tr>
<td>31309</td>
<td>Fly ash and dust from waste incineration plants</td>
<td>sol.</td>
<td>0</td>
</tr>
<tr>
<td>31312</td>
<td>Solid residues containing salt from flue gas cleaning</td>
<td>haz.</td>
<td>2,700</td>
</tr>
<tr>
<td>31312</td>
<td>Solid residues containing salt from flue gas cleaning</td>
<td>ex.</td>
<td>1,100</td>
</tr>
<tr>
<td>31312</td>
<td>Solid residues containing salt from flue gas cleaning</td>
<td>sol.</td>
<td>0</td>
</tr>
<tr>
<td>31314</td>
<td>Solid residues containing salt from flue gas purification</td>
<td>haz.</td>
<td>0</td>
</tr>
<tr>
<td>31314</td>
<td>Solid residues containing salt from flue gas purification</td>
<td>ex.</td>
<td>5,400</td>
</tr>
<tr>
<td>31315</td>
<td>FGD gypsum</td>
<td></td>
<td>130,000</td>
</tr>
<tr>
<td>31316</td>
<td>Slag and ash from waste pyrolysis facilities</td>
<td>haz.</td>
<td>76</td>
</tr>
<tr>
<td>31316</td>
<td>Slag and ash from waste pyrolysis facilities</td>
<td>ex.</td>
<td>200</td>
</tr>
<tr>
<td>31317</td>
<td>Fly ash and dust from oil-firing plants</td>
<td>haz.</td>
<td>1,600</td>
</tr>
</tbody>
</table>

Total (rounded) 1.57 m 1.61 m 1.68 m 1.37 m 1.26 m

Abbreviations: SN = code, haz. = hazardous, cont. = contaminated, ex. = exempted, sol. = solidified
Initially, the quantity of brown coal ash (SN 31305) amounting to 67,000 tonnes in 2004 increased to approx. 93,000 in 2007, but then it decreased again to 73,000 tonnes in 2008 because the use of coal underwent a decline.

Due to the rise in the use of biomass for power generation, the quantities of wood and straw ash (SN 31306) increased markedly from 100,000 tonnes in 2004 to 149,000 tonnes (including all sub-fractions) in 2008.

From 2004 to 2008, the amount of boiler ash (SN 31307) also dropped from 10,000 tonnes to approx. 1,400 tonnes. The distinctly higher figure in 2006 of 127,000 tonnes can be attributed, in its entirety, to the remediation of one single suspected site.

The amount of slag and ash from waste incineration (SN 31308 + SN 31308 88) has markedly declined again after experiencing a growth of 8.8% in the period from 2004 to 2006 and was at approx. 356,000 tonnes in 2008, i.e. some 6.4% less than 2004.

By contrast, the amount of fly ash and dust from waste incineration (SN 31309 + SN 31309 88 + SN 31309 91) increased steadily and, with a total of some 369,000 tonnes in 2008, currently is 8.9% higher than in 2004. Fly ash and dust from waste incineration also includes the residues from co-incineration. The increase in fly ash from waste incineration can therefore be attributed to an increase in the use of waste biomass.

The opposing trends “decreasing amount of ash and dust from the combustion of brown coal” and the “increasing amount of ash from biomass incineration” have caused the total amount of slag, ash and dust to increase by 7% between 2004 and 2006 and then decrease by 25% between 2006 and 2008.
### Treatment

It is estimated that of the approx. 1.26 million tonnes of ash, slag and dust belonging to group 313, some 650,000 tonnes underwent material recovery in 2008 (approx. 160,000 of which as substitute fuel in the Austrian cement industry) and the remainder was landfilled above ground in Austria or underground abroad.

From 2004 to 2006, the amount of ash, slag and dust from thermal waste treatment and combustion plants that was landfilled increased sharply from some 462,000 tonnes to approx. 762,000 tonnes. Part of this increase can be attributed to the one-off generation of boiler slag (SN 31307) from the remediation of a contaminated site in 2006.

However, even if the boiler slag (SN 31307) is left out of account, the amount of landfilled ash, slag and dust from thermal waste treatment and combustion plants increased in the period between 2004 and 2006. Since 2006, the mass in landfilled

---

### Slag, ash and dust from waste incineration plants deposited in Austrian landfills

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Slag and dust (SN 31308 88) – in tonnes</th>
<th>Fly ash and dust (SN 31309 88 + 91) – in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carinthia</td>
<td>16,200 31,800 31,700</td>
<td>4,700 5,300 8,300</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>12,500 21,800 11,500</td>
<td>10,600 8,400 7,700</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>76,800 80,700 22,400</td>
<td>3,900 2,700 3,000</td>
</tr>
<tr>
<td>Styria</td>
<td>87,200 101,600 112,000</td>
<td>6,700 12,000 38,700</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>0 400</td>
<td>0 0</td>
</tr>
<tr>
<td>Vienna</td>
<td>167,400 159,500 178,400</td>
<td>28,400 58,100</td>
</tr>
<tr>
<td>Total</td>
<td>360,100 395,400 356,400</td>
<td>25,900 28,400 58,100</td>
</tr>
</tbody>
</table>

### Other residues from waste incineration plants deposited in Austrian landfills in 2008

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>319</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carinthia</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Austria</td>
<td>90 12</td>
<td>8,508</td>
<td>24,063</td>
<td>6,433</td>
<td>577</td>
<td>44,731</td>
<td>2,073</td>
<td></td>
</tr>
<tr>
<td>Upper Austria</td>
<td>1 1,156</td>
<td>195</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salzburg</td>
<td>218 9,977</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>343</td>
</tr>
<tr>
<td>Styria</td>
<td>2,930 6,012</td>
<td>15,210</td>
<td>532</td>
<td>566</td>
<td>3,916</td>
<td>480</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyrol</td>
<td>177</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>16 408</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vienna</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,127</td>
</tr>
<tr>
<td>Total</td>
<td>3,036 6,243</td>
<td>35,792</td>
<td>24,790</td>
<td>6,999</td>
<td>5,043</td>
<td>1,400</td>
<td>48,553</td>
<td></td>
</tr>
</tbody>
</table>
ash, slag and dust from incineration has again been decreasing. Despite this, the overall mass of landfilled waste from code group 313 in 2008 was 19% higher than the 2004 level. Given the change in the amount of the individual waste fractions between 2004 and 2008, the three-fold increase in the landfilled mass of wood ash/straw ash (SN 31306 + 31306 70 + 31306 72 + 31306 74) and the more than doubling of the landfilled mass of fly ash (SN 31309 + SN 31309 88 + SN 31309 91) merit special mention. With regard to the landfilling of residues from waste incineration plants, the amount of slag and ash from waste incineration plants (SN 31308) increased by approx. 360,000 tonnes in 2004 to some 396,000 tonnes in 2007. In 2008, less slag and ash from waste incineration plants (SN 31308) was landfilled again than in the previous year, i.e. approx. 356,000 tonnes. In terms of fly ash and dust from waste incineration, the landfilled mass increased from approx. 26,000 tonnes in 2004 to some 58,000 tonnes in 2008. The rise in landfilled incineration residues was particularly high in the Federal Province of Styria. In some Federal Provinces (e.g. Lower Austria or Styria) a wide range of residues from incineration is deposited in landfills, while in other Federal Provinces (e.g. Burgenland or Tyrol) only small amounts of a narrower range of residue types are deposited.

3.16. End-of-life vehicles

Waste characteristics
Definition and origin
End-of-life vehicles as defined by the End-of-Life Vehicle Ordinance are used motor vehicles (passenger motor vehicles, motor vehicles for freight transportation with a total permissible weight of no more than 3.5 t, or three-wheel motor vehicles with the exception of motorcycles), which are considered waste within the meaning of sec. 2 (1) of the Waste Management Act of 2002, i.e. their owner wishes to dispose of them or already has disposed of them or they need to be disposed of as waste in order to avoid harming the public interest. If a motor vehicle no longer meets the traffic or operating safety requirements, this can be seen as an indicator of an end-of-life vehicle. Vintage vehicles are not considered end-of-life vehicles.

Composition
Most of the end-of-life vehicles consist of materials with usable parts that can be re-used as spare parts and/or recovered in re-processing plants to recuperate secondary raw materials. A passenger car consists of approx. 10,000 spare parts and approx. 40 different materials. End-of-life vehicles have a highly heterogeneous composition and consist to approx. 55-70% of iron/steel, to 3-8% of lightweight metals, to 8-18% of plastics and textiles, to 2-4% of rubber, to 2-5% of glass, to 2-5% of operating fluids (motor oil, braking fluid, coolants, residual fuel, window pane washing fluid, etc.) and to 5-10% of other materials.
End-of-life vehicles also contain hazardous substances such as fuel (gasoline, diesel), motor oil, oil filter, braking fluid, coolants, batteries, PBC-containing capacitors, etc.

Quantities generated
According to Statistics Austria, some 4.36 million passenger cars (some 4.06 million at the beginning of January 2004) were approved for road use in Austria at the end of December 2009. This translates into a year-on-year increase of 1.8% in the number of passenger cars. Currently, over 250,000 passenger cars (approx. 227,000 in 2004) are being withdrawn from circulation (approx. 232,500 t) every year. Only a part thereof is recovered in Austria. It must be assumed that most of the end-of-life not scrapped in Austria are exported as used motor vehicles.

Treatment
In Austria, there are approx. 700 business enterprises (car dealers, workshops, secondary raw materials dealers, waste disposal companies, shredder operations) registered as initial collection centres for end-of-life vehicles. They accept these vehicles free of charge.

End-of-life vehicles are recovered at four levels according to the present state of the art:
- re-use and continued use of car parts in workshops, approved recovery operations and in the do-it-yourself sector;
- pre-treatment of end-of-life vehicles for the purpose of removing hazardous substances and recoverable substances prior to processing them in shredder plants;
- processing of pre-treated end-of-life vehicles in shredder plants with separation into recoverable metal streams and shredder waste;
- treatment of the shredder waste

The table below shows the total amount of end-of-life vehicles subjected to treatment in a shredder since the enactment of the End-of-Life Vehicle Ordinance.

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
<td>92,236</td>
<td>101,279</td>
<td>94,520</td>
<td>87,277</td>
<td>60,716</td>
<td>63,975</td>
<td>91,190</td>
</tr>
</tbody>
</table>

Since 2006, at least 85% (by weight) of collected end-of-life vehicles have needed to undergo re-use or recovery (including thermal recovery) or at least 80% have had to be delivered for re-use or material recovery as stipulated by the End-of-Life Vehicle Ordinance.
In 2004, the rate of re-use and recovery in Austria was at approx. 78%. In 2006, the rate was at approx. 80% without thermal recovery and approx. 86% including thermal recovery. In 2009, the rate of re-use and material recovery was at approx. 84%.
In total, the 91,190 end-of-life vehicles collected in 2009 weighed approx. 85,000 tonnes.
The government premium paid for exchanging end-of-life vehicles for environmentally sound new cars is assumed to be the reason for this rise in the end-of-life vehicle quantity in 2009.

3.17. Waste pneumatic tyres

Waste characteristics
Definition and origin
Waste pneumatic tyres are tyres that are no longer suitable or approved for their respective purpose. They are put out of use for various reasons, e.g. their tread has worn off, the rubber mixture has become brittle or other damage of the carcass has occurred.

Composition
Tyres consist of a mixture of substances:
- natural rubber: approx. 24%
- synthetic rubber: approx. 21%
- carbon black and active extenders: approx. 26%
Quantities generated
The amount generated in 2009 totalled approx. 53,000 tonnes.

Treatment
After mechanical processing of the approx. 53,000 tonnes of waste pneumatic tyres, some
▷ 19,400 tonnes underwent material recovery;
▷ 30,600 tonnes underwent thermal recovery;
▷ 3,000 tonnes underwent retreading.

1. Material recovery (approx. 19,400 tonnes)
   ▷ Recovery of crumb rubber and rubber granulate (approx. 65%)
     as input material for
     – formed parts
     – plastic coatings
     – plastic mats
     – flat room protection mats
     – insulation materials
     – floor coverings
     – shoe soles
     – rubber mats for animal husbandry
     – oil binding agents
     – bumpers, cladding, dashboards, rests, etc. in the automotive industry
     for use in the construction of
     – children’s playgrounds (as fall protection, use as toys, etc.)
     – sports facilities (pitches, running tracks, tennis courts, substrate and spreading granulate in artificial grass installations, etc.)
     as aggregate in road construction (in the form of “rubber asphalt”)
   ▷ recovery of tyre wire and steel (approx. 30%)
   ▷ recovery of textile fibres (approx. 5%) aggregate for asphalt

2. Thermal recovery (approx. 30,600 tonnes)
   ▷ fuel (additive) in cement and power plants and in other industrial firing plants (using the product properties of various parts of waste pneumatic tyres, such as steel fabric and various mineral constituents for the cement qualities to be produced)

3. Retreading (approx. 3,000 tonnes)
Other forms of recovery – without indication of the quantity for this type of use – are residual tread use and the export of used tyres.
The use of waste pneumatic tyres or old tyre scrap as covering material for clearing basins, landfills, etc., does not constitute recovery.

3.18. Waste electrical and electronic equipment

Waste characteristics
Definition and origin
Electrical and electronic equipment includes devices that need electric current or electromagnetic fields to operate properly as well as devices used to generate, transmit, and measure such currents and fields.
Waste electrical and electronic equipment includes the electrical and electronic equipment that is considered waste pursuant to sec. 2 of the Waste Management Act of 2002, including all their components, subassemblies and consumables which form part of the electrical and electronic equipment at the time of discarding.
Waste electrical and electronic equipment arises in private households, business enterprises, in industry, in administrative institutions and other areas.

Composition
The term “waste electrical and electronic equipment” designates a wide range of different electrical and electronic appliances characterized by complex design and great diversity of material. Electrical and electronic equipment can contain up to 1,000 different substances. These range from precious metals to substances such as lead, cadmium, mercury, which are capable of posing a hazard to the environment and human health.
Depending on the equipment category (e.g. large home appliances, consumer electronics) and type of equipment (e.g. washing machine, TV), the material composition of the waste electrical and electronic equipment varies greatly. Given the overall amount generated – taking the percentage by weight into account – electrical and electronic equipment,
on average, has approx. 62.5% iron, 25% plastics and 12.5% non-ferrous metals. While small equipment contains approx. 2.3% in harmful substances (by weight), the percentage in large equipment – with the exception of monitors and refrigerators – is less than 1% by weight. The remaining portions are made up of glass, cable, wood, etc.

In Austria, electrical and electronic equipment is currently classified according to the Waste Electrical and Electronic Equipment Ordinance, Federal Gazette II No 121/2005 as amended. The following ten sub-categories were taken from the European WEEE Directive:

- Major household appliances
  e.g. washing machines, clothes dryers, dish washers, ovens, microwave ovens, heating, cooling and air-conditioning appliances
- Small household appliances
  e.g. vacuum cleaners, coffee machines, irons, deep-fryers, hair cutting appliances, scales, toasters, hair dryers, tools, sewing and knitting machines
- IT and telecommunications equipment
  e.g. PCs, screens, keyboards, printers, fax machines, copying equipment, telephones, notebook computers, calculators
- Consumer equipment
  e.g. audio equipment, television sets, video equipment, cameras, amplifiers, musical instruments
- Lighting
  e.g. gas discharge lamps, fluorescent lamps
- Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
  e.g. drills, saws, wood and metal-working machines, lawnmowers and other electrical gardening appliances
- Toys, leisure and sports equipment
  e.g. electrical railways, video game consoles, home trainers
- Medical devices (with the exception of all implanted and infected products)
  e.g. radiotherapy equipment, dialysis equipment, pulmonary ventilators, analysers
- Monitoring and control instruments
  e.g. smoke detectors, heat regulators, thermostats
- Automatic dispensers
  e.g. beverage machines, money dispensers

Quantities generated
With the entry into force of the Ordinance on Waste Prevention, Collection and Treatment of Waste Electrical and Electronic Equipment (WEEE Ordinance), Federal Law Gazette II No 121/2005 as amended by Federal Law Gazette II No 166/2001, collection points accepted waste electrical and electronic equipment from private households free of charge. Key coordination tasks for the collection and pick-up of waste electrical and electronic equipment have been taken on by Elektroaltgeräte Koordinierungsstelle Austria GmbH.

The table below lists the collected amounts of waste electrical and electronic equipment from the private and commercial sector.

In 2009, 159,994 tonnes (153,747 tonnes household appliance and 6,247 tonnes of commercial equipment) of electrical and electronic equipment was placed on the market. The most important data sources are evaluations from the Electronic Data Management (EDM portal) for Waste Electrical and Electronic Equipment, the “2009 Activity Report” issued by Elektroaltgeräte Koordinierungsstelle Austria GmbH, studies and reports.

Because of the new general statutory requirements, such as mandatory separate collection of waste electrical and electronic equipment since August 2005, the obligation for municipalities, specialised retailers, manufacturers and disposal companies to take them back free of charge, and the concomitant intensified public relations work, a further increase in the collected amount of waste electrical and electronic equipment can be expected.

<table>
<thead>
<tr>
<th>Collected amounts of waste electrical and electronic equipment collected from 2006 to 2009 by category expressed in tonnes</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large equipment</td>
<td>17,766</td>
<td>16,337</td>
<td>16,530</td>
<td>20,526</td>
</tr>
<tr>
<td>Refrigerators and freezers</td>
<td>15,882</td>
<td>13,914</td>
<td>14,290</td>
<td>14,761</td>
</tr>
<tr>
<td>Display devices, including picture tube devices</td>
<td>13,361</td>
<td>16,052</td>
<td>16,390</td>
<td>19,019</td>
</tr>
<tr>
<td>Small electrical and electronic devices</td>
<td>14,614</td>
<td>17,252</td>
<td>17,330</td>
<td>20,393</td>
</tr>
<tr>
<td>Lamps</td>
<td>1,004</td>
<td>971</td>
<td>920</td>
<td>863</td>
</tr>
<tr>
<td>Total</td>
<td>62,627</td>
<td>64,526</td>
<td>65,460</td>
<td>75,562</td>
</tr>
</tbody>
</table>
According to sec. 23 Ordinance on Waste Prevention, Collection and Treatment of Waste Electrical and Electronic Equipment, manufacturers and importers of electrical and electronic equipment are furthermore required to report the amounts they place on the market to the electronic register (EDM portal) by collection and treatment category. The Waste Electrical and Electronic Equipment Ordinance distinguishes between five collection and treatment categories.

- large equipment
- refrigerators and freezers
- display devices, including cathode ray tubes
- small electrical and electronic equipment
- lighting

In 2009, approx. 75,562 tonnes of waste electrical and electronic equipment was collected at collection points registered for the collection of this equipment.

According to the EU Directive on waste electrical and electronic equipment, the Member States were required to ensure that an average collection of at least four kilograms per inhabitant was ensured by the end of 2006. With the current 9.32 kg per inhabitant, Austria has markedly outperformed the target stipulated by the EU.

Most likely part of the waste electrical and electronic equipment is not collected through registered collection points. This may have different causes:

- waste electrical and electronic equipment with a high waste iron component (esp. major equipment such as washing machines) are also included in bulky waste collection along with recoverables (waste iron).
- “Exports” to neighbouring countries through organised collection directly from households, especially in rural regions. Certain waste electrical and electronic waste is highly coveted due to its composition (high metal share), since it can be sold on for a profit.
- Operational equipment (e.g. display screens) are exported abroad and used there.
- Residual waste analyses and studies have shown that the average share of waste electrical and electronic equipment in residual waste is approx. 1%.
- In many cases, the equipment is handed over to collections immediately but stored temporarily over a lengthy period in cellars, attics or in storage halls.
- Backup equipment – frequently, equipment that is in working order (e.g. coffee machines, irons, battery-powered screwdrivers and lots more) but has been replaced by more modern appliances is kept in the household.
- Technical “upgrades” – increased use of electrical appliances in households.

### Treatment

In the practice of collection and processing, the following recovery breakdown has been established:

- large electrical and electronic equipment
- refrigerators, freezers and air-conditioners
- small electrical and electronic equipment
display devices
lighting

Waste electrical and electronic equipment is collected by collection centres for recoverables or partially by bulky waste collection of communities, at stationary and mobile hazardous household waste collection centres of the municipalities, and by retailers and disposal companies.

Nearly all waste electrical and electronic equipment contains not only a large share of non-hazardous components – mostly plastics, glass and ferrous/non-ferrous metals – but also components containing harmful substances. In order to prevent the release and distribution of the relevant harmful substances into the environment, such components are disassembled in appropriate facilities and undergo specific processing ("reduction of harmful substance concentration").

Large electrical and electronic equipment is processed in shredders. Harmful substances are separated out pursuant to the Waste Treatment Obligations Ordinance Federal Gazette II No 363/2006 prior to shredding. The separation into ferrous and non-ferrous metal and other residues meets current state-of-the-art requirements.

For small electrical and electronic equipment and display devices, there are recovery methods based on prior manual disassembly and mechanical processing that ensure extensive recovery of the secondary raw materials contained in them, such as metal, glass and plastics.

The concentration of harmful substances (e.g., CFCs, VOCs, and mercury switches) in refrigerators, freezers and air-conditioners must also be reduced in specific treatment facilities before they can undergo recovery.

The complex design and the different mounting methods used for waste electrical and electronic equipment usually require a great deal of manual effort to disassemble their components. Technologies that automatically disassemble the devices are appropriate only for uniform batches. Sorting and assembling heterogeneous collected appliances is only theoretically possible and entails too high sorting and logistics costs. The manual activities are therefore generally limited to assemblies and units for re-use and to ensuring the necessary reductions in the concentration of harmful substances.

With the Waste Electrical and Electronic Equipment Ordinance, Federal Law Gazette II No 121/2005, the waste management responsibility for products belonging to the category of waste electrical and electronic equipment was transferred to manufacturers on 13 August 2005. To this end, the manufacturers must finance collection from the collection point, recovery and disposal. Ever since the entry into force, private consumers of waste electrical and electronic equipment can leave this equipment with the collection points free of charge.

### Recovery, recycling and re-use, target rates for waste electrical and electronic equipment in 2009

<table>
<thead>
<tr>
<th>Equipment category</th>
<th>Recovery rate in %</th>
<th>Re-use and recycling share in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large household appliances</td>
<td>89</td>
<td>82</td>
</tr>
<tr>
<td>Small household appliances</td>
<td>87</td>
<td>73</td>
</tr>
<tr>
<td>IT &amp; T equipment</td>
<td>90</td>
<td>78</td>
</tr>
<tr>
<td>Consumer equipment</td>
<td>92</td>
<td>81</td>
</tr>
<tr>
<td>Lighting equipment</td>
<td>87</td>
<td>72</td>
</tr>
<tr>
<td>Gas discharge lamps</td>
<td>96</td>
<td>95</td>
</tr>
<tr>
<td>Tools</td>
<td>96</td>
<td>75</td>
</tr>
<tr>
<td>Toys, leisure and sports equipment</td>
<td>87</td>
<td>73</td>
</tr>
<tr>
<td>Medical devices</td>
<td>90</td>
<td>75</td>
</tr>
<tr>
<td>Surveillance and recording equipment</td>
<td>88</td>
<td>74</td>
</tr>
<tr>
<td>Dispensers</td>
<td>99</td>
<td>82</td>
</tr>
</tbody>
</table>
Pursuant to the Waste Electrical and Electronic Equipment Ordinance, re-use and re-recovery targets ranging from 50% to 80% of the average weight per piece of equipment have been defined in accordance with their collection category.

According to the 2009 Activity Report issued by Elektroaltgeräte Koordinierungsstelle Austria GmbH all the target rates stipulated in Austria have been achieved. The table below provides the recovery, re-use and recycling rates for waste electrical and electronic equipment in 2009.

In Austria, there are 40 plants for the initial treatment of waste electrical and electronic equipment.

It is hardly possible to indicate a total treatment capacity for waste electrical and electronic equipment since throughput in the disassembly line depends on the (variable) number of workers; in addition, some waste electrical and electronic equipment is processed together with other waste.

Prior to the effective date of the Waste Electrical and Electronic Equipment Ordinance, a high percentage of waste electrical and electronic equipment was processed together with residual or bulky waste, especially in the household sector. Because of the new obligation for manufacturers to take back the equipment free of charge and the intensified public relations work on the subject “proper collection and recovery of waste electrical and electronic equipment”, a reduction in the share of waste electrical and electronic equipment can be expected in the residual or bulky waste category.

### 3.19. Wood wastes

**Waste characteristics**

**Definition and origin**

Wood wastes is a term used to refer to bark, slabs, splinters, sawdust, wood dust and sludge, construction and demolition wood, used furniture, wood wool, impregnated wood (poles, sleepers, etc.) as well as wooden packaging with hazardous contamination.

Such waste is produced by

- timber production (saw mills)
- wood-working and -processing operations (carpenter’s shops, lathing shops, paper and cellulose processing operations, etc.)
- agriculture and forestry (mostly orchards and vineyards)
- gardening and landscaping
- packaging, mainly originating from material goods and trade
- the four branches of the construction industry (preparatory construction work, structural and civil engineering, building installations, and development and construction-related trade)
- the branches that have assistant building workers (e.g., the Austrian Federal Railways, the power industry, or telecommunications)
- the chipboard industry
- furniture production
- disposal of sawdust and shavings contaminated with organic chemicals (e.g., mineral oils, solvents, lacquer, organic coatings) or with inorganic chemicals (e.g., acid, alkalines, salt)
- households and similar establishments

**Composition**

Most of wood wastes are made up of “bark” and “sawdust from clean, uncoated wood” (approx. 38%) and “rind and splinters made of clean, uncoated wood” (approx. 12%). Other wood wastes, such as “chipboard waste”, “construction and demolition waste”, “wood dust and slurries”, “impregnated wood”, as well as a category of waste wood classified as hazardous makes up approx. 10% of the total wood wastes.
Quantities generated
Every year, some 4.48 million tonnes of wood wastes are generated. The portion classified as hazardous accounts for less than 1% of total wood wastes.

Treatment
Wood wastes can generally be recovered in the following ways:
- re-use or continued use
- material recovery
- composting of natural, untreated materials as structural material
- incineration for energy value (wood chips, biomass, local and district heating, etc.)

Wood-processing industry
Mainly round wood and a certain range of industrial wood as well as waste wood are used to produce chipboards and fibreboards in Austria (splinters, rind, cut-offs, sawdust, wood chips, timber-cutting chips as well). Chipboard waste that accumulates during internal production is put back into production or used internally for energy recovery.

Paper and pulp industry
The requirements of the paper and pulp industry for reusable varieties of left-over wood are higher than those of the board industry. The former can only recover certain varieties of industrial wood.

### Wood wastes (without packaging from trade and industry) in 2009 – Quantities generated

<table>
<thead>
<tr>
<th>Codes</th>
<th>Waste designation acc. to ÖNORM S 2100 (2005)</th>
<th>Amounts generated in tonnes (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17101</td>
<td>Bark</td>
<td>1,630,000</td>
</tr>
<tr>
<td>17102</td>
<td>Rind, splinters of natural, clean, uncoated wood</td>
<td>460,000</td>
</tr>
<tr>
<td>17103</td>
<td>Sawdust and shavings of natural, clean, uncoated wood</td>
<td>1,640,000</td>
</tr>
<tr>
<td>17104</td>
<td>Wood sanding dust and sludge</td>
<td>120,000</td>
</tr>
<tr>
<td>17114</td>
<td>Dust and sludge from chipboard manufacturing</td>
<td>84,000</td>
</tr>
<tr>
<td>17115</td>
<td>Chipboard waste</td>
<td>9,000</td>
</tr>
<tr>
<td>17201</td>
<td>Wooden packaging and waste wood, not contaminated – bulky waste wood from households</td>
<td>183,225</td>
</tr>
<tr>
<td>17202</td>
<td>Building and demolition wood</td>
<td>277,000</td>
</tr>
<tr>
<td>17203</td>
<td>Wood wool, not contaminated</td>
<td>0</td>
</tr>
<tr>
<td>17207</td>
<td>Railway sleepers</td>
<td>hazardous</td>
</tr>
<tr>
<td>17208</td>
<td>Wood (e.g. stakes and poles) – impregnated with salt</td>
<td>hazardous</td>
</tr>
<tr>
<td>17209</td>
<td>Wood (e.g. stakes and poles) – impregnated with creosote</td>
<td>hazardous</td>
</tr>
<tr>
<td>17211</td>
<td>Saw dust and shavings, contaminated with organic chemicals contaminated</td>
<td>9,000</td>
</tr>
<tr>
<td>17212</td>
<td>Saw dust and shavings, contaminated with inorganic chemicals</td>
<td>3,646</td>
</tr>
<tr>
<td>17213</td>
<td>Wooden packaging, wood wastes and wood wool, contaminated with organic chemicals</td>
<td>hazardous</td>
</tr>
<tr>
<td>17213</td>
<td>Wooden packaging, wood wastes and wood wool, contaminated with organic chemicals</td>
<td>2,250</td>
</tr>
<tr>
<td>17214</td>
<td>Wooden packaging, wood wastes and wood wool, contaminated with organic chemicals</td>
<td>exempted</td>
</tr>
<tr>
<td>17214</td>
<td>Wooden packaging, wood wastes and wood wool, contaminated with organic chemicals</td>
<td>424</td>
</tr>
<tr>
<td>17215</td>
<td>Wood (e.g. stakes and poles) – impregnated with salt</td>
<td>15,200</td>
</tr>
<tr>
<td>17216</td>
<td>Sawdust and shavings, contaminated with organic materials</td>
<td>hazardous</td>
</tr>
<tr>
<td>17217</td>
<td>Sawdust and shavings, contaminated with inorganic materials</td>
<td>hazardous</td>
</tr>
<tr>
<td>17218</td>
<td>Waste wood, organically treated</td>
<td>13,000</td>
</tr>
<tr>
<td><strong>Total (rounded)</strong></td>
<td></td>
<td><strong>4,477,000</strong></td>
</tr>
</tbody>
</table>
About a third of the wood made into paper consists of residual wood from saw mills (chips and splinter wood), another third from tree-tops and branches, and the remainder from round wood used in forest maintenance.

Brick and lightweight wood wool boards
Normal sawdust and very fine sawdust are used in the brick industry to give the bricks a certain degree of porosity.
For wood cement brick production, ground wood, sawdust and chips without bark are used. In particular, the following recovery methods are used for the individual fractions:

- Recovery of bark
  Some 40% of the bark is burned within the operations (primarily for heat in wood drying plants), the remainder is recovered outside of the operations in biomass and district heating plants and passed along to the municipal administrations.

- Recovery of sawdust, rind and splinters from clean, uncoated wood (sawing by-products)
Such waste is recovered in the particle and fibreboard industry and in the paper and pulp industry. The ratio of the use of the sawing by-products, splinters, chips and sawdust to pulp wood in the sawmill industry is about 70:30. In total, about 98% of the sawing by-products are recovered in the chipboard and fibreboard industry as well as in the paper and pulp industry. The remainder of the sawing by-products is recovered for their energy value in the sawmills directly or sold to municipal administrations. No sawing by-products are deposited in landfills.

- Recovery of wood dust and sludge
  Incineration for the recovery of the energy value

- Recovery of construction and demolition wood
  Presumably uncontaminated wood (classification of waste wood in the “uncontaminated” faction often based exclusively on visual criteria): re-use (e.g. as intact building wood) or continued use (e.g. in gardening and landscaping), material recovery, incineration for recovery of the energy content
  Contaminated (impregnated) wood: incineration for the recovery of the energy value

Wood wastes with hazardous properties accounted for less than 1% of the total wood wastes collected. Most of the hazardous waste that accumulates (approx. 84%) is exported abroad.

3.20. Medical waste

Waste characteristics
Definition and origin
Waste from the medical sector includes waste that is accumulated in institutions that are subject to the

- Federal Hospitals Act (Krankenanstalten- und Kuranstaltengesetz)
- Pharmacy, Physician and Dentist Act (Apotheken-, Ärzte- und Zahnärztgesetz) as well as the Midwife Act (Hebammengesetz)
- Healthcare and Nursing Act (Gesundheits- und Krankenpflegesgesetz)
- AIDS Act (AIDS-Gesetz)
- Blood Safety and Plasmapheresis Act (Blutsicherheits- und Plasmapheresegesetz)
- Veterinarians Act (Tierärztesgesetz)

Waste from the medical sector can be subdivided into four main groups:

Group 1: Waste that is not hazardous inside or outside the medical sector.

Group 2: Waste that bears a risk of infection or injury within the medical sector but does not need to be disposed of as hazardous waste.

Group 3: Waste that is hazardous inside and outside the medical sector and requires special treatment in both areas. This waste is obliged to carry a consignment note, is considered hazardous material under the law concerning goods traffic and must be disposed as “hazardous waste”.

Group 4: Other medical waste for which special rules apply in terms of their collection and treatment.
Medical waste is mainly made up of the following components:

**Group 1:** This group comprises non-hazardous waste from the medical sector that is also generated in normal households and is generally passed along to waste collection services in the communities. This group includes, among other things, municipal waste, bulky waste, biogenic waste, street-cleaning residues and recoverables (paper and cardboard, glass, metal and plastics).

**Group 2:** This group is subdivided into “waste with no risk of injury”, “waste with a risk of injury” and “wet waste.”

“Waste with no risk of injury” includes, by way of example, mixtures of wound dressing, plaster casts, faecal nappies, disposable underwear, diaper inserts, tampons, disposal items (e.g., swabs, gloves, disposable syringes without the hypodermic needle, catheters, intravenous devices without the needle), urine sampling systems drained of residue, infusion bags or the like, even if they contain medical products from which the residue cannot be emptied but that have been conditioned using adequately absorbent material (e.g., dialysis filter sets, gel-filled suction systems).

“Waste with a risk of injury” includes, among other things, hypodermic needles and other potentially injurious pointed or sharp objects such as lancets, scalpels and the remains of ampoules.

“Wet waste” includes, for example, disposables filled with sucked-off secretions and not emptied of residue, which may leak during transport.

**Group 3:** This group includes waste with a particular risk, e.g., non-disinfected microbiological cultures and waste infected with hazardous pathogens.

**Group 4:** The following fractions are included in this group: waste from medicinal products, disinfectants, laboratory waste, and chemical waste, photo chemical, mercury or mercury-containing residues, body parts and waste body organs, laboratory animals and bodies and body parts of animals, animal faeces, catering waste and electrical and electronic equipment.

For further information, the Austrian standard ÖNORM S 2104 “Waste from the medical sector” of 1 January 2005 can be obtained from the Austrian Standards Institute.

**Quantities generated**

In the medical sector, approx. 49,300 tonnes of waste is generated (not including the municipal portion), while the portion of hazardous waste is approx. 4.4%.

The mass has been further reduced owing to the use of new technologies in the disposal of wet waste from hospitals.

<table>
<thead>
<tr>
<th>Waste from the medical sector in 2009 – Quantities generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codes</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>97101</td>
</tr>
<tr>
<td>97102</td>
</tr>
<tr>
<td>97103</td>
</tr>
<tr>
<td>97104</td>
</tr>
<tr>
<td>97105</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
Treatment
Recovery
The handling of waste from the medical sector (cf. groups 1 through 4) is governed by Austrian standard ÖNORM S 2104 “Waste from the medical sector” and the Waste Treatment Obligations Ordinance.

Group 1: Recoverables, such as paper and cardboard, glass, metals and sorted plastic packaging, but also sorted parts of bulky waste, undergo material recovery. Biogenic waste is used for the generation of compost and biogas.

The non-recoverable portions of plastic packaging and bulky waste are processed to recover the energy value.

Groups 2 and 3: Waste from these two groups is disposed of.

Group 4: Waste electrical and electronic equipment and some mercury and mercury-containing waste undergo material recovery. Catering waste and sometimes animal faeces are recovered biotechnologically. Experimental animals and the bodies and body parts of animals are passed on to carcass rendering or burned.

In the case of waste of animal origin, the provisions under the Animal By-Products Ordinance (TNP-VO) must be observed.

Disposal
Group 1: Residual waste is either subjected to mechanical-biological pre-treatment – followed by subsequent recovery of the energy content from the high-calorific fraction and deposition of the landfill fraction – or else it is delivered directly to waste incineration plants.

Groups 2 and 3: “Waste with a risk of injury” from group 2 and non-disinfected microbiological cultures and waste infected with hazardous pathogens from group 3 is collected in puncture-proof and unbreakable, sealed collection containers and brought to incineration plants without exception (waste from group 3 is delivered only to incineration plants for hazardous waste).

“Waste with no risk of injury” from group 2 is transported to the disposal plants in adequately insulated receptacles, transport containers or suitable vehicles.

Group 4: Physico-chemical treatment is applied to disinfectants, laboratory waste, chemical waste and photo chemicals, as well as non-recoverable mercury and mercury-containing residues, that is not delivered to incineration plants for hazardous waste.

3.21. Animal by-products

Waste characteristics
Definition and origin
Animal by-products are entire bodies, body parts of animals or products of animal origin not intended for human consumption. Animal by-products originate from:
- dairy processing
- slaughtering
- meat processing
- food retail (formerly food of animal origin)
- restaurants, catering establishments as well as industrial and household kitchens (catering waste of plant and animal origin)
- agriculture

Composition
According to the EU Regulation, three categories of risk are defined for animal by-products. Each of these categories contains sub-components for which obligatory transport, recovery and disposal methods are stipulated. These categories are listed below:
Selected animal by-products of category 1:
All these materials come from risk areas:
- all body parts from animals suspected of being infected by TSE (= transmissible spongiform encephalopathy)
- pet animals, zoo animals, circus animals
- experimental animals and animals used for other research purposes
- wild animals when suspected of being infected with communicable diseases
- specific risk materials
- all animal materials collected when treating sewage from category 1 processing plants
- catering waste from means of transport operating internationally

According to the Community provisions, individual materials belonging to category 3 (e.g. carcases, blood, fatty tissue, etc.) would generally be classifiable as fit for human consumption. For primarily commercial reasons, however, they are not used for human consumption.

Quantities generated
In 2009, approx. 1,738,000 tonnes of animal by-products (not including farming fertiliser) were generated.
The share from slaughtering and subsequent meat processing was approx. 406,000 tonnes, including approx. 25,000 tonnes of specific risk material (SRM). In particular, SRM includes skulls, brains, eyes, spinal columns, spinal marrow, intestines and tripe from the slaughter of cattle, sheep and goats aged 12 months and older.

Animal by-products in 2009 – Quantities generated

<table>
<thead>
<tr>
<th>Animal by-products</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk from dairy production that is not fit for processing and human consumption</td>
<td>90,000</td>
</tr>
<tr>
<td>Whey from cheese production (including wastage)¹</td>
<td>1,025,000</td>
</tr>
<tr>
<td>Waste from butter production</td>
<td>37,000</td>
</tr>
<tr>
<td>Offal from slaughtering</td>
<td>287,000</td>
</tr>
<tr>
<td>Offal from meat processing</td>
<td>119,000</td>
</tr>
<tr>
<td>Carcasses of fallen stock²</td>
<td>38,300</td>
</tr>
<tr>
<td>Former food of animal origin</td>
<td>43,000</td>
</tr>
<tr>
<td>Catering waste</td>
<td>97,500</td>
</tr>
<tr>
<td>Catering waste from international transport</td>
<td>1,900</td>
</tr>
<tr>
<td>Total</td>
<td>1,738,700</td>
</tr>
</tbody>
</table>

¹ Wastage designates any dairy and whey lost through the cleaning of tanks, etc.
² Animals that were not slaughtered but died for other reasons

Category 3 accounts for approx. 1,613,300 tonnes of animal by-products (e.g., dairy waste from dairy production and dairy processing, edible body parts from slaughtered animals, catering waste, former food of animal origin), category 2 (e.g., manure and digestive tract contents or animals unfit for slaughter) accounts for approx. 96,400 tonnes and category 1 (animal by-products, with the highest risk to humans, animals and the environment) approx. 29,000 tonnes.

Animal by-products from the production and processing of milk consists of 90,000 t of undeliverable milk (colostrum, mastitis / antibiotic milk, wastage) from agricultural production, 1,025,000 t
of sweet and sour whey from cheese and curd production and 37,000 t production waste from the manufacturing of butter.

**Treatment**

The collection and recovery of animal by-products must be carried out exclusively in operations that are permitted to do so according to Animal By-Product Directive (EC) No 1069/2009. Such operations include drying plants, i.e. operations that manufacture whey and lactose powder, fat-processing operations (including waste edible fats), operations that manufacture pet food, operations for the manufacture of pharmaceuticals and medicinal products, biogas facilities and composting facilities.

Animal by-products of category 1 are all disposed of, i.e. pre-treated and/or processed and/or burned.

Apart from incineration following appropriate pre-processing, animal by-products of category 2 may also be processed in authorised recovery facilities or in biogas or composting facilities and used as organic fertiliser or soil conditioners.

Animal by-products of category 3 from slaughterhouses and meat-processing establishments are further processed by special processing companies or rendering plants into various products (e.g., dog and cat food, into animal fat, bone, blood and feather meal or gelatine).

Depending on the starting material, animal fats of various levels of quality can be made and used as input materials for animal feed, cosmetics, pharmaceuticals and in the chemicals industry.

Almost all of the cow, calf, sheep and goat skin can be made into leather and hides.

Pigskins, however, mostly need to be recovered in the pet food industry.

Goose and duck feathers and down are used to make bed ware (pillows or cushions).

Excrements and stomach content of animals for slaughter are recovered as organic fertiliser for use in agriculture or recovered in biogas and composting plants.

All waste of category 3 can be recovered in authorised biogas and composting plants.

The various by-products of animal origin should remain separated by category from the time they are produced until recovery. If categories are mixed, all the animal by-products of the mixed categories must be processed and recovered in compliance with the statutory requirements of the lower category.

Operations for the recovery and disposal of animal by-products include, among others:

- drying plants for the production of lactose and whey powder
- intermediate waste processing operations, such as skin and fur processors or tanneries or sanitizing facilities for offal
- animal carcass processors for waste of all categories
- co-incineration plants
- incineration plants
- biogas plants and composting facilities

For the collection and processing of animal by-products and specific risk materials, each Federal Province has granted authorisation to one operator in accordance with its regional laws.
Animal by-products in processed form  
(meat-and-bone meal, animal fat, whey powder)

Animal by-products of categories 1 and 2 are, if meat-and-bone meal and animal fat are produced, processed under high-pressure sterilisation. Meat-and-bone meal and animal fat of category 1 are disposed of in waste incineration plants, thermal power stations or cement plants in order to use the energy content. Apart from incineration, meat-and-bone meal and animal fat of category 3 is also
- used in the chemical industry and for fertilisation
- used to manufacture animal feed
- used in biotechnological recovery plants or biogas plants

The intermediate treatment or processing of offal and fallen stock in rendering plants produces, among other things, 84,700 tonnes of “meat-and-bone meal” and approx. 32,400 tonnes of “animal fats”. 37.7% of the 117,100 tonnes of meat-and-bone meal and animal fat produced were subjected to thermal recovery, 25.8% were used as fertiliser in agriculture and some 6.5% in technical industry, while 30% of the meat-and-bone meal and animal fat production was exported.

Using the animal by-products from cheese production (whey), 6,500 tonnes of lactose powder and 25,700 tonnes of whey powder were produced in domestic drying plants. Some 280,000 tonnes of raw whey were exported as a concentrated formula (approx. 20-30% DM).

3.22. Asbestos waste

Waste characteristics
Asbestos is a naturally occurring, fibrous mineral that was frequently used as construction material (e.g. sheets of Eternit or injection asbestos) and as insulation material in the period lasting from 1960 to the end of the 1980s due to its heat and fire resistance and its insulating properties as well as its chemical stability. It was also used as storage medium in electric storage heaters, as flooring and in lots of other ways. Asbestos is understood to include the following naturally occurring mineral fibres:
- from the serpentine group:
  - chrysotile
- from the amphibole group:
  - actinolite
  - amosite
  - anthophyllite
  - crocidolite
  - tremolite

Asbestos contains finest fibres that are readily released upon mechanical disturbance (e.g. during improper removal of asbestos products) and can then be inhaled. When breathing-air contains elevated fibre concentrations over a longer period of time, asbestos may cause pneumoconiosis, breast cancer or peritoneal or pleural cancer.

Once the perniciousness of asbestos had been discovered, 1978 saw the introduction of a ban for individual asbestos products and 1990 a general ban on the placing on the market of any asbestos-containing objects – with only a few exceptions. Since 1 January 2004, the following has been prohibited acc. to sec. 2 of the Chemical Ban Ordinance:
- the placing on the market and use of asbestos
- the production, placing on the market and use of substances, preparations and finished goods to which asbestos fibres have been intentionally added
- the placing on the market and utilisation of used asbestos-containing substances, preparations and finished goods.

Where asbestos-containing substances, preparations and finished goods have been installed with due authority prior to 1 January 2004 or were put into operation before this date, their use may be continued if there are no other legal requirements to the contrary.
Asbestos waste and asbestos-containing waste acc. to ÖNORM S 2100.

<table>
<thead>
<tr>
<th>Code</th>
<th>Waste designation</th>
<th>Hazardous waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>31412</td>
<td>asbestos cement (including solidified asbestos cement dust, solidified asbestos waste, solidified asbestos dust and solidified asbestos cement slurry)</td>
<td>hn²⁾</td>
</tr>
<tr>
<td>31413</td>
<td>asbestos cement dust</td>
<td>hn²⁾</td>
</tr>
<tr>
<td>31437</td>
<td>asbestos waste, asbestos dust (including loosely-bound asbestos waste, waste with a bulk density of &lt; 1 kg/l and an asbestos content of &gt; 5%)</td>
<td>hn²⁾</td>
</tr>
<tr>
<td>31609</td>
<td>asbestos cement slurry</td>
<td>hn²⁾</td>
</tr>
<tr>
<td>35201</td>
<td>electrical and electronic equipment and equipment parts with an environmentally relevant amount of hazardous waste or constituents (e.g. storage heaters with asbestos components) (Waste Catalogue Ordinance)</td>
<td>hn²⁾</td>
</tr>
<tr>
<td>57503</td>
<td>rubber asbestos</td>
<td>hn²⁾</td>
</tr>
</tbody>
</table>

²⁾ It is no longer permissible to exempt asbestos waste since entry into force of the Landfill Ordinance of 2008.

As a result of these bans, only small amounts of asbestos have presumably been placed on the market since 1990. Since large amounts were used in products between 1960 and 1990 that are now coming to the end of the service life, the next few years will see a rise in the quantity of asbestos waste.

Since 1 January 2007, all asbestos waste has been classified as hazardous waste. Ever since the Landfill Ordinance of 2008 entered into force, asbestos waste, which is classified as hazardous waste, may be deposited in landfills for non-hazardous waste under certain conditions. Exemption is no longer admissible.

Quantities generated

The table below shows the quantity of asbestos-containing waste in tonnes and the quantity of waste which may contain asbestos in 1999, 2004 and 2006 through 2009.

The amount generated of asbestos cement (SN 31412 and SN 31413) has increased considerably since 2004 (cf. figure below). This may be attributable to the fact that asbestos-containing materials, which in Austria have been used primarily in construction between 1960 and 1990, are now reaching the end of their service life and an increasing amount is being replaced.

The generated amount of waste asbestos with the code SN 31437 as well as electrical and electronic equipment containing hazardous constituents (SN 35201) has varied strongly year on year, but is stagnating overall.

1997 was the last year that asbestos cement slurry (SN 31609) was generated.

The amount of asbestos-containing waste generated in Austria

<table>
<thead>
<tr>
<th>SN</th>
<th>Designation</th>
<th>1999</th>
<th>2004</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>31412 + 31413</td>
<td>asbestos cement + asbestos cement dust</td>
<td>3,000</td>
<td>12,600</td>
<td>37,400</td>
<td>35,100</td>
<td>45,300</td>
<td>56,055</td>
</tr>
<tr>
<td>31437</td>
<td>asbestos waste, asbestos dust</td>
<td>250</td>
<td>1,600</td>
<td>970</td>
<td>810</td>
<td>900</td>
<td>639</td>
</tr>
<tr>
<td>35201</td>
<td>electrical and electronic equipment with hazardous constituents</td>
<td>4,200</td>
<td>8,600</td>
<td>1,200</td>
<td>1,200</td>
<td>1,500</td>
<td>2,140</td>
</tr>
</tbody>
</table>
In terms of rubber asbestos (SN 57503), 2008 saw a small amount of one tonne generated for the first time since 2000. In 2009, six tonnes of asbestos waste (SN 31437) and 22 tonnes of electrical and electronic equipment with hazardous constituents (SN 35201) were exported. No asbestos was imported. The import of asbestos waste has been prohibited since 1 July 2007.

### Treatment

The table below depicts the amounts of asbestos-containing waste deposited in landfills in Austria between 1999 and 2009.

The deposition of asbestos cement (SN 31412) and asbestos cement dust (SN 31413) rose sharply in 2006. This can be attributed to the increase in asbestos waste imports but also to the increase in the occurrence of asbestos waste within the country since 2002. The impact of the import ban can be seen in the marked decrease of the quantities of landfilled asbestos waste in 2007 compared to 2006.

#### 3.23. Hazardous waste

**Waste characteristics**

**Definition and origin**

In Austria, hazardous waste is regulated by the amended List of Waste Ordinance, Federal Law Gazette II No 498/2008. According to sec. 4 of the List of Waste Ordinance, the following classify as hazardous waste:

1. Acc. to sec. 1 (1), all waste types marked with a “g” in the Waste Catalogue are hazardous waste.
2. Hazardous waste is any waste that contains hazardous substances or, in acc. with this Ordinance, is mixed with such substances in such a way that those hazardous properties as set forth in Annex 3 cannot be ruled out through a simple assessment, such as an evaluation of the maximum percentage by weight of toxic substances (criterion H6).
3. Certain types of excavated material
   - excavated material from industrial sites that handle soil- or water-polluting substances giving rise to the reasonable assumption that the material is “hazardous” as defined by Annex 3 of the List of Waste Ordinance (e.g., in the case of operations involving metal or mineral oil processing, filling stations, dry cleaners, the chemicals industry, gasworks or contaminated sites); this applies to all areas of the site where such substances are handled.
   - excavated material from sites that are not covered by the first item if contamination becomes apparent in the course of the excavation or re-

---


<table>
<thead>
<tr>
<th>SN</th>
<th>Designation</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 412</td>
<td>asbestos cement</td>
<td>1999: 5,800</td>
</tr>
<tr>
<td>31 413</td>
<td>+ asbestos cement dust</td>
<td>2000: 16,800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2001: 14,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2002: 10,700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2003: 11,200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2004: 13,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2005: 24,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2006: 95,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2007: 49,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008: 44,700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009: 56,100</td>
</tr>
<tr>
<td>31 437</td>
<td>asbestos waste + asbestos dust</td>
<td>1999: 41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000: 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2001: 180</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2002: 740</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2003: 1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2004: 1,200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2005: 370</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2006: 570</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2007: 420</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008: 300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009: 640</td>
</tr>
</tbody>
</table>
moval activities and it is reasonable to assume that the material is “hazardous” as defined by Annex 3 of the List of Waste Ordinance

Excavated material if it is reasonable to assume that the waste is “hazardous” pursuant to Annex 3 of the List of Waste Ordinance due to contamination caused by an operational incident or accident

Excavated material that is not covered by the above but chemical analysis reveals that the waste is so contaminated that it is at least as “hazardous” as defined by Annex 3 of the List of Waste Ordinance

4. Waste that was once classified as hazardous and subsequently solidified, stabilised or immobilised is considered hazardous even after solidification, stabilisation or immobilisation. This waste may only be exempted for the purpose of landfiling. This does not apply to waste that solely exhibits hazard properties H4 and H8 acc. to Annex 3 due to its content of alkali substances.

Quantities generated
The data stored in the e-consignment note of April 2009 and the declassification data with current data status was used as database. The import/export data from 2009 also served as base data. In the figures given for hazardous waste, overlaps with other groups of waste may occur.

Approx. 957,000 tonnes accumulated in Austria and were delivered to the treatment facilities in the country in 2009.

As against 2008, the decline in the amount of this hazardous waste (less approx. 250,000 tonnes) can be explained by the following reasons:

- Contaminated soil (SN 31424 and SN 31423) is mainly produced by sporadic primary incidents and it massively impacts the total amount of hazardous waste generated.
- The amount of slag, ash, dust, etc. from industry declined due to the economic crisis and the associated slowing in production.

This group of waste accounts for some 2% of the approx. 54 million tonnes of overall waste.

In addition, approx. 81,500 tonnes of hazardous waste from abroad was delivered to Austrian treatment facilities in 2009.
### Waste types delivered to hazardous waste treatment facilities in 2009
#### Sorted by mass

<table>
<thead>
<tr>
<th>Codes</th>
<th>Waste designations in acc. with ÖNORM S 2100 in due consideration of the amendments to the List of Waste Ordinance (1 January 2007)</th>
<th>Quantities in tonnes (rounded)</th>
<th>Percentage of total hazardous waste generated in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>31223 + 31223 91</td>
<td>dust, ash and dross from other smelting processes</td>
<td>82,823</td>
<td>8.7</td>
</tr>
<tr>
<td>31424</td>
<td>other contaminated soils</td>
<td>74,814</td>
<td>7.8</td>
</tr>
<tr>
<td>31412</td>
<td>asbestos cement</td>
<td>56,055</td>
<td>5.9</td>
</tr>
<tr>
<td>31423</td>
<td>soil contaminated with oil</td>
<td>53,446</td>
<td>5.6</td>
</tr>
<tr>
<td>35203</td>
<td>motor vehicles, machines and machine parts, with environmentally significant levels of hazardous components or constituents (e.g., starter batteries, brake fluid, motor oil)</td>
<td>52,847</td>
<td>5.5</td>
</tr>
<tr>
<td>31309 + 31309 91</td>
<td>flue ash and dust from waste incineration plants</td>
<td>48,141</td>
<td>5.0</td>
</tr>
<tr>
<td>54102</td>
<td>waste oils</td>
<td>34,334</td>
<td>3.6</td>
</tr>
<tr>
<td>31211</td>
<td>salt slag containing aluminium</td>
<td>34,208</td>
<td>3.6</td>
</tr>
<tr>
<td>31308</td>
<td>slag, ash from waste incineration plants</td>
<td>33,913</td>
<td>3.5</td>
</tr>
<tr>
<td>17207</td>
<td>railway sleepers</td>
<td>26,756</td>
<td>2.8</td>
</tr>
<tr>
<td>54702</td>
<td>oil separator contents (petrol separator contents)</td>
<td>26,447</td>
<td>2.8</td>
</tr>
<tr>
<td>54402</td>
<td>drilling and grinding oil emulsions and emulsion mixtures</td>
<td>25,046</td>
<td>2.6</td>
</tr>
<tr>
<td>31484</td>
<td>excavated soil material, fill material from CP plants</td>
<td>23,849</td>
<td>2.5</td>
</tr>
<tr>
<td>54408</td>
<td>other oil-and-water mixtures</td>
<td>18,893</td>
<td>2.0</td>
</tr>
<tr>
<td>52725</td>
<td>other watery concentrates</td>
<td>17,842</td>
<td>1.9</td>
</tr>
<tr>
<td>55374</td>
<td>solvent-and-water mixtures without halogenated solvents</td>
<td>16,157</td>
<td>1.7</td>
</tr>
<tr>
<td>55370</td>
<td>solvent mixtures without halogenated organic components, paint and varnish thinners (e.g., “diluents for cellulose lacquers”), including antifreeze</td>
<td>15,556</td>
<td>1.6</td>
</tr>
<tr>
<td>35322</td>
<td>lead accumulators</td>
<td>15,182</td>
<td>1.6</td>
</tr>
<tr>
<td>52102</td>
<td>acids, acid mixtures, inorganic 14,174</td>
<td>14,174</td>
<td>1.5</td>
</tr>
<tr>
<td>54703</td>
<td>sludge from oil-separating plants</td>
<td>13,711</td>
<td>1.4</td>
</tr>
<tr>
<td>35230</td>
<td>waste electrical and electronic equipment – small equipment with an edge length of less than 50 cm, with hazardous properties</td>
<td>13,000</td>
<td>1.4</td>
</tr>
<tr>
<td>54701</td>
<td>sand filter contents containing oil or cold cleaner solvent</td>
<td>11,886</td>
<td>1.2</td>
</tr>
<tr>
<td>94801</td>
<td>sludge from sewage treatment with hazardous constituents</td>
<td>11,777</td>
<td>1.2</td>
</tr>
<tr>
<td>31217</td>
<td>filter dust containing non-ferrous metal</td>
<td>11,339</td>
<td>1.2</td>
</tr>
<tr>
<td>51112</td>
<td>other galvanic sludge</td>
<td>11,250</td>
<td>1.2</td>
</tr>
<tr>
<td>35212</td>
<td>display screen equipment, including picture tube equipment</td>
<td>11,166</td>
<td>1.2</td>
</tr>
<tr>
<td>57805</td>
<td>hazardous contaminated fractions and filter dust from shredder plants</td>
<td>11,004</td>
<td>1.2</td>
</tr>
<tr>
<td>31633</td>
<td>glass grinding waste with production-specific harmful additives</td>
<td>10,666</td>
<td>1.1</td>
</tr>
<tr>
<td>54930</td>
<td>fuel contaminated with solid grease and oil (waste from workshops, industry and filling stations)</td>
<td>10,420</td>
<td>1.1</td>
</tr>
<tr>
<td>Sub-total</td>
<td></td>
<td>786,700</td>
<td>82.2</td>
</tr>
<tr>
<td>other 48 waste types (1,000 to under 10,000 t/a)</td>
<td></td>
<td>136,553</td>
<td>14.3</td>
</tr>
<tr>
<td>other 254 waste types (up to under 1,000 t/a)</td>
<td></td>
<td>33,565</td>
<td>3.5</td>
</tr>
<tr>
<td>Sum total</td>
<td></td>
<td>956,818</td>
<td>100</td>
</tr>
</tbody>
</table>
### Tonnes of hazardous waste imported in 2009

<table>
<thead>
<tr>
<th>Codes</th>
<th>Waste designations in acc. with ÖNORM S 2100 in due consideration of the amendments to the List of Waste Ordinance</th>
<th>Imported hazardous waste in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31435</td>
<td>used filter and absorbents with application-specific additives (e.g. kieselgur, activated earths, activated carbon)</td>
<td>23,080</td>
</tr>
<tr>
<td>35322</td>
<td>lead accumulators</td>
<td>13,932</td>
</tr>
<tr>
<td>59607</td>
<td>catalysts and contact materials</td>
<td>9,339</td>
</tr>
<tr>
<td>55374</td>
<td>solvent-and-water mixtures without halogenated solvents</td>
<td>6,660</td>
</tr>
<tr>
<td>52103</td>
<td>acids, acid mixtures with application-specific additives (e.g., pickling, ion exchange eluates)</td>
<td>3,507</td>
</tr>
<tr>
<td>55370</td>
<td>solvent mixtures without halogenated organic components, paint and varnish thinners (e.g., “diluents for cellulose lacquers”), including antifreeze</td>
<td>3,173</td>
</tr>
<tr>
<td>55220</td>
<td>solvent mixtures containing halogens</td>
<td>2,256</td>
</tr>
<tr>
<td>54930</td>
<td>fuel contaminated with solid grease and oil (waste from workshops, industry and filling stations)</td>
<td>1,892</td>
</tr>
<tr>
<td>54402</td>
<td>drilling and grinding emulsions, emulsion mixtures</td>
<td>1,795</td>
</tr>
<tr>
<td>54102</td>
<td>waste oils</td>
<td>1,688</td>
</tr>
<tr>
<td>54704</td>
<td>sludge from tank cleaning</td>
<td>1,639</td>
</tr>
<tr>
<td>55503</td>
<td>varnish and paint slurry</td>
<td>1,275</td>
</tr>
<tr>
<td>54710</td>
<td>grinding sludge containing oil</td>
<td>1,153</td>
</tr>
<tr>
<td>55502</td>
<td>waste lacquer, waste paint, if containing solvents and/or heavy metals and not fully solidified residues in containers</td>
<td>1,131</td>
</tr>
<tr>
<td>51530</td>
<td>copper chloride</td>
<td>1,039</td>
</tr>
<tr>
<td>others</td>
<td>imports of 41 hazardous waste types</td>
<td>7,969</td>
</tr>
</tbody>
</table>

Imports of hazardous waste 81,528

### Declassifications

Certain types of waste classified as hazardous also include non-hazardous waste that does not have any hazardous properties. In order to take this into account and to help production processes move further in the direction of “cleaner production”, proof can be furnished for such waste to substantiate that they do not exhibit any hazardous properties (declassification).

For hazardous waste, declassification is permissible at any stage of the waste disposal chain (see the section “Regulatory measures – Hazardous waste”). The declassification must be reported to the Federal Ministry of Agriculture, Forestry, Environment and Water Management. They may be performed for a single batch or for waste from a specific process with consistent quality. It may be performed either by the relevant waste holder ("normal" declassification) or by the landfill holder for the purposes of depositing the waste in its landfill.

An analysis of the consignment notes shows that declassifications by waste producers have the following effect: a given type of waste (either an individual batch or waste from a specific process of consistent quality) before initial transfer from the waste producer to a processor does not fall within the scope of the hazardous waste control system and therefore is never reported to the Waste Data Network.

In 2009, some 806,000 tonnes of hazardous waste were declassified. Contaminated soil and exca-
vated material, in particular, were subject to exemption. This is particularly due to sec. 4 (4) (1) of the List of Waste Ordinance, according to which excavated material is considered hazardous if it comes from sites handling substances harmful to the soil or water and therefore giving good reason to suspect that the waste is “hazard-relevant” as defined by Annex 3 (e.g., in the case of metal or mineral-oil processing operations, filling stations, dry cleaners, operations in the chemicals industry, gasworks or contaminated sites).

The analysis for the above tables was based on the presumable quantities of accumulated waste per year according to declassification reports, taking the time of declassification as the criteria for allocation to the reference year. These wastes were classified into 40 different waste types based on the declassification analysis.

### Amount of waste declassified in 2009 – By type of waste following exemption

<table>
<thead>
<tr>
<th>Codes</th>
<th>Waste types after declassification</th>
<th>Specification</th>
<th>Declassified quantities in tonnes (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31308 88</td>
<td>slag and ash from waste incineration plants</td>
<td>declassified</td>
<td>228,786</td>
</tr>
<tr>
<td>31424 37</td>
<td>other contaminated soils</td>
<td>excavated soil material and excavated fill, otherwise contaminated, non-hazardous</td>
<td>203,618</td>
</tr>
<tr>
<td>54504 88</td>
<td>earth contaminated with crude oil, excavated material and demolition material</td>
<td>declassified</td>
<td>121,342</td>
</tr>
<tr>
<td>31309 88</td>
<td>fly ash and dust from waste incineration plants</td>
<td>declassified</td>
<td>79,147</td>
</tr>
<tr>
<td>31423 36</td>
<td>soil contaminated with oil</td>
<td>excavated soil material as well as excavated fill, contaminated with hydrocarbons, non-hazardous</td>
<td>24,339</td>
</tr>
<tr>
<td>31484 88</td>
<td>excavated soil material as well as fill from chemical/physical treatment</td>
<td>declassified</td>
<td>22,322</td>
</tr>
<tr>
<td>31203 88</td>
<td>slag from non-ferrous metal smelting</td>
<td>declassified</td>
<td>16,000</td>
</tr>
<tr>
<td>31301</td>
<td>fly ash and dust from other firing systems</td>
<td></td>
<td>13,000</td>
</tr>
<tr>
<td>31411 29</td>
<td>excavated soil</td>
<td>excavated soil material with background contamination, class A2, construction and demolition waste</td>
<td>12,091</td>
</tr>
<tr>
<td>31411 33</td>
<td>solid residues containing salt from flue gas purification of firing systems for conventional fuels (excl. gypsum from flue gas desulfurising plants)</td>
<td>declassified</td>
<td>11,500</td>
</tr>
<tr>
<td>31314 88</td>
<td>sludge containing crude oil</td>
<td>declassified</td>
<td>10,100</td>
</tr>
<tr>
<td>54503 88</td>
<td>other 20 waste types</td>
<td></td>
<td>59,070</td>
</tr>
<tr>
<td></td>
<td>waste without SN</td>
<td></td>
<td>5,052</td>
</tr>
</tbody>
</table>

**Total** 806,367

**Treatment**

There is a large number of facilities for the processing of specific hazardous waste. Since the Landfill Ordinance already contains extensive provisions concerning the study of waste, synergies for the declassification for the purpose of landfilling have been harnessed. Such exemption must be based on an overall assessment in accordance with the Landfill Ordinance. Pursuant to sec. 16 (1) of the Waste Management Act of 2002, it has been prohibited since 16 July 2001 to deposit hazardous waste on above-ground landfills, i.e. such waste must either be declassified, treated or exported prior to above-ground depositing. About 450,000 tonnes of hazardous waste were treated in numerous plants with the objective of converting it into a form compatible with landfilling. Alternatively, highly contaminated waste is deposited in underground landfills or sent abroad for a different type of recovery or disposal (approx. 215,000 tonnes).
**Exported hazardous waste in 2009 – Largest quantities**

<table>
<thead>
<tr>
<th>Codes</th>
<th>Description</th>
<th>Exported hazardous waste in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31223</td>
<td>dust, ash and dross from other smelting processes</td>
<td>58,577</td>
</tr>
<tr>
<td>31211</td>
<td>salt slag, containing aluminium</td>
<td>34,208</td>
</tr>
<tr>
<td>17207</td>
<td>railway sleepers</td>
<td>25,948</td>
</tr>
<tr>
<td>31309</td>
<td>fly ash and dust from waste incineration plants</td>
<td>16,209</td>
</tr>
<tr>
<td>57805</td>
<td>hazardous contaminated fractions and filter dust from shredder plants</td>
<td>11,003</td>
</tr>
<tr>
<td>31217</td>
<td>filter dust containing non-ferrous-metal</td>
<td>10,025</td>
</tr>
<tr>
<td>54102</td>
<td>waste oils</td>
<td>9,715</td>
</tr>
<tr>
<td>52725</td>
<td>other watery concentrates</td>
<td>6,510</td>
</tr>
<tr>
<td>94801</td>
<td>sludge from sewage treatment with hazardous constituents</td>
<td>3,954</td>
</tr>
<tr>
<td>31312</td>
<td>solid residues containing salt from flue gas cleaning of waste incineration plants and waste pyrolysis facilities</td>
<td>2,917</td>
</tr>
<tr>
<td>55224</td>
<td>solvent-and-water mixtures without halogenated solvents</td>
<td>2,477</td>
</tr>
<tr>
<td>55370</td>
<td>solvent-containing sludge without halogenated organic components, paint and varnish thinners (e.g. &quot;diluents for cellulose lacquers&quot;), also antifreeze</td>
<td>2,301</td>
</tr>
<tr>
<td>31466</td>
<td>glass, ceramic with production-specific additives</td>
<td>2,078</td>
</tr>
<tr>
<td>54701</td>
<td>sand filter contents containing oil or cold cleaning solvent</td>
<td>1,780</td>
</tr>
<tr>
<td>52103</td>
<td>acids, acid mixtures with application-specific additives (e.g., pickling, ion exchanging eluates)</td>
<td>1,723</td>
</tr>
<tr>
<td>54930</td>
<td>solid fuel contaminated with grease and oil (waste from workshops, industry and filling stations)</td>
<td>1,618</td>
</tr>
<tr>
<td>35322</td>
<td>lead accumulators</td>
<td>1,569</td>
</tr>
<tr>
<td>51112</td>
<td>other galvanic sludge</td>
<td>1,567</td>
</tr>
<tr>
<td>55374</td>
<td>solvent-and-water mixtures without halogenated solvents</td>
<td>1,342</td>
</tr>
<tr>
<td>31203</td>
<td>slag from non-ferrous metal smelting</td>
<td>1,298</td>
</tr>
<tr>
<td>94801 91</td>
<td>sludge from sewage treatment with hazardous contents</td>
<td>1,256</td>
</tr>
<tr>
<td>31633</td>
<td>glass grinding sludge with production-specific harmful additives</td>
<td>1,232</td>
</tr>
<tr>
<td>31217 91</td>
<td>filter dust containing non-ferrous-metal</td>
<td>1,103</td>
</tr>
<tr>
<td>35210</td>
<td>picture tubes (based on the cathode-ray tube principle)</td>
<td>1,031</td>
</tr>
<tr>
<td></td>
<td>others exports of 58 hazardous waste types</td>
<td>13,058</td>
</tr>
<tr>
<td></td>
<td><strong>Exported hazardous waste</strong></td>
<td><strong>214,499</strong></td>
</tr>
</tbody>
</table>
3.24. Waste oils and waste lubricants (including specifically contaminated soil)

Waste characteristics

Since a demarcation between the waste with the code number SN 54504 “crude oil containing soil, excavation material, and demolition waste” and SN 31423 “oil contaminated soil” is difficult, this section also considers waste assigned to SN 31423 “oil contaminated soil”.

In essence, waste belonging to code group 54 “waste from mineral oil and coal refining products” include:
- liquid hydrocarbons
- solid hydrocarbons (often with lubricating effect)
- emulsions, sludge and mixtures of hydrocarbons with aqueous liquids (including acids)
- solids contaminated with hydrocarbons

Furthermore, there are other types of waste that represent typical by-products in mineral oil production and coal refinement (e.g. sulphur and ferrous sulfide) and not carbon-containing lubricants such as silicon oils. Only small quantities of these wastes are generated.

Part of the coolant and lubricant waste is incurred by the use of cooling emulsions when processing metals. Cooling emulsions are auxiliary materials that are kept in the enterprise’s cycle until irreversible chemical and biological reactions render individual components unusable.

Mineral-oil-containing oil sludge belongs the waste under group 54. This sludge occurs either as a solid mixed with lots of mineral oil or as mineral oils strongly mixed with solids. Generally, sludge consists of mineral oil, production-specific solids, storage-specific solids or solids that have otherwise got into the mineral oil as well as any water and/or other liquid.

Most of the waste belonging to code group 54 is generally classified as hazardous, since it is liable to cause great damage to the environment, poses a health risk and is flammable upon release. Some types of waste can be exempted if it they demonstrably exhibit no hazardous properties. Some types of waste can be solidified to facilitate their handling. They continue to be considered hazardous waste even after solidification.

Special attention should be given to waste that contains carcinogenic substances.

According to the Ordinance on Limit Values of 2007
- the following are clearly carcinogenic:
  - aromatic extracts from crude oil distillation
  - tar-containing ointments
  - pyrolysis products from organic materials containing polycylical aromatic hydrocarbons (such as coal tar and tarry oils)
- there is reason to suspect that the following substances are potentially carcinogenic:
  - chlorinated biphenyls (i.e. from polychlorinated biphenyls (PCBs));
  - cooling lubricants containing nitrite or reactants for nitrosamine formation
As a rule, waste belonging to group 54 originate from
- the transport sector (e.g. filling stations, workshops)
- industrial production
- the area of crude oil extraction, mineral oil processing and coal refining

More precise information can be given, for instance, for the origin of oil sludge:
- sludge from mineral oil storage
- sludge from emulsion storage containers and emulsion treatment facilities
- sludge from production processes
- sludge from waste water purification plants in refineries and petrochemical operations

**Quantities generated**

Approx. 1.1 million tonnes of waste belonging to code group 54, including SN 31423 “oil-contaminated soil” was generated.

Some 926,000 tonnes of earth and soil contaminated with oil (SN 54504 + SN 31423) was generated and makes up 84% of this waste group. In addition to this, larger amounts of waste oils, oil separator contents and various types of emulsions and sludge occurred as well. However, there are 15 codes for which no occurrence of waste was determined.

In terms of transformer oil/heat transfer oils, relatively large quantities of halogen-free oils were, i.e. 850 tonnes. With only 4 tonnes, the amount of halogen-containing transformer oils generated is negligible. A total of 110 tonnes was registered for PCB/PCT-containing waste.

The total amount of the fractions requiring a consignment note and belonging to code group 54 and code 31423 “oil-contaminated soil” decreased by nearly 40% between 1999 and 2009.

### Quantities of waste generated belonging to code group 54 + SN 31423

<table>
<thead>
<tr>
<th>SN (without specification)</th>
<th>Waste designation</th>
<th>Amounts generated in 2009 in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31423</td>
<td>soil contaminated with oil</td>
<td>800,000</td>
</tr>
<tr>
<td>54504</td>
<td>earth contaminated with crude oil, excavated soil, and demolition material</td>
<td>126,200</td>
</tr>
<tr>
<td>54102</td>
<td>waste oils</td>
<td>34,300</td>
</tr>
<tr>
<td>54702</td>
<td>oil separator contents (petrol separator contents)</td>
<td>27,400</td>
</tr>
<tr>
<td>54402</td>
<td>drilling and grinding oil emulsions and emulsion mixtures</td>
<td>25,000</td>
</tr>
<tr>
<td>54408</td>
<td>other oil-and-water mixtures</td>
<td>18,900</td>
</tr>
<tr>
<td>54703</td>
<td>sludge from oil-separating plants</td>
<td>14,300</td>
</tr>
<tr>
<td>54701</td>
<td>sand filter contents containing oil or cold cleaning solvent</td>
<td>12,200</td>
</tr>
<tr>
<td>54503</td>
<td>sludge containing crude oil</td>
<td>10,700</td>
</tr>
<tr>
<td>54930</td>
<td>solid fuels contaminated with grease and oil</td>
<td>10,400</td>
</tr>
<tr>
<td>54912</td>
<td>bitumen, asphalt</td>
<td>5,000</td>
</tr>
<tr>
<td>54704</td>
<td>sludge from tank cleaning</td>
<td>4,500</td>
</tr>
<tr>
<td>54715</td>
<td>sludge from container cleaning</td>
<td>4,100</td>
</tr>
<tr>
<td>54505</td>
<td>other residuals contaminated with crude oil from crude oil field slopes</td>
<td>2,900</td>
</tr>
<tr>
<td>54710</td>
<td>grinding sludge containing oil</td>
<td>2,600</td>
</tr>
<tr>
<td>54201</td>
<td>oily sludge</td>
<td>1,100</td>
</tr>
<tr>
<td>54106</td>
<td>transformer oils, thermal oils, free of halogen</td>
<td>850</td>
</tr>
<tr>
<td>54111</td>
<td>other PCB- and PCT-containing waste</td>
<td>66</td>
</tr>
<tr>
<td>54110</td>
<td>PCB- and PCT-containing electrical equipment</td>
<td>44</td>
</tr>
<tr>
<td>54107</td>
<td>transformer oils, thermal oils, containing halogen</td>
<td>4</td>
</tr>
</tbody>
</table>

**Remain- ing SN 54**

| SN 54 | total other waste belonging to code group 54 | 5,400 |

**Total**

1,106,000
3. Selected Waste Streams

This decline can be attributed almost exclusively to the decrease in the amount of (crude) oil-contaminated earth and soil requiring consignment notes (SN 31423 + SN 54504). Without the inclusion of (crude) oil-contaminated earth and soil, the amount of waste requiring a consignment note and belonging to group 54 decreased by 3% in the period from 1999 and 2009, remaining more or less constant.

Treatment

Essentially, there are three ways to treat waste oils, waste lubricants and materials contaminated with waste oils:

- physico-chemical treatment (PC treatment)
- biological processes;
- thermal processes.

In many cases, physico-chemical treatment includes the splitting of emulsions and the separation of sludge or other oil-water mixtures into an organic and an aqueous phase. The separated phases are then separately treated further downstream.

The organic phase may be prepared for re-use, but in most cases it is incinerated to recoup its energy content.

The aqueous phase is neutralised and purified by way of precipitation, membrane separation and/or filtration.

In thermal treatment, the organic hydrocarbons are converted to CO₂ and water by exposing them to air and high temperatures; the subsequent energy released is used in the form of process steam or district heating.

In biological treatment, micro-organisms break down the organic compounds.

In the cement industry, approx. 22,200 tonnes of waste oils were recovered as substitute fuel. Some 50% of the oil-contaminated soil and earth was landfilled (following treatment). Bitumen and asphalt in particular, also undergo landfilling. Overall, some 28% of the waste belonging to code group 54 and oil-contaminated soil (some after treatment) is deposited in landfills.

The quantities of waste belonging to code 31423 and code group 54 and landfilled in 2008 are broken down by Federal Province in the table above.

### 3.25. Selected other waste

#### Waste characteristics

**Definition and origin**

The main chapter of “Other waste” is presented according to the groups of waste defined by standard ÖNORM S 2100 “Waste Catalogue” with double digit codes.

**Non-hazardous waste of mineral origin (not including metal waste, construction and demolition waste as well as excavated materials).**

- metallurgical slag, dross and dust
  - Blast furnace slags, converter slags, ash and dross from iron and steel production and from
other smelting processes, furnace top gas dust, iron oxide and others
- other solid mineral waste (not including construction and demolition waste, excavated materials and glass)
  Carbon dust, powdery waste from slag processing, used filter and absorption masses, gypsum and others
- mineral sludge
  Soil from cleaning and washing beet, carbonation sludge, soil sludge, sand sludge, diaphragm wall excavation, gypsum sludge, drilling muds, sludge from concrete, cement and mortar production and from sand-lime block production and others
- spent lining, blast furnace and foundry waste
  Spent lining from metallurgical and non-metalurgical processes, dolomite, blast furnace and foundry waste, and others

**Iron and steel waste**
Waste from the iron and steel industry, forge scaling, iron cinder, ferrous dust without harmful additives

**Residues from mechanical and biological waste processing and the treatment of municipal waste and residues of waste from mechanical-biological waste treatment**
Residues from biological waste treatment, residues from mechanical waste preparation, mechanical-biological pre-treated household waste and similar commercial waste, aerobically and anaerobically-aerobically stabilised waste from mechanical-biological waste treatment

**Food, beverage and tobacco waste including waste from food retail (market waste)**
Mixture of plant and animal residues from the assortment of goods on offer, some mixed with packaging, foodstuffs past the expiration date, grain dust, beet-pulp, beet tails, spent malt, molasses, animal feed and others

**Sludges from water treatment and waste water treatment, residues from sewage and waste from the use of bodies of water**
Sludges from waste water treatment, residues from waste water purification, sand filter contents, contents from fat traps, screened-out material from power plant installations, etc.

**Plastic and rubber waste (no incl. shredder residues)**
Cured plastic waste, rubber and the like

**Other waste from the processing and refinement of animal and plant products**
Residues from potato starch and corn starch production and the like

**Waste of plant and animal fat products (not including offal and animal faeces)**
Residues of seed oils, grease trap contents, fats, whey and the like

**Non-ferrous metal waste**
Aluminium, aluminium foil, copper, punching and cutting waste, shavings, cable and the like

**Skin and leather waste**
Hides and skins, raw skived leather, tanning sludge, glue leather and the like

**Oxide, hydroxide, salt waste**
Metal hydroxide, iron sulphate, aluminium hydroxide, iron hydroxide, other oxides and hydroxides
3. Selected Waste Streams

Quantities generated

<table>
<thead>
<tr>
<th>Waste group</th>
<th>Designations according to ÖNORM S 2100 (2005)</th>
<th>Quantities generated in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>non-hazardous waste of mineral origin (not including waste metal, construction and demolition waste, excavated materials, asbestos as well as flat and packing glass)</td>
<td></td>
</tr>
<tr>
<td>312</td>
<td>metallurgical slag, dross and dust</td>
<td>2,719,000</td>
</tr>
<tr>
<td>314</td>
<td>other solid mineral waste</td>
<td>487,000</td>
</tr>
<tr>
<td>316</td>
<td>mineral sludge</td>
<td>520,000</td>
</tr>
<tr>
<td>311</td>
<td>spent lining, blast furnace and foundry waste</td>
<td>164,000</td>
</tr>
<tr>
<td>35</td>
<td>iron and steel waste (not including waste electrical and electronic equipment, metal packaging and non-ferrous metal waste)</td>
<td>1,167,000</td>
</tr>
<tr>
<td>91</td>
<td>residues from mechanical and biological waste processing and the treatment of municipal waste and residues from waste from mechanical-biological waste treatment</td>
<td>289,000</td>
</tr>
<tr>
<td>11</td>
<td>food, beverage and tobacco waste</td>
<td>836,000</td>
</tr>
<tr>
<td>94</td>
<td>sludge from water treatment and sewage treatment, residues from the sewage system and waste from water utilisation (not incl. sewage and faecal sludge)</td>
<td>290,000</td>
</tr>
<tr>
<td>57</td>
<td>plastic and rubber wastes (not including shredder residues and not including end-of-life tyres)</td>
<td>468,000</td>
</tr>
<tr>
<td>13</td>
<td>waste from animal husbandry and slaughtering (not including offal and carcasses)</td>
<td>312,000</td>
</tr>
<tr>
<td>19</td>
<td>other waste from the processing and refining of animal and plant products</td>
<td>302,000</td>
</tr>
<tr>
<td>12</td>
<td>waste of plant and animal fat products (not including offal and animal faeces)</td>
<td>284,000</td>
</tr>
<tr>
<td>35</td>
<td>non-ferrous metal wastes</td>
<td>221,000</td>
</tr>
<tr>
<td>14</td>
<td>hide and leather waste</td>
<td>119,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>8,178,000</strong></td>
</tr>
</tbody>
</table>

Treatment

Non-hazardous waste of mineral origin” (not including metal wastes, construction and demolition waste, excavated materials as well as flat and packing glass)

The quantity of this waste of mineral origin (not including waste metals, construction and demolition waste, excavated materials and glass) amounted to nearly 3.89 million tonnes in 2009. Most of the waste from this waste stream is recovered and originates from foundries, the iron and steel industry, the construction industry and energy utilities.

In 2009, approx. 164,000 tonnes of spent lining, blast furnace and foundry waste were deposited in landfills. Moreover, approx. 167,000 tonnes of metallurgical slag, dross and dust, approx. 75,000 tonnes of other solid mineral waste and some 100,000 tonnes of mineral sludge were deposited in landfills.

Waste of mineral origin comes from the following production processes, amongst others:

a) Ash, slag, and dust from the iron and steel industry

In the iron and steel industry, large quantities of slag, ash and dust accumulate, along with mill scale and slag. The amount is increasing because production is being extended; the slag is mainly delivered to the cement and construction material industry, and another portion is deposited in landfills.

Ash, slag, dust, mill scale and sludge are practically unavoidable in the iron and steel industry. However, the production processes have already been optimised in terms of slag quality.

Slag that is manufactured for special applications in such a manner that it has the desired product properties may be sold as by-products and, acc. to ECJ judgments, does not fall under the waste regime if it complies with specific criteria (existence of a market price, contracts for trading, application-related product standards, quality assurance, public approval, specific use). An example of slag from the iron and steel industry with specific product properties is blast furnace slag produced at VOEST. Blast furnace slag is added to the raw meal for cement production for example.

The oil content in the mill scale and the content of persistent organic compounds and heavy metals (among others, zinc, lead, chromium, nickel, and vanadium) in dust and sludge is problematic. The high rate of recycling of both waste internal to smelting works (dust, scale and sludge) and of ex-
ternal waste (scrap) leads to an undesirable in-
crease in associated elements, especially heavy
metals (zinc, lead).
If the zinc content in the blast-furnace dust or
sludge is greater than 0.2%, the blast furnace dust
or sludge is deposited in landfills. If the zinc share
is 20% or higher, the dust may be submitted to
recovery in order to reclaim the zinc.
In the case of mill scale, the oil content is decisive
for further treatment. Direct treatment in sinter
plants is possible only with oil contents of up
to approx. 0.1%. Mill scale with oil contents of up
to approx. 2% can be fed into the blast furnace.
If oil levels are higher, the scale must undergo
appropriate treatment or be deposited in land-
fills.

b) Ash, sludge, dust from secondary aluminium
production
Typical residues or waste from secondary aluminium
production includes saline slag, filter dust, dross and spent lining. These have a high heavy
metal content and sometimes also contain a high
portion of salt (saline slag) or organic compounds.
Waste from secondary aluminium production is
practically unavoidable since it accumulates as a
result of the process; however, optimal process
selection and management can reduced the ac-
cumulating quantities.
The quantity of the residues or waste is highly de-
pendent on the materials used and the targeted
product quality (aluminium).
In the case of secondary aluminium production, the
different uses of scrap in the individual smelting
furnaces must be taken into account.
The essential criteria for classifying the input ma-
terials into the most suitable smelting groups are:
▶ oxide contamination of the raw materials or
waste
▶ adherent iron and organic foreign matter
▶ the magnesium content
▶ the dimensions of the scrap employed
▶ the changes in the alloy per day

c) Slag and dust from secondary copper
production
Residues or waste from secondary copper produc-
tion consist of slag (shaft furnace slag, converter
slag, anode furnace slag), filter dust (shaft furnace
dust, converter dust, anode dust) and spent lin-
ing.
These have a high heavy metal content and some-
times a high share of organic compounds.
Filter dust from anode furnaces and slag from con-
verter and anode furnaces of the secondary copper
industry is re-used internally in shaft furnaces.
However, filter dust from the shaft furnaces and
converters has a very high heavy metal content
(zinc, lead) and a low copper content and is dis-
carded. Shaft furnace slag is recovered as sand-
blasting grit.

Residues from mechanical and biological
waste processing and the treatment of
municipal waste and residues of waste from
mechanical-biological waste treatment
Overall, the amount of this waste stream amount-
ed to approx. 288,600 tonnes; of this amount,
approx. 2,400 tonnes were made up of residues
from biological waste treatment, approx. 37,200
tones were made of residues from mechanical
waste processing, approx. 148,400 tonnes were
made up of household waste and similar com-
mmercial waste similar, mechanical-biological pre-
treatment, while approx. 22,800 tonnes were
made up of aerobically stabilised waste from me-
chanical-biological waste treatment and approx.
77,800 tonnes of anaerobically-aerobically stabi-
lised waste from mechanical-biological waste
treatment.
In 2009, a major portion of these residues from
waste processing and treatment was deposited in landfills.

Food, beverage, and tobacco waste
Food, beverage, and tobacco waste accumulates
on the order of approx. 836,000 tonnes in total.
In part, this waste originates from food retail and is
frequently mixed with other waste commonly gen-
erated in food retail, e.g. packaging. This category
also includes originally packed foodstuff that is
provided through social care institutions (Vinzi mar-
kets, Soma, Caritas, Team Österreich Tafel and oth-
ers), some of it free of charge. This option has yet
to be optimally developed. Depending on the com-
position of the waste, it is subjected to treatment
in the form of composting, fermentation or to me-
chanical-biological treatment and incineration
(treatment of municipal waste).
In the case of sugar beet processing, between 3%
and 5% of the waste consisted of molasses and
5% of beet chips and stems. Currently, approx.
270,000 tonnes are generated.
About 12% of the grain harvest accumulated as
waste from mills. The weight of grain dust amount-
ed to approx. 207,000 tonnes.
Based on the beer production in Austria, the gen-
eration of malt draff, malt sprouts and malt dust
was determined to be approx. 150,000 tonnes. This
waste is almost entirely recovered.
Untreated waste from this branch of industry is no
longer deposited.
Plastic and rubber waste (not including shredder waste)
This type of waste includes hardened plastic waste, plastic sludge and rubber wastes, including waste pneumatic tyres. The total amount generated in 2009 was approx. 521,000 tonnes. The portion of hardened plastics made up approx. 88% and weighed approx. 461,000 tonnes.

Some examples of this type of waste are phenol and melamine resin, polyester, other cast resins, impregnating resin, thermosetting plastics (Duroplast), polystyrene, expanded polystyrene, hard paper, vulcanised fibre, vulcanised fibre, polyurethane, polyurethane foam, polyamides, etc.

A number of plastics have the advantage that several methods are available to recover used products. In material recovery, plastics are preserved as material. In their case, the plastic only undergoes physical/mechanical treatment. It is crushed, washed, dried, melted, and remoulded as granulated (or regranulated) material. Chemically built up of individual “building blocks”, plastics can likewise be decomposed chemically into small fragments in exactly the same way. These fragments can then be re-used as raw materials in the chemicals industry.

Plastic waste (e.g., polystyrene and expanded polystyrene, PVC waste) and rubber waste are processed in nine recovery facilities. Since 2009, plastic waste is no longer brought to landfills. All waste was subjected to thermal or material recovery (e.g. in the chemicals industry).

Other waste from the processing and refinement of animal and plant products
Waste from the processing and refinement animal and plant products was estimated to amount to approx. 302,000 tonnes. Most of it consists of residues from potato starch and corn starch production (approx. 170,000 tonnes and approx. 132,000 tonnes, respectively). The rise in the amount of this waste category can be attributed to the capacity expansion in starch production. Most of this waste is considered a by-product by the industry and used in the animal feed industry.

Waste of plant and animal fat products
According to estimates, approx. 284,000 tonnes of waste of plant and animal fat are generated. Some 175,000 tonnes of this waste stream are attributable to oilseed residues from the food-processing industry, which are recovered to 100%.

Some 79,000 tonnes of grease trap contents were generated.

Non-ferrous metal waste
Non-ferrous waste metal is estimated to amount to approx. 22,000 tonnes. Aluminium and aluminium foil scrap amounts to approx. 110,000 tonnes in this waste stream. 100% of the aluminium scrap is recovered and used for aluminium production. Hard zinc is recovered as secondary raw material. Copper is no longer extracted from ore in Austria. However, copper is still a by-product in a number of enterprises and undergoes material recovery.

Hide and leather waste
Approx. 119,000 tonnes of hide and leather waste are produced every year. Throughout Austria, six companies are active in the leather-making industry.

The amount of waste generated by the leather-making industry has hardly changed in recent years. The major material streams are hides and skins, raw skived leather, tanning sludge and glue leather.

Since 2009, waste of hide and leather are no longer deposited.
4. Recovery and Disposal Facilities
4. RECOVERY AND DISPOSAL
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The present section summarises all the relevant types of waste recovery and disposal facilities in Austria.

In total, some 2,200 waste recovery and disposal facilities were in operation in 2010.

**Waste treatment plants in Austria in 2010**

<table>
<thead>
<tr>
<th>Types of facilities - including internal company facilities</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal waste incineration plants</td>
<td>10</td>
</tr>
<tr>
<td>Thermal treatment facilities (excl. municipal waste incineration plants)</td>
<td>49</td>
</tr>
<tr>
<td>Physico-chemical treatment facilities</td>
<td>43</td>
</tr>
<tr>
<td>Selected processing plants for specific waste (fats and frying oil, asbestos waste, chemicals, batteries, etc.)</td>
<td>93</td>
</tr>
<tr>
<td>Plants for the treatment of waste electrical or electronic equipment</td>
<td>40</td>
</tr>
<tr>
<td>Shredder plants for scrap metals (incl. post shredders)</td>
<td>9</td>
</tr>
<tr>
<td>Processing plants for construction and demolition waste</td>
<td>400</td>
</tr>
<tr>
<td>Biotechnological treatment facilities for pre-treating residual and other waste (MBT)</td>
<td>16</td>
</tr>
<tr>
<td>Plants for the aerobic biotechnological treatment of separately collected biogenic waste, etc. (composting facilities)</td>
<td>466</td>
</tr>
<tr>
<td>Plants for anaerobic biotechnological treatment (biogas plants)</td>
<td>157</td>
</tr>
<tr>
<td>Plants for sorting and processing separately collected recoverables and other waste</td>
<td>182</td>
</tr>
<tr>
<td>Recovery plants for separately collected recoverables</td>
<td>48</td>
</tr>
<tr>
<td>Landfills</td>
<td>666</td>
</tr>
</tbody>
</table>

**4.1. Municipal waste incineration plants**

10 municipal waste incineration plants with a total capacity of approx. 2.3 million tonnes are currently in operation.

In seven plants, mainly residual waste or bulky waste is used. In three fluidised bed incinerators, mainly high-calorific fractions and sewage sludge are thermally treated.

**Plants for thermal treatment of municipal waste in operation in 2010**

<table>
<thead>
<tr>
<th>Thermal waste treatment</th>
<th>Firing/waste use</th>
<th>Capacities in tonnes/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste incineration plant Spittelau, Vienna</td>
<td>Grate firing (residual waste)</td>
<td>250,000</td>
</tr>
<tr>
<td>Waste incineration plant Flötzersteig, Vienna</td>
<td>Grate firing (residual waste)</td>
<td>200,000</td>
</tr>
<tr>
<td>Waste incineration plant Pfaffennau, Vienna</td>
<td>Grate firing (residual waste)</td>
<td>250,000</td>
</tr>
<tr>
<td>Waste incineration plant WAV, Wels</td>
<td>Grate firing (residual waste)</td>
<td>300,000</td>
</tr>
<tr>
<td>Waste incineration plant Dürnrohr, Zwentendorf</td>
<td>Grate firing (residual waste)</td>
<td>525,000</td>
</tr>
<tr>
<td>Carinthian residual waste incineration plant, Arnoldstein</td>
<td>Grate firing (residual waste)</td>
<td>96,000</td>
</tr>
<tr>
<td>Waste incineration plant Zistersdorf</td>
<td>Grate firing (residual waste)</td>
<td>130,000</td>
</tr>
<tr>
<td>Fluidised bed furnace 4 - Simmeringer Haide, Vienna</td>
<td>Fluidised bed (high-calorific fraction, sewage sludge)</td>
<td>110,000</td>
</tr>
<tr>
<td>Residual material recovery Lenzing</td>
<td>Fluidised bed (high-calorific fraction, sewage sludge)</td>
<td>300,000</td>
</tr>
<tr>
<td>Thermal residual material recovery, Niklasdorf (ENAGES)</td>
<td>Fluidised bed (high-calorific fraction, sewage sludge)</td>
<td>100,000</td>
</tr>
<tr>
<td><strong>Total (rounded)</strong></td>
<td></td>
<td><strong>2.3 million</strong></td>
</tr>
</tbody>
</table>

*Data source: EDM (data from April 2011)*
4.2. Thermal treatment plants (excl. municipal waste incineration plants)

The objectives of thermal treatment of waste are:
- to reduce the hazardousness of waste by destroying its organic components and by concentrating the inorganic components through subsequent conditioning (immobilisation) of the residual materials
- to reduce the amount and volume of waste to be landfilled
- to sanitise the waste
- to generate energy.

Part of the treatment facilities are used exclusively for thermal treatment of waste (e.g. Fernwärme Wien / rotary kiln for hazardous waste); however, there are also “plants for co-incineration” (e.g. companies of the cement industry, power industry, pulp and paper industry, and the chipboard- and fibreboard-processing industry), which, besides conventional fuels, such as oil, coal, wood etc. partially apply thermal treatment also to processed waste like plastics (e.g. sorted lightweight fraction or beverage composite packages) or rubber (e.g. waste pneumatic tyres).

The thermal treatment facilities are used to burn primarily the following types of waste for their energy value:
- high-calorific fractions from mechanical (-biological) waste treatment
4. Recovery and Disposal Facilities

residual materials from wood working/processing and waste wood
sewage sludge and other sludge
residual materials from paper and pulp production
plastics and packaging materials
waste pneumatic tyres and other rubber waste
hazardous waste and waste oil
meat-and-bone meal and animal fat
shredder residues

While all thermal treatment facilities were listed in the previous Federal Waste Management Plans, the present Federal Waste Management Plan considers only such incinerators that fall within the scope of the EU Directive on the incineration of waste 2000/76/EC (in future EU Directive on industrial emissions 2010/75/EU).

Accordingly, facilities in which the following waste is treated shall no longer be considered:

a) vegetable waste from agriculture and forestry,
b) vegetable waste from the food processing industry, if the heat generated is recovered,
c) fibrous vegetable waste from virgin pulp production and from production of paper from pulp, if it is co-incinerated at the place of production and the heat generated is recovered,
d) wood waste with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood-preservatives or coating, and which includes in particular such wood waste originating from construction and demolition waste,
e) cork waste.

Based on this new definition, there are currently 49 thermal treatment facilities in operation in Austria with an annual capacity of approx. 2.2 million tonnes.

Due to the fact that capacity data is not available for all facilities, this capacity figure constitutes a minimum value, also referred to as minimum capacity in the following chapters.

Pursuant to sec. 18 of the Waste Incineration Ordinance (Federal Law Gazette No 389/2002 as amended by Federal Law Gazette II No 476/2010), the Federal Minister of Agriculture, Forestry, Environment and Water Management publishes an annual report for the public on the functioning and monitoring of the (co-)incineration plants. This annually updated report contains detailed data on the individual (co-)incineration plants in Austria.
4.3. Physico-chemical treatment plants

The objectives of physico-chemical treatment of waste are
- to reclaim the recoverable components,
- to pre-process waste for subsequent material recovery or thermal treatment,
- to separate harmful substances from aqueous solutions,
- to reduce hazardousness,
- to reduce the amount of waste to be landfilled,
- to immobilise harmful substances prior to landfilling

There are currently 43 physico-chemical treatment facilities in operation for the processing of organic waste (PCO facilities) and/or inorganic (PCI facilities) waste.

In total, they have a treatment capacity of more than 1.1 million tonnes.

Most of the input to physico-chemical plants can be classified into the following categories:
- liquid and semi-solid organically contaminated waste, e.g. emulsions, solids and oily water, contents of oil and petrol separators, residues from tank cleaning, etc. The indicated types of waste originate mostly from businesses in the metal- and mineral oil-processing industry, as well as petrol stations and vehicle repair shops.
- liquid and semi-solid inorganically contaminated waste, e.g. acids, alkalines, cyanide, nitrite, chromatic and heavy metal-containing waste water and thin slurries from the metal-processing industry, electro-technical and galvano-technical industry.

Facilities for the solidification and stabilisation of waste shall also be included among the PCI facilities.

Of the physico-chemical treatment facilities in operation, 13 are operated as combined plants that can receive and treat both organic and inorganic waste.

Another 15 plants are authorised to receive and treat exclusively organic waste, mainly oil separator contents, waste oil, oil-and-water mixtures as well as drilling and grinding oil emulsions and emulsion mixtures.

There are 11 plants available for the treatment of exclusively inorganic waste and their immobilisation.

### Physico-chemical treatment plants in 2010

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>PCI</th>
<th>PCO</th>
<th>PCI/PCO</th>
<th>Total</th>
<th>Capacity in tonnes/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5,600</td>
</tr>
<tr>
<td>Carinthia</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3,500</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>8</td>
<td>81,600</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>348,250</td>
</tr>
<tr>
<td>Salzburg</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>28,000</td>
</tr>
<tr>
<td>Styria</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td>127,000</td>
</tr>
<tr>
<td>Tyrol</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>40,650</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>91,700</td>
</tr>
<tr>
<td>Vienna</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>426,400</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td><strong>11</strong></td>
<td><strong>18</strong></td>
<td><strong>14</strong></td>
<td><strong>43</strong></td>
<td><strong>1,152,700</strong></td>
</tr>
</tbody>
</table>

PCI ... for inorganic waste
PCO ... for organic waste
PCI/PCO ... for inorganic and organic waste

Data source: Environment Agency Austria plant database (data from August 2010) and EDM
4.4. Selected treatment plants for specific waste

There are currently many plants available for the processing of specific, partly hazardous waste, with a capacity of more than one million tonnes. The resulting materials are mostly subject to recovery.

In these plants, the following types of waste can be used:

- **Hazardous excavated material** is submitted to biotechnological, physiochemical or, to a lesser extent, to thermal processing in stationary or mobile plants depending on the degree of contamination. There are currently 33 plants available for the treatment of contaminated soils with a total capacity of approx. one million tonnes. Most of them are stationary biotechnological treatment facilities or mobile soil-vapour extraction plants.

- **Fats and frying oil** are processed in 18 plants with a minimum annual capacity of approx. 130,000 tonnes. A part is made into potassium soap in soap plants. Another part of the waste fat is used for biodiesel production and fermentation into biogas, a lesser portion of the overall collected quantity is processed into animal feed and exported abroad. Most of the **asbestos waste and dust** generated was deposited to landfills by 23 asbestos rehabilitation businesses after it was packaged and/or immobilised.

There are two plants available for the processing of **lead accumulators, storage battery acids, zinc- and lead-containing dust, ash and dross, acids and acid mixtures** in Arnoldstein (Carinthia).
Most of the metal-salt-containing concentrates and solvents are processed in 9 facilities. These are mostly physico-chemical treatment facilities. Mercury-containing waste with codes SN 35326 and SN 53510 is treated in 10 facilities. There are 4 facilities available for the collection of amalgam fillings. Workshop waste is treated in 6 facilities. Catalysts and contact coatings with code number SN 59507 are almost all treated in the nickel roasting plant Treibach.

4.5. Plants for the treatment of waste electrical or electronic equipment

There are 40 facilities available for the first treatment of waste electrical and electronic equipment (WEEE):

- There are 15 facilities available for the first treatment (case removal) of display devices (picture tube devices and flat screens). Additionally, six of these facilities can process picture tubes manually or using a hot wire method. The capacity for picture tube treatment is approx. 14,000 tonnes annually.
- There are a total of four facilities available for the treatment of refrigerators and freezers, two of which carry out the entire treatment (draining of the refrigeration circuit and treating of the insulation material). The latter have an aggregate annual capacity of 30,000 tonnes.
- Gas discharge lamps are processed completely in a dry process using the “cap-separation method” or the shredder principle in a treatment facility with an annual treatment capacity of 1,000 tonnes. An additional facility carries out pre-treatment (breaking) of gas discharge lamps before they are exported for further treatment using a glass crushing and washing method.
- Small electrical and electronic devices are dismantled manually in 20 facilities. The throughput of most dismantling businesses depends mainly on the number of their employees. Another four facilities are available for treatment based on first reducing size and then manually sorting out components containing hazardous substances. The aggregate treatment capacity of the three relevant facilities of this type amounts to approx. 70,000 tonnes. There are six large shredders and other metal processing facilities available for the further mechanical processing of depolluted small electrical and electronic devices.
The first treatment of one-third of all large devices is performed in WEEE treatment facilities using manual dismantling and depollution methods. The mechanical treatment of large devices is carried out in six large shredder companies.

4.6. Shredder plants for scrap metals

The following shredder and post-shredder plants are available in Austria for the treatment of scrap metals (and production residues):

There are six companies that process scrap metals in large shredder plants. The main area of business for shredder companies is the collection or acceptance of scrap metals, the processing and batch management of these metals, and commerce with the resulting metallic fractions.

Aside from new scrap/production residues, large shredder plants use the following scrap metals: various mixed and collected scrap (incl. household scrap from the municipal collection) (> 50%), waste electrical and electronic equipment (approx. 10%), end-of-life vehicles pursuant to the End-of-Life Ordinance (approx. 16%), material from metal packaging collection (< 10%), fractions from mechanical treatment of municipal waste (scraps from waste incinerators and MBT scraps) (approx. 10%). The waste electrical and electronic equipment used was partially pre-treated in special WEEE-treatment facilities.

A small post-shredder facility is available for the further treatment of residues from large shredders. In this facility, a mixture of substances made of plastics, light materials and metals is sorted mechanically, and the plastic granulates, agglomerated fluff and metal fractions obtained are passed on for recovery.

There are a total of several hundred companies available for the pre-treatment (depollution, dismantling of recoverable building components) of end-of-life vehicles pursuant to the End-of-Life Vehicles Ordinance, carried out by vehicle repair shops, car dealers and end-of-life car and scrap metal recyclers.

Aside from large shredders, these companies also have scrap cutters and other facilities for the further separation of non-ferrous metal fractions such as eddy current separators, float-sink facilities or sensor separation facilities.
The following waste streams are generated in shredder facilities:

- Ferrous/steel scrap
- Non-ferrous scrap and fractions enriched with non-ferrous materials
- Heavy shredder fraction
- Lightweight shredder fraction
- Filter dust and wet scrubber residues

Iron/steel scrap is recovered in Austrian and foreign steelworks. Non-ferrous fractions are either used directly or following further concentration in appropriate metal processing facilities in non-ferrous materials.

Data source: Environment Agency Austria plant database (data from August 2010) and EDM

Facilities for the treatment of scrap metals (large shredders and post shredders) in 2010

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Operator</th>
<th>Capacities in t/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Austria</td>
<td>Metall Recycling GmbH, Amstetten</td>
<td>65,000</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>Scholz Rohstoffhandel GmbH, Laxenburg</td>
<td>135,000</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>Gebrüder Gratz GmbH, Lambach</td>
<td>80,000</td>
</tr>
<tr>
<td>Styria</td>
<td>Fritz Kuttin GmbH, Knittelfeld</td>
<td>120,000</td>
</tr>
<tr>
<td>Tyrol</td>
<td>Tiroler Shredder GmbH, Hall</td>
<td>50,000</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>Loacker Recycling GmbH, Götzis</td>
<td>80,000</td>
</tr>
</tbody>
</table>

Total number of shredders: 539,000

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Operator</th>
<th>Capacities in t/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Austria</td>
<td>Metran Rohstoff Aufbereitungs GmbH, Kematen</td>
<td>120,000</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>TBS – Technische Behandlungssysteme GmbH, Enns</td>
<td>95,000</td>
</tr>
<tr>
<td>Styria</td>
<td>Recyclingpark Eisenerz GmbH&amp;Co KG</td>
<td>69,800</td>
</tr>
</tbody>
</table>

Total number of post shredders: 284,800
iron works/smelters and foundries. In further operational steps performed in appropriate processing or so-called post shredder facilities, the shredder residues (heavy and lightweight shredder fraction) are separated mainly into further iron and non-ferrous fractions, plastic fractions, which are used in the blast furnace as a substitute for fuel oil or recycled in material recovery processes, and high-calorific and low-calorific residual fractions. The latter are landfilled; high-calorific residual fractions are treated thermally in waste incineration plants (sewage sludge incineration, residual waste incineration) and in industrial co-incineration plants (e.g. in the cement industry).

Aside from in large shredder facilities, scrap metal is also separated in a large number of companies operating in the scrap and metal trade. At least 14 companies operate scrap cutters in order to reduce scrap metals for their subsequent use in the steelworks.

There are additional facilities available for the mechanical processing of various non-ferrous metal-containing waste (e.g. fractions from large shredder or WEEE treatment facilities, cable waste, circuit boards).

Partially, scrap metals are also processed directly in steelworks and non-ferrous metal works for final recovery (e.g. Pb accumulators).

4.7. Treatment plants for construction and demolition waste

Crushers and sieves are used to produce usable raw materials from mineral construction and demolition waste (masonry, concrete waste, demolition cement, etc.) and demolition asphalt, which can then be used as aggregates for the production of building materials for bottoming, foundations, or filling.

There are stationary and mobile facilities in use. Some 55% of the 101 member companies of the Austrian Association for the Recycling of Building Materials (BRV) are operated as mobile facilities and 45% as stationary facilities. While the mobile facilities usually employ crushers and screens, stationary facilities have several modules which can be connected in any order required.

According to the data provided by the Austrian Federal Provinces, there are currently some 400 facilities available for the processing of this construction and demolition waste. However, the Federal Provinces manage the facility data collected in different ways, e.g. when it comes to taking inter-
mediate storage into account, in which case mobile facilities take on the processing if required. Therefore, comparability of the number of facilities in the Federal Provinces is limited. In terms of the distribution of facilities, the facility system should be considered to have full coverage, even though half of them are mobile.

According to the analysis of the Austrian Association for the Recycling of Building Materials (BRV), a total minimum annual capacity of eight million tonnes can be assumed for plants that process construction and demolition waste. This is significantly more than the amount of waste generated, which is why an increase of facility processing rates appears technically possible.

### 4.8. Mechanical-biological treatment plants (MBT)

Mechanical-biological waste treatment for the purpose of landflling combines mechanical and biological processes for the treatment of municipal and similar commercial waste. Sewage sludge and other waste that is suitable for mechanical-biological treatment according to the current state of the art can be processed together with such waste. The biological treatment of contaminated soil is not mechanical-biological treatment, even if the soil is sifted first or undergoes similar mechanical processing.

In particular, one objective of mechanical processing is to separate out substances that are unsuitable for biological treatment, undesirables and harmful substances as well as to optimise the biodegradability of the remaining waste through increased availability and homogeneity. The purpose of biological processing is to decompose organic substances (decomposing and converting the biodegradable components) by using...
either aerobic processes or anaerobic processes followed by an aerobic process; mechanical-biological treatment significantly reduces the biodegradable parts, volume, water content, gas-generating potential, and breathing activity of the waste. It also leads to a significant improvement in the leaching and settling properties of the waste.

Apart from mechanical-biological treatment for the purpose of landfilling, Austria also practices mechanical-biological treatment prior to thermal treatment. In this process, the waste input is partially reduced and homogenised in the course of mechanical processing; moreover, the waste, which is sometimes simply freed from bulky substances and undesirables, ferrous and sometimes non-ferrous metals, is then submitted to biological treatment (e.g. biological drying or partial rotting). The main purpose of this treatment is to reduce the moisture content prior to thermal treatment. In contrast to MBT prior to landfilling, the targeted separation of high-calorific fractions is optional and any portions of the residual waste to be landfilled are relatively small in quantity. Another mechanical biological

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Site</th>
<th>Authorised MBT capacity in tonnes</th>
<th>MBT capacity in tonnes according to current operational concept or stage of development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>Oberpullendorf</td>
<td>82,000</td>
<td>82,000</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>Fischamend</td>
<td>27,000</td>
<td>27,000</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>St. Pölten</td>
<td>88,000</td>
<td>42,000</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>Wiener Neustadt</td>
<td>24,000</td>
<td>24,000</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>Linz</td>
<td>85,000</td>
<td>85,000</td>
</tr>
<tr>
<td>Salzburg</td>
<td>Bergheim – Siggerwiesen</td>
<td>140,000</td>
<td>140,000</td>
</tr>
<tr>
<td>Salzburg</td>
<td>Zell am See</td>
<td>40,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Styria</td>
<td>Aich-Assach</td>
<td>15,250</td>
<td>15,250</td>
</tr>
<tr>
<td>Styria</td>
<td>Allerheiligen</td>
<td>17,100</td>
<td>17,100</td>
</tr>
<tr>
<td>Styria</td>
<td>Frohnleiten</td>
<td>76,250</td>
<td>65,000</td>
</tr>
<tr>
<td>Styria</td>
<td>Fojach-Katsch</td>
<td>15,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Styria</td>
<td>Halbenrain</td>
<td>70,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Styria</td>
<td>Hartberg</td>
<td>4,500</td>
<td>4,500</td>
</tr>
<tr>
<td>Styria</td>
<td>Liezen</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Tyrol</td>
<td>Kufstein</td>
<td>15,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Tyrol</td>
<td>Lavant</td>
<td>17,000</td>
<td>17,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>741,100</td>
<td>683,850</td>
</tr>
</tbody>
</table>

Data source: Plant and Substance Database of Environment Agency Austria (data from October 2010)
There are currently 16 facilities available nationwide for the mechanical biological waste treatment of municipal and other waste with an authorised MBT plant capacity of approx. 741,000 tonnes. MBT plant capacity according to up-to-date operational concepts is approx. 684,000 tonnes. Biological waste treatment in the MBT plant in Ort im Innkreis with an MBT capacity of 15,000 tonnes has been discontinued until further notice. The plant’s operating permit continues to be valid (data from: 23 August 2010).

Some 555,000 tonnes of waste were treated in mechanical biological treatment plants in 2009. The main types of waste were SN 91101 “Municipal and similar commercial waste” making up 70% of overall input and SN 91103 “Residues from mechanical waste processing” with 13% of the overall input. Overall output was approx. 449,000 tonnes. The main waste in terms of quantity was SN 91107 “High-calorific fraction from processed municipal and commercial waste and processed construction and demolition waste, not quality assured” making up 40% and SN 91105 “Household and similar commercial waste, mechanically biologically pre-treated” with 25%. Overall, 2.2% of the input was separated as ferrous and non-ferrous metals. Output reduction in comparison to input amounted to 19%. This reduction is the result of biodegradation during the aerobic rotting process and incoming and outgoing stock.

### 4.9. Aerobic biotechnological treatment plants (composting facilities)

In a composting facility for the recycling of biogenic waste, biodegradable materials are transformed into a product rich in humin in the presence of oxygen (aerobic treatment or composting). After treatment of the biogenic waste, it is returned to the natural cycle in the form of compost. Essentially, the composting operations/operation combinations can be categorised according to the following aspects of the technical process:

- open or closed systems
- dynamic or static methods
- methods with or without forced ventilation

There are 466 facilities with a minimum capacity of 1.3 million tonnes available for the recovery of separately collected biogenic waste, catering waste,
as well as municipal waste from green areas (park waste, cemetery waste and roadside greenery), and of sewage sludge. According to ARGE Kompost & Biogas, some 935,000 tonnes of organic waste were treated in composting facilities in 2009.

**Composting facilities in 2010**

- ◊ 1 - 2 plants
- ◅ 3 plants
- ◇ more than 3 plants
The 6 facilities, that employ a combination of aerobic and anaerobic methods, are accounted for in the following chapter on anaerobic biological treatment plants.

### Composting facilities in 2010

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Plants</th>
<th>Minimum capacities in t/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>8</td>
<td>62,600</td>
</tr>
<tr>
<td>Carinthia</td>
<td>23</td>
<td>53,450</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>118</td>
<td>354,500</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>164</td>
<td>207,000</td>
</tr>
<tr>
<td>Salzburg</td>
<td>10</td>
<td>36,000</td>
</tr>
<tr>
<td>Styria</td>
<td>71</td>
<td>126,500</td>
</tr>
<tr>
<td>Tyrol</td>
<td>58</td>
<td>87,300</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>10</td>
<td>45,500</td>
</tr>
<tr>
<td>Vienna</td>
<td>3</td>
<td>154,700</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td>465</td>
<td><strong>1,301,810</strong></td>
</tr>
</tbody>
</table>

1 Preliminary analysis
2 Processed amounts 2009

Data source: Plant and Substance Database of Environment Agency Austria (data from August 2010), EDM and ARGE Kompost & Biogas

Additionally, there is a humification plant in Vienna with an annual capacity of 75,000 tonnes.

### 4.10. Anaerobic biotechnological treatment plants (biogas plants)

In biogas plants, biologically degradable materials with high water content are biologically decomposed in the absence of oxygen (anaerobic treatment or fermentation). In principle, almost all biogenic substances, with the exception of wood (due to the lignin content) are suitable for use as input materials for treatment in biogas plants:

- Substances from initial agricultural and forestry production
  - natural fertilisers (mainly from cattle, pig and poultry husbandry)
  - renewable raw materials (silo maize, grass silage, plant cuttings, leftover fodder, etc.)
  - spoiled animal feed
  - windfalls
- Residues from the treatment and processing of agricultural products
  - brewery residues
  - dairy residues
  - oilseed residues
- Other biogenic waste
  - leftover food
  - organic waste container contents
  - fat separator contents
  - sewage sludge

Some input materials may also contain animal by-products pursuant to the Animal By-Product Regulation. These must be subjected to a sanitation procedure.

The resulting biogas, which mostly consists of methane, is utilised thermally to generate electrical energy and heat.
The remaining fermentation residues can be composted, thermally recovered or spread on agricultural surfaces as fertiliser – in compliance with the relevant applicable laws.

Currently, there are 157 biogas plants for waste recovery in operation with a minimum capacity of 860,000 tonnes. Plants that process exclusively renewable raw materials (silo maize, grass silage, plant cuttings, leftover fodder) are not included in
this count. According to ARGE Kompost & Biogas, some 410,000 tonnes of organic waste were treated in biogas plants in 2009. These figures also take plants into account that employ a combination of aerobic and anaerobic methods. There are 6 such plants with an annual capacity of approximately 84,000 tonnes.

### Biogas plants in 2010

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Plants</th>
<th>Minimum capacities in t/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>8</td>
<td>43,000</td>
</tr>
<tr>
<td>Carinthia</td>
<td>13</td>
<td>19,200</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>12</td>
<td>118,900</td>
</tr>
<tr>
<td>Upper Austria(^1)</td>
<td>25</td>
<td>189,326</td>
</tr>
<tr>
<td>Salzburg</td>
<td>6</td>
<td>29,700</td>
</tr>
<tr>
<td>Styria</td>
<td>42</td>
<td>352,900</td>
</tr>
<tr>
<td>Tyrol</td>
<td>18</td>
<td>34,000</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>32</td>
<td>57,150</td>
</tr>
<tr>
<td>Vienna</td>
<td>1</td>
<td>17,000</td>
</tr>
<tr>
<td>Austria</td>
<td>157</td>
<td>861,176</td>
</tr>
</tbody>
</table>

\(^1\) Throughput

Data source: Plant and Substance Database of Environment Agency Austria (data from August 2010), EDM and ARGE Kompost & Biogas

### 4.11. Plants for sorting and processing separately collected recoverables and other waste

In Austria, there are currently 182 sorting and processing plants in regular or trial operation with a minimum capacity of at least 2.9 million tonnes. This chapter summarises all plants that report pre-treatment of waste prior to further treatment procedures. The waste can be both from separately collected recoverables (e.g. paper, plastics, wood, metal, textiles), as well as mixed waste from households and similar establishments, as well as trade and industry. The aim of pre-treatment is to separate various waste fractions and to improve waste quality in order to simplify further recovery. The methods applied are mechanical treatment (e.g. classification, sorting, ferrous and non-ferrous metal deposition) and processing methods (e.g. reduction, drying, pelleting).
Federal Waste Management Plan 2011

4. Recovery and Disposal Facilities

Facilities for sorting and processing in 2010

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Plants</th>
<th>Minimum capacities in tonnes/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>3</td>
<td>30,000</td>
</tr>
<tr>
<td>Carinthia</td>
<td>11</td>
<td>35,000</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>27</td>
<td>130,500</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>42</td>
<td>534,600</td>
</tr>
<tr>
<td>Salzburg</td>
<td>21</td>
<td>184,000</td>
</tr>
<tr>
<td>Styria</td>
<td>26</td>
<td>1,236,700</td>
</tr>
<tr>
<td>Tyrol</td>
<td>11</td>
<td>72,000</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>10</td>
<td>220,400</td>
</tr>
<tr>
<td>Vienna</td>
<td>31</td>
<td>455,500</td>
</tr>
<tr>
<td>Austria</td>
<td>182</td>
<td>&gt;2,898,700</td>
</tr>
</tbody>
</table>

Data source: Environment Agency Austria plant database (data from August 2010) and EDM

The increase in number of sorting plants compared to the Federal Waste Management Plan 2006 is attributable to increased separate collection of waste intended for recovery, on the one hand, and to the requirements of the Austrian Landfill Ordinance, on the other hand, according to which waste with a total organic carbon content (TOC) of more than 5% may no longer be deposited without treatment. These requirements pertain mainly to waste streams from households and similar facilities, as well as commercial and industrial waste streams.

4.12. Recovery plants for separately collected recoverables

There are 48 plants with a minimum capacity of 1.2 million tonnes available nationwide for reclaiming materials from separately collected recoverables from households and similar establishments, as well as from trade and industry.

The following components were delivered for reclaiming materials in 2010:

- Waste paper, cardboard, corrugated board and cardboard packaging in 14 plants
- Waste glass in 6 plants
- Scrap metal (ferrous and non-ferrous metal) in 9 plants
- Recoverable plastics in 15 plants
- Waste wood in 4 plants

In another plant, several recoverable fractions are recovered, which is why the plant cannot be assigned to any item in the above list.
Recovery plants for separately collected recoverables in 2010

- 1 recovery plant for recoverables
- 2 recovery plants for recoverables

<table>
<thead>
<tr>
<th>Federal Province</th>
<th>Number of plants</th>
<th>Minimum capacities tonnes/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgenland</td>
<td>2</td>
<td>13,900</td>
</tr>
<tr>
<td>Carinthia</td>
<td>5</td>
<td>19,000</td>
</tr>
<tr>
<td>Lower Austria</td>
<td>11</td>
<td>323,000</td>
</tr>
<tr>
<td>Upper Austria</td>
<td>15</td>
<td>204,000</td>
</tr>
<tr>
<td>Salzburg</td>
<td>3</td>
<td>N.A.</td>
</tr>
<tr>
<td>Styria</td>
<td>7</td>
<td>585,000</td>
</tr>
<tr>
<td>Tyrol</td>
<td>2</td>
<td>N.A.</td>
</tr>
<tr>
<td>Vorarlberg</td>
<td>3</td>
<td>76,500</td>
</tr>
<tr>
<td>Vienna</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Austria</strong></td>
<td><strong>48</strong></td>
<td><strong>&gt;1,220,000</strong></td>
</tr>
</tbody>
</table>

Data source: Environment Agency Austria plant database (data from August 2010) and EDM

4.13. Landfills

Since 1998, the operators of landfills have been required to keep records of the amounts of waste deposited and to report this data annually to the Federal Ministry of Agriculture, Forestry, Environment and Water Management. The switch to an electronic reporting system took place in reporting year 2008.

The reports of the facility operators for the year 2008 showed a total amount of waste deposited in landfills of approx. 10.7 million tonnes in 666 landfills.

<table>
<thead>
<tr>
<th>Deposited amounts between 1999 and 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>in million tonnes</td>
</tr>
</tbody>
</table>

Data source: UBK landfill database and efficiency Sheets
The lion’s share of the deposited waste is constituted by “Waste of mineral origin” - waste category 31 of ÖNORM S 2100. In 2008, approx. 10 million tonnes of this stream of waste were deposited.

In 2008, 129,300 t of untreated municipal and similar commercial waste were deposited; this was possible until 31 December 2008 at the latest, due to a transitional period provided for in the Landfill Ordinance.
4.14 Changes in plant base compared to the Federal Waste Management Plan 2006

The present Federal Waste Management Plan lists more than 300 waste treatment facilities less compared to the Federal Waste Management Plan 2006. Aside from an actual change in the number of facilities, different facility type definitions and the gradual switch of data collection to EDM result in changed data on the number and capacity of treatment facilities.

- Municipal waste incineration plants
  Since the Federal Waste Management Plan 2006, the waste incineration plants of Zistersdorf and Pfaffnau have begun operation and the waste incineration plant in Dürnrohr has been expanded by a third line. This increases the number of waste incineration plants from 9 to 10 facilities and ups annual capacity from 1.7 million to 2.3 million tonnes.

- Thermal treatment facilities (excl. municipal waste incineration plants)
  The number and capacity of thermal treatment facilities in the Federal Waste Management Plan 2011 cannot be directly compared to the values of the Federal Waste Management Plan 2006 because the present Federal Waste Management Plan only takes thermal treatment facilities into account if the Waste Incineration Ordinance applies to them. If all thermal treatment facilities were counted - as they were in the Federal Waste Management Plan 2006 - the number of facilities would be only slightly smaller.

- Physico-chemical treatment facilities
  The number of physico-chemical facilities has increased slightly, which is the result of soil washing plants being included in the count. The high increase in facility capacity indicated is the result of the improved data situation.

- Plants for the treatment of waste electrical or electronic equipment
  By way of deviation from the Federal Waste Management Plan 2006, the data on WEEE treatment facilities was removed from the chapter “Selected treatment plants for special waste” and presented in a separate chapter. Due to the development in the area of waste electrical and electronic equipment, the number of facilities has increased from 31 to 40.

- Facilities for the treatment of scrap metals (shredders)
  The overall number of large shredders has remained the same, while capacity has increased due to the availability of more precise data.
Three post-shredder facilities for the sorting of shredder residues were added to complete the count.

- Processing plants for construction and demolition waste
  As compared to the Federal Waste Management Plan 2006, the number of processing facilities for construction and demolition waste increased to 400 and capacity increased to approx. 8 million tonnes. The increase in the number of facilities and in particular the increase in the relevant capacity of the facilities is primarily the result of the improved data situation. However, due to the reasons indicated in Chapter 4.7, a smaller number of operating facilities must be assumed.

- Biotechnological treatment facilities for pre-treating residual and other waste (MBT)
  Overall, the number of MBTs remains unchanged. However, two facilities in Lower Austria and Upper Austria were shut down, while two other facilities in Styria and Tyrol were added. These changes resulted in a slight processing capacity decrease.

- Plants for the aerobic biotechnological treatment of separately collected biogenic waste, etc. (composting facilities)
  The number of composting facilities has fallen from 539 (Federal Waste Management Plan 2006) to 467 (Federal Waste Management Plan 2011). The reduction by approx. 70 facilities (equalling 13%) is essentially the result of an up-to-date data collection in the course of which the data records of Environment Agency Austria, Arge Kompost, and Biogas, as well as data from EDM were consolidated and cleansed. Recently, there was a particular decline in the number of small facilities owing to higher technical requirements. Despite the fall in facility numbers, the treatment capacity ascertained did not decline. This is also a result of the improved data situation.

- Plants for anaerobic biotechnological treatment (biogas plants)
  In comparison to the Federal Waste Management Plan 2006, biogas plants have fallen in number to 157 facilities, which, however, provide a much larger capacity (approx. 860,000 tonnes). The changed data is essentially the result of an up-to-date data collection in the course of which the data records of Environment Agency Austria, Arge Kompost, and Biogas, as well as data from EDM were consolidated and cleansed. The number of the biogas plants accounted for in the Federal Waste Management Plan depends strongly on whether waste or other biogenic input material is actually used (renewable raw materials).
Plants for sorting and processing separately collected recoverables and other waste
Since the separation of sorting and processing facilities is difficult, both facility types are summarised in one chapter of the present Federal Waste Management Plan. Therefore, direct comparison to the facility numbers and capacity of the Federal Waste Management Plan 2006 is not possible.

Recovery plants for separately collected recoverables
The number of facilities to process recoverables has risen slightly from 43 to 48 facilities compared to the Federal Waste Management Plan 2006, while capacity has hardly changed.

Landfills
There have been no substantial changes in total number of landfills recorded compared to the Federal Waste Management Plan 2006. The amount of landfilled waste has, however, increased to 10.7 million tonnes. Excavated soil makes up the largest share of this increase. In contrast, as a result of the provisions of the Landfill Ordinance for untreated municipal waste, the amount of landfilled waste has declined further from 283,000 tonnes in 2004 to 130,000 tonnes in 2008. As of 2009, landfilling untreated municipal waste has no longer been permissible.
5. Requirements and Measures
### 5. Requirements and Measures

#### 5.1. Austrian Waste Management Strategy

- Austrian Raw Material Plan
- Urban mining

#### 5.2. Options and Instruments

- Options and instruments

#### 5.3. Regulatory Measures

- The Waste Management Act of 2002 – waste holders, waste producers, waste collectors and waste processors
- The parties subject to the Waste Management Act of 2002 – waste holders


#### 5.3.2. Ordinances Relating to the Waste Management Act of 2002

- Waste shipment
- Waste data collection
- Electronic Data Management (EDM) – Implementation and current status

#### 5.3.3. Hazardous Waste

- Hazardous waste

#### 5.3.4. Waste Data Collection

- Waste data collection

#### 5.3.5. Waste Shipment

- Waste shipment

#### 5.3.6. Waste Control

- Waste control

#### 5.3.7. Waste Management Programmes

- Waste management programmes

#### 5.3.8. Waste Management Programmes

- Waste management programmes

#### 5.3.9.2. EU Commission Proposals

- EU Commission proposals

#### 5.3.9. Other EU-relevant Provisions

- Other EU-relevant provisions

#### 5.3.10. Ordinances Based on the 1996 Chemicals Act

- Ordinances based on the 1996 Chemicals Act

### 5.4. Product- and Waste-related Measures

#### 5.4.1. Construction and Demolition Waste

- Construction and demolition waste

#### 5.4.2. End-of-life Vehicles

- End-of-life vehicles

#### 5.4.3. Waste Electrical and Electronic Equipment

- Waste electrical and electronic equipment

#### 5.4.4. Batteries and Accumulators

- Batteries and accumulators

#### 5.4.5. Biogenic Waste

- Biogenic waste

#### 5.4.6. Animal By-products

- Animal by-products

#### 5.4.7. Packaging

- Packaging

### 5.5. Plant-related Measures

- Biological waste treatment

#### 5.5.1. Biological Waste Treatment

- Biological waste treatment

#### 5.5.2. Anaerobic Treatment (Fermentation)

- Anaerobic treatment (fermentation)

#### 5.5.3. Mechanical-biological waste treatment (MBT)

- Mechanical-biological waste treatment (MBT)

#### 5.5.4. Thermal Waste Treatment

- Thermal waste treatment

#### 5.5.5. Landfilling

- Landfilling

### 5.6. Measures in Companies

- Waste Management Programmes

#### 5.6.1. Waste Management Programmes

- Waste management programmes

#### 5.6.2. Waste Officers

- Waste officers

#### 5.6.3. EMAS

- EMAS

#### 5.6.4. Sector-specific Programmes

- Sector-specific programmes

#### 5.6.5. The Implementation of the EMAS Regulation in Austria

- The implementation of the EMAS Regulation in Austria

### 5.7. General Measures

#### 5.7.1. Material Flow Management

- Material flow management – Waste management based on material

#### 5.7.2. Urban Mining

- Urban mining

### 5.7.3. Austrian Raw Material Plan

- Austrian Raw Material Plan

### 5.7.4. Public Procurement

- Public procurement

### 5.7.5. Sustainable Environmental Technology Policy – Environmental Technology Master Plan

- Sustainable environmental technology policy – Environmental Technology Master Plan

### 5.7.6. Environmental Support in Austria

- Environmental support in Austria pursuant to the Environmental Support Act

### 5.7.7. The Austrian Eco-label and the EU Ecolabel

- The Austrian eco-label and the EU Ecolabel
5.1. Austrian waste management strategy

The Austrian waste management strategy is guided by the principles of precaution and sustainability. The aim is to achieve the objectives of Austrian waste management (sec. 1 Austrian Waste Management Act of 2002) through an optimal mix of waste prevention, re-use, recycling, and other forms of recovery and disposal. Every precept and every instrument must be measured according to the relevant principles and obligations rather than becoming an end in itself.

From waste management to material stream and resource management

Austrian waste management helps provide ecological protection, on the one hand, and supplies the economy with secondary raw materials and energy sources, on the other. Due to the scarcity of resources, secondary resources and the corresponding processing technologies, but also re-use, are becoming increasingly important. The objective is to further increase the contribution of Austrian waste management to sustainable material flow and resource management.

In order to be able to make a major contribution to the Austrian raw material base, waste needs to be evaluated based on various criteria such as relevance to raw materials, the level of contaminants in the context of waste treatment in Austria, raw material requirements, but also in consideration of environmental impact and climate protection. In addition, the knowledge base requires further improvement. There are incentives and guidelines for the further development of collection systems, reclaiming, recovery and disposal technologies and their capacities as well as the use of secondary raw materials and substitute fuels with effective removal of contaminants. The choice of desirable treatment channels should be encouraged through economic incentives.

Material flow analysis provides the basis for resource management and evaluation from the ecological, economic and social perspective.

Starting from a structured survey of the potential for raw material and the level of pollutants in waste streams and urban mining as well as landfill mining, economically realistic waste management objectives should be defined in harmony with the EU Waste Framework Directive and oriented according to the national raw material plan and the applicable legal framework in order to achieve them. On the basis of those objectives and the priorities identified, effective and efficient measures can finally be created and implemented for the types of waste classified as relevant. This includes incentives for designing products and processes that minimise pollutants and save resources for the sake of waste prevention. Waste management is familiar with the quality and quantity of waste and is therefore in a position to impose appropriate requirements on production and consumption although the direct influence exercised by waste management over production and hence waste accumulation is limited.

Waste management methods and instruments

Various methods are available (modified cost-effectiveness analysis, cost/benefit analysis, lifecycle approach) in order to ensure compliance with the requirements of the Federal Ministry of Agriculture, Forestry, Environment and Water Management (e.g., reduction of quantities and pollutants, re-use and recovery that is appropriate to the national economy) and to check whether those objectives have been achieved.

More attention should be paid to eco-efficiency in national and European laws (e.g., cost-effectiveness).

In the case of important measures, audits should be conducted to show the effectiveness and degree of accomplishment of the objectives. For this purpose, it is necessary to take a holistic view of the economic effects of a measure, a project or the overall lifecycle of a product (product sustainability) in order to identify the advantages for the purposes of sustainability. The principle of sustainability requires adopting an economic and social point of view that goes beyond environment impact (e.g. employee protection, quality of workplaces and, in particular, a sustainability indicator set). In order to implement the „best“ measure – evaluated in terms of the objective, effectiveness and efficiency – the individually optimised means can be employed.

More ecologically effective instruments and measures should be promoted, where possible. The implementation of sustainability strategies on the company level should be documented through an environmental management system and the regular publication of sustainability reports. Since there are currently only very basic guidelines and no industry-wide report for waste management operations in the Global Reporting Initiative, contents, indicators and basic statistics need to be developed.
In terms of social development, people should be made more aware of sustainability through specific public relations campaigns.

„Stepping beyond“ waste management
Waste management should be seen as an integral part of the overall national economy. Certain parts of waste management reach into other economic and environmental areas or exercise a mutual influence on one another. Stemming the flow of secondary raw materials out of Austria and the EU is a central concern. Appropriate measures (e.g., mapping of the materials flows, possible restrictions within the EU) should be taken to secure the most important secondary materials for the Austrian economy, as well. For the sake of value creation, waste as a carrier of important secondary materials, especially end-of-life vehicles or waste electrical or electronic equipment, should be kept inside the EU, more specifically in Austria. Importing waste to Austria should also be viewed as positive in that light.

In addition to the careful use of resources and climate protection, the competitiveness of national enterprises is becoming increasingly important in the European context. Further harmonisation of the legal standards in Europe is therefore desirable, especially in terms of end-of-waste, waste/by-products, recycling, etc. as well as the determination of standards and limit values, while taking into account the international know-how that is already available. The legal obstacles that prevent continued ecologically friendly use of waste should be overcome. Coordination is necessary with other areas of the law and more attention should be paid to the use of synergies in the future (e.g., end-of-waste and effects on REACH).

It is extremely important to promote recognised environmental certificates for companies (e.g., EMAS, ISO 14001, V-EFB, Responsible Care) and for products (e.g., PEFC certification, eco-labels, industry-specific quality control systems). Such certificates are intended to inform shoppers of the added environmental benefits of certain products (careful use of resources, climate protection, etc.). Companies that undergo environmental certification processes should be offered clear economic, administrative and image-enhancing benefits (simplified authorisation procedures, etc.).

Climate protection
Greenhouse gas emissions from waste management are covered in the „Waste“ sector of the national climate reports. However, these reports only cover emissions related to landfilling, biological treatment and combustion without energy production.

Greenhouse gas reductions achieved through the preparation of secondary raw materials or the replacement of mineral fertilisers in agriculture are attributed to other sectors such as „Energy“, „Industrial Processes“ and „Agriculture“. In order to map the actual success of waste management, cross-sector reports covering all climate-relevant contributions of waste management would be advisable.

There is still potential for further reduction in waste management in accordance with the Austrian Energy Strategy. This includes, above all, further development of the re-use and recovery systems, intensification of separate collection and recovery of recoverables, optimised use of biogenic waste, efficiency boosting and energy optimisation in the plants as well as optimisation of transport logistics in consideration of regional planning concepts and the principle of proximity.

Intensifying the public relations campaigns and introducing appropriate control mechanisms can also help reduce climate-relevant emissions.

Allocation of responsibilities in Austrian waste management
The allocation of responsibilities between the public and private waste disposal industries has proven effective in Austria. Austrian households and enterprises are offered top-quality waste collection and treatment. It is necessary to strengthen this system and optimise the interplay between public and private disposal, especially in terms of the guidelines of the five-level waste hierarchy.

Orientation of waste management facilities
One objective of both European and Austrian waste management is to achieve self-sufficiency in waste disposal. The facilities are therefore geared towards extensive waste treatment within Austria. The Austrian waste disposal industry (municipal and private) has made major investments in waste treatment facilities in order to comply with the applicable laws and ensure appropriate disposal, while complying with the principle of proximity. Austrian facilities have the highest environmental standards of any in Europe.

For ecological and economic reasons, it has now become imperative to ensure that the waste and recoverables accumulating in Austria are largely treated in Austrian facilities. This is the only way to
Prevent „stranded investments“ that would harm the Austrian national economy.
So long as „unused plant capacities“ are available in Austria, it is advisable to use them to treat the waste from Austria’s neighbouring countries, as well, especially in light of our plants’ high technical standards.
The waste management facilities are therefore geared towards raising the quantity and quality of recovered secondary materials and to make optimal use of the energy generated by waste treatment. It is important to choose the right location, since thermal waste treatment facilities are more energy-efficient when placed in proximity to suitable consumers of heat (steam).

**Target achievement in Austria’s waste management**

Vision: The objectives of the Waste Management Act are achieved through sustainable waste management in Austria with a high degree of effectiveness and efficiency.

The degree to which objectives have been achieved with respect to basic measures and general conditions should be checked through an evaluation and mapped in the Federal Waste Management Plan.

Apart from describing effectiveness in terms of the Waste Management Act objectives, it is important to include a thorough evaluation of micro- and macroscopic aspects such as ensuring safe waste disposal, compatibility with the overall economy, economic costs/benefits, regional value creation, social justice and compatibility, reasonableness for the economy and consumers, practical feasibility, etc. The effectiveness of the instruments deployed should be evaluated in a similar manner.

The current knowledge base should be supplemented by analysing the import/export streams of the national economy and its inventories (concentration, magnitude and location of the materials), in order to enable the forecasting of medium- to long-term waste streams.

Knowledge of commercial and industrial waste is currently needed most.

Waste management requires such knowledge in order to be organised effectively and efficiently: on the one hand, by determining the quantities of recyclable materials that can be used to produce secondary materials and, on the other, by describing the quantities of potential pollutants, so that they can be purposefully separated, treated and disposed of in landfills.

Such knowledge of waste management can also be used by the manufacturing industry to design products that satisfy ecological and resource-oriented criteria.

**5.2. Options and instruments**

Pursuant to sec. 8 (3) (8) of the Waste Management Act of 2002, the Federal Waste Management Plan is required to set out the specific measures planned by the Federal Government in order to meet the specific requirements derived from the objectives and principles of the Waste Management Act of 2002.

This involves:

- requirements for a reduction in the quantity and pollutant level of waste and its detrimental effects on the environment and health;
- requirements for the promotion of preparation for re-use, recycling and other waste recovery, in particular with a view to resource conservation
- requirements for environmentally sound waste recovery that is appropriate in terms of the national economy
- requirements for the disposal of unavoidable or non-recoverable waste and
- requirements for the shipment of waste to or from Austria for recovery or disposal
The possibilities and instruments available to meet the requirements are classified as follows:

- legal and organisational measures as well as the preparation and creation of the necessary technical foundations for this purpose
- public relations work and the provision of information as well as advice and educational training
- the public administration acting as a role model
- international cooperation (especially within the EU)
- market economy instruments and financial incentives
- voluntary agreements

The Waste Management Act of 2002 provides the fundamental basis for meeting the requirements. On the one hand, the Waste Management Act of 2002 stipulates how to handle the waste that has been generated and, on the other hand, it defines requirements that serve to prevent the generation of waste, while establishing the duties of the persons subject to the Act. The regulatory powers with the most significant practical implications are set out under sections 14, 23 and 65 of the Waste Management Act of 2002.

Section 14 of the Waste Management Act of 2002 provides for regulatory authority to initiate waste prevention and recovery measures, particularly in order to reduce waste quantities and pollutant contents while promoting closed-loop recycling system. The aim is to reduce waste generation to a minimum as early as the design phase, but also during the manufacture, selling and use of goods. The law provides for requirements such as the obligation to provide goods with labelling that includes instructions for disposal and an indication on pollutant levels. In addition, it sets out requirements that intervene more directly in economic life, such as the obligation to accept product returns, the collection of deposit fees and, finally, complete bans on placing specific goods on the market (e.g. goods containing heavy metals). The requirements prescribed by the Ordinance may be applicable to an early phase of the product life cycle (e.g. product design) and therefore affect objects and substances that are not waste. Such requirements usually need to be applicable across Europe in order not to run counter to the principle of the free movement of goods.

Moreover, the Federal Minister of Agriculture, Forestry, Environment and Water Management is empowered by virtue of sec. 14 (6) of the Waste Management Act of 2002 to set a waste prevention target for packaging by way of ordinance, in agreement with the Federal Minister of Economy, Family and Youth, along with a reasonable time allowance for achieving that waste prevention target or, alternatively, several time allowances as part of a phased plan. Moreover, rules may be set up to regulate the procedure for ascertaining achievement of the targets, the required periodic disclosures concerning the extent or estimated degree of achievement of the targets, and the type of measures defined if the waste prevention target is not achieved as part of a phased plan (e.g. Packaging Ordinance).

According to sec. 23 of the Waste Management Act of 2002 it is possible to specify certain general obligations of waste holders by way of ordinances. Under sec. 23 (1) of the Waste Management Act of 2002, the Federal Minister of Agriculture, Forestry, Environment and Water Management in agreement with the Federal Minister of Economy, Family and Youth, may determine which types of waste must be collected separately and which type of treatment the waste must undergo, as well as the requirements for collection, storage, and shipment, but also the requirements for treatment of waste according to the state of the art (e.g. End-of-Life Vehicle Ordinance and Ordinance on Waste Treatment Obligations).

By virtue of the authority to issue ordinances granted by sec. 23 (2) and (3) of the Waste Management Act of 2002, specific measures can be stipulated for biogenic waste. Such waste has great potential for the achievement of a functional closed-loop recycling system. The Federal Minister of Agriculture, Forestry, Environment and Water Management may stipulate quality requirements for compost or soil originating from waste and provide for accompanying measures, such as labelling requirements for compost intended for the market. Compost or soil originating from waste may only be placed on the market if it meets the quality requirements established by ordinance (e.g. Compost Ordinance).

For waste treatment plants, the Federal Minister of Agriculture, Forestry, Environment and Water Management may, by virtue of sec. 65 of the Waste Management Act of 2002, issue ordinances to regulate with greater precision the equipment and operating mode of treatment corresponding to the state of the art in agreement with the Federal Minister of Economy, Family and Youth. Section 65 of the Waste Management Act of 2002 contains very extensive regulatory powers with respect to (stationary and mobile) treatment facilities. Among other things, the Minister may determine the type and quality of the waste to be treated, the criteria and limits for allocating waste to certain plants, the applicable measurement
5. Requirements and Measures

procedures, monitoring during operation and after-care, as well as the corresponding emissions limits to be imposed on the plants in accordance with the state of the art (e.g. Landfill Ordinance, Waste Incineration Ordinance and Industrial Accident Ordinance).

The **Chemicals Act**, too, offers a basis for setting measures that are particularly capable of improving the situation with respect to qualitative waste prevention.

Other sets of instruments that are available to implement the necessary measures include voluntary declaration, voluntary commitment, agreement or cooperation, which have proved effective for recovery measures. **Guidelines and standards** also help to specify or introduce the state of the art in plants and with regard to operating modes.

To ensure that sustainable waste management is also applied to industrial practice, sections 10 and 11 of the Waste Management Act of 2002 specifically prescribe the use of two effective instruments: the **waste management programme** and **waste officers**.

Another essential instrument of environment policy and thus waste management measures consists of **public relations work and the provision of information** as well advice and educational training. On the one hand, they raise the awareness and understanding of the selected requirements and help to ensure performance of the measures that need to be implemented. On the other hand, sustainable changes can be achieved only through educational training and enriching the knowledge of those directly concerned.

As a major awardee of contracts for business services, particularly in procurement and construction, the **public administration** can act as a decisive role model for the long-term pursuit of the objectives and principles set forth by the Waste Management Act. For instance, it can have a decisive impact on the development, market launch and competitiveness of environmentally sound products or procedures.

The Austrian and European **eco-labels** offer reliable information audited by independent agencies with an eye on the environmental aspects of products and services and thus provide manufacturers with an incentive. They also facilitate decision-making for consumers and purchasing agents. These eco-labels awarded by the state stand for high living standards and environmental quality, clear and transparent information, a strong statement and for an environmental policy for which each individual company is responsible.

Not least due to cross-border environmental pollution and waste shipment, **international cooperation** in environment policy plays a strategic and thus vital role. Particularly within the context of the European Union, this area of waste management represents a further key challenge.

5.3. Regulatory measures

The term „waste management“ within the meaning of the Austrian Constitutional Act (B-VG) includes all measures for the prevention, reduction, recovery, safe treatment and disposal of waste (of all types). Under constitutional law, the Federal Government has the authority to issue and enforce legislation governing hazardous waste (cf. sec. 10 (1) (12) of the Federal Constitutional Act). With the adoption of the Waste Management Act of 2002, Federal Law Gazette I No 102/2002, the Federal Government made extensive use of its „authority in
The Waste Management Act of 2002 extensively reformulated the former Waste Management Act of 1990, and nine Provincial Acts were adopted to bring waste management regulations into compliance with EU law. This also contributed substantially to a simplification in the administration. Particularly noteworthy are:

- a firmer foundation for resource conservation and waste prevention (reinforcement of the principle of sustainability)
- ongoing adjustment of Austrian laws to EC law
- increased legal certainty through nationwide uniformity in waste law provisions, which had previously been under the authority of the individual Federal Provinces, through the extensive exercise by Federal Government of its „authority in case of need“
- increased transparency and possibilities of control over waste collection and treatment
- continued advancement of the procedural concentration in the laws governing industrial plants

5.3.1. The Waste Management Act of the Federal Government (AWG 2002)


- Section 1: General provisions
- Section 2: Waste prevention and recovery
- Section 3: General duties of waste holders
- Section 4: Waste collectors and processors
- Section 5: Collection and recovery systems
- Section 6: Treatment facilities
- Section 7: Transboundary shipment
- Section 8: Treatment contracts, verification
- Section 9: Transitional provisions
- Section 10: Final provisions

5.3.1.2. The objectives and principles of waste management

The Waste Management Act of 2002 is based on the precautionary principle and principle of sustainability and is geared towards the following objectives (sec. 1 (1) Waste Management Act of 2002):

- to protect humans, animals and plants as well as their basis of existence and natural environment
- to minimize air pollution and gases relevant to climate change
- to conserve resources (raw materials, water, energy, landscape, land, landfill volumes)
- to ensure that the materials recovered are no more hazardous than the primary raw materials
- to deposit the waste from waste treatment in a manner that is safe for future generations

The Act is based on the following hierarchy (sec. 1 (2) Waste Management Act of 2002):

- waste prevention (qualitative and quantitative)
- preparation for re-use
- recycling
- other recovery, e.g. energy recovery
- disposal

In applying this hierarchy, ecological and economic factors need to be taken into account. Departing from this hierarchy is justified whenever a holistic approach shows that another option would bring about a better result in terms of environmental protection.
5. Requirements and Measures

The objectives and principles of waste management are supplemented in the Waste Management Act of 2002 by a definition of „public interest“, which must not be harmed when dealing with waste (especially in the collection, shipment, storage or treatment of waste, and in the authorisation procedure; cf. sec. 1 (3) of the Waste Management Act of 2002). Preventing any impairment to this public interest is furthermore decisive for:

- the objective classification of an object or substance as waste
- general treatment obligations of waste holders
- collection or treatment of non-hazardous waste
- authorisation of collection and recovery systems
- authorisation of treatment facilities
- treatment contracts.

5.3.1.3. The parties subject to the Waste Management Act of 2002 – waste holders, waste producers, waste collectors and waste processors

Waste holders – sec. 2 (6) (1) of the Waste Management Act of 2002

According to the definition in Article 1 of Directive 2006/12/EC on waste, replaced by Directive 2008/98/EC on waste and repealing certain Directives, the term „holder“ means the producer of the waste or the natural or legal person who is in possession of the waste. The term „holder“ as used in the Act means the person who has physical control over the object or substance. The necessary condition for a person to hold (to have physical control) and possess waste is that the waste must be under his control; in this context, physical control is determined by the generally accepted standards. What is decisive here is not the possessor’s permanent possession of the object or substance but merely the fact that, as experience has shown, any objects located within a specific area of a person is considered alien property. The person according to whose instructions and ideas work is carried out and who determines which work is to be carried out exercises the actual influence and, as the accepted standard has it, has physical control of the materials and the waste resulting from them. This is consistent with the case law of the Supreme Court (OGH) and Administrative Court (VwGH) (cf. OGH 23 Feb. 1993, 1Ob516/93; 4 Sep. 1998, 6Ob211/98t; 18 Sep. 1991, 1Ob22/91; VwGH 20 Feb. 1990, 90/01/0010). The „waste holder“ concept is used as an umbrella term that covers waste producers, waste collectors and waste processors.

The waste producer – sec. 2 (6) (2) Waste Management Act of 2002

The waste producer, according to sec. 2 (6) (2), is the person who actively creates the waste (initial waste producer) or the person who performs preliminary treatment, mixing or any other type of treatment that changes the nature or composition of said waste.

To determine whether a person is a waste producer, it is also necessary take into account the criteria discussed above (especially physical control over the object or substance, the generally accepted standards, and power of disposition).

The waste collector – sec. 2 (6) (3) of the Waste Management Act of 2002

A waste collector is any person who, either directly or through an agent, picks up, accepts, or exercises legal control over the pick-up or receipt of waste produced by third parties.

The Waste Management Act of 2002 distinguishes between two different cases with respect to the term „waste collector“:

1. a waste collector who holds the waste in his own physical custody since it picks up or receives the waste itself (or through its own staff);
2. a waste collector who merely has legal control over the waste (over the pick-up or receipt of such waste).

In the second case, it is not necessary for the waste to be actually physically picked up or delivered. The decisive factor is whether a person has the power of disposition and is therefore able to make a decision (under civil law) regarding the pick-up or delivery or location of the waste.

The contractor that picks up the accumulated waste is considered either a waste collector or carrier, depending on the agreement. The decisive factor in the evaluation is which party to the contract determines to which waste processor the waste will be transported. If the contractor is free to decide to which waste processor it will bring the waste, then the contractor should be designated a waste collector under sec. 2 (6) (3) of the Waste Management Act of 2002.

Waste processor – sec. 2 (6) (4) of the Waste Management Act of 2002

A „waste processor“ is a person who recovers or disposes of waste.

5.3.1.4. The duties of waste holders

The general duties of waste holders are summarised in sections 15 through 23 of the Waste Management Act of 2002. In particular, the Act stipulates that when collecting, shipping, storing and
treated waste in the framework of sustainable waste management the objectives and principles of sec. 1 of the Waste Management Act of 2002 must be followed and any harm to the public interest must be avoided. Apart from general and specific treatment obligations, duties of record-keeping, duties related to the transfer and transport of hazardous waste (consignment note), reporting duties and reporting obligations, special requirements are stipulated for the treatment of certain types of waste (PCB-containing waste, waste oils, hazardous household waste, waste edible fats and oils as well as construction and demolition waste).

The duties of the waste holder include, in particular:

- the waste holder's general treatment obligation (sec. 15 Waste Management Act of 2002)
- the waste holder's special treatment obligation (sec. 16 Waste Management Act of 2002)
- the waste holder's obligation to keep records (sec. 17 Waste Management Act 2002)
- declaration of transfer of hazardous waste in a consignment note (sec. 18 Waste Management Act of 2002)
- accompaniment by a consignment note when shipping hazardous waste (sec. 19 Waste Management Act of 2002)
- the waste producer's obligation to notify hazardous waste (sec. 20 Waste Management Act of 2002)
- the obligation to register and enter master data in the electronic master data register (sections 20 and 21 (3) Waste Management Act of 2002)

Special duties of the waste collector and processors include, in particular:

- submission of the consignment note (sec. 18 Waste Management Act of 2002)
- obligation to draw up annual waste balance sheets and submit these electronically (sec. 21 (3) Waste Management Act of 2002 in conjunction with the Waste Balance Sheet Ordinance)
- the landfill owner's obligation to draw up a waste input/output report and electronically submit this report (sec. 21 (4) Waste Management Act of 2002)
- the obligation to draw up and submit emission reports (sec. 65 (1) Waste Management Act of 2002)
- the appointment of a managing director under waste law (only under certain circumstances; sec. 26 Waste Management Act of 2002)

5.3.1.5. Laws governing the profession of waste collectors and processors

Acc. to sec. 24 of the Waste Management Act of 2002, anyone who collects or processes waste must obtain a permit from the Governor of the Federal Province. This permit is awarded subject to certain requirements specified by the law. The essential criteria are:

- suitability of the collection or treatment for the relevant type of waste,
- proof that the public interest as defined by sec. 1 (3) of the Waste Management Act of 2002 is not prejudiced
- proof of the technical know-how and skills
- reliability
- compliance with the objectives and principles of the Waste Management Act of 2002

The Governor of the Federal Province can issue specifications, conditions or time periods and may, under certain circumstances, revoke an authorisation already granted (cf. sec. 25 (5) and (6) Waste Management Act of 2002).

Waste collectors and processors are obliged to register in the electronic register for plants and personal data prior to starting up their activities (sec. 21 Waste Management Act of 2002). If the activity of the collection and treatment of hazardous waste is not to be carried out by an individual (e.g. in the case of a corporation) or the applicant for the permit himself fails to demonstrate the necessary technical know-how and skills, a full-time employee must be hired as waste officer (sec. 26 (1) Waste Management Act of 2002). By way of exception from sec. 26 (4) of the Waste Management Act of 2002, municipalities must appoint an expert. If hazardous waste (or asbestos cement) is collected and treated by a legal person, a responsible person must be appointed (sec. 26 (6) Waste Management Act 2002). Any person authorised to represent the company, such as the managing director, or a responsible person as defined under sec. 9 Administrative Penal Code (VStG), is deemed such a responsible person.

5.3.1.6. Waste management in enterprises

Enterprises above a certain size (based on the number of employees) are required to make use of instruments that have proved effective in practice for the promotion of industrial waste prevention and recovery.

The waste officer (sec. 11 Waste Management Act 2002)

In enterprises with more than 100 employees, a technically qualified waste officer and deputy waste officer must be appointed.
The appointment or removal of the waste officer and deputy must be reported without undue delay to the district administration or, in cities with their own charter, to the municipal department. The waste officer is tasked with providing information and advice relating to all issues concerning waste management at the business operation, including waste management issues in procurement. The enterprise owner is obliged to assist the waste officer in the performance of his duties.

The waste management programme (sec. 10 Waste Management Act of 2002) – WMP
A WMP must be created at every plant where waste accumulates and that has more than 20 employees. A WMP provides information about the type, quantity, origin and location of all the waste accumulated through the operation of the business, as well as defining measures to prevention and disposal of waste. The term „business operation“ within the meaning of this provision should be interpreted broadly and includes not only industrial operations but also office buildings and schools.

5.3.1.8. Laws governing waste management plants
Except for the plants enumerated in sec. 37 (2) of the Waste Management Act of 2002, all waste treatment facilities are subject to the Waste Management Act of 2002. Generally, the construction and operation of treatment plants and any material changes thereto are subject to authorisation from the authorities. The authorising and controlling authority is usually the Governor of the Federal Province (with the possibility of delegating authority to the district administrative authorities for specific plants). The court of appeals for decisions under industrial plant law is the respective Independent Administrative Tribunal.

A basic distinction is made between stationary treatment facilities and mobile treatment facilities. For stationary waste treatment facilities, sec. 38 of the Waste Management Act of 2002 stipulates a cover-all authorisation procedure for the materials enumerated therein. This concentration of procedures is applicable not only to federal regulations but also to Provincial regulations, including the civil engineering provisions of each Austrian Federal Province.

In addition to the general authorisation procedure, there is a simplified authorisation procedure and a reporting procedure. Section 37 (3) of the Waste Management Act of 2002 specifies the treatment plants and changes to treatment plant that may be approved using the simplified approval procedure (sec. 50). Acc. to sec. 51 of the Waste Management Act of 2002, specific measures (sec. 37 (4)) need to be notified.

Special rules are provided for public participation in the authorisation procedure for IPPC treatment facilities and incineration and co-incineration plants. There are also other special provisions, especially for landfills and for the control of hazards in the event of major accidents.
Sections 52 ff. of the Waste Management Act of 2002 provide rules for mobile treatment facilities, which are generally to be set up and operated for no more than 6 months. Mobile plants requiring authorisation are those designated in an ordinance in accordance with sec. 65 (3) of the Waste Management Act of 2002. This ordinance names mobile treatment facilities that have comparable effects on people or the environment as the stationary treatment facilities. This concerns, among others, certain crushing and reduction plants for waste and plants for treatment of hazardous waste. It does not include chaff cutting machines, tank cleaning vehicles or disinfection devices.

Approval of these plants is the responsibility of the Governor of the Federal Provinces in which the applicant for authorisation resides. If the interests to be taken into account in granting authorisation at a specific site are not sufficiently protected, the authorities with territorial jurisdiction over the area in which the mobile plant is set up and operated may impose further requirements or prohibit operation of the mobile plant at that site (sec. 53 (2) of the Waste Management Act of 2002).

5.3.1.9. Transboundary shipment
Generally, the transboundary shipment of waste is regulated in Regulation (EC) No 1013/2006 of the European Parliament and of the Council on shipments of waste (EC Waste Shipment Directive). In certain sub-areas, implementation provisions were adopted in sections 66 through 72 of the Waste Management Act of 2002 pursuant to this directly applicable EU Directive. This concerns, in particular, the competence of the national authorities, notification, security, and the duty to re-import, if the waste is not accepted or is shipped illegally – and the supervisory authorities of the customs agencies. More details will follow in Chapter 5.3.6.

5.3.1.10. Treatment contracts
The imposition of waste management duties under administrative law is regulated by sec. 73 of the Waste Management Act of 2002 in two sets of cases. Treatment contracts may be imposed on anyone who violates waste management law.

When imposing a treatment contract, it is important to decide whether a duty has been violated (sec. 73 (1) (1)) or there is the possibility of a violation of the public interest within the meaning of sec. 1 (3) of the Waste Management Act of 2002 (sec. 73 (1) (2) Waste Management Act of 2002). Pursuant to sub-subsection 1, the duties should generally be imposed on any person who collects, stores, transports, or processes waste contrary to waste management law, or causes such irregular conduct. He need not be the holder of the waste. In case sub-subsection 2 applies, the duties are to be imposed on the person to whom the waste or hazard is attributable, i.e. particularly the originator (even if through no fault of his own) as well as the owner of the waste.

By virtue of the Waste Management Act Amendment of 2010, sec. 15 (5b) Waste Management Act of 2002 also explicitly provides that the duties pursuant to sec 73 (1) Waste Management Act of 2002 should be imposed on anyone who transfers waste without adherence to sec. 15 (5a).

If it is impossible to identify the person on whom these duties should be imposed under sec. 73, sec. 74 of the Waste Management Act of 2002 provides for subsidiary liability of the owner of the property on which the waste is located. If the land owner cannot be held liable either, then the municipality in which the municipal waste is stored or landfilled illegally must remove it at its own expense and submit it to environmentally sound treatment. This regulation is not applicable to landfills that have been shut down or closed. In all other cases, the law provides for the subsidiary liability of the Federal Government, subject to the approval of the Federal Minister of Agriculture, Forestry, the Environment, and Water Management.

5.3.1.11. Regulatory powers under the Waste Management Act of 2002
The Waste Management Act of 2002 establishes the basic framework for waste management law. More detailed configuration and implementation is generally reserved for ordinances issued by the Federal Minister of Agriculture, Forestry, Environment and Water Management – partly in agreement with the Federal Minister of Economy, Family and Youth. Express regulatory powers are granted in:
Section 4 – Certain decisions related to a waste list (e.g., types of waste, exemption): List of Waste Ordinance
Section 5 – Waste end: Compost Ordinance, Waste Incineration Ordinance

Section 14 – Measures for waste prevention and recovery: End-of-Life Vehicle Ordinance, Battery Ordinance, Waste Electrical and Electronic Equipment Ordinance, Packaging Ordinance


Section 36 – More detailed provisions on collection and recovery systems: End-of-Life Vehicle Ordinance, Waste Electrical and Electronic Equipment Ordinance, Packaging Ordinance

Section 65 – More detailed provisions on treatment facilities: Waste Incineration Ordinance, Landfill Ordinance, Ordinance on Mobile Waste Treatment Plants, Ordinance on Waste Balance Sheets

5.3.2. Ordinances relating to the Waste Management Act of 2002

- Ordinance on the Taking Back, Deposit Payment, and Environmentally Sound Treatment of Certain Lamps (Lamp Ordinance), Federal Law Gazette No 144/1992 as amended by Federal Law Gazette No 440/2001, repealed by the end of 12 August 2005 – sec. 4, however, continues to be applicable
- Ordinance on Quality Requirements for Compost from Waste (Compost Ordinance), Federal Law Gazette II No 292/2001
- Ordinance on Record-Keeping Obligations for Waste (Waste Record-Keeping Ordinance 2003), Federal Law Gazette II No 618/2003
5.3.3. Hazardous waste

Pursuant to sec. 4 sub-subsection 2 of the Waste Management Act of 2002, the Federal Minister of Agriculture, Forestry, Environment and Water Management is authorised to issue ordinances regulating all types of hazardous waste. This covers all the hazardous properties enumerated in Annex III of the Waste Management Act of 2002 (e.g., explosives, oxidising, flammable, irritant, harmful, toxic, etc.). Moreover, records must be kept for all waste types that are hazardous at Community level.

In Austria, hazardous waste is regulated by the List of Waste Ordinance, Federal Law Gazette II No 570/2003 as amended by Federal Law Gazette II No 498/2008, hereinafter referred to as the List of Waste Ordinance.

According to sec. 4 of the List of Waste Ordinance, the following are considered hazardous waste:

1. Waste expressly listed as hazardous in the above-mentioned lists. Annex 5 of the List of Waste Ordinance is authoritative, which ÖNORM S 2100 „List of wastes“, issued on 1 October 2005, has declared binding along with the amendments specified in Annex 5 of the List of Waste Ordinance.

2. Waste containing hazardous substances to an extent, or mixed with them in such a way, that hazardous properties as defined by Annex 3 of the List of Waste Ordinance cannot be ruled out through a simple assessment, such as an evaluation of the maximum percentage of toxic substances by weight.

3. Specific types of excavated materials:
   - excavated material from sites that handle soil- or water-polluting substances, which makes it reasonable to assume that the material is „hazardous“ as defined by Annex 3 of the List of Waste Ordinance (e.g., in the case of operations involving metal or mineral oil processing, filling stations, dry cleaners, chemicals industry, gasworks or contaminated waste sites); this applies to all areas of the site where such substances are handled
   - excavated material from sites if contamination becomes apparent in the course of the excavation or removal activities and it is reasonable to assume that the material is „hazardous“ as defined by Annex 3 of the List of Waste Ordinance
   - excavated material when it is reasonable to assume that, by reason of contamination caused by an operational incident or accident, the waste is „hazardous“ as defined by Annex 3 of the List of Waste Ordinance
   - excavated material that is not covered by the above paragraphs if chemical analysis reveals that the waste is so contaminated that it is at least „hazardous“ as defined by Annex 3 of the List of Waste Ordinance.

4. Waste that was once categorized as hazardous and subsequently solidified (i.e., firmly bonded in a matrix) is considered hazardous even after solidification.

   - The List of Waste Ordinance finally regulates which types of waste are hazardous. To this extent, the parts of the Ordinance on the Definition of Hazardous Waste and Hazardous Household Waste of 1997 related to hazardous waste rather than to the exemption (see below) are substantively superseded by the List of Waste Ordinance and no longer applicable.

   - A number of hazardous waste types in marginal areas necessarily overlap with non-haz-
ardous waste that does not have any hazardous properties. In order to take this into account and to help production processes move further in the direction of „cleaner production“, it is possible to furnish proof that, in individual cases, waste listed as hazardous has no hazardous properties (exemption).

- Exemption is covered by Community law in Art. 7 (3) of the Waste Framework Directive and Art. 3 of Decision 2000/532/EC. Member States have the option of issuing provisions by which, in exceptional cases and once the waster holder has provided sufficient proof, certain types of waste contained in the waste list can be deemed not to have any hazardous properties.

- This option was implemented by sections 4 (3) and (7) of the Waste Management Act of 2002 and in the Ordinance on the Definition of Hazardous Waste and Hazardous Household Waste of 1997 through the exemption procedure defined under sections 5 and 6.

Declassification may be performed for a single batch or for waste from a specific process with consistent quality. It may be performed either by the relevant waste holder (general exemption) or by the landfill operator for the purposes of depositing the waste in his landfill. In the case of general declassification, the following points must be observed:

- objectively verifiable criteria of hazardousness (Annex 3 of the Waste Catalogue Ordinance)
- assessment by an external authorised expert or expert body; the expert report must confirm that the waste does not exhibit any of the hazardous properties as defined by the Ordinance
- use of forms for proof that the given waste is non-hazardous
- for excavated material, the assessment to determine declassification must be carried out before excavating or removing the material

**Declassification for the purpose of landfilling**

Since the Landfill Ordinance already contains extensive provisions concerning waste testing, synergies are used for declassification for the purpose of landfilling. Any such declassification must be based on the basic characterisation as defined in the Landfill Ordinance of 2008.

Acc. to sec. 16 (1) of the Waste Management Act of 2002, depositing hazardous waste in above-ground landfills has been prohibited since 16 July 2001, i.e. waste must either be declassified (whenever permissible) from surface landfilling or undergo alternative treatment. Asbestos waste is the only exemption, which, under certain circumstances, may be deposited on surface landfills for non-hazardous waste (cf. sec. 10 Landfill Ordinance of 2008).

**5.3.4. Waste data collection**

Electronic notification of waste balance sheets

The Ordinance on Annual Waste Balance Sheets (Waste Balance Sheet Ordinance) was published in Federal Law Gazette II No 497/2008 on 23 December 2008 with the objective of collecting basic data to satisfy the EU reporting obligations, improving the information available for waste management planning and the traceability of waste streams. The content of this Ordinance mainly concerns the implementation of a obligation provided for under sec. 21 (3) of the Waste Management Act of 2002 requiring waste collectors and processors subject to recordkeeping requirements to report their annual waste balance sheets to the Provincial Governor each year. The first annual waste balance sheet report must be submitted electronically by waste collectors and processors via the Register (edm. gv.at) by 15 March 2011 (for the reporting year 2010). Some rules have been relaxed for the first few reporting years after introduction of the obligation. For example, the first annual waste balance sheet report may be made on the “personal level”, i.e., reporting exclusively pick-ups of waste from other legal entities and deliveries of waste to other legal entities. A relaxation (“location level”) has also been provided for the reports on the reporting years 2011 and 2012. Starting from reporting year 2013, a comprehensive balance sheet report will be required that covers pick-ups of waste from other legal entities, deliveries of waste to other legal entities, in-house waste movements and storage level information.

Moreover, the Waste Balance Sheet Ordinance contains guidelines for registration of waste collectors and processors (supplementing the master data if necessary) in the electronic register in accordance with sec. 22 of the Waste Management Act of 2002, electronic record-keeping concerning the type, quantity, origin and location of waste and the electronic transmission of records and summaries required by the authorities in case of need. Things have also been made easier with respect to the introduction of the electronic record-keeping obligation and, as mentioned above, with respect to the reporting of annual waste balance sheets in the initial reporting years. Regarding record-keeping, the existing data entry guidelines under the Waste Record-Keeping Ordinance of 2003 for waste collectors and processors have been replaced by the Waste Balance Sheet Ordinance. The
record-keeping provisions under sections 1 through 4 of the Waste Balance Sheet Ordinance 2003 are therefore addressed de facto only to waste producers and to the waste collectors and processors that are exempted from the scope of the Waste Balance Sheet Ordinance.

The introduction of the waste balance sheet accounting and of the electronic record-keeping obligation is intended to improve the traceability of waste streams and ensure greater transparency of appropriate waste collection and treatment. The introduction of electronic data management in this field was intended to reduce the administrative expenses for data entry and verification, especially in comparison to paper-based workflows.

5.3.4.1. Electronic Data Management (EDM) – Implementation and current status

Background and objective

The Electronic Data Management system of the Ministry of Life is a central strategic focus of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management which aims to reduce administrative effort and expenses incurred by companies and the authorities at all administrative levels. The objective is to gradually change over from conventional „paper systems“ to efficient, electronic data-entry and reporting systems. Data will only have to be entered once and made available to the competent authorities with minimal expense and effort. The Electronic Data Management system is an important contribution of the Federal Ministry of Agriculture, Forestry, Environment and Water Management in the Administrative Quality Initiative launched by the Federal Government. The EDM programme is being implemented in accordance with the objectives of the EU Initiative i2010 and the Federal Government’s work programme of ICT Strategy 2005+. By implementing the Electronic Data Management system, which reaches across several areas of law, registration and notification duties in the environmental sector – starting with waste management – are being switched over gradually to electronic processing. In waste management, the Waste Management Act of 2002 provides the legal basis for Electronic Data Management.

Accurate information on waste streams constitutes the pre-requisite and basis for optimised waste management planning. The duties of documentation, record-keeping and reporting imposed on waste holders by the Waste Management Act of 2002 and its ordinances, waste collectors and processors ensure record-keeping and communication of the relevant data.

Before Electronic Data Management was introduced, notifications regarding waste and the environment were submitted in paper – by post or fax. If standard forms are not used, however, it is im-
possible to process the data directly, requiring considerable more effort as the data needs to be entered manually into the electronic data base. The extensive registration and reporting duties under Community law also require careful data collection and administration by the Member States. Additionally, European Waste Statistics Regulation requires high quality statistical data concerning the quantities of industrial waste and waste routes. To this purpose, a special quality report must be drafted.

The EDM therefore provided and further developed a comprehensive system for the communication and processing of electronic data. The notifications can be transmitted quickly and efficiently, error sources can be reduced, waste streams can be better recorded and proper treatment is more easily traceable.

Another central focus of EDM is to make the data collection systems more uniform and to compile the stores of data already available. In the past, in many legal areas of public administration, the same information was entered in duplicate (e.g., master data on companies, plants and plant parts), communicated to various authorities and managed there. The development and use of uniform structures and systems aims to avoid such stand-alone solutions in the future. The use of other eGovernment registers, which have already been set up or are still under construction, is part of the plan. This will cut administrative expenses for both administrative authorities and companies while economising on resources. The extension of electronic registers and development of IT applications have therefore been carried out in coordination with other departments and Provincial authorities from the very beginning.

For the sake of ensuring a data exchange beyond national borders (e.g., in connection with waste shipments) and in order to develop longer-term consistent and stable solutions, we also partake in cross-border projects and seek international coordination in our efforts with the relevant bodies. In order to develop a forward-looking system, international standards are taken into account.

**EDM in figures**

With some 46,000 visitors to the EDM Portal and 60 million visits each year, approx. 755,000 reports were processed in 2010. EDM now enables around 40,000 registered users to perform administrative procedures online. On the government side, about 1,300 Federal, Provincial and district civil servants work with EDM. In some areas, several authorities are responsible for the same report according to (EU) law, which makes the administrative procedures very complex. This would be practically impossible to bring under control without using an e-government solution in the form of EDM.
**Status of EDM sub-projects**
A wide variety of projects regarding information, record-keeping and reporting obligations as well as electronic processing of administrative procedures concerning the areas of waste management and the environment are uniformly managed and developed by means of Electronic Data Management.

**Description of EDM (sub-)projects relevant to waste management**

**eRAS/ZAReg:**
eRAS (Elektronisches Register für Anlagen- und Personenstammdaten or electronic register for plant and personal master data) constitutes the central electronic register of personal and plant information on which all the applications rely (core of any EDM application). Ongoing development of eRAS includes the integration of a WebGIS solution by means of which owners can geographically localise their plants and operations entered in EDM. In addition, authorisation contents (information in one or several authorisations) can be entered in eRAS for business enterprises.

**eBalance Sheets:**
eBalance Sheets enable the transmission of notifications on the type, quantity, origin and location of waste (in the form of an XML file). This application forms the basis for the transmission of waste input/output notifications in compliance with the Waste Incineration Ordinance, of the landfill notification acc. to the Landfill Ordinance of 2008 and also serves as foundation for the notification for waste collectors and processors subject to the record-keeping obligation stipulated by the Waste Balance Sheet Ordinance.

**eConsignment Note:**
The Waste Data Network was replaced in 2007. Since then, all consignment notes for the transport of hazardous waste are reported in the EDM-consignment note register. On the one hand, consignment notes are uploaded by the authorities of the Austrian states themselves („EBSM_alt“ interface) or entered in online entry forms. On the other hand, the data entry and uploading of consignment notes is also performed directly by companies using the e-consignment note application of the EDM Portals („EBSM_neu“). In 2010, as many as 400,000 consignment notes were processed using EDM.

**ePRTR:**
a) the release of pollutants into air, water and the soil
b) the transfer of waste quantities
c) the transfer of pollutants into waste water that is routed to external sewage treatment plants whenever certain limit values for emissions or waste quantities are exceeded

These reports are submitted to the competent authorities by the plant operators via the web-based EDM application e-PRTR. Once a plausibility check has been performed, they are forwarded to the European Commission. Every year, over 300 PRTR reports are processed through Electronic Data Management in this way.

**eShipment/EUDIN:**
The eShipment application has been used by the government since early 2006 to process administrative procedures and transport reports for the transboundary shipment of waste (in accordance with the EU Waste Shipment Regulation No 1013/2006).

Pursuant to the EU Waste Shipment Regulation, authorities process some 200,000 transport reports of transboundary waste shipments. This includes receiving the reports by fax and printing out each one, entering the associated data and, finally, archiving the documents.

In 2009, the EDM application eShipment/EUDIN enabled fully electronic and legally compliant processing of certain notifications, together with Bavaria, Baden-Württemberg and Switzerland. The objective should now be to expand from the pilot phase to cover the whole of Europe.

**eWEEE:**
This EDM sub-project has been in operation since 2005 to implement the reporting obligations under the Waste Electrical or Electronic Equipment Ordinance published in Federal Law Gazette II No 121/2005. The Ordinance requires ongoing reports (on the quantities placed on the market, amounts collected and recovered, etc.) via electronic data management. In 2009, as many as 95,000 reports on e-waste electrical or electronic equipment were processed electronically.

**eEnd-of-Life Vehicles:**
Thanks to implementing the reports in accordance with the End-of-Life Vehicles Ordinance published in Federal Law Gazette II No 407/2002, about 600 reports can now be processed efficiently (electronically) and as required by the law in this EDM sub-project.
ePackaging:  This EDM application first launched in 2008 is used to process reports in accordance with the Packaging Ordinance (Federal Law Gazette II No 648/1996), insofar as they are not covered by a collection and recovery system. Every year, the EDM Portal is used to electronically process some 400 reports from around 1,000 participants: companies that, rather than using a collection and recovery system, take back and recover packaging themselves; individuals who import goods for their own use/consumption; high-volume waste accumulation sites; packagers using returnable packaging, as well as suppliers to high-volume waste accumulation sites.

eCompost:  The development of our own eCompost application to enable complete electronic documentation and communication of records in accordance with the Compost Ordinance has been put on the back burner for the time being. In the eCompost sub-project, based on the obligations imposed by the Compost Ordinance, the requirements of the compost plant operators and of the quality control systems and of the authorities are being contributed on an ongoing basis to the sub-projects eExpert Report, including the development of eWaste Documentation, eAudits, eBalance Sheet, and for the registration of authorisations.

eIncineration:  With the EDM sub-project elncineration, the electronic reports are implemented in accordance with the Waste Incineration Ordinance (Federal Law Gazette II No 389/2002; Federal Law Gazette II No 296/2007) and the Emissions Clarification Orderinance (Federal Law Gazette II No 292/2007). elncineration is a joint project of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Federal Ministry of Economy, Family and Youth. Every year, 500 emission declarations are digitally submitted via Electronic Data Management. Of these, about 40 declarations concern atmospheric emissions from waste incineration and co-incineration plants and about 10 declarations concern water pollution from waste incineration co-incineration plants. The remaining emissions declarations are submitted by plant operators pursuant to the Steam Boiler Emission Act (EG-K, Federal Law Gazette I No 150/2004 as amended by Federal Law Gazette I No 65/2010). An official plausibility check is being developed for the elncineration application. It can be used by the Austrian Federal Provinces for emission registers. The system contains data from several reporting periods.

The development of movement data, e.g. on emissions loads, can already be observed.

eBatteries:  The eBatteries application has been in use since late 2008 to submit and receive all the reports prescribed by the Batteries Ordinance (Federal Law Gazette II No 159/2008). This application primarily helps manufacturers and consumers who import goods for their own use and/or the collection and recovery systems that represent them, and collectors, processors and hired contractors meet their reporting obligations. The reportable information includes placing batteries and accumulators on the market, as well as pick-up and recovery. Just as in the e-Waste Electrical or Electronic Equipment Ordinance, reports can be submitted in eBatteries by using online data entry forms or by uploading standardised reports or web services. Around 8,000 reports per year are processed via the EDM sub-project eBatteries.

eExpert Report:  This EDM sub-project assists future landfill owners, authorised specialists and technical institutions, as well as landfill supervisory bodies in the implementation of the Landfill Ordinance of 2008 as required by the law through creation of export reports and processing. In 2009, as part of the eExpert Report project, a „form generator“ was developed that can already be used to generate waste management information in accordance with sec. 16 of the Landfill Ordinance of 2008 for all types of waste via the EDM portal. By late 2012, it will be possible to create evaluation documents electronically using EDM and to release them for use by other people.

eLandfill:  The Landfill Ordinance of 2008 provides for the electronic processing of certain record-keeping and reporting obligations through EDM. These could include records of incoming materials inspection results, the measurement and monitoring program and the report from the supervisory authority in charge of landfills. In cooperation with Austrian Water and Waste Management Association, the contents of record-keeping and reporting duties are specified in detail, structured and made available as a basis for developing the electronic application. This should also result in the standardisation of the records and reports.

ePermit:  The objective of this EDM sub-project is to create an application for online transmission of applications for waste collection/treatment via the EDM
register to the appropriate Provincial Governor. This application is intended to provide support and ensure that the mapping of the scope of authority in electronic data management does not vary from the actual authority (no duplicate submissions by hand). This means that data must be entered only once in the various applications, which increases the reliability and consistency of the data.

eAudit:
For the sake of performance and resources, audits using complex systems that go beyond queries and the (relatively) simple aggregation of current data sets are generally not performed directly in the EDM „input system“ but rather in a parallel „audit system“. In addition, especially complex, multiple-application audits require a data-warehouse as a base. Apart from that, since many users working in the authorities carry out audits using different applications, it is also necessary to standardise the implementation of the user logic and interfaces for the various audits. This explains why the EDM Project “eAudits” was launched to build an environmental audit platform together with Umweltbundesamt GmbH.

In 2009, an initial prototype audit of consignment notes was implemented. Over the next few years, other, more complex audits will be created in the data warehouse system.

5.3.5. Waste shipment
5.3.5.1. Exports and import
EU Directives No 1013/06/EC, No 1418/2007/EC


The Waste Shipment Regulation sets forth the monitoring procedure applicable to shipment. The specific procedure to be applied depends on the type of waste (subdivided into Annexes III, IIIa, IIIb, IV and IVa) and the place of destination (inside/outside the EU). Waste shipment to third countries for disposal (except for Iceland, Norway and Switzerland) is generally prohibited.

The export of non-hazardous waste specified in Annex II or IIIa of the Waste Shipment Regulation to third countries that are not OECD members is governed by Commission Regulation No 1418/2007 as amended by Commission Regulation No 837/2010 of 23 September 2010. The Waste Shipment Regulation is directly applicable and does not require any implementing measures under national law. The Waste Management Act of 2002, however, sets forth export requirements (Chapter 8 provides explanations on how to apply the Waste Shipment Regulation).

Export
At Community level, exporting waste from the EU for disposal is an option only for EFTA member countries (Iceland, Norway and Switzerland) according to the principle of self-sufficiency in disposal (Article 4 (2) of the Basel Convention). Such exports are always subject to authorisation.

When exporting certain types of waste for recovery, the following cases are to be distinguished:
1) Types of waste specified in Annex II or IIIa of the Waste Shipment Regulation are, if shipped to third countries that are not OECD members, subject to the respective control procedures of Commission Regulation (EC) No 1418/2007 (as amended). If exported to OECD countries, only the documents complying with the requirements under Article 18 of the Waste Shipment Regulation need to accompany the shipment.
No notification is required, however. In particular, this does not apply to hazardous waste such as scrap metal and recoverable plastics intended for recovery and currently not quantifiable.

2) Hazardous waste which can be allocated to Annex V of the Waste Shipment Regulation and waste specified in Annex V Part 3 (since 10 December 1999) are subject to a general export ban to third countries that are not OECD members (with the exception of Liechtenstein; exports to OECD countries and Liechtenstein are always subject to authorisation).

3) The export of waste types not listed in Annexes III and IV require authorisation. The export to third non-OECD countries is not permitted unless the waste is non-hazardous (Annex V Part 2).

To the extent that notification is required for exporting, the notification documents must be submitted to the Federal Ministry of Agriculture, Forestry, Environment and Water Management (Department VI/1), which is tasked with carrying out the notification, including the check for completeness of the notification documents (notification of authorities).

The forms to be used for notification can be downloaded from https://secure.umweltbundesamt.at/edmportal/home.do just as the form for waste shipment in acc. with Art. 18 Waste Shipment Regulation (for details on the notification procedure and formal requirements as stipulated by Art. 18, cf. Chapter 8.2.).

Import
Importing waste into the EU for disposal is always subject to notification (subject to authorisation). It is not permitted unless the exporting country is a party to the Basel Convention or has entered into an agreement with Austria within the meaning of Art. 11 of that Convention.
When waste is imported for recovery, the following cases should be distinguished:

1) The waste is listed in Annex III (or IIIa or IIIb) of the Waste Shipment Regulation. In this case, authorisation is not required if the waste is intended to be recovered in an authorised recovery plant. However, the shipment must be accompanied by the documents specified under Art. 18 of the Waste Shipment Regulation. In addition, a written agreement regarding the recovery of the waste must have been concluded. In particular, this does not apply to hazardous waste such as scrap metal and recoverable plastics intended for recovery and currently not quantifiable.

2) All other types of waste (waste listed or not listed in Annex IV) are subject to notification. Notification generally needs to be made by the foreign waste producer or waste holder when waste that is subject to notification is shipped to Austria.
Within the EU, authorities need to be notified, i.e. requests for the authorisation of transboundary waste shipment are examined in advance by the competent foreign authorities and communicated to the Federal Ministry of Agriculture, Forestry, Environment and Water Management.
Waste shipments through third countries that are subject to notification (e.g. through the “Deutsches Eck” region where Germany, Austria and Switzerland meet) require notification and authorisation. On the basis of the Border-Region Agreement with Germany (Federal Law Gazette III No 72/2009) various facilities have been granted for this purpose.

Transit
Tacit consent generally applies to shipments within the Community that transit Austria. This means that approval for transit is considered given 30 days following the date of transmission of the acknowledgment by the competent authority of destination.
For exports outside the EU or imports into the EU with transit through Austria, a decree from the Federal Minister for Agriculture, Forestry, Environment and Water Management needs to be issued.

Reporting obligations
The shipment of waste that is subject to notification requirements is also subject to a number of reporting obligations. As a result, the notifying party, under the Waste Shipment Regulation, is obliged to notify the competent authorities of the time of waste shipment three working days prior to the transport. Likewise, the consignee of the waste is obliged to confirm receipt to the notifying party and the competent authorities concerned within 3 days and as soon as possible, but no longer than 30 days after completion of non-interim recovery or disposal, and no later than one year after receipt of the waste, the completion of non-interim recovery or disposal of waste.

Electronic transmission of notifications
A database has been installed at the Federal Ministry of Agriculture, Forestry, Environment and Water Management to manage the ongoing records concerning waste exports, imports and transits. New notifications and requests for authorisation regarding shipments from Austria (export, shipment
through the „Deutsche Eck”) have been available for online completion since 30 November 2010 and can be electronically transferred to the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

In addition, notifications as defined under Art. 15 and 16 of the Waste Shipment Regulation may be transmitted electronically to the Federal Ministry of Agriculture, Forestry, Environment and Water Management using the application eShipment.

In 2011, a pilot run for electronic notifications in the EUDIN project will be launched in cooperation with Belgium and the German Federal Environment Agency.

Statistics

<p>| Number of notifications (2005 – 2009) |</p>
<table>
<thead>
<tr>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td>429</td>
<td>472</td>
<td>630</td>
<td>564</td>
</tr>
<tr>
<td>Import</td>
<td>250</td>
<td>300</td>
<td>295</td>
<td>306</td>
</tr>
<tr>
<td>Transit</td>
<td>591</td>
<td>687</td>
<td>850</td>
<td>1004</td>
</tr>
</tbody>
</table>

<p>| Exports of selected groups of substances (in t) (Waste Shipment Regulation database, eShipment, data from March 2010) |</p>
<table>
<thead>
<tr>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste oils</td>
<td>5,218</td>
<td>7,321</td>
<td>9,742</td>
<td>10,805</td>
</tr>
<tr>
<td>Salt slags and metal-containing fly ash</td>
<td>116,616</td>
<td>111,650</td>
<td>141,291</td>
<td>135,714</td>
</tr>
<tr>
<td>Waste wood, treated</td>
<td>57,951</td>
<td>47,531</td>
<td>50,557</td>
<td>26,596</td>
</tr>
<tr>
<td>Residues from waste incineration</td>
<td>40,931</td>
<td>59,683</td>
<td>72,660</td>
<td>59,789</td>
</tr>
<tr>
<td>Sewage sludge</td>
<td>25,860</td>
<td>35,468</td>
<td>14,352</td>
<td>22,739</td>
</tr>
<tr>
<td>Municipal waste and similar commercial waste, construction site waste, residues from mechanical or mechanical-biological waste treatment</td>
<td>182,276</td>
<td>66,209</td>
<td>162,648</td>
<td>140,146</td>
</tr>
<tr>
<td>Exports for disposal</td>
<td>157,901</td>
<td>104,469</td>
<td>175,088</td>
<td>126,927</td>
</tr>
<tr>
<td>Total exports (not incl. excavated materials)</td>
<td>534,629</td>
<td>493,630</td>
<td>751,638</td>
<td>685,121</td>
</tr>
</tbody>
</table>

<p>| Imports of selected groups of substances (in t) (Waste Shipment Regulation database, eShipment, data from March 2010) |</p>
<table>
<thead>
<tr>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-acid batteries and other metal-containing waste (metal recovery)</td>
<td>14,729</td>
<td>14,662</td>
<td>27,999</td>
<td>28,500</td>
</tr>
<tr>
<td>Solvents, waste oils (substitute fuels)</td>
<td>7,975</td>
<td>4,807</td>
<td>3,415</td>
<td>4,608</td>
</tr>
<tr>
<td>Waste paint and lacquer</td>
<td>4,793</td>
<td>3,171</td>
<td>5,054</td>
<td>3,967</td>
</tr>
<tr>
<td>Workshop waste, industry and filling station waste</td>
<td>480</td>
<td>1,734</td>
<td>1,146</td>
<td>1,672</td>
</tr>
<tr>
<td>Halogenated solvents</td>
<td>2,822</td>
<td>2,829</td>
<td>4,177</td>
<td>3,626</td>
</tr>
<tr>
<td>Waste wood, treated</td>
<td>42,642</td>
<td>51,200</td>
<td>57,158</td>
<td>57,745</td>
</tr>
<tr>
<td>Imports for disposal</td>
<td>26,691</td>
<td>124,453</td>
<td>69,301</td>
<td>49,898</td>
</tr>
<tr>
<td>Total imports</td>
<td>109,266</td>
<td>249,375</td>
<td>220,741</td>
<td>212,861</td>
</tr>
</tbody>
</table>

<p>| Export, import, and transit quantities between 2005 and 2009 in tonnes (Waste Shipment Regulation database; data from March 2010) |</p>
<table>
<thead>
<tr>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td>586,052</td>
<td>531,299</td>
<td>895,749</td>
<td>1,060,918</td>
</tr>
<tr>
<td>Import</td>
<td>109,266</td>
<td>249,375</td>
<td>220,741</td>
<td>212,861</td>
</tr>
<tr>
<td>Transit</td>
<td>889,667</td>
<td>1,589,094</td>
<td>1,245,524</td>
<td>1,373,594</td>
</tr>
<tr>
<td>Export (not incl. excavated soil)</td>
<td>534,629</td>
<td>493,630</td>
<td>751,638</td>
<td>685,121</td>
</tr>
</tbody>
</table>
5.3.5.2. IMPEL-TFS
In 1992, the informal „European Network for the Implementation and Enforcement of Environmental Law“ (IMPEL) was created under the patronage of the EU Commission. At the same time, as part of this network, the IMPEL/TFS working group (Transfrontier Shipment of Waste) started working on transboundary waste shipments. Through the EC Waste Shipment Regulation No 1013/2006, international cooperation between the competent authorities has gained particular importance, especially with respect to the monitoring and control of transboundary waste shipment. The most important objectives and tasks of the IMPEL/TFS working group may be summarised as follows:

- to develop and improve communication and cooperation between the authorities responsible for transboundary waste shipments (IMPEL/TFS enforcement authorities, police, customs) both within individual Member States and between them
- to assess the situation of national rules and regulations concerning waste disposal and the various modes of implementing and applying the EC Waste Shipment Regulation No 1013/2006 in the Member States
- to create manuals, guidelines and rules for enforcement practices
- to enforce the EC Waste Shipment Regulation No 1013/2006 uniformly within the EU Member States
- to ensure Europe-wide common waste checks on roadways, railways, and waterways

What needs to be taken into account with the results obtained to date is that, at the beginning of the IMPEL/TFS projects, international contacts were still few and far between and that coordination and cooperation among the Member States in the monitoring of transboundary waste shipments was virtually non-existent.

The following summary gives a general idea of the main results obtained to date in the IMPEL/TFS network:

- Links to all the competent enforcement authorities in the EU Member States and other important waste importing and exporting countries (e.g., China/Hong Kong, EU accession candidates, Switzerland, Norway)
- Establishment of national TFS contact points
- Insights into the various areas of authority and personal contacts with these authorities
- Manuals, e.g., concerning uniform procedures for transport or plant checks, return of illegally shipped waste, sampling during waste checks, and performance of a study on waste streams
- Data material on specific waste streams and the companies involved
- A study to estimate the hazardous potential of illegal waste movements
- Pointing out the various interpretations and applications of the EC Waste Shipment Regulation 1013/2006 within the Member States
- Coordination and regular performance of transboundary (EU-wide) waste checks on roadways (main traffic routes, border areas), railways (freight train stations) and waterways (sea ports, Danube-Rhine-Main canal)
- Support to exchange programmes for waste inspectors. These programmes allow waste inspectors of one IMPEL-TFS Member State to participate in waste checks in another Member State.

In order to cope with the growing tasks in transboundary wastes shipment, the IMPEL/TFS network will continue to foster cooperation/communication between the participating authorities through a permanent TFS secretariat, regular conferences, and a separate website (http://impeltfs.eu/).

5.3.5.3. Basel Convention
The Basel Convention (BC) on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which was drawn up in 1989 as part of the United Nations Environment Programme (UNEP), provides the basis under international law for export and import constraints of the Waste Shipment Regulation. Both the EU as a Community and Austria are parties to the Convention.

The objective of the Basel Convention is to protect developing countries in particular against uncontrolled transboundary waste movements by means of an efficient control of transboundary waste streams but also to safeguard environmentally sound treatment in suitable plants. In 1995, the Third Conference of the Parties (COP-3) adopted an amendment to the Convention that generally bans exports from countries listed in a newly created Annex VII (OECD, EU and Liechtenstein) to non-Annex VII countries.

To make this Ban Amendment effective and enforceable, COP-4 (1998) adopted the two new Annexes VIII und IX, which enumerate types of waste, by way of example, that are subject to the Ban (Annex VIII) or not subject to the Ban (Annex IX). These annexes represent the core list of Annexes III and IV of the Waste Shipment Regulation. These annexes were supplemented both at the 6th and 7th Conference of the Parties.
COP-5 (1999) adopted a Protocol on Liability as a supplement to the Convention. Since the provisions of this Protocol largely concern Community authorities, ratification can only be at Community level.

The provisions of the Basel Convention were implemented in the Waste Management Act of 2002. To the extent that they concern the transboundary shipment of waste, they are implemented through direct application of the EC Waste Shipment Regulation (since a Regulation relates to the single market).

For several years, UNEP has been pushing for stronger cooperation and the use of synergies between the Basel Convention, Rotterdam Convention (Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals) and Stockholm Convention (Convention on Persistent Organic Pollutants – POPs). The Basel Convention has gradually become the technical leader in this cooperation when it comes to guidelines for the management of hazardous substances.

Work under the Basel Convention is currently focused on

- Guidelines for the interpretation of the hazard criteria contained in Annex III of the Basel Convention as a prerequisite for fair and equal implementation by all parties to the Convention. This issue is also being worked on in the context of the efforts to harmonise the rules of chemical and hazardous substance classification (Global Harmonised System: GHS).
- Guidelines for environmentally sound waste management (incl. waste prevention) to raise the environmental standard world-wide. Due to the wide scope of the problems involved, a number of these guidelines are being developed in close co-operation with other international organisations (WHO, FAO, UNEP Chemicals). Guidelines on waste mercury are being developed in preparation for the Mercury Convention which is currently being drawn up.
- Projects for the improved recycling of major waste streams (e.g. mobile telephones under the Mobile Phone Partnership – MPP Initiative, computer and IT devices under the Partnership for Action on Computing Equipment – PACE Initiative).

Since the Ban Amendment adopted by the 3rd Conference of the Parties has yet to be ratified by a sufficient number of countries to become effective, Indonesia and Switzerland started a country objective at the 9th Conference of the Parties (2008 in Bali) with the aim to ensure operational implementation of the Ban Amendment (protecting developing countries against hazardous waste imports). Corresponding decisions and a working programme are expected for the third decade of the Convention at the 10th Conference of the Parties in October 2011 (in Cartagena, Colombia).

5.3.6. Waste control

5.3.6.1. Waste shipment checks

The conclusions of the Cardiff Summit stated that environmental crime is a grave and serious issue which often entails with transboundary consequences and for which measures should be adopted, giving priority to the prevention of illegal waste movements.

UNEP experts, too, have recorded that the growing occurrence of environmental crime can only be countered through stronger international cooperation. Among other things, cooperation with Interpol and international customs authorities regarding illegal waste shipment must be intensified.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management maintains contacts at the international level with the authorities responsible for transboundary waste shipments (especially in neighbouring countries) and is keen on further developing such contacts. The focus is on exchanging experience and implementing common waste checks. Regular expert rounds are organised in the EU for the purpose of ensuring uniform enforcement across the EU and intensifying cooperation projects in the field of international waste control through expert talks and the exchange of practical information.
Coordinated action of the authorities in charge of transboundary waste shipment is ensured through close cooperation within the IMPEL/TFS network (Network of the European Union for the implementation and enforcement of environmental law – an international public interest company of the EU Member States’ environmental authorities, the accession and candidate countries as well as the EFTA countries – http://impeltfs.eu/). In this framework, conferences are held at regular intervals and coordinated inspections are carried out throughout Europe.

In 2008, the IMPEL/TFS working group drafted a practical manual for dealing with illegal waste shipment. Due to partially inconsistent legal viewpoints among the Member States, this manual is not legally binding.

There is a consensus in the EU, however, that environment crimes must be combated not only individually but also jointly, especially in light of the IMPEL-TFS investigatory report from 2009.

The findings of the IMPEL-TFS projects entitled „Seaports“ and „Verification on waste destination“ have shown that up to 50% of waste shipments leaving Europe from seaports are illegal. In particular, the illegal export of cars wrecks and end-of-life vehicles to Africa, of electronic waste to Asia and Africa and of household waste to Eastern European countries has underscored the need for close cooperation among the relevant authorities in order to solve such problems.

According to Article 50 of the EC Waste Shipment Regulation No 1013/2006, all EU Member States are obligated to perform sample inspections of shipments of waste for recovery or disposal. In connection with Austrian and European waste legislation (EC Waste Shipment Regulation), it is the responsibility of the Federal Ministry of Agriculture, Forestry, Environment and Water Management to check transboundary waste shipments.

The objective is to ensure proper treatment of waste in suitable authorised plants in order to guarantee environmentally sound recovery and disposal of waste and to prevent eco-dumping.

Together with Umweltbundesamt GmbH (Federal Environment Agency), the checks are coordinated and managed in close cooperation with the following organisational units:

**Federal Ministry of the Interior**
- Interpol
- Environmental groups of crime departments; support in carrying out investigations in the event of suspected violations under criminal law
- Transport departments

The Federal Police has been conducting transport controls itself since 2007 and has had the power to impose administrative fines since then.

**Federal Ministry of Finance**
- Central Office: Department IV/27 (Prohibitions and Restrictions)
- Customs officers, esp. operative control units („RMW–Risiko-Management Wirtschaftsraum“)

**Federal Ministry of Transport, Innovation and Technology**
- Federal Office of Transport – Cooperation in hazardous substance classification in the context of notification procedures
- Supreme Shipping Authority

In order to supply customs and police law enforcement agencies with up-to-date information, the Federal Ministry of Agriculture, Forestry, Environment and Water Management provides ongoing training courses, especially concerning waste shipment laws.

In addition to customs and police agencies, law enforcement agencies of the Austrian Federal Provinces are also given access to the eShipment application of EDM (notification database) to allow them to quickly determine online whether transboundary waste shipments have been approved by the appropriate authorities.

**Inspecting waste shipments**

Waste shipments are inspected at heavily travelled border crossings and inland inspection centres – that are located as close as possible to the border – by customs authorities and police, with the expert support of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and Environment Agency Austria (for any sampling and analyses that may be required), if possible, also with the participation of the relevant authorities of the neighbouring countries.

The obligatory shipping documents are checked to make sure they match up with the cargo. Ongoing waste shipment inspections are also performed by the customs authorities and public supervisory authorities that are primarily called upon to inspect waste shipments.

The many years of experience with checks and good cooperation with the representatives of the Federal Ministry of the Interior and Federal Ministry of Finance warrant successful investigatory results.
despite the limited human resources available. Waste checks of Danube ship transports are conducted in cooperation with representatives of the Bavarian authorities.

**Harmonising inspections (national)**

In order to standardise the inspection activities to be carried out by the authorities of the Austrian Provinces, a study group was set up with the Austrian provincial inspection authorities. In 2009, a checklist was drawn up together with the authorities of the Austrian Provinces in order to facilitate waste shipment inspections.

In cases of suspected illegal shipments, the district administrative authorities are involved. In order to exchange information, meetings are held several times a year between the representatives of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and these inspection authorities.

The inspection of business enterprises in connection waste shipments

In addition to the nationwide shipment inspections on the roads, railways and waterways, inspections are also performed in business enterprises when the occasion arises. (Unannounced) inspections are performed at business enterprises based on tip-offs made to the Federal Ministry of Agriculture, Forestry, Environment and Water Management by the general population and the waste disposal industry, as well as shipment inspection findings, tracing operations in the case of illegal shipments, and suspicions. Such inspections involve an extensive audit of the records required under environmental law, shipping papers, and usually an inspection of the grounds.

Most of the time, these inspections are carried out in close cooperation with the Austrian Provincial authorities (offices of the Provincial authorities or district administrative authorities). In some cases, waste samples are taken by Umweltbundesamt GmbH in accordance with the applicable standards, and counter-samples are provided and analysed.

Moreover, the Federal Ministry of Agriculture, Forestry, Environment and Water Management, as the supervisory or supreme authority, may order the Governor of the Federal Province to perform checks pursuant to sec. 75 of the Waste Management Act of 2002 as amended if the justified.

Every year, between 20 and 30 business operations undergo inspections, while at least two large-scale transport inspections are carried out and 5 to 10 short transport inspections are conducted in the proximity of various border crossings or at check points on motorways, some of them in collaboration with representatives of the foreign environmental authorities.

In connection with the inspections of business enterprises, sometimes extensive fact-finding reports on illegal shipments are transmitted to the relevant Provincial Governors for further action; the relevant foreign authorities are likewise informed.

In case of suspected illegal activities, fact-finding reports are sent to the Public Prosecutor’s Office.

5.3.6.2. Checks under the Landfill Ordinance

In cooperation with the customs offices, the quantities of waste deposited at landfills are verified to ensure contribution payments for the remediation of contaminated sites. In addition, the authorities responsible for monitoring activities inspect plants to verify compliance with the targets of the Waste Management Act of 2002 and the Landfill Ordinance.

5.3.6.3. Checks under the Packaging Ordinance

The Federal Ministry of Agriculture, Forestry, Environment and Water Management has had the authority to conduct checks in order to ensure compliance with the obligations under the Packaging Ordinance since the end of 1996. Ever since, companies (manufacturers, importers, retailers), especially those involved in packaging-intensive sectors, are inspected by external technical experts and financial experts every year. From 1997 to 2008, approx. 1,600 checks were performed. In approx. half of the checks, violations had to be reported to the competent district administrative authorities. As a result, some 400 administrative fines and warnings were issued by the district administrative authorities or the independent administrative tribunals.

Such checks were conducted in companies belonging to the following sectors in particular: food retail and production, beverage retail and production, toys and sporting goods retail, retail in all types of merchandise, textile retail, electrical and electronics retail, packaging manufacturers and retailers, paints and varnishes, DIY stores, prefabricated homes, pharmaceuticals and chemical products, mail-order business, furniture production and retail, shoe retail, vending machines for hot drinks, cleaning companies, jewellery stores and gift items, office supplies, printing and publishing companies.
5.3.6.4. Checks under the End-of-Life Vehicle Ordinance
The End-of-Life Vehicle Ordinance, which entered into force in November 2002, lays down the numerous substantive and procedural obligations of the manufacturers, importers, motor vehicle dealers, repair shops, secondary raw material dealers and shredders. The individual Austrian Federal Provinces are in charge of verifying compliance with the obligations concerning storage and treatment of end-of-life vehicles. The Federal Ministry of Agriculture, Forestry, Environment and Water Management is responsible for the prevention, labelling, information and take-back, re-use or recovery of such waste and the related duties of record-keeping, substantiation and notification. Because of the divided inspection authority and to ensure efficient action, the checks have been coordinated by the Federal Ministry of Agriculture, Forestry, Environment and Water Management since 2004 in order to enable joint control of all the obligations at the business operations subject to checks. Record-keeping, substantiation and notification duties are now audited on site at the business operations by external technical experts acting on behalf of the Federal Ministry of Agriculture, Forestry, Environment and Water Management; in most Austrian Federal Provinces, compliance with the treatment principles is verified jointly either in agreement with the respective Austrian Federal Province or, whenever possible, on the same day as the check by a Provincial expert. From 2004 to 2008, approx. 150 checks were performed. In approx. half of the checks, violations had to be reported to the competent district administrative authorities. As a result, some 50 administrative fines and warnings were issued by the district administrative authorities or the independent administrative tribunals.

5.3.6.5. Inspections under the Waste Electrical and Electronic Equipment Ordinance
Since the companies that place electrical and electronic equipment on the market generally also market packaging, the inspection of the manufacturers subject to the relevant obligations has been carried out together with a verification of compliance with the Austrian Packaging Ordinance since 2006. From 2006 to 2009, approx. 120 checks were performed. The inspections were focused on manufacturers of electrical and electronic equipment for home use, since participation in a collection and recovery system is generally necessary in that sector. About a third of the inspections lead to reports being filed with the relevant district administrative authorities. In the course of the inspections, sample compliance checks are also made with respect to the materials banned under sec. 4 (1) of the Waste Electrical or Electronic Equipment Regulation, because since 1 July 2006 it has been necessary to ensure that the maximum concentrations of cadmium, mercury, lead, hexavalent chromium and certain polybrominated flame retardants are not exceeded in any of their homogeneous materials in electrical or electronic equipment newly placed on the market. The inspections focused on the following product groups: chains of lights, electrical tools, low-cost toys, computer hardware and small household appliances. Lead and polybrominated flame retardant have been determined to be in excess of the limit values.

5.3.6.6. Inspections under the Waste Batteries Ordinance
During inspections of the enterprises subject to the Packaging Ordinance and the Waste Electrical or Electronic Equipment Ordinance, the manufacturer and importers of batteries and accumulators are inspected, as well. Such inspections focus on equipment batteries.

5.3.6.7. Inspections under the Compost Ordinance
The Federal Ministry of Agriculture, Forestry, Environment and Water Management performs inspections in addition to the ongoing inspections by the Provincial authorities, especially in relation to compost reports.

5.3.7. OECD
5.3.7.1. Transboundary shipment
By virtue of EC Waste Shipment Regulation No 1013/2006, OECD Council Resolution C (2001) 107 Final (two-part list system with recoverable waste – Green and Amber List) has become binding for all EU Member States in the case of waste shipments to countries that have not implemented the OECD Council Resolution. Wastes whose recovery represents no risk in the OECD region have been classified under the Green List and their shipment requires no notification and authorisation from the environmental authorities (transitional provisions for specific EU Member States must be observed); wastes classified on the Amber List are subject to notification and authorisation. A regular revision of the lists has been ensured at the level of the Basel Convention, preferably follow-
ing a preliminary discussion at EU and OECD levels.

**OECD interactive database**

An interactive database on the specific requirements for OECD countries concerning waste shipments is available not only to the authorities but also to participating businesses (www2.oecd.org/waste/).

This database contains information on the competent authorities, methods of calculation for security services, deviating check procedures and pre-authorised plants in the OECD area.

**5.3.7.2. Environmentally Sound Management (ESM) of Waste**

The OECD adopted Council Recommendation C (2004) 100 Final concerning environmentally sound waste management (Recommendation of the Council on the Environmentally Sound Management of Waste), in which “core performance elements” were developed as a basis for classifying plants as environmentally sound. One criterion is the provision of certification in accordance with the EMAS or ISO 14000 ff. or an equivalent national system.

In this regard, OECD also drew up a Guidance Manual for the implementation of the above-referenced Council Recommendation.

OECD Member States have already had to submit a progress report on the implementation of the Council Recommendation.

**5.3.7.3. Sustainable Materials Management (SMM)**

Reducing the amounts of waste (quantitative waste prevention) and its hazardous properties (qualitative waste prevention) are the main objectives of the OECD working group. The cradle-to-cradle approach has replaced the previous cradle-to-grave model.

An OECD Council Recommendation on Sustainable Materials Management (SMM) is currently being drawn up which is to take into account results of the OECD workshop held in October 2010 (Global Forum on Environment).

In addition, OECD studies on the sustainable treatment of aluminium, “critical” metals (such as Li, In, Pd, etc. in mobile telephones, etc.), plastics and wood fibres are being developed.

**Waste prevention indicators**

Waste prevention indicators can show, among other things, whether waste production has been properly decoupled from economic growth. Internationally comparable indicators should be created in any case. Test indicators for sustainable materials management have been developed at OECD
level. The development of material flow analyses and the related indicators on the micro and macro levels should be promoted, and cooperation should be improved among OECD countries in order to work out common methodologies and measurement systems for material flow analyses.

**Resource productivity and material efficiency**

On the subject of climate change through greenhouse gases, the OECD Council Recommendation on Resource Productivity C (2008) 40 Final and the „G8-KOBE-3R Action Plan“ (G8-Environmental Ministers’ Meeting in Kobe 2008; 3R= Reduce, Re-Use, Recycling) deserves special merit. In 2011, every OECD Member State was obliged to submit a progress report to the OECD Secretariat on the implementation of the OECD Council Recommendation on Resource Productivity C (2008) 40, as required by that Recommendation. Generally, the goal is to deploy low-carbon technologies, make greater use of renewable energies, break the correlation between economic growth and resource consumption by modernising the transport system and promoting energy efficiency.

**Extended producer responsibility**

As part of the OECD efforts relating to extended producer responsibility (EPR), reports on efficient and effective EPR schemes have been drawn up and suitable policy instruments to implement the EPR principle and incorporate it into the subject area of „Economics of Waste“ have been developed. An OECD study highlights the impact of EPR on product design.

### 5.3.7.4. Environmental reports of the OECD countries

Environmentally relevant legislative efforts undertaken by all the OECD countries as well as their operative implementation are being examined at OECD level (Group on Environmental Performance programme, GEP). The primary objective of this programme for country-specific assessments is to promote sustainable development in all OECD Member States through a lively exchange of information. Publishing the country-specific assessment report also creates an additional incentive to boost the efficiency of all measures taken in this area.

Apart from OECD countries, there is a growing effort among a number of non-OECD countries to apply for audits of their environmental efforts and to request recommendations for the future development of their waste management policy.

### 5.3.8. Reporting obligations in the European Union

Nearly every Directive and Regulation in the field of waste contains a provision obliging the Member States to report regularly on the implementation of the legislation in question to the European Commission (in addition to notification of the implementation). These reports are prepared using questionnaires adopted by the European Commission and submitted nine months after the end of the reporting period, which is generally three years.

Within nine months of receipt of the national reports, the Commission publishes a Community report. This reporting regime is generally governed by Council Directive 91/692/EEC of 23 December 1991 standardising and rationalising reports on the implementation of certain Directives relating to the environment.
Moreover, certain provisions require the preparation of national programmes (e.g., Packaging Directive) to be submitted to the European Commission and periodically reviewed.

Finally, predefined tables are used to query the products that each Member State places on the market, the waste collected (collection rates) and re-used and recovered waste, including any material recovery rates and other recovery rates under numerous directives (e.g., Packaging Directive, Waste Electrical and Electronic Equipment Directive). In the end, documents that need to contain a description of the data used and the data collection methodology are also being queried ever more frequently.

Most of the reports are now queried and transmitted electronically via Eurostat (online). This has the advantage that comparable data can be sent relatively quickly. However, it has the disadvantages that the European Commission no longer receives the reports and data in written form but only after they have been „electronically filtered“, the issue of reporter identification is complex and associated with risks and the questionnaires are now only available in English contrary to EU custom (naturally, the answers can still be provided in the respective national language).

The following list shows the reporting obligations or duties to create programmes and update them periodically:

**Waste Framework Directive**
Art. 37 of Directive 2006/12/EC on waste (for the first time as of 2011); as of 2014, pursuant to Art. 37 of Directive 2008/98/EC:
Report on the implementation, every three years

**Waste statistics**
Art. 3 as well as Annex 1 and 2 of Regulation 2150/2002 on waste statistics, every two years

**Batteries**
Art. 22 of Directive 2006/66/EC on batteries and accumulators as well as waste batteries and accumulators:
➤ Report on the implementation, every three years
➤ Report on measures to promote developments concerning the environmental impact of batteries and accumulators (decreasing the quantity of heavy metals and other hazardous substances, new recycling and treatment techniques, etc.)

**Packaging**
Report on the implementation, every three years

**End-of-life cars**
Report on the implementation, every three years
➤ Art. 7/2 of Decision 2005/293/EG on the monitoring of targets – Tables: data on re-use, recovery and disposal of materials, annually

**Waste electrical and electronic equipment**
Art. 12 of Directive 2002/96/EG on waste electrical and electronic equipment
➤ Quantity and weight of devices annually placed on the market, collected and recovered, every two years
➤ Report on the implementation every three years

**Titanium dioxide**
Art. 14 of Directive 78/176/EEC on waste from the titanium dioxide industry:
Report on the implementation, quantities, every three years

**Sewage sludge**
Report on the implementation, every three years

**Waste incineration**
Report on the implementation, every three years

**Landfills**
Art. 15 of Directive 1999/31/EC on the landfill of waste:
Report on the implementation, every three years

**IPPC**
Directive 2008/1/EC concerning integrated pollution prevention and control (IPPC)
Information on the most important emissions and their sources (emissions data register) (Art. 15 (3)), once
Representative data, plants that burn hazardous waste, waste incineration plants (Art. 16 (1)), as needed
Report on the implementation (Art. 16 (3)), every three years
Transboundary effects (Art. 17), as needed

Waste Shipment Regulation
Art. 51 of Council Regulation (EC) No 1013/2006 on shipments of waste:
Report on shipped waste, annually
According to the Basel Convention, an annual report on exported and imported waste should be sent to the Basel Secretariat and a copy thereof to the Commission.

5.3.9. Other EU-relevant provisions
General
In the pursuit of its objectives, especially environmental policy objectives requiring a high level of protection, the European Union strives to harmonise the legislation of its Member States or to create minimum standards in order to achieve sustainable development that extends beyond national borders. The following measures are suited for this purpose:
- creating a uniform system of terms and concepts
- recording, processing and assessing data
- creating uniform, high-level standards
- introducing suitable authorisation and control procedures,
- restrictions and bans
- reporting duties
When the Single European Act entered into force on 1 July 1987, a special chapter on the environment was added to the EC Treaty (Art. 100a of the EC Treaty, now Art. 95 EC, and Art. 130 r ff. of the EC Treaty, now Art. 174 EC), which also forms the
basis for measures under waste law. Once the Treaty of Lisbon had taken effect in 2009, the Treaty establishing the European Community (EC) was renamed Treaty on the Functioning of the European Union (AEUV). Former Art. 95 EC became Art. 114 AEUV and former Art. 174 became Art. 191 AEUV. The articles were not altered in their contents.

Just as environmental measures in general – waste legislation can be based either on Art. 191 AEUV or Art 114 AEUV. The choice of legal basis depends on whether the primary focus is on harmonisation measures related to the internal market or on environmental protection measures.

Art. 114 (4) AEUV provides for the option of maintaining higher standards. In such cases, the Commission must be notified of the national provisions and the grounds for maintaining them for environmental reasons must be substantiated. Art. 114 (5) AEUV provides for the option of maintaining higher standards. In such cases the Commission must likewise be notified of the national provisions and the grounds for maintaining them for environmental reasons must be substantiated. The Commission then reviews and approves or rejects these standards.

For legislation based on Art. 191 AEUV, Art. 193 AEUV allows for maintaining or introducing more stringent protective measures compatible with the Treaty.

The ruling of the European Court of Justice on Waste Framework Directive 75/442/EEC was decisive for the choice of a legal basis under numerous national waste management laws. In this ruling, the Court of Justice confirmed that the Waste Framework Directive aims at efficient waste management and that therefore Art. 175 EC (formerly Art. 130s of the EC Treaty) should be used as the legal basis. Ever since, not only the Waste Framework Directive but also the EC Waste Shipment Regulation has been supported by Art. 175 EC (formerly Art. 130s EC Treaty). Directives concerning incineration plants, landfills, end-of-life vehicles, and waste electrical and electronic equipment are all supported by Art. 175 EC.

A directive must be implemented within a certain deadline by the Member States. Each country must issue a law or ordinance in accordance with its own legal system. EU regulations are applicable directly, i.e., they do not need to be adopted by the national parliaments or ministries. EC regulations are adopted for subject areas such as the transboundary shipment of waste (EC Waste Shipment Regulation).

5.3.9.1. Directives, regulations and other EU legislation

The following EU directives and regulations provide the basis for European waste management. They are supplemented by the other legislation relating to specific organisational, product-specific, waste-specific and plant-specific measures discussed in the other chapters.

Directive 2008/98/EC on waste and repealing certain Directives


- five-step versus three-step waste hierarchy
- focus on waste prevention (waste prevention programme that is mandatory for Member States and Commission mandate in waste prevention)
- changes to the definitions (esp. recovery and disposal)
- clarification of end-of-waste status (early termination of the end-of-waste status)
- clarification of by-products – to distinguish by-products from waste
- extension of the waste producer’s responsibility
- re-use, recycling and recovery targets for waste from households and similar waste as well as construction and demolition wastes


This list includes waste and determines which waste is hazardous waste; it does not represent an exhaustive list, however. The use of the European List is required especially for the waste shipment process.

The use of national lists is generally compatible with the objectives and principles of Community waste management law. When it comes to determining whether waste is hazardous or not, the European Waste List shall be authoritative.
Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture, as amended by Regulation (EC) No 219/2009

The Directive lays down limit values for heavy metal concentrations in soils onto which sewage sludge will be applied and for sewage sludge to be used in agriculture.

Directive 96/59/EC on the disposal of polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs) as last amended by Regulation (EC) No 596/2009

The Directive imposes inventory and labelling obligations while prohibiting the filling of transformers with PCB; moreover, it imposes the obligation to decontaminate transformers. It replaces Directive 76/403/EEC, which merely specified duties of care, in particular the duty of safe disposal, and proved to be insufficient.


Plan and principles for decontamination and/or disposal of PCB-containing devices pursuant to Art. 11 of Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and terphenyls

By virtue of the Austrian Ordinance on the Ban of Halogenated Substances, Federal Law Gazette No 210/1993 (Halogen Ordinance) and the Waste Management Act of 2002 (Waste Management Act of 2002), Federal Law Gazette I No 102/2002, the Austrian legal system has an inherent plan for the decontamination and disposal of PCB-containing devices. This plan will be presented in a systematic manner below.

- Since 24 March 1993, no devices that contain PCB may be placed on the market.
- The following has been prohibited since 24 March 1993:
  - to manufacture, place on the market or use PCBs or substances and preparations containing PCBs (sec. 1 of the Halogen Ordinance),
  - to manufacture or place on the market finished products containing such substances, (sec. 2 of the Halogen Ordinance),
  - to use of hydraulic installations containing hydraulic fluids with more than 30 ppm of PCB, (sec. 3 of the Halogen Ordinance).

Any PCB-containing devices that were already on the market on 24 March 1993 (with the exception of hydraulic systems with more than 30 ppm PCB in their hydraulic fluid, the use of which has been prohibited altogether since 1993) are subject to a labelling obligation and must be notified to the Federal Minister of Agriculture, Forestry, Environment and Water Management as follows:

- Electrical equipment with a content of more than 1 litre of liquid or groups of electrical equipment that are spatially connected with a content of more than 2 litres of liquid and an obvious PCB concentration of more than 30 ppm were required to be labelled pursuant to sec. 6 (1) and (2) of the Halogen Ordinance and reported by 24 March 1994 to the Federal Minister of Agriculture, Forestry, Environment and Water Management.
- Likewise, electrical equipment containing more than 1 litre of liquid had to be analysed when they were commissioned, and no later than 31 December 1996, if they were suspected of being polluted with PCB; and if the content was determined to be above 30 ppm PCB, this equipment had to be labelled and notified to the Federal Minister of Agriculture and Forestry, Environment and Water Management by no later than 31 December 1996.

At the Federal Ministry of Agriculture, Forestry, Environment and Water Management (formerly the Federal Ministry of the Environment, Youth, and Family), the current status of all the notified devices subject to this obligation has been on record since 31 December 1996.

In compliance with sec. 8 (1) through (4) of the Halogen Ordinance, a phased plan for the gradual implementation of a ban on the use of any labelled equipment has been in place since 24 March 1993:

- The use of equipment subject to labelling requirements – with the exception of transformers – with more than one litre of liquid was permitted up to the time the equipment was taken out of service and until 31 December 1996 at the latest.

- The use of transformers subject to labelling requirements with a PCB concentration greater than 500 ppm was permitted until they were taken out of service and until 31 December 1999 at the latest.

- The use of PCB-contaminated transformers with a concentration of less than 500 ppm is permitted until they are taken out of service.

Pursuant to sec. 16 (2) (2) of the Waste Management Act of 2002, PCB-containing waste must
be given to an authorised waste collector or processor without undue delay. The waste processor may not keep the waste for disposal in temporary storage for more than one year pursuant to sec. 2 (7) (4) of the Waste Management Act of 2002 (formerly sec. 2 (11) (2) of the Waste Management Act).

According to the phased plan for taking such equipment out of service, this means that all PCBs and all PCB-containing equipment subject to the inventory obligations under Directive 96/59/EC on the disposal of polychlorinated biphenyls and terphenyls must be decontaminated or disposed of.

The following principles must be observed when disposing of PCBs:

1. the possibility of releasing PCBs (and PCTs) and
2. the risk of the formation of polyhalogenated dibenzodioxins and dibenzofurans (PCDD/PCDF) through thermal influences (particularly at temperatures above 180 °C).

As a result of these potential risks, the safe disposal of PCB-containing electrical equipment is to be seen as a primary objective and any use will only be permitted if PCBs or PCDD/PCDF contamination of the environment can be excluded. Accordingly, PCB-containing oils are primarily disposed of thermally. In so doing, a minimum requirement is for the incineration plant to apply incineration gases at a temperature greater than 1,200 °C over a period of at least 2 seconds (cf. the recommendations of the Technical Working Group of the Basel Convention on the treatment/disposal of PCB-containing waste; Basel Convention Series/SBC No 94/005; Geneva, 1994).

The Waste Management Act of 2002 (sec. 16 (2)) thus provides for the obligation that PCB-containing waste (if the total content exceeds 30 ppm) be disposed of thermally. Alternative procedures are permitted if they meet the same environmental protection specifications as incineration and the state of the art is complied with.

Moreover, under the Waste Management Act of 2002, the separating out of other substances for the purpose of re-use is not permitted. If the PCB-containing devices are components of other equipment, they should be removed and collected separately, if this can be done at a reasonable expense (sec. 16 (2) Waste Management Act of 2002).

The required treatment of PCB-containing electrical equipment and other PCB-containing waste has been specified in sections 25 ff of the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004. According to this Ordinance, alternative methods are possible, especially for oils containing low PCB levels: dehalogenation with liquid alkali metals (DEGUSSA process and comparable processes) and catalytic high-pressure hydration/dehalogenation (VEBA process and similar processes). In these cases, it is necessary to ensure that PCBs are destroyed to an appropriate extent.

For solid electrical equipment (transformers, condensers), disposal in underground landfills or through thermal treatment are currently the disposal options available. A possible pre-treatment for this type of disposal (drainage, etc.) can only be carried out if the following aspects are taken into account:

- When draining PCB oils out of electrical equipment, it must be ensured that no PCBs find their way into the environment. In particular, when executing this kind of work, it must be ensured that any spilled PCB oils are caught in suitable oil- and solvent-tight catchment wells. Drainage of PCBs „on site“ is only permitted when necessary for technical reasons. To the extent possible, PCB-containing electrical equipment (condensers and transformers) are to be prepared for further treatment in suitable transfer stations.

- During treatment at transfer stations, all the work is to be performed in a separate, isolated zone. With regard to the exhaust air from the black area, suitable measures are to be taken (e.g. charcoal filter or equivalent) to ensure that there is no release of PCBs into the environment. The floor of the black area must be executed as a catchment well and be oil- and solvent-resistant.

- Employees must be protected against PCB contamination by wearing appropriate protective clothing.

- Suitable measures must be taken (airlock, etc.) to ensure that no PCBs are carried out of the black area.

If electrical equipment is to undergo recovery (to reclaim metal), adequate decontamination is necessary. Since PCBs already tend to form PCDD/PCDF under relatively low thermal stress, thorough decontamination before the actual recovery process is absolutely necessary. It is insufficient to simply rinse electrical equipment containing PCBs with solvents and subsequently treat them using a shredder, as experience gained in the retro-filling of transformers has shown that significant amounts of PCB-containing oils remain
in the coils (transformer winding, transformer sheets, capacitor plates) and in insulating material, which may lead to the formation of dioxins during shredding. Because of the significantly higher toxicity of dioxins, the danger of contamination of the environment exists even with the smallest residual PCB quantities. Prior to recovering metal parts of electrical equipment containing PCBs, it is therefore necessary to completely dismantle (uncoiling copper wires, removing transformer sheets, eliminating oil-soaked insulating paper, etc.) and decontaminate the metal parts. As for the pre-treatment process, all these operations are to be carried out in a suitable plant with a secured black area. As the manual work involved is significantly more extensive, dismantling prior to recovery requires special precautionary measures, in particular with regard to PCB containment (decontamination chamber, exhaust air treatment, etc.).

Material that is contaminated with PCBs, such as paper and wood cores, need to be disposed of through incineration.

As part of the Basel Convention, two new directives were issued for the environmentally sound management (with alternative treatment processes) of POPs or PCBs:

- General Technical Guidelines for the Environmentally Sound Management of Waste Consisting of, Containing or Contaminated with Persistent Organic Pollutants (POPs) (SBC No 2005/1)
- Technical Guidelines for the Environmentally Sound Management of Waste Consisting of, Containing or Contaminated with Polychlorinated Biphenyls (PCBs), Polychlorinated Terphenyls (PCTs) or Polybrominated Biphenyls (PBBs) (SBC Nr 2005/2)

The following should also be mentioned:

- Directive 91/692/EEC standardizing and rationalizing reports on the implementation of certain Directives relating to the environment as last amended by Regulation (EC) No 1882/2003

The IPPC Directive (Integrated Pollution Prevention and Control) is applicable to certain treatment facilities as a „framework directive“. It contains the following essential components:

- Provision of an explicit and comprehensive basis for the integrated approach. The holistic assessment that takes into account interactions, relocations and synergy effects is intended to assess the full range of air, water and soil pollution, and determine its environmental impact.
- Public participation in the authorisation procedure.
- Definition of emission limits based on the Best Available Techniques (BAT)/state-of-the-art.
- Regular adjustments to the state of the art as a requirement for operators.
- Exchange of information on the available technologies to ensure an integrated approach.

**Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)**


Through this Directive, further waste treatment methods as subject to the IPPC obligation. In addition, the BAT conclusions will become more binding in nature and the rules concerning inspections more stringent.


This EU Regulation came into force on 28 April 2011, will be applicable as of 9 October 2011 and uniformly regulates the end of the waste status for iron, steel and aluminium.

**Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II), amended by Regulation (EC) No 1882/2003 adapting to Council Decision 1999/468/EC the provisions relating to committees which assist the Commission in the exercise of its implementing powers laid down in instruments subject to the procedure referred to in Articles 251 of the EC Treaty as last amended by Regulation (EC) No 1137/2008.**

The „SEVESO-II Directive“, which was issued subsequent to the first „SEVESO“ Directive of 1982, aims to protect serious accidents involving hazard-
ous substances and control the consequences of such accidents for humans and the environment in order to ensure a high level of protection throughout the whole Community.

The Directive is applicable to all enterprises at which specific quantities of hazardous substances can be found or an accident could occur, provided they contain the amounts specified in the Annex or more.

In particular, the Directive contains requirements related to security management systems, contingency plans, regional planning, duties to inform, inspection provisions and public disclosure.

Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment as last amended by Directive 2009/31/EC

The EIA Directive provides for a comprehensive, integrated assessment of the possible environmental impact of any given project on humans, flora, fauna, soil, water, air, climate and countryside, material goods and cultural heritage, as well as possible interactions between media, with broad public participation before a decision is made regarding the application for authorisation.

The scope of this Directive also includes large waste treatment facilities.

Directive 2000/53/EC on end-of-life vehicles as last amended by Decision 2008/33/EC


Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC


Directive 78/176/EEC on waste from the titanium dioxide industry as last amended by Directive 91/692/EEC standardising and rationalising reports on the implementation of certain environmental protection Directives

This Directive has no relevance to Austria, since Austria does not have any titanium dioxide.


This Waste Statistics Regulation requires that statistics on waste generation and waste disposal be compiled and reported. The statistics must be produced every second year. The first data reference year is 2004. The data may be collected through surveys, administrative and other sources, statistical estimates based on samples or expert appraisers operating in the waste management sector, or by any combination thereof.

The data on waste accumulation should be produced separately for each economical activity (based on their NACE code) and waste categories specified by the Regulation. The data on waste recovery and disposal should be produced by type of operation for each recovery and disposal plant that falls under the designated economic activity by NACE code and in the waste categories specified by the Regulation. This does not include recovery within the business enterprise.
Decision No 1600/2002/EC laying down the Sixth Community Environment Action Programme of the European Community

The Environment Action Programme determines the programme for Community actions over the next 10 years. The period of the Sixth EAP commenced on 22 July 2002.

The Sixth Environment Action Programme provides for the development of “thematic strategies” in seven environmental areas:

- protection of the soil
- protection and conservation of the marine environment
- use of pesticides with a focus on sustainability
- air pollution (CAFE – Clean Air For Europe)
- urban environment
- waste prevention and recycling
- sustainable use and management of resources

This programme has already been presented by the Commission.

A thematic strategy for waste prevention and recycling

In accordance with the Sixth Environment Action Programme, the European Commission presented the Waste Prevention and Recycling Strategy along with the Resource Strategy in December 2005. At the same time, a proposal for revising the Waste Framework Directive was submitted as part of this strategy.

The objective of the Waste Prevention Strategy is to prevent adverse effects on the environment caused by the use of resources and to turn the EU into a recycling society.


In the third reading, the European Parliament and European Council agreed on a Directive on the management of waste from extractive industries. The Directive was adopted by the Council and published on 11 April 2006 in the Official Journal under number 2006/21/EC. The Directive aims to establish minimum requirements for the management of waste from mineral-extracting industries. With this Directive, a special law was created for mining waste, by which this specific waste is no longer subject to the Waste Framework Directive.

In reliance on the Landfill Ordinance, the Directive contains, in particular, provisions on the construction and operation of waste facilities, including the permit procedure and closure of such facilities, as well as provisions on waste management plans for waste disposal plants. Moreover, it contains provisions on the security of such facilities, on the financial guarantee obligations, and on the compiling of an inventory in closed waste facilities.

Regulation (EC) No 1102/2008 on the banning of exports of metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury

This Regulation imposes an export ban on mercury and disposal requirements for specific mercury compounds. Moreover, this Regulation contains provisions for the storage and disposal of metallic mercury that diverge from those of the Landfill Directive and the Landfill Decision.


By virtue of this Directive, carbon dioxide, which is captured and transported for the purpose of geological storage and geologically stored in acc. with the Directive, is excluded from the scope of the Waste Framework Directive, Directive 2006/12/EC.

5.3.9.2. EU Commission proposals


5.3.10. Ordinances based on the 1996 Chemicals Act

Based on sec. 14 of the Chemicals Act, Federal Law Gazette No 326/1987, the ordinances set forth below were adopted. The legal basis for these ordinances is the 1996 Chemicals Act, Federal Law
Gazette No 53/1997 (hereinafter referred to as sec. 17 Chemicals Act of 1996). They have remained in full force and effect since Austria’s accession to the EU. These ordinances have also improved the situation with respect to qualitative waste prevention.

**Ordinance on the Ban of Fully Halogenated Chlorofluorocarbons as a Propellant in Pressurised Aerosol Dispensers, Federal Law Gazette No 55/1989**

On 28 February 1990, a ban was imposed on the distribution of pressurised aerosol dispensers containing fully halogenated CFCs as a propellant. This Ordinance aims to bring about qualitative waste prevention. As a result, more multi-packs with a pump or atomisation mechanism were placed on the market, which facilitate recovery in terms of the technical processes involved.

**Formaldehyde Ordinance, Federal Law Gazette No 194/1990**

With a view to ensuring qualitative waste prevention, this Ordinance, which entered into force on 1 March 1990, eliminated formaldehyde, a dangerous chemical substance, from wood materials and products derived therefrom as well as detergents, cleaning products and care products.

**Ordinance Restricting and Prohibiting the Use, Production and Placing on the Market of Fully Halogenated Chlorofluorocarbons, Federal Law Gazette No 301/1990**

The provisions most relevant to waste management are the ban on the use of fully halogenated chlorofluorocarbons as a heat transfer medium in large equipment from 1 January 1992 on and in small equipment starting on 1 January 1994, as well as the ban on their use in the production of cellular materials from 1 January 1993 onwards.

Among other things, this Ordinance simplifies the disposal of waste refrigerators since CFCs were formerly used as both a heat transfer medium and in insulation material.

**Ordinance Banning Certain Partially Halogenated Chlorofluorohydrocarbons (HCFC Ordinance), Federal Law Gazette No 750/1995**

This Ordinance regulates the placement on the market and use of certain partially hydrogenated chlorofluorohydrocarbons and certain hydrobromofluorocarbons as well as methyl bromide. The placement on the market and use of methyl bromide and HCFC and HBFCs is prohibited, in particular, and the exceptions are specified exactly. These substances are used chiefly as solvents, to manufacture foams and coolants, and they have a harmful effect on the ozone layer.

**HFKW-FKW-SF₆ Ordinance („Industrial Gas Ordinance“), Federal Law Gazette II No 447/2002**

This Ordinance regulates the placement on the market and use of partially fluorinated and fully fluorinated hydrocarbons as well as sulphur hexafluoride (SF₆) in equipment, plants and products. All of these substances exhibit a high global-warming potential.

This Ordinance bans the manufacture, placement on the market and use of brominated fully halogenated hydrocarbons. Halogenated hydrocarbons are used mainly in fire extinguishers and fire-fighting systems. They contribute significantly to the depletion of the ozone layer.


For the purposes of qualitative waste prevention and the protection of organisms, the manufacture and use of certain substances and preparations as pesticide is prohibited.

Ban on polychlorinated biphenyls, terphenyls, naphthalenes and diphenylmethanes, Federal Law Gazette No 210/1993

The ban on polychlorinated biphenyls (PCBs) applies to insulating oils in capacitors and transformers, to hydraulic fluids and numerous other applications. In particular, the labelling requirements applying to electrical equipment and the mandatory determination of the PCB content of insulating oils facilitate the identification of potential sources of danger. Even in small amounts PCBs are dangerous since they pose a hazard to human health and the environment and, furthermore, lead to the formation of chlorinated dioxins in uncontrolled incineration processes.

Brominated biphenyls have also been banned (use as flame retardants in plastics). Therefore, the Ordinance also has an impact on waste quality in this area.


This Ordinance imposes a general ban on benzene and chlorinated hydrocarbons in paints, lacquers and varnishes (wood protecting agents) and restrictions on the use of organic solvents in paints, lacquers, varnishes and medicinal products. Due to the mandatory replacement of these solvents by water, alcohol, etc., this Ordinance not only results in qualitative waste prevention but also in a reduction of waste quantities by encouraging a changeover to alternative low-waste, non-polluting technologies.

Ordinance on the Establishment of a Halon Bank (Halon BankV), Federal Law Gazette II No 77/2000

This Ordinance aims to define applications in which halons may still be used after 1 January 2000 („critical uses“), ensuring that the use of halons is limited to „critical uses“, establishing an inventory of halon stocks existing in Austria on 1 January 2000, ensuring that halons are available from these stocks for „critical uses“ by establishing a national halon bank and controlling and reducing emissions to the environment. These objectives are to be achieved by implementing a special halon management programme (halon bank).


This Ordinance is applicable to substances and preparations that are classified as highly toxic or toxic and imposes specific duties of prevention and care when handling them.

Toxic Substance List –Notification Ordinance, Federal Law Gazette II No 129/1999

Anyone intending to introduce highly toxic or toxic substances into Austria for the first time or place them on the market must notify the Ministry of Agriculture, Forestry, Environment and Water Management of these substances no later than two weeks after they are first placed on the market.

Ordinance Banning and Restricting Partially Fluorinated, Fully Fluorinated Hydrocarbons and Sulphur Hexafluoride (SF₆), Federal Law Gazette II No 447/2002

This Ordinance is intended to help protect the climate, especially through compliance with the Kyoto objectives, which first defined binding targets for industrial nations to control the problem of global warming by reducing emissions of specific substances enumerated in the Kyoto Protocol (greenhouse gases). This Ordinance is intended to reduce the use of industrial gases subject to the Protocol (fluorocarbons, hydro fluorocarbons, SF₆), – to the extent that substitutes or alternative procedures are available – and restrict them to the applications for which they are still necessary in the current state of the art.

Such industrial gases include substances that contribute to global warming by promoting the natural greenhouse effect, along with CO₂, methane, laughing gas, CFCs and halons. This Ordinance regulates the placement on the market and use of partially fluorinated and fully fluorinated hydrocarbons as well as sulphur hexafluoride in equipment, plants and products. The areas regulated by this Ordinance are refrigeration and cooling, foams, use in aerosols and specific solvents, in the electronics industry and electrical
applications, and in certain specific areas (such as sports shoes).


This Ordinance implements the pertinent EC legal guidelines. As umbrella regulation, it also serves as a compilation of the prohibition ordinances issued on the basis of sec. 14 of the Chemicals Act of 1987. Among other things, it regulates asbestos, benzene, CMR substances, specific chlorinated hydrocarbons, pentachlorophenols, antifouling, azo dyes, creosote, nonylphenol, arsenic compounds, mercury compounds, and cement (containing soluble chromium VI).

**Poison Information Ordinance 1999, Federal Law Gazette II No 137/1999**

According to this Ordinance, Environment Agency Austria must be notified of all preparations that are classified as very toxic, toxic or corrosive and are placed on the Austrian market for the first time and available in retail. Furthermore, it obliges practicing physicians in hospitals and occupational physicians to notify any cases of poisoning.


**Directly applicable EC Regulations**

The following directly applicable EC regulations are also relevant to chemicals law:


This Regulation replaces Regulation (EC) No 2037/2000 on substances that deplete the ozone layer and regulates the production, import, export, placing on the market, use, recovery, recycling, reclamamtion and destruction of substances that deplete the ozone layer, on the reporting of information related to those substances and on the import, export, placing on the market and use of products and equipment containing or relying on those substances.

Production, placing on the market and use of controlled substances is generally prohibited.


Council Regulation (EEC) No 2445/92 of 23 July 1992 concerning the export and import of dangerous chemicals created a basis for a common notification and information system for the export of chemicals banned or severely controlled in the Community because of their effects on human health and the environment to third countries. At the same time, it imposes a mandatory obligation to perform the international procedure known as „Prior Informed Consent“ (PIC), which is rooted in the non-binding London Guidelines for the Exchange of Information on Chemicals in International Trade of the United Nations Environmental Programme (UNEP as amended in 1989) as well as in the International Code of Conduct on the Distribution and Use of Pesticides (as amended in 1990) of the Food and Agriculture Organisation (FAO).


5.4. Product- and waste-related measures

5.4.1. Construction and demolition waste
Construction and demolition work produces large amounts of inorganic and organic waste, which should be submitted to environmentally friendly recovery whenever possible. For successful recovery of unavoidable construction and demolition waste, separate collection is necessary. The Ordinance on the Separation of Materials Generated during Construction (Federal Law Gazette No 259/1991) enacted on 1 January 1993 requires that groups of materials (mineral building debris, excavated soil, waste fragments, broken asphalt, waste wood, metal and plastic, as well as construction site waste) must be separated once they exceed certain threshold levels.

The obligation to separate the collection and recovery of construction and demolition waste also helps to achieve the following:

- to recover homogeneous building materials as secondary raw materials and/or backfilling materials
- to reduce the amount of residual materials to be landfilled and thus to reduce the use of landfill volumes
- to minimise costs by reducing the amount of waste to be ultimately landfilled
- to deposit residual materials properly on appropriate landfills with input control
- to conserve natural primary materials (protecting the landscape by removing less material and improving groundwater protection).

Proper preliminary sorting on the construction site ensures higher quality construction material for recycling. Construction site waste, in particular, is increasingly separated from mineral building debris on site at the construction site. An online recycling exchange for construction materials was set up by the Austrian Association for the Recycling of Building Materials to increase the amount of building materials being recycled and it continues to grow. The aim is to provide better information on the supply and demand of construction and demolition waste and processed building materials for recycling.

A prerequisite for manufacturing aggregates from construction and demolition waste, which also lends itself to expedient recovery, is the good quality of the input materials for the recycling plant. Such a quality can only be achieved by identifying pollutants and ensuring a mode of dismantlement that takes into account recovery. The measures that need to be taken to ensure this are described in Chapter 7.14.
5.4.2. End-of-life vehicles


This End-of-life Vehicle Ordinance, which took effect enforced on 6 November 2002, substantially determines the return, re-use and treatment of end-of-life vehicles as well as the detailed legal basis for collection and recovery systems in this sector according to sections 14, 23 and 36 of the Waste Management Act of 2002.

If an end-of-life vehicle needs to be disposed of, the owner can return the vehicle free of charge to a collection facility set up by the manufacturer or importer of the particular brand or to an initial collection centre. Details on the collection facilities for the different brands have been published on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management (www.lebensministerium.at) since December 2002 and can also be provided by the vehicle importers.

Generally, manufacturers and importers are obliged to take back end-of-life vehicles. For this purpose, they are obliged to set up collection points (usually car dealers) that meet the needs of their distribution structure. In addition, the Ordinance defines what are known as initial collection centres. These operations recover and disassemble end-of-life vehicles and require a permit to do so in acc. with sec. 25 of the Waste Management Act of 2002. Initial collection centres are not obliged to take end-of-life vehicles but do so in pursuit of business interests as they generate proceeds from recovery. Collection points and manufacturers (importers) are obligated to take end-of-life vehicles and ensure compliance with the rate of recovery.

In view of the waste hierarchy, various options for the recycling of waste pneumatic tyres should be examined, particularly their re-use in the production of new tyres. Any recycling rates could only be imposed as a uniform requirement across the EU. The European Commission requires regular reports on the implementation of the EU Directive and on compliance with the recovery rates. Therefore, operations involved in collecting and recovering vehicles must keep specific records and submit reports to the Federal Ministry of Agriculture, Forestry, Environment and Water Management. This can also be done at www.altauto.at by the party obliged to make a notification. The records and notifications contain data relating to the receipt of end-of-life vehicles (vehicle identification numbers, brand, model, details of the party returning the vehicle, etc.) and to the treatment and/or transfer of the end-of-life vehicles or the waste produced during treatment per calendar year.

The reports for a calendar year need to be made electronically by 31 March and 21 April of the following year. Before a report can be submitted, the reporting party needs to register with the “Electronic Register for Waste Management Master Data” (eRAS). Once successfully registered, current details can be entered on an ongoing basis and stored in the official electronic registration system. They can also be updated or corrected regularly. Once the responsible party releases the data, the report is deemed submitted to the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

As car dealers no longer classify as initial collection centres ever since the law was amended in 2010, they are no longer obliged to submit reports as initial collection centres. In order to ensure the proper treatment of end-of-life vehicles that are returned to car dealers, new requirements have been imposed on car dealers. End-of-life vehicles must be accepted free of charge and car dealers are obliged to issue a certificate of destruction on acceptance. They must then ensure that the end-of-life vehicles they accept are passed on to a shredder operation for treatment.
Collection and recovery systems for end-of-life vehicles

The manufacturers and importers, as well as initial collection centres following the amendment of the law in 2010, can use a collection and recovery system to fulfil their collection and recovery obligations (and also their recording and notification obligations).

Approved collection and recovery system pursuant to sec. 29 of the Waste Management Act of 2002 in conjunction with sec. 6 of the End-of-life Vehicle Ordinance:

<table>
<thead>
<tr>
<th>SYSTEM OPERATOR</th>
<th>ADDRESS</th>
<th>VEHICLES</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ÖCAR Automobilrecycling GmbH</td>
<td>Lindengasse 43/19 1071 Vienna</td>
<td>Daihatsu, Ferrari, Honda, Hyundai, Lotus, Maserati, MG, Mitsubishi, Rover</td>
<td>Collection and recovery of end-of-life vehicles of the specified brands and classes M1 and N1 in acc. with the Motor Vehicle Act (KFG) and three-wheeled motor vehicles but no motorcycles</td>
</tr>
<tr>
<td></td>
<td>Tel.: 01/253 6006-2440 Fax: 01/253 6006-2444 mailto: <a href="mailto:office@oecar.at">office@oecar.at</a> <a href="http://www.oecar.at">http://www.oecar.at</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With regard to the other brands, the manufacturers are each responsible for their own brand.

Achieved recovery rate in 2008 in acc. with the report submitted to the EU Commission (in kg)

<table>
<thead>
<tr>
<th></th>
<th>Re-use</th>
<th>Recycling</th>
<th>Energy recovery</th>
<th>Total recovery</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries</td>
<td>740,147.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquids (not including fuel)</td>
<td>321,893.47</td>
<td>377,729.08</td>
<td>699,622.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil filters</td>
<td>19,193.23</td>
<td>24.25</td>
<td>19,217.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other materials occurring during pollutant disposal (not including fuels)</td>
<td>407,530.71</td>
<td>407,530.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalysts</td>
<td>2,413,462.35</td>
<td>2,140,980.88</td>
<td>2,140,980.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal components</td>
<td>1,276,346.21</td>
<td>849,522.47</td>
<td>2,125,868.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyres</td>
<td>37,023.14</td>
<td>37,023.14</td>
<td>358.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>211,159.53</td>
<td></td>
<td>211,159.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other materials occurring during dismantlement</td>
<td>13,399.98</td>
<td>1,712.23</td>
<td>15,112.21</td>
<td>113.58</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2,413,462.35</td>
<td>5,167,674.80</td>
<td>1,228,988.02</td>
<td>6,396,662.82</td>
<td>1,534.42</td>
</tr>
</tbody>
</table>

Recycling Energy recovery Total recovery Disposal

| Ferrous scrap (steel) | 30,945,500.01 | 30,945,500.01 |          |          |
| Non-ferrous materials (Al, Cu, Zn, Pb, … ) | 2,158,617.06 | 2,158,617.06 |          |          |
| Light fraction from shredding | 1,888,437.38 | 3,633,786.92 | 5,522,224.29 | 1,763,522.16 |
| Other (heavy fraction from shredding) | 1,094,848.04 | 1,650,515.59 | 2,745,363.63 | 254,766.19 |
| Total                 | 36,087,402.49 | 5,284,302.50 | 41,371,704.99 | 2,018,288.36 |

Re-use Total recycling Total recovery Total recovery and recycling Total re-use and recovery

| 2,413,462.35 | 41,255,077.29 | 47,768,367.81 | 43,668,539.64 | 50,181,830.16 |

Total number of end-of-life vehicles | 63,975 |          | 83.7% | 96.1% |

Total vehicle weight | 52,201,652.94 |
5.4.3. Waste electrical and electronic equipment

The electrical and electronic sector is characterised by rapid product changes. Technical innovation and market expansion have led to a steady rise in the rate of goods being replaced. The number of uses is growing and there is scarcely an area in modern life where electrical and electronic equipment are not used. This development has led to a marked increase in electrical and electronic equipment.

Electrical and electronic equipment is made up of a complex range of materials and components and is distinguished from the flow of municipal waste in the following respect:

- The rapid growth in electrical and electronic equipment is considerable. The annual growth rate in electrical and electronic equipment is estimated to be around 3 – 5%. This means that every five years sees an increase of between 16 – 28% in electrical and electronic waste and this figure doubles every twelve years.

- If not properly pre-treated, hazardous substances in electrical and electronic equipment causes significant environmental problems during disposal. Without prior treatment, a large share of the hazardous substances in municipal waste can be traced back to electrical and electronic equipment.

- The environmental pollution (“ecological rucksack”) caused when manufacturing electrical and electronic equipment is far greater than in the production of other materials that make up the other sub-streams of municipal waste. Improved methods of recycling electrical and electronic equipment therefore contribute significantly to conserving resources, especially energy.

Electrical or electronic equipment requires electricity to run. Basic components of electrical or electronic equipment are printed/soldered circuit boards, cables, connectors and wires, plastics containing fire retardants, mercury switches and interrupters, media for display units such as cathode ray tubes and liquid crystal displays, accumulators and batteries, data storage media, light emitting units, condensers, resistors and relays, sensors and plug-in connectors. The environmentally harmful substances in these components are heavy metals such as mercury, lead, cadmium and chromium, halogen substances such as chlorofluorocarbons (CFCs), PCBs, PVC and brominated flame retardants as well as asbestos and arsenic.

State-of-the-art treatment methods

The treatment of waste equipment is troublesome and comparatively expensive due to its complexity. Procedures that do not comply with the state of the art, particularly the disposal of waste equipment in landfills, are prohibited. The most crucial requirement in the treatment of waste equipment is the removal of hazardous substances. Contaminated components must be removed prior to further treatment of the equipment and handled separately as hazardous waste. The following standards are available to assure quality in the processing of electrical and electronic equipment: ÖNORM S 2106 “Recycling and disposal of electrical and electronic equipment” and ÖNORM S 2107 “Requirements for electrical and electronic equipment collection and treatment facilities”.

The “Guidelines for the collection and treatment of electrical and electronic equipment” issued by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the treatment principles laid out for electrical and electronic equipment in the 2001 Federal Waste Management Plan have been summarised in the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004 as amended. The Ordinance provides requirements for the collection, storage, transport and treatment of waste electrical and electronic equipment. The clear specifications represent an improvement on legal certainty, on the one hand, and simplify control procedures by the competent authorities, on the other.

The Federal Ministry of Agricultural, Forestry, Environment and Water Management has published
“Guidelines for the treatment of electrical and electronic equipment” to facilitate compliance with the law and provide hands-on help in identifying harmful substances or in the removal of hazardous components.

**EU Directives**


The main points in the Directives are:

- As a matter of principle, all waste electrical and electronic equipment is subject to the Directive. Exemptions apply for individual product groups that are almost exclusively used commercially, e.g. vending machines for drinks, which aim to prevent that such machines are subject to the same collection and financing schemes as equipment from private households.
- Free return of waste equipment from private households.
- When selling new equipment, the obligation for retailers to take back waste electrical and electronic equipment of the same type (function) free of charge (1:1 rule).
- The manufacturers or importers, in co-operation with the most recent owners, are responsible for the collection of equipment that does not originate from private households.
- The aim was to collect 4 kg per inhabitant and year by the end of 2006.
- Manufacturers and importers are responsible for the environmentally friendly recovery and treatment of the collected waste equipment. Environmentally harmful components must undergo special treatment. Specific recovery rates needed to be achieved by the end of 2006.
- It is for the manufacturers or importers (“producer responsibility”) to pay for the transport of household waste equipment from collection points and their recovery and environmentally friendly treatment.
- Generally, manufacturers are responsible for the costs of equipment from commerce or industry; agreements can be made regarding the financing of recovery and treatment.
- These points are supplemented by requirements regarding the labelling of electrical and electronic equipment as well as certain obligations to provide information and submit reports.

- A special provision was envisaged for the costs of waste equipment from e-commerce.
- Directive 2002/95/EC, which was adopted at the same time, provides for a ban on specific environmentally harmful substances (e.g. heavy metals) both in the products and during the placement on the market of electrical and electronic equipment.

In 2009, the European Commission presented proposals for new versions of these two Directives. The new version of the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment will be published in the Official Journal of the European Union in 2011. The most important aspects of the new versions concern the scope and the exemptions, the procedure to extend banned substances and the relationship to the REACH Regulation as well as the establishment of market surveillance instruments and CE labelling requirements. The period granted for transposition into national law is 18 months.

The negotiations on the new version of the Directive on waste electrical and electronic equipment have yet to be concluded; a proposal by the Council of Environmental Ministers is currently on the table. Essential changes relate to scope, the definition of the term “producer”, mandatory collection and recovery targets, specifications for the national register and the shipment of waste equipment.

**The implementation of the EU Directive in Austria**

Key implementation provisions were included in the changes to the Waste Management Act in 2004.

A key element of the Directive, the treatment principles for waste electrical and electronic equipment (especially the removal of harmful substances) has been transposed into the Waste Treatment Obligations Ordinance.

A system with a division of responsibilities between municipal collection and producer was sought for reasons of practicability, controllability, cost reflectiveness and cost efficiency, as well as fairness of the system. In so doing, care was taken to ensure a tandem of two flows – a goods flow and a financial flow.

The Waste Electrical and Electronic Equipment Ordinance, Federal Law Gazette II No 121/2005 as amended came into effect on 30 April 2005. The main points of the Ordinance are:
Free return option for waste equipment from private household at municipal collection points and at retail stores (with a sales area greater than 150m²) if new equipment of the same type is bought at the same time.

The collection target of at least 4 kg per person and year.

Manufacturers and importers are responsible for the environmentally friendly recovery and treatment of the collected waste equipment. (“Producer responsibility”). Environmentally harmful components must undergo special treatment. Ambitious recovery rates are specified for waste equipment.

What are known as collection and recovery systems provide services to the public under the control and coordination of a coordination centre of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Registration and notification obligations have also been imposed.

A high priority is being given to the re-use of waste equipment. The documented transfer of functioning equipment to repair shops and consumers who wish to make further use of the equipment is to be strongly encouraged.

A special provision was planned for the financing of waste equipment from e-commerce and internet sales.

It is the responsibility of manufacturers and importers to provide a comprehensive public information service for households and businesses regarding the collection and recovery systems.

A ban on specific environmentally harmful substances (e.g. lead, mercury, cadmium and specific fire retardants) in the production and placement on the market of electrical and electronic equipment.

Elektroaltgeräte Koordinierungsstelle Austria GmbH was appointed coordination point by administrative order.

Its duties include, in particular, coordinating the pick-up of waste equipment from the collection points using the collection and recovery systems, public relations work, payment of lump-sum allowances for infrastructure costs as well as reporting to the Federal Ministry of Agriculture, Forestry, Environment and Water Management and to the European Commission.

The implementation of the EU Directives tailored to Austria’s needs has resulted in a broadly accepted practical system that largely works very well. Comparisons with other implementation models within the European Union have shown that the Austrian system was implemented in a manner that is both consumer friendly and inexpensive for manufacturers subject to the relevant obligations.

Since the enactment of the Waste Electrical or Electronic Equipment Ordinance in August 2005 until the end of 2010, some 350,000 tonnes of waste appliances have been collected and forwarded to treatment plants in the context of Austrian household collection alone. This has made it possible to put back into the economic cycle a total of some 119,000 t of iron, 38,500 t of copper and 17,500 t of aluminium. The minimum collection target of 4 kg is usually far exceeded in Austria; in 2009, about 9 kg per inhabitant were collected.

5.4.4. Batteries and accumulators

Directive 2006/66/EC on batteries and accumulators as well as waste batteries and accumulators and repealing Directive 91/157/EEC (hereinafter referred to as Batteries Directive) was published on 26 September 2006 in the Official journal of the European Communities. The focus is on the collection, treatment and related financing of waste batteries and accumulators.

The main points of the Directive are:

- Restrictions on the use of hazardous substances in batteries or accumulators (hereinafter referred to as “batteries” for short).
- All batteries need to be collected and recycled at the end of their service life. Disposal in incineration plants or landfills is no longer an option. Under certain circumstances, exemptions are granted.
Batteries are divided into the following categories: batteries for appliances, vehicle batteries and industrial batteries. There are specific requirements for the collection of each category. Retailers, in particular, are obliged to take back waste batteries free of charge.

- The appliances need to be designed in such a manner as to allow the removal of batteries and the battery capacity must be indicated on the appliance itself or on the label.
- The collection rate targeted for batteries from appliances are at least 25% and 45% of the average sale over the previous three years; these targets must be achieved in 2012 and 2016 respectively.
- The batteries collected must undergo material recovery. Recycling efficiencies have been defined: 50% for batteries containing neither cadmium nor lead and 75% and 65% for batteries containing cadmium and lead.
- The producers are responsible for financing the waste management of batteries.
- The previous Directive (91/157/EEC) will be replaced.

These points are also supplemented by requirements regarding the labelling of batteries as well as certain obligations to provide information and submit reports.

The above-referenced Directives were implemented in three Austrian laws:
- The Waste Management Act of 2002 defines the “producer” term, the obligation to participate in a collection and recovery system and the legal basis for the collection and transfer of specific tasks to a coordination point. Moreover, it extends the control powers of the Federal Minister in sec. 75.
- The Batteries Ordinance implements the Directive’s remaining provisions.

In transposing the Directive, the Ordinance of the Federal Minister of Agriculture, Forestry, Environment and Water Management on Waste Prevention, Collection and Treatment of Waste Batteries and Waste Accumulators (Batteries Ordinance), Federal Law Gazette II No 159/2008, imposed the following requirements for the manufacture of batteries:
- Since 26 September 2008, it has been prohibited for manufacturers and importers deemed equivalent to manufacturers to place batteries on the market at any commercial level in the European Union if they contain more than 0.0005% by volume of mercury or more than 0.002% by volume of cadmium, including batteries built into appliances.
- The ban on mercury does not apply to button cell batteries with a mercury content of 2% by weight maximum.
- The ban on cadmium is not valid for appliance batteries and accumulators designed to be used in emergency and alarm systems, including emergency lighting, medical devices and cordless power tools.
- The appliances need to be designed in such a manner as to allow the removal of batteries and the battery capacity must be indicated on the appliance itself or on the label.

Waste batteries (appliance batteries and car batteries) will continue to be collected via collection points of the municipalities and through retailers, which are likewise required to take them back free of charge. Retailers and municipalities have the option of disposing of waste batteries at the collection points of the manufacturers. Manufacturers are required to register in the electronic Register (eRAS) and set up at least one collection point per political district at which waste batteries from final distributors can be deposited. The waste batteries must be accepted free of charge at the collection points. Manufacturers (collection and recovery systems) must finance the transport from the collection points and processing. Batteries must be marked with the symbol depicting a “crossed-out rubbish bin” and with the chemical symbol(s) of any heavy metals contained in them.

Manufacturer of batteries for appliances and vehicles must satisfy their obligations (transport, setting up collection points for batteries taken back by retailers, treatment of waste batteries, reporting obligations) by participating in a collection and recovery system. Manufacturers (collection and recovery systems) are subject to a proportional pick-up obligation for all waste batteries collected at the collection points. All waste batteries collected must be forwarded to an approved treatment plant by the manufacturer (collection and recovery systems). The waste batteries must be treated in accordance with the guidelines of the Waste Treatment Obligations Ordinance; it is necessary to ensure and document compliance with the specified recovery efficiency levels by choosing a suitable recoverer. Collection and recovery systems must sign a contract with the coordination point. The subject matter of this agreement is the pick-up of the waste...
to be accepted by collection points (hand-over points), approval of the alternative procedure involving performance with reimbursement of costs, the collection infrastructure, information for the end users and the determination of a board of arbitration, including the financing of the collection infrastructure and information for the final users.

Industrial batteries, i.e. batteries mainly used in industry, but also batteries from electric cars, must be taken back by the manufacturers. The financing of the collection and recovery may be regulated in individual agreements.

5.4.5. Biogenic waste

Waste of biogenic origin comes from various areas (separate collection from households, waste from green areas, catering waste, biogenic waste from commerce and industry, sewage sludges, and the like) and represent a major recovery potential.

**Recovery options available for biogenic waste**

Only biodegradable waste with a low level of harmful substances or undesirables is suitable for material recovery. The are exclusively waste groups 921 through 925 of the Waste Catalogue Ordinance or Austrian standards ÖNORM S 2100 "Waste Catalogue" and ÖNORM S 2201 "Biogenic waste – Quality requirements " (taking into account the quality requirements according to the Compost Ordinance). A basic prerequisite for achieving such quality of recovery is carefully sorted collection.

Recovery options available for biogenic waste:
- aerobic, biological (composting)
- anaerobic, biological in biogas plants (fermentation)
- thermal recovery
- biotechnological production of defined liquid or solid products, e.g. alcohols, organic acids and base materials for biopolymers
- spreading out on the soil (in compliance with the requirements set forth by Provincial soil protection laws and the Water Act, but also in consideration of the targets and principles of the Waste Management Act of 2002)
- a combination of these procedures.

Generally, the mode of treatment is determined by the properties of the biogenic waste (e.g. solid, liquid) and the principle of proximity and likelihood of recovery. Recommendation on biological treatment methods (composting or fermentation) by code can be found in ÖNORM S 2201. Generally, the following treatment methods are recommended:
- solid, richly-structure waste (e.g. biogenic waste from separate collection) are preferably recovered in composting facilities
- solid and viscous biogenic waste (e.g. catering waste) is preferably recovered in biogas facilities
- high-energy biogenic waste (e.g. waste edible oils and fats) can be subjected not only to thermal treatment but also to biotechnological recovery (e.g. generation of green electricity)
- high-calorific, woody biogenic waste (e.g. rhizomes) are preferably recovered thermally.

The objective is to ensure treatment that produces the lowest possible emissions with optimal energy efficiency and use of the nutrients and hydrocarbon resources contained in the biogenic waste. To achieve this objective, combinations of possible treatment methods are desirable. For example, an anaerobic treatment stage prior to composting makes it possible to use part of the energy content
of the biogenic waste. On the other hand, composting of the fermentation residue sanitisates and humidifies it. The organic substance and nutrients can be returned to the natural cycle and humidification eventually transforms the hydrocarbons into compost (or following their use in the soil). It is also possible, for example, to use sewage sludge or sifting residue with a high calorific value from composting for the recovery of natural energy and heat.

Fermentation residue has a high percentage of easily available (water-soluble) nutrients. During composting, such valuable components are bound into the humus (humidification). They are available but not very water-soluble. That makes compost a highly viscous but long-lasting source of nutrients; in addition, the use of compost decreases the risk of groundwater pollution as compared to direct application.

In relation to the greenhouse gas balance sheet, fermentation (with the fermentation residue used for conversion into electricity, heat recovery and agricultural recovery) results in the highest CO₂ equivalent balance (credit minus emissions) compared to other recovery processes. In composting, GHG emissions resulting from processing emissions and the necessary energy consumption slightly outweigh credits for C-fixation and replacement of commercially available fertilisers. In terms of energy efficiency (ratio of energy produced to the energy content of the waste used), the transformation of biogas into natural gas is most efficient (UBA study: Climate Relevance and Energy Efficiency of Energy and Material Recovery from Biogenic Waste).


This Ordinance sets forth which biodegradable waste products may be collected separately provided they cannot be recovered at home or at business operations (composted). Leftover food may only be collected together with other biogenic waste if it is brought to a suitable recovery plant. Otherwise, leftover food must be disposed of with the residual waste. The scope of separate collection therefore varies regionally. Separate collection of biogenic waste is the most important prerequisite for the good quality of compost. It must be accompanied by intensive educational and public relations efforts. Reference is made to various ordinances based on the Provincial waste management acts providing for the separate collection of biogenic waste.

Ordinance of the Federal Minister of Agriculture, Forestry, Environment and Water Management on Quality Requirements for Compost from Waste (Compost Ordinance, Federal Law Gazette II No 292/2001, entered into force on 1 September 2001)

Biogenic waste offers a great potential for achieving a functional closed-loop system. The Ordinance on the Separate Collection of Biogenic Waste, Federal Law Gazette No 68/1992, bears witness to this. In order to ensure the recovery cycle in this area, it was also important to define the requirements that allow recovery of the waste into products and make these products widely available on the market. High quality compost can be produced from biogenic waste which can then be used as a soil improver or as fertiliser. The Compost Ordinance lays down uniform and binding rules that are applicable across Austria for the production, placing on the market and labelling of compost made from waste. The quality requirements for the end products, as well as the type and origin of the source materials, are of prime importance in this process. Subject to the quality, applications and recommended quantities are defined in keeping with the pollutant content rules. Furthermore, the Ordinance stipulates the measurement method, labelling and inspection of the composts.

5.4.6. Animal by-products


According to the Animal By-Product Regulation, animal by-products are entire bodies of dead animals, parts of animals or products of animal origin not intended for human consumption. These materials are divided into three categories. Category 1 contains animal by-products with the greatest risk factor, e.g. specific risk materials and material suspected of containing TSE. Category 2 contains dead animals but also liquid manure, for instance. Category 3 contains materials such as body parts of slaughtered animals which are not fit for human consumption, blood, hides and skins, hooves.
Catering waste falls under the Animal By-Product Regulation, category 1, if it originates from means of transport operating internationally, is destined for feeding purposes or is destined for processing by pressure sterilisation or for processing using the methods referred to in point (b) of the first subparagraph of Art. 15 or for transformation into biogas or for composting. All other catering waste is classified as belonging to category 3.

The Animal By-Product Regulation provides for restrictions and bans in the use and disposal of animal by-products. The treatment requirements differ depending on the category.

Waste according to the Waste Management Act of 2002
Animal by-products can also be waste. Carcasses of animals that have died other than by being slaughtered, including carcasses killed to eradicate epizootic diseases, and that are disposed of in accordance with Regulation (EC) No 1774/2002 are subject to the Waste Management Act of 2002. In addition, other animal by-products, including processed products that fall under Regulation (EC) No 1774/2002, with the exception of those intended for specific waste treatment plants, such as incineration in an incineration or co-incineration plant, or treatment in a biogas or composting plant are excluded from the Waste Management Act of 2002 (sec. 3 (1) (5) (a) and (b) Waste Management Act of 2002).

Similarly, the collection, storage, transport and treatment of manure, silage, liquid manure and organically compostable material as waste is not necessary if they occur on an agricultural or forestry holding and find an approved use in the immediate vicinity of an agricultural or forestry holding.

Composting and fermenting
Entrepreneurs who produce, transport, handle, store or place on the market, distribute, use or dispose of animal by-products must inform the authorities before taking up their activities. Plants and facilities need a licence to pursue the activities enumerated in Art. 24 of the Animal By-Product Regulation. The same is true of composting or processing in a biogas plant.
Art. 25 of the Animal By-Product Regulation stipulates general health requirements for such activities. Other requirements are found in the annexes to the Animal By-Product Regulation and can also be established through implementation measures.

More detailed provisions on using and placing organic fertilisers and soil improvement products on the market, including fermentation residue from biogas plants and compost, are found in Art. 32 of the Animal By-Product Regulation.

If catering waste is processed in a composting or fermenting plant, then they are subject to the Animal By-Product Regulation. According to Art. 14 (k) of the Animal By-Product Regulation, such material, providing that it falls under category 3, may be processed through high-pressure sterilisation or other methods defined by Article (15) (1) (1) (b) or transformed into biogas. Moreover, Art. 15 defines parameters for transforming animal by-products, including catering waste, into biogas or compost. Pending the enactment of such provisions, the national provisions may be maintained.

According to Art. 21 (4), the collection, transport and disposal of category-3 kitchen waste may be
5. Requirements and Measures

carried out in compliance with the individual national measures under Art. 13 of the Waste Framework Directive (2008/98/EC). Labelling, however, should be regulated by the animal by-product rules.

For the recovery of the various animal by-products which are subdivided into 3 categories, Animal By-Product Regulation (EC) No 1069/2009 defines specific requirements regarding the equipment and operation as well as the end product (fermentation residue) of biogas and compost plants. Generally, the treatment of animal by-products belonging to category 1 in biogas and compost facilities is not permitted.

With the exception of liquid manure, stomach and intestinal contents (separated from stomach and intestine), milk and colostrum (permitted without pre-treatment, provided there is no hazard of spreading serious disease), all animal by-products of category 2 must, before processing in a biogas and composting plant, be steam-pressure sterilized at \( \geq 133 \, ^\circ\text{C}, \geq 3 \, \text{bar}, \) particle size \( < 50 \, \text{mm} \) for at least 20 minutes (after reaching the core temperature of \( 133 \, ^\circ\text{C} \)) in a plant authorized for this purpose. Catering waste and processed former foodstuffs of animal origin whose storage, collection and biological treatment is governed nationally by the Animal Materials Ordinance (Federal Law Gazette II No 141/2010) are exempted from this.

The following applies for the treatment of other animal by-products belonging to category 3:

Thermal pasteurisation must be carried out at 70 \( ^\circ\text{C} \) for 60 minutes with a particle size of \( < 12 \, \text{mm} \) inside a suitable non-bypassable plant.

Alternatively, Regulation (EC) No 208/2006 provides the possibility of system validation for the recognition of other processes as well.

5.4.7. Packaging


The Packaging Directive provided that the following recovery rates must be achieved by no later than the end of 2008:

- at least 60 percent by weight of packaging waste must be recovered or burned in incineration plants with energy recovery
- at least 55 percent and a maximum of 80 percent by weight of packaging waste must be subjected to material recovery

At the same time, material recovery rates have been defined for specific packaging materials which have to be met since the end of 2008:

- 60 percent by weight for glass
- 60 percent by weight for paper and cardboard
- 50 percent by weight for metals
- 22.5 percent by weight for plastics, only the material that can be recovered as plastic is taken into account
- 15 percent by weight for wood

The Directive sets a limit on the concentration of heavy metals in packaging, basic requirements for the composition, re-usability and recoverability of packaging, the establishment of databases for packaging and reporting obligations.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management is a member of the Committee responsible for the Adaptation to Scientific and Technical Progress (Packaging Committee) set up in compliance with Art. 21 of the Directive. Decisions of the Commission have already been adopted by committee procedure.

**Spreading out animal by-products for agricultural purposes**

According to the Animal By-Product Directive, green fodder may not be fed to farmed animals if it originates from land on which organic fertiliser or soil improvers (from animal by-products), with the exception of manure, has been applied, unless the cutting or grazing does not follow until a waiting period of 21 days has passed.

By way of the committee procedure, these requirements, especially the waiting period, may be amended.
on a labelling system for packaging materials
- on a format for the databases
- on the definition of conditions under which heavy metal limit values stipulated in Directive 94/62/EC on packaging and packaging waste do not apply for plastic crates and palettes
- on the definition of conditions under which the heavy metal limit values stipulated in Directive 94/62/EC on packaging and packaging waste do not apply for glass packaging.

Programme for the implementation of Directive 94/62/EU on packaging and packaging waste

In accordance with Art. 14 of Directive 94/62/EC on packaging and packaging waste, a special chapter on packaging and the management of resultant waste, including the measures required by the Directive and waste prevention and re-use programmes, needs to be included in waste management plans. Therefore, the following measures and targets are to be taken and met respectively:
- waste prevention measures
- promotion of re-use
- targets for the recovery of packaging waste
- development of take-back, collection and recovery systems
- maintenance and/or introduction of labelling and identification systems
- maintenance of quality requirements for packaging which have yet to be defined
- setting up databases
- mandatory submission of data on packaging in accordance with Annex III of Directive 94/62/EC (manufactured packaging, imported or exported packaging, packaging use, re-used share, recovered share, etc.)

The measures taken to date in Austria to implement the Directive will be described in the following sections. Austria had achieved all targets through these measures and in some cases even exceeded the targets set.

Further duties (e.g. labelling, databases) are being implemented in accordance with the provisions set forth by the Directive (decisions).


This Ordinance adheres to the basic principles of the existing Packaging Ordinance dating back to 1 October 1993 (Federal Law Gazette No 645/1992), especially with regard to the take-back and recovery obligations for sales, repackaging and transport packaging. Returned packaging is to be recovered or re-used. The material recovery

The annual quantities of packaging waste generated and disposed of in Austria (in tonnes, 2008 data, which needs to be reported to the EU Commission pursuant to the Packaging Directive).

<table>
<thead>
<tr>
<th>Material</th>
<th>Generated packaging waste</th>
<th>Material recovery</th>
<th>Other forms of material recovery</th>
<th>Total quantity of recovered materials</th>
<th>Energy recovery</th>
<th>Other forms of recovery</th>
<th>Incineration in waste incineration plants with energy recovery</th>
<th>Total quantity of recovered and incinerated in waste incineration plants with energy recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLASS</td>
<td>260,842</td>
<td>219,803</td>
<td>0</td>
<td>219,803</td>
<td>0</td>
<td>0</td>
<td>219,803</td>
<td>219,803</td>
</tr>
<tr>
<td>PLASTICS</td>
<td>251,569</td>
<td>87,717</td>
<td>0</td>
<td>87,717</td>
<td>62,981</td>
<td>0</td>
<td>94,062</td>
<td>244,760</td>
</tr>
<tr>
<td>PAPER AND BOARD</td>
<td>503,572</td>
<td>430,164</td>
<td>0</td>
<td>430,164</td>
<td>83</td>
<td>0</td>
<td>58,330</td>
<td>488,577</td>
</tr>
<tr>
<td>METAL</td>
<td>59,566</td>
<td>38,066</td>
<td>0</td>
<td>38,066</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>38,066</td>
</tr>
<tr>
<td>WOOD</td>
<td>64,807</td>
<td>13,756</td>
<td>499</td>
<td>14,215</td>
<td>8,189</td>
<td>0</td>
<td>28,434</td>
<td>50,838</td>
</tr>
<tr>
<td>OTHER</td>
<td>39,778</td>
<td>11,477</td>
<td>0</td>
<td>11,477</td>
<td>10,388</td>
<td>0</td>
<td>16,360</td>
<td>38,225</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,180,134</td>
<td>800,983</td>
<td>459</td>
<td>801,442</td>
<td>81,641</td>
<td>0</td>
<td>197,186</td>
<td>1,080,269</td>
</tr>
</tbody>
</table>
rates for packaging materials must be complied with.
The Packaging Ordinance of 1996 lays down the following:
- definition of primary responsible parties (mainly the packager or the importer), who are bound to fulfill licensing and notification duties (in particular with a view to an improved system of control and penalties)
- principle of major waste generation points
- rules for minor waste producers
- promotion of returnable packaging systems
- requirements for collection and recovery systems (definition of tasks and duties, such as securing recovery, achieving certain collection levels, presentation of cost factors)
- licensing for additional quantities
- packaging requirements.

The amended Act of 2006 primarily transposed the amendments to the Packaging Directive (Revision 2004/12/EC).
In particular, these are:
1. supplementary definitions (definition of packaging, and examples, definition of organic recovery),
2. minimum targets for recovery and recycling
3. evaluation of the export of packaging materials in connection with the recovery rates
4. definition of material recovery targets in relation to total market input.
Moreover, this Amendment resulted in combining the Packaging Ordinance of 1996 and the Packaging Objective Ordinance, particularly by adopting the objectives of the Packaging Objectives Ordinance. The EU package labelling guidelines were also adopted for Austria. Since 2008, the reports required by the Packaging Ordinance of 1996 (“Annexe 3 reports”) have been filed electronically (through the electronic data management system). Moreover, returnable packaging placed on the market has for the first time become reportable; such data may also be reported by special interest groups.
Finally, the conditions imposed on collection and recovery systems were adjusted, particularly by extending the systems’ substantiation and reporting obligations.
A further amendment of the Packaging Ordinance with the following main objectives is scheduled for 2011:
- general conditions for fair competition among collection and recovery systems to open up the market
- compensation to municipalities for packaging waste in residual waste
- environmentally-friendly development of the share of returnables in beverage containers, in consideration of the consumers’ freedom of choice
- promotion of measures to avoid and against littering.

Sustainability agenda
In recent years, a decline in the use of returnable packaging has been noted. The reasons for this trend can be found in the convenience of disposable packaging (low weight, resistant to breaking, dense collection system), consumption away from home, advertising and retail prices. The voluntary obligations assumed by the beverage trade up to now may result in weakening the trend towards disposable beverage packaging. The concept of the sustainability agenda has therefore been further developed. The trend toward increased environmental pollution due to the decline in returnable packaging must be brought into balance or even turned around. This approach basically relies on the following focal points:
- The beverage industry has pledged to take measures to reduce greenhouse gases in the period from 2008 to 2017. These measures are supposed to result in a net reduction in emissions of at least 10% relative to the reference baseline (2007).
- Promoting the recovery of materials from beverage packaging, especially through bottle-to-bottle recycling of PET containers.

The progress in achieving the objectives will be documented in an annual monitoring report.
There is a need for adjustment in order to safeguard the consumers’ freedom of choice, information for consumers and placement of the returnable packaging of the products.

Waste prevention demonstrated on the example of plastic bags
In Austria, between 5,000 and 7,000 tonnes of plastic bags are generated every year, accounting for approx. 0.01% of the total quantity of accumulated waste. Due to the high level of environmental awareness in the population and dense nationwide network of collection points, nearly all the plastic bags are recovered or recycled. Yet there are still more possible measures that could be deployed to boost resource efficiency. The use of shopping bags, shopping baskets, fabric bags or other reusable carrying devices takes top priority in waste prevention.
A 5-point programme has subsequently been developed in order to promote appropriate alternatives using renewable raw materials:

1. cooperation with retail to prevent the use of plastic bags
2. pilot project for the increased use of renewable packaging materials
3. creating awareness to promote waste prevention
4. evaluation of existing rules in other EU countries relating to plastic bags
5. review of the possibility of implementing a labelling requirement for plastic bags by the EU Commission

Audit of 2007 residual waste quantity targets in acc. with the Packaging Ordinance
Due to the change in the general conditions of waste treatment brought about by the Landfill Ordinance (only pre-processed waste can now be stored in the landfills), the Packaging Ordinance specifies only residual quantity objectives for glass and metal packaging starting from 2007. The maximum quantities that can still be deposited in landfills now apply to all types of packaging, however. In contrast, the Packaging Objectives Ordinance that had been in effect up to 2006 specified the residual quantities for other packaging (meaning all packaging except for beverage containers, which were regulated separately) made of glass, plastic, paper/cardboard, metal and composite materials that still could be deposited in landfills.

As shown by an audit ordered by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the maximum quantities stipulated by sec. 10a of the Packaging Ordinance for glass or metal packaging deposited in landfills in 2007 were not complied with only in the case of metal packaging, by about 30%. In the case of glass packaging, the residual quantity objective of no more than 40,000 t was exceeded by at least 6,550 t. Increased efforts in waste glass collection are necessary and Austria Glas Recycling GmbH has already been instructed accordingly.

In the course of the audit, extensive waste analyses were performed (on residual waste, bulky waste and commercial waste). The total quantity of waste deposited in landfills was determined through a nationwide survey. Apart from glass and metal packaging, the paper, plastic and composite material packaging in the residual waste, bulky waste and commercial waste was separated into beverage packaging and other packaging.

The residual quantities of metal and glass packaging specified in the Packaging Ordinance apply to the net packaging quantity actually deposited in landfills in the dry state without any attachments or residual contents. These quantities were determined and analysed, taking into account the treatment phases and determination of weight loss due to drying and cleaning the material. The results show that the level of left-over contents and contaminants per packaging material is between 1% in the case of glass beverage containers and 35% in the case of plastic packaging. The rate of target compliance is measured against the net weight of the packing material.

The quantities of packaging in household waste show the following trend:

![Other packaging in household waste – beverage containers and other packaging (gross)](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sum total of plastic packaging</th>
<th>Sum total of paper packaging</th>
<th>Sum total of metal packaging</th>
<th>Sum total of composite packaging</th>
<th>Sum total of glass packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>10,000</td>
<td>20,000</td>
<td>15,000</td>
<td>10,000</td>
<td>5,000</td>
</tr>
<tr>
<td>2001</td>
<td>15,000</td>
<td>25,000</td>
<td>20,000</td>
<td>15,000</td>
<td>7,500</td>
</tr>
<tr>
<td>2004</td>
<td>20,000</td>
<td>30,000</td>
<td>25,000</td>
<td>20,000</td>
<td>10,000</td>
</tr>
<tr>
<td>2007</td>
<td>25,000</td>
<td>35,000</td>
<td>30,000</td>
<td>25,000</td>
<td>12,500</td>
</tr>
</tbody>
</table>

5.5. Plant-related measures

5.5.1. Biological waste treatment

5.5.1.1. Aerobic treatment (composting)
The Ordinance on Quality Requirements for Compost from Waste (Compost Ordinance, cf. also Chapter 5.4.5 “Biogenic waste”) does not lay out
5. Requirements and Measures
any minimum requirements for technical equipment and the management of composting facilities. The Federal Ministry of Agriculture, Forestry, Environment and Water Management issued “The state of the art in composting — Guideline from the Federal Ministry of Agriculture and Forestry, the Environment and Water Management” (2005) to describe the current state-of-the-art in composting. The Guideline covers the technical and operational requirements for low-emission processes, taking into account the achievement of high end-product quality in all steps of the process. Building on the requirements of the Compost Ordinance, the minimum requirements are set out for individual parts of the production process alongside detailed requirements for emission reduction or general quality control (especially, smell, pathogens, liquid emissions, health): accepting materials – delivery area – material preparation – main rotting – post-rotting – fine preparation – storage. The requirements for emission-reducing or quality-based measures laid particular emphasis on putting the effectiveness and the principle of economic proportionality in relation to the targeted quality improvements. The variety of composting methods in Austria were taken into account and classified by their location, annual capacity and wide range of processed materials. For the purpose of preventing climate-relevant emissions, medium- and large-scale plants will put greater emphasis on dedicated exhaust air process management in future (comparable to plants for mechanical-biological waste treatment). When composting drained digestate, it is recommended to aerobise the digestate as quickly as possible and to provide an enclosed process in the hot rot stage in order reduce the smell to a minimum. Other basis requirements for the technology and operation of composting facilities are included in Rule Sheet 518 “Requirements for the Operation of Composting Plants (2009)” and in ÖNORM S 2205 “Technical Requirements for Composting Plants (2008)”. Alongside the basic requirements to be met in order to establish adequate health conditions for organic waste, Chapter 3 in the Guideline on state-of-the-art composting Health requirements also describes the requirements for biogenic household waste and catering waste from industrial kitchens. For the composting of catering waste and processed former foodstuffs, requirements under veterinary law (e.g. ample clearance to animal husbandry, documented pest extermination) are set forth in the Animal By-Products Ordinance, Federal Law Gazette. II No 141/2010 (Annex IV). With regard to the requirements for catering waste and animal by-products pursuant to the EC Directive for animal by-products (EC Animal By-Product Directive) see also Chapter 5.4.6. Animal by-products.

5.5.1.2. Anaerobic treatment (fermentation)
The objectives of “stabilising organic material” and “energy recovery (biogas)” can be achieved through anaerobic biological treatment. The state of the art for biogas plants is described in Austrian standard ÖNORM S 2207 “Biogas Plants, Part 2 –Technical requirements for process engineering” and in “Technical Basis for Biogas Plant Assessment” of the Austrian Federal Ministry of Economy and Labour (2007).

Basic requirements for emission protection in biogas plants:
- Generally, all parts of the plant that are relevant to emissions should be made gas-tight.
Methane leakage can be considerable when feeding gas into the gas network, depending on the processing method that is used. In addition, processing that involves relatively high emissions is performed in combination with the processing of the necessary electrical and thermal energy. This means that it is generally necessary to minimise methane leakage during gas processing and gas feeding and when using biogas in combustion engines. In addition, methods requiring low thermal/electrical consumption should be used.

The level of methane emissions can be very high in the case of fermentation residue storage facilities, which should therefore be made gastight. Ideally, the residual gas should be used to generate energy.

When choosing the location of the plant, it is important to consider the possibility of making extensive use of the heat produced.

Sanitation requirements and the implications of the EC Directive for animal by-products and biogas plants
Requirements for the sanitation processes other requirements under veterinary law (e.g. ample clearance to animal husbandry, documented pest extermination) for catering waste and processed former foodstuffs of animal origin are set forth in the Animal By-Products Ordinance, Federal Law Gazette II No 141/2010 (Annex IV).

Where materials of various categories are collected jointly, the rules applicable to the respective lower category become applicable; for example, the treatment requirements for category 2 are applicable for joint treatment of categories 2 and 3.

The process for anaerobic treatment of biogenic waste can be mesophile (25 °C to 37 °C) or thermophile (50 °C to 55 °C).

In order to ensure the required sanitation in thermophile processes, compliance with the following parameters is required:

- temperature ≥ 55 °C
- (constructed) hydraulic residence time of 20 days with an (actual) guaranteed minimum residence time of 24h
- particle size ≤ 12 mm

In the mesophile process, the required thermal sanitation does not take place. In this case, sanitation must be ensured in an additional procedural
stage prior to or after fermentation (also at a different site) by heating all of the waste:
Option 1) temperature ≥ 70 °C, dwell time 1 h, particle size ≤ 12 mm
Option 2) temperature ≥ 60 °C, dwell time 5 h, particle size ≤ 12 mm
Sanitation can be ensured by the subsequent composting of the fermentation residue in accordance with the requirements of the Compost Ordinance. Further sanitation processes may be permitted by means of validation.

5.5.1.3. Mechanical-biological waste treatment (MBA)
Due to the ban on landfilling of waste containing more than five percent by weight of organic carbon in solid form (cf. sec. 7 (7) Landfill Ordinance of 2008), the waste must be treated prior to landfilling. This essentially involves thermal or – in application of the exemption set forth by sec. 7 (7) (f) of the Landfill Ordinance of 2008 – mechanical-biological processes. For the incineration of waste, the requirements set forth by the Waste Incineration Ordinance (AVV, Federal Law Gazette II No 389/2002 as amended by Federal Law Gazette II No 476/2010) are described as state of the art. For mechanical-biological waste treatment, the state of the art was developed by the Federal Ministry of Agriculture and Forestry, Environment and Water Management after consultation in expert working groups as targeted requirements for an environmentally compatible operation of mechanical-biological waste treatment plants and published as “Guideline for the Mechanical-Biological Treatment of Waste” (March 2002).
Through this Guideline, of which the European Commission has also been notified, a uniform state of the art has been imposed. It represents a key step in providing a point of reference for all stakeholders, especially for planners and prospective plant operators. Authorities are recommended to use this Directive as reference in the plant approval process. The stability parameters of the Guideline for mechanical-biological treatment plants were enshrined as compulsory landfill criteria for waste from mechanical-biological treatment (cf. Annex 1 Table 9 of the Landfill Ordinance of 2008).
When undertaking the required adjustments to the state of the art, mechanical-biological treatment plants with capacities of over 50 tonnes per day or more than 17,500 tonnes per annum – plants which qualify as IPPC treatment plants under the Waste Management Act of 2002 – shall take not only use
the Guideline for mechanical-biological treatment plants but also the “Reference Document on the Best Available Techniques for Waste Treatment Industries” as reference.

New mechanical-biological treatment plants have been built (cf. Chapter “4.8. Mechanical-biological treatment plants”) and existing plants have been adapted to implement the ban on landfilling. A survey carried out together with Umweltbundesamt GmbH in 2009 and 2010 on progress in the implementation of the Guideline on mechanical-biological treatment and the “Reference Document on the Best Available Techniques for Waste Treatment Industries” has confirmed the findings of the study “Mechanical-Biological Treatment Status Report 2006” (Umweltbundesamt GmbH, 2006). The study documents some considerable need to catch up with the state of the art not only among existing plants but also among some of the newly built plants, in particular as regards the separation of open and sealed parts of the plants, ventilation management, incl. the collection and cleansing of exhaust air, and compulsory emission limits.

According to the government programme for the period from 2008 to 2013, it is necessary to evaluate and reinforce the contributions of waste management to the Austrian climate objectives in order to make use of potential improvements. In this regard, it is also desirable to obtain binding regulations for exhaust gas cleaning in mechanical-biological waste treatment plants. Medium-term binding regulations for mechanical-biological waste treatment plants are therefore part of the Governmental Agreement (cf. Chapter 3.9 “Efficient Resource Use/Waste Policy” of the governmental programme for the 24th Legislative Period). The Federal Ministry of Agriculture, Forestry, Environment and Water Management will therefore enact a binding Ordinance in accordance with sec. 65 (1) of the Waste Management Act of 2002 to standardise the general statutory requirements for mechanical-biological waste treatment, especially for the registration of old plants within that legislative period.

Another goal of the Federal Ministry of Agriculture, Forestry, Environment and Water Management is to promote the integration of an anaerobic treatment stage in mechanical-biological waste treatment plants. According to the environmental assessment of 2008 of the German expert council for environmental matters (SRU, 2008) and with regard to the energy efficiency of the various mechanical-biological waste treatment concepts, the purely aerobic methods have fundamental shortcomings, since the energy content of the organic substance is rendered completely unusable. In contrast, various combined methods involving anaerobic partial-flow or full-flow designs enable energy recovery according to the share of anaerobically treated organic components. Mechanical-biological waste treatment plants using anaerobic processing followed by aerobic biological treatment have not yet been deployed in Austria.

5.5.2. Thermal waste treatment

In Austria, the incineration of waste is comprehensively governed by the Waste Incineration Ordinance (AVV, Federal Law Gazette II No 389/2002 as amended by Federal Law Gazette II No 476/2010), with the Waste Incineration Ordinance implementing EU Directive 2000/76/EC on the incineration of waste. The Waste Incineration Ordinance is an Ordinance issued jointly by the Federal Minister of Agriculture, Forestry, Environment and Water Management and the Federal Ministry of Economy, Family and Youth and is based on waste, water, trade and clean-air control laws, setting standards for all plants that incinerate waste regardless of which authorisation system they are subject to.

The Waste Incineration Ordinance covers hazardous and non-hazardous waste incinerated in incineration plants (plants for the thermal treatment of
waste with or without using the heat generated during incineration) or in co-incineration plants (plants whose main purpose is to generate energy or produce material products).

In particular, the Waste Incineration Ordinance also contains limit values for emissions to the air (Annex 1 and 2) as well as requirements for compliance with these values.

Moreover, the Waste Incineration Ordinance defines limit values for the harmful substances contained in waste that is incinerated in co-incineration plants for each of the following types of co-incineration plants: cement plants, power plants and other co-incineration facilities. The objective of setting such limit values was to limit the harmful content in products or residues. To ensure a high level of protection against air pollution, however, it is more useful to set limit values on atmospheric emissions and require a certain frequency of measurement of such emissions rather than to set limit values for the harmful content of the waste that is incinerated.

Moreover, the Waste Incineration Ordinance contains detailed guidelines for the planning of sampling procedures, the taking of samples, and the investigation of waste that is incinerated in co-incineration facilities. This ensures that a uniform quality assurance system is developed on the basis of the standards CEN/TC 343 “Solid recovered fuels”.

The Waste Incineration Ordinance also defines the requirements concerning the final destination of waste from substitute fuels. A distinction is made between substitute fuel products made from scrap wood and other substitute fuel products, and the limit values are guided by the composition of comparable conventional fuels.

In addition to the requirements of the Waste Incineration Ordinance, IPPC treatment plants (e.g. incineration plants for municipal waste) need to be adjusted to the state of the art on a regular basis. The state of art is the one laid down in the “Reference Document on the Best Available Techniques for Waste Incineration”.

Energy efficiency in waste incineration

The requirements for efficient energy use when incinerating waste are enshrined in various underlying laws.

Acc. to sec. 7 (11) of the Waste Incineration Ordinance, any heat generated by the incineration or the co-incineration process must be recovered to the extent practicable.

Acc. to sec. 43(2b) of the Amendment of the Waste Management Act of 2010, authorisations covering incineration or co-incineration with energy recovery may only be granted if energy recovery achieves a high level of energy efficiency.

In thermal waste treatment, a distinction is generally made between recovery method R1 (mainly used as fuel or as other means of energy production) and disposal method D10 (incineration on land). According to Annex 2 of the 2010 Amendment to the Waste Management Act, incineration facilities whose purpose is to process municipal solid waste qualify for recovery method R1 only if their energy efficiency reaches a certain level. To calculate such energy efficiency, Annex 2 of the 2010 Amendment to the Waste Management Act contains a formula whose application is specified by a guideline of the European Commission.

The general principles regulating the plant operators’ basic obligations are formulated in Art. 3 of EU Directive 96/61/EC concerning integrated pollution prevention and control (the IPPC Directive – which in the future will become Art. 11 of the EU Directive on Industrial Emissions). It stipulates, for example, that the Member States must take appropriate precautions to ensure that the plants are operated in an energy-efficient manner.

To calculate the degree of efficiency of plants and the annual degree of utilisation of waste incineration facilities and steam boiler installations that are primarily used to incinerate waste, it is possible to draw upon the ÖWAV (Austrian Water and Waste Management Association) Rule Sheet 519 “Energy Efficiency of Waste Incineration Facilities”, published in April 2010.

The energy efficiency requirements for IPPC facilities are found in the “Reference Documents on the Best Available Techniques” (e.g., BREF for Waste Incineration, BREF for Large Combustion Plants, BREF for Cement, Lime and Magnesium Oxide Manufacturing Industries).

5.5.3. Landfilling

The long-term deposition of waste in landfills represents the final stage in the chain of treatment procedures which are usually taken care of downstream of this. Based on the aims and principles of the Waste Management Act of 2002, all upstream measures are to be designed such that they produce the most inert and non-leachable residual material possible that can be stored without posing a threat for future generations (see sec. 1 (1) and (2) of the Waste Management Act of 2002).

In April 1996, the first ordinance was issued on the state of the art of equipment and operating methods in waste storage plants to achieve this target (Landfill Ordinance, Federal Law Gazette No
164/1996), which became applicable for new plants starting on 1 January 1997. The gradual adaptation of existing landfills was to be completed by 1 January 2004. Individual exemptions to the ban on landfilling organic waste (TOC restriction) were applicable until not later than 31 December 2008.


The core of the Landfill Ordinance of 2008 provides rules for waste acceptance procedures and involve a basic characterisation, assessment of compliance and identity check at the landfill. Annex 4 contains detailed provisions for the examination of one-off wastes, waste streams and recurrent wastes as well as wastes subject to mechanical-biological pre-treatment.

The main orientation of the Landfill Ordinance of 1996 remained unchanged. The technical equipment in the individual landfill classes in combination with quality requirements for waste to be landfilled prevent the emergence of contaminated sites that cause water and soil to become contaminated, reduce the production of greenhouse gases to a minimum and conserve energy resources.

The existing (sub-)categories of landfills – i.e., excavated soil, construction and demolition waste, residual waste and mass waste – have been supplemented by introducing the categories of the inert waste landfill and the underground landfill. Only uncontaminated excavated soil material may be stored in excavated soil landfills.
Depositing hazardous waste in above-ground landfills has been prohibited since 16 July 2001. The only exception is asbestos-containing waste, whose storage in landfills for non-hazardous waste has been regulated separately by the guidelines of the Council Decision in the Landfill Ordinance of 2008.

Hazardous waste may only be landfilled in underground landfills. This previously unregulated area was implemented based closely on the Council Decision (cf. in particular Annex 6 of the Landfill Ordinance of 2008).

In addition, the Landfill Ordinance of 2008 provides requirements to secure financial resources, with the 2010 Amendment providing for exemptions in terms of the type and manner of the service provided.

The ban on landfilling waste whose organic carbon (TOC) share in the solid waste exceeds five percent by weight prevents the landfilling of waste that produces methane and acidic leachate during biodegradation and thus requires very lengthy after-care periods, on the one hand. On the other hand, combustible, i.e. thermally recoverable and treatable waste is kept away from the landfill.

For waste subject to mechanical-biological pretreatment, a calorific value of 6,600 kJ/kg DM (calorific value criteria) must be achieved in combination with the limit values for stability parameters (breathing activity and potential gas formation).

The last exemptions from the TOC restriction expired on 1 January 2009. Since then, only waste with very low organic constituents may be deposited. This has had an especially big impact on the depositing of waste from households and similar institutions. In this area alone, the share of waste that was deposited directly or without treatment fell from 29% in 1999 to 8% in 2004. Since 2009, only 0.4% of the waste from households and similar institutions has been deposited (inert residues from the sorting of collectibles collected separately).

5.5.3.1. Implementation of the Austrian strategy for the reduction of specific biodegradable waste going to landfills

According to Art. 5 (1) of Directive 1999/31/EC on waste landfills (Landfill Directive), Member States must set up a strategy to reduce the amount of specific types of biodegradable waste going to landfills and notify the Commission of that strategy. The measures described in the strategy should achieve the objectives set forth in Art. 5 (2); in particular, the strategy should include measures of recycling, composting, biogas production or materials/energy recovery.

The Austrian strategy for the reduction of the amounts of biodegradable waste going to landfills and of the harmful effects of the depositing of waste is generally based:

- on the separate collection of biodegradable waste (in particular separately collected fractions of municipal waste are composted and used in biogas plants or for heat recovery) and
- on the definition of quality requirements for waste to be deposited in landfills under the Landfill Ordinance.

The separate collection of biogenic waste is regulated by the Ordinance on the Separate Collection of Biogenic Waste, Federal Law Gazette No 68/1992 as amended by Federal Law Gazette No 456/1994, which was enacted in 1995. This Ordinance stipulates which types of biodegradable waste of a household or plant should be collected separately, insofar as they are not recovered directly on their own premises.

The Compost Ordinance enacted in 2001 regulates quality requirements for the composting of waste, the type and origin of the initial materials and the conditions under which it can be placed on the market: Ordinance on the Quality Requirements for Compost from Waste (Compost Ordinance), Federal Law Gazette II No 292/2001.


The Landfill Ordinance (Landfill Ordinance of 2008, Federal Law Gazette II No 39/2008 as amended by Federal Law Gazette II No 178/2010, see Chapter 5.5.3.) drastically reduced the organic component that may be deposited in landfills. Since 31 December 2008, no waste with a TOC (total organic carbon) content of more than 5% may be deposited. This applies not only to municipal waste but to all waste going to landfills. The only exceptions are waste that has undergone prior mechanical-biological treatment and whose calorific level is below a specific level, as well as certain other types of waste that are not significantly biodegradable.
Apart from specifying the contents of the measures to be applied, article 5 (2) determines the extent of the reduction in the quantity of biodegradable municipal waste going to landfills relative to certain percentages by weight of the total quantity of biodegradable municipal waste produced in the reference year 1995. The quantity of biodegradable municipal waste going to landfills must be reduced to 75% by 16 July 2006, to 50% by 16 July 2009 and to 35% by 16 July 2016, in each case relative to the quantity produced in the reference year 1995.

In 1995, the total quantity of biodegradable municipal waste in Austria amounted to 2,675,300 t, consisting in particular of the biodegradable components of residual waste, bulky waste, waste paper and green waste (in this connection, see the “Austrian strategy for the reduction of specific biodegradable waste going to landfills”, Report to the Commission pursuant to Art. 5 (1) of the Landfill Directive (1991/31/EC), Zl. 62 5530/115-VI/2/03 of 26 November 2003 see www.umweltnet.at/article/articleview/88302/1/6943/).

According to reduction objectives under Art. 5 (2) of the Landfill Directive, the quantities of biodegradable municipal waste going to landfills in Austria must be reduced as follows:
- to 2,006,475 t by 16 July 2006 (-25%)
- to 1,337,650 t by 16 July 2009 (-50%)
- to 936,355 t by 16 July 2016 (-65%)

The actual quantity of biodegradable municipal waste going to landfills in Austria in 2006 was only 69,860 t. Since 2009, no more biodegradable waste has been going to landfills due to the landfill ban. This change makes clear that the Austrian strategy for the reduction of specific biodegradable waste going to landfills has not only been ensuring compliance with and achievement of the objectives under Art. 5 (2) of the Landfill Directive for years but has put a complete stop to depositing biodegradable waste in landfills.

The trend in the quantities of household waste collected and treated since 1989, described in Chapter 3.1, clearly demonstrates that the measures have been implemented in Austria for separate collection and recovering (recycling) of biogenic waste and recoverables from municipal waste as well as thermal recovery of the residual quantities collected by the waste collection system. As early as in 2009, more than 50% of the accumulated household waste was brought to recycling plants and a further 36% was recovered thermally.

### 5.5.4. Plants and sites

Chapter 4 contains a detailed presentation of all the relevant waste recovery and disposal facilities and their regional distribution. The existing Austrian treatment facilities and their capacities generally provide for a very high degree of “self-sufficiency of disposal” within the meaning of Art. 16 of Directive 2008/98/EC (Waste Framework Directive).

The transitional period (ending in 2008) for the ban on depositing waste with a high organic content in landfills under the Landfill Ordinance of 1996 of the 2008 has now expired, and sufficient processing capacities for municipal waste have been successfully made available. Additional capacities are still needed for certain types of commercial waste and specific waste fractions, such as sewage sludge and light fractions from shredding, since such waste is more often required to undergo thermal or mechanical-biological treatment (in the case of contaminated sewage sludge, for example) and fewer waste shipments to foreign countries are being made (commercial waste).

10 plants for the **thermal treatment of municipal waste** with a total capacity of approx. 2.3 million t/a are currently in operation. Relative to the plant capacities determined by the Federal Waste Management Plan 2006, additional capacities of approx. 600,000 t/year have been created. Approvals have already been obtained for three further plants, one of which is to be commissioned shortly (capacity approx. 200,000 t/a). Moreover, 49 **thermal treatment facilities**, particularly co-incineration facilities, with a total capacity of approx. 2.2 million t/year are available. There are also sufficient capacities with respect to **thermal treatment plants for hazardous waste**, apart from possible short-term bottlenecks due to major contaminated site remediation projects.

It should generally be noted, with respect to the stated capacities for thermal treatment facilities, that the quantity of waste actually processed depends on the calorific value. The throughput will be less when using mechanically processed waste that has a higher calorific value than municipal waste.

All such plants are subject to the strict requirements of the Waste Incineration Ordinance and must comply with the energy efficiency formulas of the new Waste Framework Directive and are therefore classifiable as “other types of recovery plants”. Generally, thermal waste treatment, with the application of appropriate technologies and with a high degree of energy efficiency, may be considered an especially suitable process that is far more environmentally friendly than the alternative processes. Highly energy-efficient plants (waste incin-
eration and waste co-incineration facilities) economise on primary energy carriers, making an essential contribution to climate protection. To this extent, the importation of waste from such facilities should also be viewed positively from the standpoint of environmental and energy policy (provided that the distances travelled are not too great and, in particular, that the standards of the foreign plants are lower than in Austria).

The expanded capacity of mechanical-biological treatment facilities is now approx. 680,000 t/year. Due to the necessary adjustment of a good part of such plants to the state of the art, it is likely that the plant capacities will tend to decline in the middle term and that there will be a shift towards thermal treatment.

In terms of (surface) landfills for non-hazardous waste, sufficient capacities are available for the medium term. For construction and demolition waste landfills, regional capacity bottlenecks are to be expected. Hazardous waste may be deposited above-ground in suitable classes of landfills, either by special exemption (proof that the specific case of landfilling has no hazardous characteristics) or directly in the case of asbestos waste.

Hazardous waste may be deposited only in underground landfills for hazardous waste (sec. 16 (1) Waste Management Act of 2002). Austria still has no such facilities. However, the shipment of such waste, which accumulates in small quantities, to appropriate state-of-the-art facilities in the Federal Republic of Germany appears to be warranted in the long run.

Chapter 4 has also made it clear that sufficient processing capacities are available with respect to special treatment facilities and the associated waste streams (e.g., physical-chemical treatment facilities, shredders, construction and demolition waste processing facilities, sorting and recovery facilities for separately collected recoverables, waste electrical and electronic equipment). The same is true of treatment of (separately collected) biogenic waste, where a welcome trend toward combined anaerobic/aerobic facilities (particularly in biogas plants) can be observed and should be further encouraged.
5.5.5. Climatic relevance of waste management

The demands on sustainable waste and materials management have long gone beyond the norms of traditional disposal management, necessitating the inclusion of additional environmental media and environmental factors in waste management strategies and projects. The mitigation of the anthropogenic greenhouse effect is one of the main global environmental protection challenges for the coming decades. To meet the targets of the Kyoto-Protocol, Austria signed a burden-sharing agreement within the European Union that requires it to reduce its greenhouse gas emissions by 13% within the target period 2008-2012 (relative to the reference year 1990). To achieve this reduction target, the "Austrian Climate Strategy", which defines target values and measures for eight sectors, was enacted by the Austrian Federal Government. Waste management and its treatment methods are also affected to a considerable degree.

Waste management is one of the major sources of methane emissions in Austria. Owing to the steady rise in the quantities of waste, emissions have increased steadily since 1990. Since 1991, despite increasing quantities of waste, emissions have dropped significantly. This positive trend is primarily attributable to the effects of the waste management regimes. The Landfill Ordinance is presumably the most important legal instrument ensuring further measures to reduce climate-relevant greenhouse gases (GHG) in the field of waste management.

In 2009, another study analysed the greenhouse gas emissions (methane and carbon dioxide) caused by residual waste treatment and showed the contribution that Austrian waste management has already made, and can continue making, towards the attainment of the national greenhouse gas reduction objective. The types of residual waste treatment analysed were landfilling, thermal recovery in waste incineration facilities and mechanical-biological treatment.

The balance sheets include on-site emissions from residual waste treatment as well as the emissions, which, because of the unused energy values of the residual waste and its fractions, but also of landfill gases, are released by fossil fuels in power stations, industry and domestic heating facilities.

As an example of the waste flow of residual waste, GHG emission balance sheets were drawn up for the years 2006 and 2013 and compared with the year 1990, which is the reference year for the greenhouse gas reduction objective of the Protocol. 2006 is the year for which the most recent data on Austrian waste management was available. 2013 was chosen as the year in which the waste incineration facilities that were under construction at the time were expected to go into operation.

- The balance sheet for 2006 emissions indicates that the share of greenhouse gases released by residual waste accounted for 1.254 million tonnes of CO₂ equivalent, i.e. 1.5%, of Austria’s total CO₂ and CH₄ emissions of 84.22 million tonnes in CO₂ equivalent.
- The balance sheets make it clear that in the year-on-year comparison of 2006 and 1990, sector-specific GHG emissions have steadily decreased from approx. 2.028 to approx. 1.254 million tonnes per year of CO₂ equivalent. This corresponds to a decrease of more than 38%. Thus, the sector-specific GHG emissions have fallen by about 18% to 0.889 tonnes per year of CO₂ equivalent per tonne of residual waste. The reduction in emissions generated by landfilling was the main factor responsible for this trend.

In 1990, the amount of GHG emissions from residual waste landfilling was still at 1.672 mil-
lion tonnes per year of CO₂ equivalent. By 2006, these emissions had been reduced by about 56%, thanks to stricter provisions in the Landfill Ordinance, which reduced the amount of residual waste deposited in landfills by more than 88% from 1990 (1.21 million tonnes) to 2006. Moreover, emissions were reduced thanks to the increased capture of landfill gas, the higher recovery rates for landfill gas, the conversion into electricity in more efficient landfill gas engines, the significantly higher percentage of residual waste used thermally, more efficient external incineration and the treatment of the highly caloric light fraction in mechanical-biological waste treatment facilities.

The results of the scenarios calculated for 2013 clearly demonstrate the impact of varying the distribution formula for the accumulated quantity of residual waste with respect to the types of treatment (thermal treatment of residual waste versus mechanical-biological treatment). It becomes clear that GHG emissions could be reduced even more if waste prevention resulted in the accumulation of less residual waste for treatment and if, above all, the percentage of waste treated by waste incineration facilities were increased, while the percentage processed through mechanical-biological treatment were reduced. If all the residual waste were treated thermally in waste incineration facilities, GHG emissions could be lowered by about 85% relative to 1990 in the best-case scenario. If all the residual waste went to mechanical-biological treatment plans, GHG emissions would be reduced by approx. 15% relative to 1990 in the worst-case scenario.

The existing GHG emissions balance sheets make it clear that residual waste alone is capable of making a contribution in the order of 1.2 to 1.6 million tonnes of CO₂ equivalent to the national objective for greenhouse gas emissions reduction of 22.3 million tonnes of CO₂ equivalent. This may be considered a readily attainable objective.

As the amount of combustible waste in Austria is far higher than that of residual waste, the overall greenhouse gas reduction potential in waste management is certainly greater than the figures indicated in this study. Significant reductions in emissions amounting to some 1 million tonnes in CO₂ equivalent are expected on account of increased...
thermally processed and optimised energy use, particularly in terms of industrial and commercial waste as well as in terms of bulky waste.

A comparison of climate-relevant emissions from the manufacture of marketable (intermediate) products from primary raw materials (iron/steel, copper, aluminium, PET, green container glass), on the one hand, and from waste/recoverables, on the other, demonstrates how relevant to the climate recycling selected waste/recoverables are. Contrasting the two scenarios illustrates the climate-relevant significance of each recycling procedure in comparison to primary production. Reducing the amount of waste/recoverables in the economic cycle has very positive effects with respect to energy savings and the reduction of GHG emissions in the production of marketable intermediate products (aluminium bars, copper cathodes, crude steel, green container glass PET beverage bottles).

The utilisation of secondary raw materials from the waste management recycling processes in secondary production saves 7,000 – 8,000 TJ per year (reference year: 2008) of worldwide cumulative energy expenditure relative to the reference year. This corresponds to 3-3.5% of the energy requirement of Austrian households for indoor heating, air-conditioning and hot water or the annual electrical consumption of some 500,000 households. Moreover, between 570,000 and 690,000 tonnes of CO₂ equivalent are saved. This amounts to about 7 to 9% of the annual greenhouse gas emissions of Austrian households for the supply of indoor heating and other small-scale consumption in 2008.

Using scrap metal in secondary production results in highly specific global reductions of energy consumption and greenhouse emissions in comparison to primary production. An increase in the scrap metals that are collected separately or recovered from various waste streams is therefore beneficial from the standpoint of global climate protection. Since the specific savings with secondary metal production are very high, increased collection and recycling of various small metal parts would also contribute to global reduction of GHG emissions. The domestic capacities for secondary metal production could handle the additional quantities of scrap metal fractions; in any case, imports would be replaced.

Recovering metallic fractions from waste incineration slag for use in secondary metal production is likewise very positive from the perspective of climate protection. The resulting additional quantities of waste metal are in the order of 1,000 to 10,000 tonnes.

PET recyclate from the treatment of PET bottles is not fully processed in Austria at present. An increase in the share of recyclate used in the production of PET bottles (currently 30% in Austria) would contribute significantly to reducing the specific cumulative energy expenditure and greenhouse gas emissions, mainly thanks to redundancy of the oil refining process for the primary process in an equal proportion.

In the case of green container glass, a slight increase (about 5%) in the use of shards would be possible, provided that shards are available in sufficient quantity. The maximum technically feasible percentage of use of glass shards is 80%, and that limit has already been reached. The only way to further increase the use of shards is to raise the quantity of production. That would result in an additional global reduction of 2,000 tonnes of CO₂ equivalent nationally and another 2,000 tonnes of CO₂ equivalent.

The waste management baggage of the recoverables under consideration and the treatment procedures is negligible in comparison to the cumulative energy expenditure and GHG emissions of primary production. The waste management costs (energy, GHG emissions) for recovering such secondary materials (Al, Cu, Fe/Steel) could therefore be significantly increased without neutralising the climate-relevant savings of secondary production in comparison to primary reduction.

The highest specific reductions in secondary production compared to primary production of marketable intermediate products are achieved with aluminium bars (assuming 15% of primary aluminium) at the top of the list (reduction of approx. 8 tonnes of CO₂ equivalent per tonne of marketable intermediate product), followed by copper (reduction of approx. 5 tonnes of CO₂ equivalent per tonne of marketable intermediate product). In the case of electric steel (100% use of scrap), the specific reduction amounts to approx. 2 tonnes of CO₂ equivalent, in the case of crude steel from the blast furnace route (30% use of scrap) approx. 0.5 tonnes of CO₂ equivalent per tonne of marketable intermediate product. In the case of PET bottles (30% PET recyclate), specific reductions of approx. 1 tonne of CO₂ equivalent per tonne of marketable intermediate product are produced. In the case of green container glass (75% shards), the specific reduction amounts to approx. 0.4 tonnes of CO₂ equivalent per tonne of marketable intermediate product.

The highest percentage of reduction in GHG emissions is achieved with electric steel (87% reduction), followed by copper (85% reduction) and aluminium (80% reduction in the case of a 15% pri-
mary share, 97% reduction without the addition of primary aluminium). The reduction in the secondary production of green container glass is 42%, in the case of PET bottles (30% PET recyclate) 23% and in the case of crude steel from the blast furnace route (30% use of scrap) 20%.

The climate relevance of refrigerator treatment
CFC R12, as is usually used in cooling circuits, has a GHG equivalence factor of approx. 10,700. CFC R11 was usually used as a foaming agent for insulating foam and has a GHG equivalence factor of approx. 4,600. The CFCs used in the average refrigerator produce a greenhouse effect in the order of 2.8 tonnes of CO₂ equivalent.

In Austria, about 350,000 refrigerators accumulate as waste each year. It is necessary to measure their CFC-bearing coolants and insulators according to the state of the art and to ensure their destruction. Each year, this prevents GHG emissions in the approximate amount of 1 million tonnes of CO₂ equivalent.

5.5.5.1. The significance of waste management in the National Climate Strategy
The National Climate Strategy was adopted by the Austrian Federal Government and the Conference of the Provincial Governors (Landeshauptleutekonferenz) in 2002. In 2007, the strategy was updated to take current developments into account. Regarding measures taken in Austria, the strategy calls for a reduction from 79.0 (initial value in 1990) to 68.8 million tonnes of CO₂ equivalent in 2010, i.e., a reduction of 10.2 million tonnes of CO₂ equivalent (including JI/CDM). Within this framework, waste management measures are to lead to a reduction by 1.5 million tonnes of CO₂ equivalent: from 3.6 million to 2.1 million tonnes. Percentage-wise, approx. 41% is the biggest reduction in all the areas of action. In absolute terms, only indoor heating and other small-scale consumption makes a greater contribution to achieving the reduction objective. In the National Climate Strategy, landfilling, waste water treatment and aerobic biological waste treatment are allocated to the waste management sector, especially by reason of international conventions. Since, the decisive criterion for allocation to the various sectors is no longer a facility's main object but rather its products, waste incineration plant emissions that result from electrical power production or the decoupling of district heating are no longer allocated to waste management measures but rather to power and heat generation.

This data shows that waste management plays an important role in the implementation of the national climate strategy. Waste management has been given the necessary legal framework to accomplish this task in the form of the Waste Management Act of 2002 as well as the Landfill Ordinances of 1996 and 2008. Landfills, in particular, are the major sources of methane emissions in Austria. The impact of methane on the climate is 21 times greater than CO₂. From 1990 to 2007, the Landfill Ordinance causatively led to a reduction in emissions by 1.6 million tonnes of CO₂ equivalent (-48.3%) from landfills alone. It is to be expected that a continued consistent application of the Landfill Ordinance will make a further reduction possible.

Since the 2006 Federal Waste Management Plan, waste incineration, both in terms of the capacities in mono-incineration and in co-incineration, has considerably improved. This has had a positive effect on achieving potential reductions. Apart from reducing methane emissions, the incineration of biogenic waste and waste from biogenic raw materials will not produce carbon dioxide with its detrimental impact on the climate. This means that the thermal and electrical energy generated in the process has no adverse effect on the climate and also explains the call for an optimised
5. Requirements and Measures

5.6. Measures in companies

5.6.1. Waste management programmes

The lion’s share of waste generated in Austria is generated through business operations. To ensure sustainable development, material streams at the level of business operations need to be closely scrutinised. This can be done by creating and following up on a waste management programme (WMP).

According to sec. 10 of the Waste Management Act of 2002, a waste management plan must be created at every business operation that generates waste and has more than 20 employees on its payroll. This obligation concerns every operator of such a plant and also applies to all locally integrated establishments, including office buildings and schools. Furthermore, when building and commissioning waste treatment facilities (regardless of the number of employees) and in the event of major changes, the application for authorisation must be accompanied by a waste management programme. There are similar provisions for industrial plants in the Austrian Industrial Code and for mining facilities in the Mineral Raw Materials Act.

The waste management programme must be submitted to the authorities upon request and these may require improvements by decree.

The purpose of a waste management programme is to make a company’s waste situation transparent and to point out any weaknesses, to identify measures for meaningful waste prevention and recovery, and to show possibilities for optimisation.

The Waste Management Act of 2002 only stipulates minimum contents that need to be considered in
waste management programmes on a mandatory basis. In addition, the plant operator and maintainer is obliged to review and update the waste management programme at regular intervals. The waste management programme can be used as management and controlling instrument for business operations and help to

- integrate ecological principles in the company
- improve production planning
- organise more efficient material procurement and management
- prevent waste at the source
- conserve resources
- reduce the actual share of emissions

By virtue of the Amendment to the Waste Management Act of 2010, the environmental statement as defined under the EMAS Regulation is deemed a waste management programme. As a result, there is no obligation to create a separate company waste management programme if such a valid environmental statement is available.

To provide professional assistance in drawing up a waste management plan, the following documents are available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water management:

- guidelines describing the statutory contents in detail
- a manual for the creation of waste management programmes on major construction sites
- an electronic tool (WMP web module) for schools to use for the interactive creation of a waste management plan.

5.6.2. Waste officers

Pursuant to sec. 11 (1) of the Waste Management Act of 2002, it has been mandatory since 1 October 1995 for all companies in Austria with 100 or more employees to appoint a qualified waste officer and a deputy in writing and to report their names to the authorities.

The duties of a waste officer include monitoring compliance with the stipulations of the Waste Management Act and the administrative orders based on this Act as well as informing the owner of the business operation of his or her findings, in particular with regard to any identified shortcomings. Moreover, the waste officer is charged with developing proposals to eliminate shortcomings. He/she is obliged to work towards the implementation of waste prevention measures and the effective organisation of waste separation, waste recovery and waste control systems as well as towards the implementation of all provisions under waste management legislation affecting the business operation. In the course of creating or updating the waste management programme, waste officers are required to report the costs of waste treatment and proceeds from recoverables to the owner of the business operation. These factors, too, represent important contribution to further development towards a recognised environmental management system and also help to enhance legal certainty.

By performing his/her duties, the waste officer can make an essential contribution towards optimising the organisation of waste management in the company, thereby saving subsequent storage and disposal costs.
To help him or her cover this wide range of duties, the waste officer should be given appropriate training by the business owner and be granted sufficient leeway to take care of his or her duties. In addition, he or she should be provided the necessary resources. An information sheet of the Federal Ministry of Agriculture, Forestry, Environment and Water Management defines the minimum profile of requirements for the job. In specific institutions and education centres, numerous courses and events are currently offered in order to convey the knowledge necessary for the responsibilities of a waste officer.

5.6.3. EMAS

As a market-oriented, voluntary tool, the Community eco-management and audit scheme has already proven effective at optimally reconciling ecological and economic requirements in business operations and organisations, making an essential contribution to improving cooperation with the companies, public institutions and authorities.

For the sake of a sustainable industrial policy, EMAS organisations need to be supported in their efforts to optimise production processes, reduce environmental effects and ensure more efficient use of resources.

In Austria, EMAS has been in the process of implementation since 1995 and was originally intended for industry only. Since 2001, EMAS has been accessible to all organisations (private companies and public institutions). In 2009, the EMAS Regulation was revised a second time in order to improve the functionality of this voluntary tool and to promote its application especially in SMEs. Regulation (EC) No 1221/2009 of the European Parliament and the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) came into effect on 11 January 2010.

Since 2001, the environmental management system and procedures for EMAS have been developed in full compliance with ISO 14001. EMAS is more than simply a management system, however. The business operation should continuously improve its environmental performance beyond the requirements imposed by environmental law. Employees should be involved in the process, as well, so that they can identify with the company's interests in environmental protection and to ensure that environmental management becomes part of their daily lives.

Beyond the ISO guidelines, an EMAS organisation is required to publicise its environmental performance in an environmental statement with a precise description of the environmentally relevant activities and data, such as consumption of resources and energy, emissions, waste, etc.

The internal documents and environmental statement are evaluated by an independent state-authorised environmental verifier. If the audit results in a positive evaluation, they are declared valid (validated). In addition, the environmental verifier checks whether the audited organisation complies with the statutory provisions of environmental law.

Once validated, EMAS organisations are listed in a public register by the environmental verifier and receive a Europe-wide registration number. All the relevant environmental authorities are involved in the registration process in order to make sure that there are no environmental violations.

The enactment of EMAS III entails various new features that are intended to having a stimulating effect on EMAS. The most important changes that merit mentioning are global applicability, special conveniences for SMEs through a lengthier supervisory cycle and increased transparency of environmental performance by using uniform core indicators and uniform use of the logo.

Further information on subsidy programmes, contents and objectives of the EMAS Regulation, participation in this scheme, can be found on www.emas.gv.at.

5.6.3.1. The implementation of the EMAS Regulation in Austria

Generally, the EMAS Regulation is directly applicable in all EU Member States; the Environmental Management Act was adopted by way of transposition into Austrian law.

This Act regulates the authorisation and supervisory procedures of environmental verifiers, the registration of organisations and, in particular, provides rules on administrative easements for EMAS-registered organisations.

The Federal Minister of Agriculture, Forestry, Environment and Water Management is the licensing body for environmental verifiers and competent body.

For the registration of organisations and the keeping of the required registers, the Federal Minister relies on Umweltbundesamt GmbH, which receives and examines all applications for registration and
submits a recommendation for registration, deletion or rejection to the Ministry. As of 15 May 2010, the EMAS register in Austria comprised 250 organisations with 644 locations. A comparison with previous years shows that the number of participants has stagnated since the number of those joining EMAS is just as high as the number of parties exiting in EMAS. In terms of EMAS registrations, Austria (in relation to the number of inhabitants) continues to rank among the first at European level.

Promoting EMAS-registered organisations
The 2010 Amendment of the Waste Management Act of 2002 has made it possible to apply for pre-consent pursuant to Art. 14 of the EC Waste Shipment Regulation. In the case of trans-boundary waste shipment to a pre-consented facility, a general notification may be given with a validity of up to three years. Moreover, the time limit for decisions by the authorities is reduced from 30 days to seven working days. According to sec. 71a of the Waste Management Act of 2002, such pre-consent is available, in particular, to EMAS-registered organisations and to organisations registered in accordance with sec. 15 (5) of the Environmental Management Act. Such organisations may be granted pre-consent with a validity of up to ten years.

5.6.3.2. The specialised waste disposal operation (EFB)
To become certified as a specialised waste disposal operation (EFB), waste management companies need to be organised in accordance with certain requirements, creating a uniform quality standard for operations in this sector. The sector-specific regulations serve as proof of good practices in waste collection, recovery and disposal.

The association that issues the certificate (VEFB or Association awarding specialised waste disposal operation certificates) is sponsored by its three members (the Association of Austrian Waste Disposal Companies and the Austrian Water and Waste Management Association, International Solid Waste Association Austria).

At present, over 100 enterprises in Austria with more than 170 locations are duly certified as specialised waste disposal operations (as of April 2011). Most of them are also registered as EMAS enterprises. EMAS and EFB have much in common: they both strive for a high level of environmental protection and have audits performed by external, independent environmental verifiers to certify a high degree of reliability.

The EFB’s objective is to ensure the correct and lawful implementation of the Waste Management Act of 2002 and the legal instruments derived from it.

As proof of legal certainty and legal compliance, the EFB primarily relies on certificates (attestation of no prior criminal convictions, declaration of reliability, confirmation of compliance with regulations) and records such as audit reports, official inspection certificates, etc. In the case of violations that are punishable by “substantial fines” (greater than € 7,270.00), certification is denied and existing certificates are revoked. As a result, the EFB ensures a high degree of credibility and integrity for custom-
Quantitative flow analysis is used to capture waste-relevant input and the output resulting from the activity. This makes it possible to point out changes in the waste streams as well as increases/decreases of the quantities held in storage. In addition, weaknesses within companies (logistical, organisational deficiencies, etc.) are identified and appropriate corrective actions are proposed.

The certificate is valid for a period of 18 months.

5.6.4 Sector-specific programmes

Since the mid-1990s, numerous sector-specific programmes have been developed in order to describe and quantify the waste prevention and recovery potential in various sectors and stages of production. The aim is to prevent the generation of waste characteristic of the sector and to direct any waste generated to recovery by taking measures in the individual companies. The focus was put on waste generated in large amounts and exhibiting a relatively high hazard due to their constituents.

The inter-company programmes were usually developed through cooperation between the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the business organisations concerned.

The current sector-specific programmes are for the following areas:
- wood
- agriculture
- waste from the medical sector
- paint and lacquer waste
- waste from halogen-free solvents
- waste from leather-making operations
- foundry waste
- food, beverage and tobacco waste
- chemical cleaning
- chlorinated hydrocarbon metal surface cleaning
- pulp and paper industry
- textiles (sub-programme for waste, sub-programme for waste water)
- photographic waste and waste water
- waste oils and waste lubricants
- surface finishing
- chemicals industry

For the automotive industry, a system study has been prepared for the development of sector-specific programmes.

Besides providing companies with information, it is also necessary to motivate them to take concrete steps towards implementation. The representations of interest should be better informed about the practical applications. With small and medium-sized businesses, in particular, this objective combines ecologically-oriented impulses with technologically innovative approaches, thereby making the companies more competitive. In times of increased globalisation, the implementation of sector-specific programmes is not only an environmental policy measure but also constitutes an important step to take in economic policy.

Owing to the regular amendments to international transport law (ADR/RID), to the standards in terms of health and medical technology and due to the high application rate in Austria’s medical institutions, plans are to revise the sector-specific “Medical Waste” programme once again. Although medical waste accounts for only a small portion of the total quantity of hazardous and non-hazardous waste, it nevertheless constitutes a sometimes sensitive area in waste management.
5.7. General measures

5.7.1. Material flow management – Waste management based on material considerations

Materials flow management to achieve the Waste Management Act targets
In order to attain the objectives “protection of humans and the environment” and “conservation of energy and raw materials” laid down in the Waste Management Act of 2002, material flows must be controlled. In so doing, potential pollutants must be prevented from harming humans and the environment, and resources must not be wasted. Waste management serves a key function in controlling material streams at the end of material flows. On the one hand, it serves as a “filter” between the anthroposphere and the environment and is intended to ensure that only emissions with low environmental impact on water, soil and air occur in order to guarantee sustainable development. On the other hand, waste management enables the re-use of substances to enhance ecological efficiency. This is especially true of substances that are available in economically recoverable form or could be transformed into such, for instance, by increasing the concentration. Furthermore, the purpose of waste management is to provide important impulses for the material-based design of goods and processes, by which the possibilities of recovery and environmental protection can be taken into account already at the levels of production and supply (design for recycling, design for disposal).

Significance of waste management for the overall management of materials and substances
For reasons inherent in the system, goods and material inputs into the national economy of a growth society are always greater than the outputs (the inventory of capital goods and consumer goods increases). Quantitatively speaking, waste is therefore less important than the goods produced. Ultimately, however, all goods are subjected to waste management. The adequate handling of the quantities generated in the meantime must be improved by analysing the flows of goods and materials; the importance of waste management should be appropriately reflected. Therefore, aspects of material management provide an essential approach for the Federal Waste Management Plan. For this purpose, balance sheets need to be developed for the most important – both economically and in terms of quantity – goods and materials, as only this knowledge will guarantee that the measures taken in waste management are efficient and economically viable in the context of the overall national economy.

Impact-based assessment of waste management measures
Due to the environmental protection efforts undertaken in the past three decades, production-related emissions have steadily decreased. In the same period, the quantities of consumer goods and related emissions have continuously increased. In relative terms, the emissions caused by the use of goods are therefore larger than production-related emissions. For this reason, requirements ensuring human and environmental protection as well as resource conservation must not only relate to the production of goods and their recovery/disposal, but also to the use and consumption of goods.
In a nutshell: what needs to be done before any measures are taken to protect humans and the environment and any measures to conserve energy and raw materials is to determine what the greatest threat is for the goods and resources meriting protection. A sector-specific approach, such as an approach solely oriented towards recovery/dispos-
al, does not do justice to the problem; it may give rise to inefficient, uneconomical measures. The places where significant environmental pollution are generated or are expected to be generated, the potentials for resources that are being decreased or increased and the control possibilities that are most effective within the entire material management system in keeping with the objectives of the Waste Management Act of 2002 can only be identified through an overall analysis of all sources, pathways and sinks of a substance.

Currently, the limits for waste management processes are primarily set on the basis of emission standards. However, as a rule, these concern only a small share of the entire material flow. Comprehensive environmental protection and an efficient use of resources call for the active control of all material flows in waste management. This can prevent the transfer of substances to areas where no current regime applies (e.g. heavy metals in recycled plastics). Recovery procedures generally need to meet the challenge of subjecting each and every individual ingredient to appropriate recovery or disposal in order not to constitute mere “sham recovery”. The first steps in this direction are provided by the treatment principles laid down for specific groups of waste.

The systematic, holistic orientation of waste management based on material-related factors makes it possible to:

- obtain better and more up-to-date data on waste quantities and the pollutants and useful substances contained therein than would be possible using traditional methods
- recognise threats to the objectives of the Waste Management Act in human and environmental protection (accumulation of pollutants in the environment and anthroposphere, increase or decrease of emissions, transfer of pollutants into recycled products, etc.) and the conservation of resources (accumulation or exhaustion of stored resources) early on
- define priorities for waste management measures (measures with the strongest impact, urgent measures)
- design a waste management system that has been optimised based on technical-economic and ecological principles

The Ministry of Life is currently working on a national Resource Efficiency Action Plan (REAP), that is being drafted through a stakeholder process involving business, science and administration. REAP will define resource-efficiency objectives and the corresponding lead measures and lead instruments for implementation. The objective is to increase resource efficiency and reduce resource consumption in Austria. Since sustainable waste management significantly contributes to the careful use of resources and to boosting resource efficiency, synergies can be expected in that respect.

### 5.7.1.1. Urban mining

Since 2008, more than 50% of the world’s population has been living in cities. It is estimated that by 2030 60% of people will be living in urban agglomerations. Such agglomerations have an enormous need for resources, which means that most of the resources we are currently extracting will be used up to build our cities. This will entail a major increase in the use of metal, in particular. Since the 1950s, the use of aluminium, for instance, has risen by a factor of 25, the use of zinc by a factor of 5 and that of copper by a factor of 6. The use of lead has doubled in the last 60 years.

This steady rise in the consumption of resources is leading to a continuous decline in underground deposits of such raw materials and an increase in the stocks of such resources integrated into buildings, infrastructures and consumer durables (such as electrical appliances and vehicles). In addition to large amounts of mineral materials (cement and tiles), for each Austrian there is an average quantity of about 4,500 kg of iron, 340 kg of aluminium, 200 kg of copper and 40 kg of zinc in the anthroposphere.

Such potential raw materials are often bound up in use for decades. The anthropogenic copper stocks in Austria amount to about 1.4 million tonnes and are growing at a rate of 6 to 8% per year. A look at these bound-up stocks shows that 80% of the copper is contained in buildings (electrical conductors, cords, cables, pipes, sheets and strips) and networks (electricity, telecommunication and railways) and 20% in long-lasting consumer goods (motor vehicles, electrical appliances). In comparison, there is four time less copper in landfills and in the natural copper deposits of Austria (approx. 300,000 tonnes in each case). What applies to copper also
applies to the other metals. The main areas of use are various areas of construction, where the metals are also bound up in the infrastructure for long periods of time.

From the point of view of resources, the utilisation of such anthropogenic stocks is of enormous importance. In addition to encouraging careful use of primary resources, the “ecological rucksack” shows the consequences of the production of goods and energy consumption for recovery, production and transport, water consumption and use of materials. 15 tonnes of resources, for example, are required to produce 1 tonne of iron, whereas 1 tonne of aluminium requires 85 tonnes of resources. The recovery of 1 tonne of copper requires 500 tonnes of resources.

When using secondary metals, this rucksack is much smaller. For example, the energy savings from the use of iron scrap is between 60 and 70%, and 85% in the case of copper scrap. In the case of aluminium scrap, energy savings amount to 95%.

Cities are gigantic raw materials storage sites. The challenge is to recover the raw materials from the infrastructure, the buildings and the goods. This is the idea behind the “urban mining” concept. (Today’s cities will be tomorrow’s mines!) “Urban mining” will enable increased use of the raw materials in anthropogenic bound-up stocks in order to protect the natural deposits, to minimize toxic emissions and to save energy. To do so, it is necessary to expand our knowledge of the raw materials in such anthropogenic storage places. Innovative solutions are needed to deal carefully with our resources, if we are to implement the “careful use of resources” objective of the Waste Management Act efficiently in the future. The waste management of the future means efficient resource management.

5.7.1.2. Austrian Raw Material Plan
Agriculture and mining are the two pillars of primary production. Practically everything is either made from mineral raw materials or contains them. In order to continue supplying the economy with such mineral raw materials in future, intelligent raw materials management is necessary.

In the past decade, however, remarkable distortions have occurred in supplying the economy with internationally negotiable raw materials (ores, industrial minerals, energy-bearing raw materials). The limited availability, combined at times with high commodity prices, is not attributable to an exhaustion of resources but rather to China’s enormous demand for raw materials. Yet even in the case of raw materials for construction (gravelly sand, crushed rock) that is traded only on the regional level, shortages sometimes occur because gaining access to such raw materials deposits is becoming increasingly difficult.

The objective of Austria’s raw materials policy is therefore to use mineral raw materials economically. The more raw materials can be procured from secondary sources, the less it is necessary to resort to natural (primary) resources. Moreover, it is necessary to recover mineral resources in such a way that not only the richest deposits are used (mining site protection).

The most important thing is to protect the raw material deposits from being rendered inaccessible through construction or other land uses (storage site protection under regional planning laws). The Austrian Raw Materials Plan, as an integral part of the Austrian Raw Materials Policy, is therefore intended to secure the availability of raw materials within Austria and to make sure that raw materials continue to be available in the future.

Raw materials for construction such as sand, gravel and crushed rock are often called mass materials because they presumably are available in massive
amounts. If source deposits are not sufficiently taken into account in regional planning, however, such raw materials might cease to be available in sufficient quantities and regional shortages might even occur, especially since the raw materials for construction can be transported no more than 30 km due to the price level.

As part of the work on the Austrian Raw Materials Plan, stock was taken of all raw materials deposits for the first time. The Federal Ministry of Economy, Family and Youth commissioned Geological Survey (Geologischen Bundesanstalt) to perform a nationwide survey of areas rich in the relevant raw materials. With the help of an innovative evaluation procedure based on systems analysis, such areas were examined for potential suitability. Appropriate areas were determined using computers and then digitally overlaid with the prohibited areas and conflicting areas under regional planning laws. The result is a mapping of surfaces that have the best quality raw materials and are not subject to any regional planning conflicts.

For each political district, the regional planning authorities of the Austrian Federal Provinces were then given suggestions on how to safeguard such raw materials deposits so as to ensure a supply of sand and gravel for at least 50 years and of solid rocks for 100 years. This objective evaluation method made it possible to identify raw materials areas without in any way jeopardising natural and environmental protection (e.g., no “Natura 2000 areas”). In order to supply the economy with sand and gravel for the next 50 years, only about 0.15% of the total Austrian territory is necessary. This ensures maximum legal certainty and reliability of planning for both government agencies and enterprises. Austrian Raw Material Plan can therefore be called an intergenerational contract to safeguard raw materials.

As early as in 2008, the European Commission, in the highly esteemed “Raw Materials Initiative”, awarded the Austrian raw materials plan the title of best-practice method for the safeguarding of raw materials. In the recently finished report “Ad hoc Working Group on Exchanging Best Practice on Land Use Planning, Permitting and Geological Knowledge Sharing”, both the Austrian raw materials policy and raw materials planning policy were distinguished as best-practice methods among the EU Member States.

5.7.2. Public procurement

Developing sustainable consumption and production patterns is one of the essential challenges of the future. The current modes of production and consumption are causing massive environmental issues, consuming too much energy, producing too much waste and using the limited resources available in an inefficient way.

**Great potential in the public sector for green/sustainable procurement**

The public authorities, with their purchasing power of approximately 17% of the GDP, play a key role in greening public procurement. Endowed with that considerable purchasing power, public procurement is considered an effective European instrument for the promotion of ecologically friendly and socially acceptable habits of consumption and production.

The public authorities are therefore called upon to assume the role of a “change agent” and trailblazer by procuring more sustainable goods and services in a more intense and purposeful manner.

**What is sustainable public procurement?**

In public procurement, as well, the key question is whether the goods and services procured are really necessary. When several products are available for procurement, the one that best meets the sustainability criteria should be chosen.

Sustainable procurement is the procurement of environmentally sound goods and services that are sufficiently inexpensive, economically efficient and suitable to the desired purpose and that are manufactured or supplied in accordance with the applicable social standards. Sustainable procurement is especially successful when ecological, social and economic criteria are incorporated into the procurement process as early as possible.

Taking environmental issues into account means procuring the goods or services that are least burdensome for the environment, considering their lifecycle as a whole. Goods and services are considered not to constitute a burden for the environment, for instance, if they result in low consumption of non-renewable resources and produce low greenhouse gas emissions.
Sustainable procurement as cost-efficient procurement

Particularly in these times of tight budgets, cost reflectiveness is of special relevance. Sustainable procurement is sometimes associated with higher costs. That is not generally so. Rather, sustainable procurement is procurement that ascertains the costs in a holistic and realistic manner. Using the total-cost-of-ownership (TCO) approach, for examples, helps determine the costs actually incurred (for procurement, use and disposal/recycling) and thereby makes a substantial contribution to calculating true costs.

The Austrian Court of Audit, in its report for the 2006-2012 period, expressed its opinion on costs related to sustainability and determined that “from the standpoint of sustainability, higher costs for the purchase of goods and services may be justified; especially when the higher costs are outweighed by important overall economic and ecological effects that could not be obtained at less expense”.

Sustainable development should be understood as a process that would be inconceivable without further development and innovations. Goods and services that are now considered to be sustainable compared to conventional products might cease to be considered so in several years on account of further technical advances (e.g., if electronic appliances are developed that consume less electricity). Sustainable public procurement therefore generally makes innovations necessary.

Developments at European level

In 2008, the European Commission (EC) presented a strategy paper that points the way towards establishing sustainable patterns of production and consumption. In its Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan (SCP) [(COM 2008) 397], the EC presented an integrated approach to improving the energy efficiency and environmental performance of products and to help public and private consumers with the implementation by offering tools such as GPP (Green Public Procurement), Ecolabel, EMAS and the Ecodesign Directive. The EC Communication “Public Procurement for a Better Environment” [(COM 2008) 400] is part of the SCP Action Plan.

At http://ec.europa.eu/environment/gpp/index_en.htm, the EC offers many resources to assist with the implementation of green procurement (Green Public Procurement, GPP), such as a helpdesk, a list of specific criteria for various procurement groups, studies and projects, etc.

In light of the importance of GPP to establish sustainable patterns of production and consumption, the European Commission advised the Member States to draw up action plans for the greening of public procurement with ambitious objectives and measures in order to promote GPP in the EU Member States. Austria already has a tradition in the greening of procurement reaching back many years and was one of the pioneers in green procurement within the EU. Studies show, however, that there is still potential for further development. Leveraging this potential is the main reason for developing an Austrian Sustainable Public Procurement Action Plan.

Sustainable Public Procurement Action Plan adopted by the Austrian Federal Government

The objective of organising public procurement in a sustainable manner is anchored in the governmental programmes of the last two legislative periods.

Based on this decision, under the leadership of the Ministry of Agriculture, Forestry, Environment and Water Management, an Austrian Sustainable Public Procurement Action Plan was drawn up with a broad range of participants. Eleven workshops were attended by some 250 representatives from the Austrian Federal Government, Federal Provinces, cities/municipalities, and sector-specific procurement managers as well as experts.

The Federal Government adopted the Sustainable Public Procurement Action Plan by Ministerial Decision in July 2010. It represents an important milestone on the path to making public procurement in Austria gradually more sustainable. In addition, the public authorities can come closer to achieving the individual key objectives of the sustainability strategy, give the market appreciable stimuli for sustainable products and services while at the same time acting as a positive role model.

The Action Plan is addressed to all public procurers (public contractors and sector-specific contractors) subject to the Federal Public Procurement Act.

1 E.g. the key objectives of ensuring a decent life fit for humans (key objective 5), promoting competitiveness through innovative structures (key objective 6), ensuring successful management through eco-efficiency (key objective 9), strengthening sustainable products and services (key objective 10), fighting poverty, creating a social and economic equilibrium within and between countries (key objective 16), developing a globally sustainable economy (key objective 17).
The Action Plan consists of two parts. The first part of the Action Plan comprises the following chapters:

- Political background for the development of the Action Plan (Chapter 2).
- Definition of sustainable procurement (Chapter 3).
- Objectives of the Action Plan (Chapter 4).
- Activities to achieve the objectives (Chapter 5).
- Implementation and further development (Chapter 6).
- Status quo of sustainable public procurement in Austria (Annex).

The second part of the Action Plan consists of guidelines for the implementation of sustainable procurement that directly address those responsible for procurement. These guidelines lay out the core criteria for the procurement groups which currently number 16.

The main objectives of the National Action Plan are:

- ensuring that sustainable procurement is firmly anchored in the minds of all public procurers
- ensuring Austria’s pioneering role in the EU’s sustainable public procurement
- coordinating the activities of sustainable public procurement within Austria and to join forces
- removing any constraints to sustainable procurement

The following measures are to be implemented in future:

- to support the networking of and information exchange between those responsible for procurement
- to introduce a solution for budgetary issues and develop social criteria for public procurement in expert groups
- to generate more knowledge on the cost implications of sustainable procurement
- to inform providers about requirement criteria for various product groups in sustainable procurement
- to build a monitoring system and evaluate the implementation of the Action Plan

Partners are extremely important for the implementation. One of the partners available is procurements Service Austria (BSA), a service entity for sustainable procurement practice, financed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. BSA publishes, among other things, the electronic newsletter “take it!”, provides support for the central information platform www.nachhaltigebeschaffung.at with a helpdesk and forums for an exchange of information between procurement managers; BSA also responds to direct inquiries from procurement offices (tel.: 0316 / 813909-9).

A crucial role in implementing the Action Plan is also played by BundesbeschaffungsGmbH (www.bbg.gv.at), the procurement services provider for the public authorities. BBG contributed unremittingly to drawing up the Action Plan and already bases its invitations to tender on the criteria of the Action Plan. The cooperative efforts will be reinforced in the implementation phase.

Implementing the Action Plan requires a common procedure for all the public procurement managers of every local and regional bodies and organisations. As the coordinator, the Federal Ministry of Agriculture, Forestry, Environment and Water Management encourages Federal, Provincial and municipal procurement managers to orient their procurement practices according to the guidelines of the Action Plan.

5.7.3. Training

For landfill personnel, especially for the input control manager, the Landfill Ordinance prescribes specific training requirements, depending on the landfill class. The Austrian Water and Waste Management Association (ÖWAV) has issued a job profile for input control managers and audit personnel and organises courses to this purpose.
In connection with the Landfill Ordinance, the following merit special mention: the training course for the input control managers of excavated soil, inert waste and construction and demolition waste landfills, the training course for the operating personnel of mass waste and residual waste landfills, as well as the special training course for landfill input control for mass waste and residual waste landfills.

The requirements and educational contents for managers under waste law and applicants for authorisations have been published in Rule Sheet 512 of the ÖWAV. The pertinent training course that qualifies managers under waste law serves above all to standardise and assure the quality of the current state of knowledge.

When a legal person collects or treats non-hazardous waste, a person in charge must be named. This person must have the necessary technical skills and knowledge for the relevant activity, as demonstrated by five years of relevant professional experience or appropriate training or a diploma from an appropriate school (e.g., secondary level college, such as Umwelttechnik-HTL) or a course of study. Unlike the educational requirements for the waste manager as defined under waste management law, an examination is not absolutely necessary.

For the field of waste collection, a training course should be provided for the operating personnel of collection points for recoverables and recycling yards.

In order to cover the need for biological waste treatment training, the available courses include a basic course for the operating personnel of mechanical-biological treatment plants and composting facilities as well as a training course for the operating personnel of biogas plants.

There are also courses on mechanical processing and thermal treatment of waste and on the fundamentals of environmental and plant laws.

In 1992, a training programme for “recycling and disposal specialist” was created as an pilot programme. In April 1998, it was integrated into the standard training programmes (Federal Law Gazette No 129/1998). To ensure good employment prospects, the content was adapted based on previous experience and new fields of employment were opened up.

Another key contribution, as always, is made by the information activities of environmental and waste management consultants. For the on-site implementation of waste management activities, environmental and waste consultants are indispensable. For industrial waste officers, many institutions offer education, training and continuing education courses.

The Austrian Association for the Recycling of Building Materials (BRV) offers training in demolition work. Graduates of this programme have the waste management knowledge required by the standard ON B 2251 “Demolition works” for company managers of demolition sites.

Apart from the major educational programme, numerous conferences, seminars, workshops and other events offer the possibility for a lively exchange of information and experience by active participants in waste management.

5.7.4. Public relations

In order to maintain the high level of Austrian waste management, particularly the success in the sorting of household municipal waste, the population must be informed continuously about waste prevention, re-use, proper waste sorting and collection, as well as the suitable treatment. In addition, there is a growing need to build awareness of waste management issues and sustainable consumer behaviour.

To this purpose, the Federal Ministry of Agriculture, Forestry, Environment and Water Management supports nationwide public relations campaigns and seeks to cooperate with the Austrian Federal Provinces, municipalities (municipal associations), waste management associations and the business world.

The Federal Coordination Group for Waste Management Public Relations Work is not only a forum for the exchange of information but also a forum for networking between the activities in the Federal Provinces. Jointly defined thematic focuses of the nationwide public relations campaigns are implemented effectively, using synergies and interaction between strategic control of the themes at federal level and action/organisation at regional level. It is precisely the relationship with regional players and circumstances that lend credibility and provide emotional access to the target groups.

The Federal Coordination Group should be strengthened. In addition to the representatives of the Austrian Federal Provinces and associations, repre-
sentatives will also be drawn from collection systems required to conduct public relations campaigns, the Waste Electrical or Electronic Equipment Coordination Point (EAK), the Association of Austrian Waste Disposal Companies (VÖEB), the Federation of Austrian Environmental Consultants (die Umweltberatung) and the Austrian Waste Management Consulting Association (VABÖ). The Federal Ministry of Agriculture, Forestry, Environment and Water Management is charged with the organisation.

The principles of public relations in waste management:

- All measures must take their cue from the objectives and principles of sec. 1 of the Waste Management Act of 2002.
- Information/messages need to be quality- and target-group-oriented (understandable, motivating, repeating).
- The public relations measures taken need to be rated in order to determine their effectiveness and undertake any adjustments necessary.

Effective public relations work not only helps the population in its efforts to behave properly and sustainably towards the environment but can also lead to savings, both for consumers and for the Austrian national economy. Adequate funding should therefore be provided for public relations work, which should be secured through appropriate measures based on the shared responsibility of the Federal Government, Federal Provinces, municipalities (municipal associations) and business.

The activities of municipal environmental and waste advisers organised throughout Austria form an essential part of the public relations work. These activities have been supported by the Federal Ministry of Agriculture, Forestry, Environment and Water Management since 1997 through the project “Communication Network with Waste Consultants”. The network consists of approx. 300 waste and environmental advisers from across Austria. Ever since, it has proven to be a very effective platform and communication hub for waste management matters at regional and municipal level.

Once a year, the Waste Consultant Network Conference offers a venue for waste advisers to discuss current themes and be informed of innovations and developments.

The commitment and creativity of the waste advisers are suitably rewarded with the annual presentation of an award to the waste advisor of the previous year.

The association magazine VABÖ-Blatt subsidised by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, communicates current and important news. VABÖ-Blatt is published six times a year. Since the start of 2005, VABÖ has also been publishing a monthly electronic newsletter (VABÖ Newsletter), which is also subsidised by the Ministry and reaches a still wider audience quickly and without red tape.

The waste management award: PHÖNIX – ideas instead of waste

PHÖNIX is awarded to innovative projects and ideas related to sustainable materials and resource management. The “PHÖNIX” prize is symbolic for waste management. Named after the mythological phoenix that rises from its ashes, PHÖNIX embodies renewal and thus two main strategic elements of waste management: material and energy recovery. The PHÖNIX is therefore a symbol of innovation and sustainability in waste management. PHÖNIX laureates are the Ministry of Agriculture, Forestry, Environment and Water Management and the Austrian Water and Waste Management Association (ÖWAV). The prize has been awarded since 1999.

State Prize for “Exemplary Packaging”

The “Austrian State Prize for Exemplary Packaging” is organised by the Ministry of Economy, Family and Youth with the support of the Ministry of Agriculture, Forestry, Environment and Water Management. Among other objectives, it is intended “to provide incentives for improvements in environmental protection” as well as “to coordinate environmental policy and packaging developments”.

With the special prize of the ARA System, which forms part of the State Prize programme, awards are presented to supplementary packaging measures that make an especially big contribution to resource conservation and waste prevention.

The “Richtig sammeln. Ist doch logisch!” website (Collecting the right way. How logical!)

Many useful facts about proper waste collection and waste separation are made available on the communication platform created by the Ministry of Agriculture, Forestry, Environment and Water Management in cooperation with the Austrian Federal Provinces and interns. Users can find contact points for their inquiries about regional waste management and the network of experts is available to all waste management disseminators. The website also offers tips for schools and basic information for creating a waste management plan. Similarly, collection guidelines in several languages can be downloaded from the website www.richtig-sammeln.at. These tips are available in Hungarian,
Slovak, Slovene, Czech, Turkish, Croatian, Serbian, Polish, Russian, Arabic, and Chinese, along with information on the most convenient way to deal with the modular-structured collection tips. The logo of “Richtig sammeln” too has been translated into eleven different languages.

**Umpädicus, training course for qualified environmental teachers**

Proper management and sorting of waste are key elements of environmentally sound behaviour, so they should be taught as early as possible. The Ministry of Agriculture, Forestry, Environment and Water Management has therefore developed a course of study that aims at environmental education for small children.

Teaching young people to recognise and understand the complex relationships between society and the environment is a big challenge that requires teachers who are suitably qualified in terms of their knowledge and teaching skills.

The “Umpädicus” course helps build qualified environmental teachers by providing the necessary expertise in combination with the requisite teaching skills.

The course is addressed in particular to municipal waste management and environmental advisers but also to anyone else interested, whether trained teacher or not, who is already active – or who needs to prepare to be active – in environmental education in projects at elementary schools and primary schools.

Participants who pass the final exam are given a certificate that confirms that they are able to teach all topics related to waste and material flow management independently, according to sound pedagogical principles.

“Umpädicus” received a special award at PHÖNIX 2008.

**Publications**

Specific topics in waste management, such as research results, sector-specific programmes and the like are published in specialised publications by the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

All publications are available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

**5.7.5. Sustainable environmental technology policy – Environmental Technology Master Plan**

Environment and climate change, scarcity of resources, globalisation and technological trends as well as economic crises are changing the basic global conditions at breakneck speed. Against this backdrop, the European Commission prepared “Europe 2020 – EU Strategy for smart, sustainable and inclusive growth” (further development of the Lisbon Strategy) in June 2010. Europe 2020 focuses on three main issues:

1. smart growth – developing an economy based on knowledge and innovation
2. sustainable growth – promoting a more resource-efficient, greener and more competitive economy
3. inclusive growth – fostering a high-employment economy delivering economic, social and territorial cohesion

The Europe 2020 Strategy assists with the development of innovative environmental and energy technologies and thus green growth markets in Europe.

In Austria, the MUT (Environmental Technology Master Plan) has set up initiatives to strengthen and network the Austrian environmental engineering industry. The main objective of the master plan is to establish Austria as a recognised centre of environmental technology.

The MUT measures concentrate primarily on the following strategic fields of action:

1. Research & development
2. Innovation & qualification
3. Funding & investment
4. Vitalisation of the home market
The implementation of the Environmental Technology Master Plan is stimulating networking and cooperative projects in Austria and abroad. Examples thereof are the Environmental Technology export initiative and support for the new EU Member States through “twinning projects”. Another priority is the training campaign and the development of basic and advanced training programmes (Klima:aktiv programme) and the coordination of environmental engineering training services.

The Environmental Technology export initiative allows Austria to take advantage of the opportunities provided by globalisation. This initiative has already made it possible to support some 150 environmental and energy technology operations with their foreign activities. Over half of the participating enterprises have recorded increases of more than 10% in annual sales revenue. Austria’s export activities are decisive for the economic success: 2/3 (approx. € 4 billion) of the sales revenue of the environmental technology industry is earned through exports. Austria’s main market for exports is the EU, which accounts for 40% of the total purchases. Other important regions are Asia (e.g., China) with 17% and North America (5%). One of Austria’s special challenges is to promote European and international cooperation projects in the environmental technology sector.

With the website www.kursfinder.at, the Ministry of Agriculture, Forestry, Environment and Water Management has created its own portal for training in environmental technology. In addition, Austrian Clean Technology (ACT) has been set up as an information and service centre for the environmental engineering industry.

The measures provided for by the Environmental Technology Master Plan stimulate investments in eco-innovations and sustainable environmental technologies. The growth rates in the environmental technology sector in Austria show that economic growth and environmental protection have already become a successful combination. There are currently about 185,000 green jobs in Austria, including around 22,000 employees working on the production of environmental technologies.

5.7.6. Environmental support in Austria pursuant to the Environmental Support Act

The objective of federal environmental support is to improve the Austrian environmental situation sustainably. The support also plays a supplementary role with respect to the instruments promoting a precautionary environment policy. Above all, they are intended to encourage environmentally sound and resource-conserving investment decisions while increasing the rate of economic and technical innovations. The legal framework for these objectives was created by the Environmental Support Act of 1993. One of its four support objectives is to protect the environment by preventing and reducing contamination in the form of air pollution, climate-relevant pollutants, noise (with the exception of traffic noise) and waste; this objective is entitled “Environmental Support in Austria”.

Since 1 April 1993, Kommunalkredit Austria AG, and subsequently Kommunalkredit Public Consulting GmbH since 1 October 2003, has been in charge of handling environmental support. The objective of the subsidies in waste management is to promote the use of technologies for recovery and the prevention of hazardous waste within business operations as well as energy recovery from waste of biogenic origin.

The subsidy rates are based on the principles of the Waste Management Act of 2002. They are staggered according to measures for the prevention, recovery or disposal of hazardous waste. Prevention and recovery measures for the reduction of non-hazardous waste may only be subsidised in the course of pilot projects.

The general trend in the first few years according to which fewer projects involving hazardous waste prevention and recovery to be submitted for subsidies than projects in other funding areas continued in the period between 2006 and 2010. Moreover, subsidies are also provided for measures that aim to replace fossil fuels through the thermal recovery of biogenic raw materials and residues, on the one hand, and to convert biogenic waste into...
biogas through fermentation in order to generate energy from it, on the other.

In the case of biogas facilities, the subsidies for additional investment to promote green electricity fed into the power grid were adjusted starting from the beginning of 2003. As a result, biogas facilities that produce electricity beyond the domestic requirements have no longer been promoted through environmental subsidies in Austria ever since.

With the reform of the Subsidy Guidelines in 2009, the name of the promotional focus was changed from “energy recovery from waste of biogenic origin” to “energy recovery from biogenic raw and residual waste”. This means that this promotional focus now basically concentrates on thermal treatment of biogenic raw and residual waste, taking into account the biogenic portion of the waste and possible thermal decoupling, so that the number of

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<th>Subsidised waste management projects from 2006 to 2010</th>
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5. Requirements and Measures

applications for subsidies is diminishing here as well. Biogas plants that transform biogas into natural gas quality have been promoted ever since under its own promotional focus: “Production of biogenic combustibles and fuels”.

With the reform of the Subsidy Guidelines in 2009, another promotional focus was created on the topic of “resource management”. Subsidies are provided for investments made through independent initiatives to reduce raw material consumption by at least 10% in the course of production processes already in place while maintaining the functionality of the product and for investments in innovative service concepts to increase material resource efficiency. The first applications are currently being evaluated. Due to the still relatively short period of observation, it is not yet possible to make well-founded statements about the acceptance and effects of this new area of promotion.

5.7.7. The Austrian eco-label and the EU Ecolabel

In creating the Austrian eco-label, an additional instrument was developed in 1990 to demonstrate environmental friendliness, quality as well as health and, in particular environmental awareness and environmental commitment to the outside. The eco-label is primarily addressed to consumers, but also the businesses. For consumers, the eco-label should serve as a point of reference when purchasing products. Its aim is to point out environmentally sound and environmentally sounder products to customers in the assortment available. The eco-label promotes greater transparency when assessing the environmental impact of products. Products awarded the eco-label are obliged to meet a number of criteria, and compliance with these needs to be verified through an expert assessment.

What is more, only products that exhibit appropriate fitness for use (quality) and have been proven environmentally sound are awarded the eco-label. In this way, the eco-label warrants a high environmental standard without having to fear any reduction in quality and safety.

In tourism operations, the Austrian eco-label is meant to help lower running costs by ensuring greater awareness in the use of energy and water, but also with regard to waste prevention and reduction. Environmentally sound business management helps keep nature and the environment intact, both of which form the basis of tourism.

The eco-label for schools aims to create awareness for sustainable development among all stakeholders, including students, parents and teaching staff, and also to promote ecological literacy in day-to-day life. The quality in the educational institutions is raised by setting targets and assessing their achievement.

Developing environmentally compatible products, services and solutions

The mission is to develop and revise eco-label criteria. Currently, there are 50 criteria. Recently, a number of new criteria have been adopted by the Eco-Label Advisory Board: in terms of “mobility”, the eco-label criteria for driving schools were adopted, for “gardens” the eco-label criteria for garden equipment were adopted, as well as the criteria for digital cordless telephones and for “green meeting” events.

In addition, several sets of criteria were revised in the prescribed four-year revision interval (e.g. tourism criteria, criteria for educational institutions).

Key eco-label figures

In terms of product eco-labels, the number of products awarded an eco-label has increased to over 1,150. Overall, 150 businesses manufacture products with the Austrian eco-label and generate more than € 560 through these products.

With 21 businesses and 80 products, the EU Ecolabel generates domestic sales worth € 415 million.

With regard to eco-labels for tourism operations, over 200 businesses currently carry an eco-label (with approx. 20,000 guest beds). Moreover, 80 schools have already been awarded the eco-label.

Educational work on the Austrian eco-label and the EU Ecolabel

The www.umweltzeichen.at website is updated continually. In addition, information events for eco-labels and EU Ecolabel stakeholders (e.g. expert workshops, public procurement, regular meetings for eco-label consultants of schools and tourism operations, workshops for newcomer schools and schools that have already been awarded the eco-
label and extra-mural educational institutions, etc.) are being carried out. With regard to the eco-label, a special marketing focus is being placed on “healthy living” and in the field of “energy”. Here, cooperation has been intensified with various furniture stores. Since 2004, another focus has been the “Clever shopping for school, for the benefit of the environment” campaign. A website has been set up for this at www.schuleinkauf.at.

**Strategic development of the Austrian eco-label**

In particular, plans are to deepen cooperation with the EU eco-label and the national German “Blauer Engel” eco-label while strengthening cooperation with a number of projects, including klima:aktiv, mobility management, Regions of Delight, national parks and also project in the Federal Provinces, such as in the area of “sustainable building”.
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6.1. Introduction

The increasing scarcity of resources and the negative environmental impact caused by the consumption of resources require us to find ways to use them sustainably and remove the link between economic growth and resource use, and by extension, environmental harm.

It is therefore one of the aims of the EU to create an economic system that is more efficient in its use of resources and energy and consequently more competitive.

A number of political instruments and strategies available to the EU, such as the EU Strategy for Sustainable Development, the Thematic Strategy for the Sustainable Use of Natural Resources, the Thematic Strategy for Waste Prevention and Recycling, the Action Plan for Sustainable Production and Consumption and for a Sustainable Industrial Policy, the Raw Materials Initiative, the Waste Framework Directive, the Ecological Design Directive and other product-specific directives, as well as REACH, are geared towards this objective.

The waste management policy contributes by working towards a functional closed-cycle management system that aims to use waste as a resource and also to prevent the accumulation of waste.

Waste prevention is at the top of the waste management hierarchy.

According to the Waste Framework Directive and the Waste Management Act of 2002, waste prevention is an issue that should be tackled from a quantitative and qualitative perspective. Waste prevention therefore encompasses all measures taken before a product becomes waste, reducing:

a) the quantity of waste, also through the re-use of products or the extension of the life span of products;

b) the detrimental effects of the subsequently accumulated waste on the environment and human health or

c) the pollutants contained in products.

In order to promote waste prevention activities, all Member States are obliged to draw up a Waste Prevention Programme by the end of 2013 under the new EC Waste Framework Directive. The targets and measures to be included in this programme should aim to cut the link between economic growth and the environmental impact of waste accumulation.

Annex IV of the Waste Framework Directive and Annex 1 of the Waste Management Act of 2002 include examples of measures whose expediency should be evaluated as part of the Waste Prevention Programme. Progress should be measurable against benchmarks to be defined by the Member States.

6.1.1. Prevention of waste – Status and environment

An increase in eco-efficiency is crucial for any sustainable economic system, with the increase in material efficiency and sufficiency being of primary importance and decisive in waste management. This shows that waste prevention generally merits high priority in any effort to ensure sustainable development. This fundamental rule, however, requires that each case be examined individually to find the best possible recovery or environmentally sound disposal solution.

What effect does the resource efficiency of the system as a whole have on waste management and what can it do?

Waste management can accomplish three things:

- First of all, it can ensure optimal recovery of waste, such as thrown-away foodstuffs, and it can prepare waste for re-use.
- Secondly, it can provide feedback to upstream areas, political decision-makers and the general public about problems arising during the waste stage.
- Thirdly, it can launch initiatives at the production/waste and consumption/waste interfaces.

Other than that, waste management can only exert indirect influence as a source of measurement variables in a control loop.

According to the European Commission, waste management indicators provide information on whether “progress is achieved in a balanced way towards social, economic and environmental goals.”

The Waste Framework Directive of the European Union (Directive 2008/98/EC) describes the measures that rely on information from waste management but must be implemented in upstream processes – “design and production and distribution phase” and “consumption and use phase”.

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6.1.2. Effect of other strategies on waste prevention

At the European level, the “Thematic Strategy on the Sustainable Use of Natural Resources”, the “Sustainable Consumption and Production Action Plan” and the “Raw Materials Initiative” all underscore the importance of increasing resource efficiency for the sustainable development of the European economic systems. Alone the name of the thematic waste strategy “Taking sustainable use of resources forward: A Thematic Strategy on the Prevention and Recycling of Waste” underscores the close relationship between the concepts “sustainable use of resources” and “waste prevention”. One of the main objectives, “Factor 4” (doubling welfare standards while cutting resource consumption in half), can also serve as a key objective for waste prevention, or waste prevention could serve as a tool to achieve this main objective.

In Austria, too, the social partners are convinced that resources must be used more efficiently in order to ensure economic growth. “Increasing energy and resource efficiency in the economy pushes the boundaries of growth and thus creates the necessary time to manage the transition to a sustainable prosperity model in which the economy and the environment are no longer in conflict with each other.”

Individuals as well as society as a whole (the economy) are caught in a web of apparently mutually exclusive interests – on the one hand economic growth, on the other hand sustainable conservation of the principles of life and welfare. Taking measures to make the use of raw materials more efficient and thus reduce waste can mitigate some of the conflict between the targets. **This makes waste prevention an indispensable component of any sustainable growth strategy.**

6.1.3. The economic reality

The aim of economic activity, apart from generating profit, is usually to achieve growth within the relevant economic sector. If legislators created the right framework conditions, it would become desirable, from a micro-economic perspective, to reduce resource consumption.

---

**Resource policy as a mediator**

**Growth-oriented policies** Overview of permanent and short-term successes

- Social policy
  - basic income
  - growth
- Economic policy
  - free movement of goods
  - growth
- Labour market policy
  - full employment
  - growth

**Mitigating policies** Overview of medium- and long-term objectives

- Waste prevention
  - decrease
- Climate policy
  - decrease

**Resource policy**
- securing of supply
- sustained use
Waste prevention is an issue between a number of divergent interests:
- individual consumers – the common good
- the economy – the common good
- environment as a common good – profit and labour as a common good

An active resource policy could mediate between the divergent requirements of growth policies and mitigating policies. A resource management policy is crucial. Without an active resource management policy, our supply of energy and materials cannot be secured over the long term.

6.1.4. Need for action

Mitigating policies will only be successful if integrated into growth policies. Each individual measure in a growth policy must be checked to ensure that it does not counteract a mitigating policy. There is no either or when it comes to growth and mitigating policies. Neglecting one side would weaken the other side, too. Only an integrated resource policy is liable to engender new and sustainable solutions.

In an economy built on the division of labour, there is hardly any link between one’s own activities (work) and the production of the goods one consumes. As a result, people are unable to gauge how much raw material, energy and work – in short “resources” – it takes to make a product. Individuals who do not know the “objective value” (the resource input) of a good are unable to assess the impact of their choice, i.e. their decision to consume the product, leave it be or look for a more environmentally sound product. Without a minimum of interdisciplinary information or education, individuals are unable to truly engage in waste prevention, even with the best intentions, because they cannot tell what effect their choice will have. Prevention (more careful use of resources) requires:
- Economic growth must be evaluated together with its negative impact, i.e. by offsetting the positive effects of a product or process against its negative effects (comprehensive view). As it stands now, activities to repair the damage done by economic growth actually increase our primary economic indicator, GDP! (cf. European Commission 2009d).
Knowledge of the resources inherent in a product or service, e.g. by indicating CO₂ emissions, the amount of waste accumulated during production, man-hours used.

Recognition from society for cutting down on resource use.

“The smartest lifestyle earns recognition, not ownership of the biggest or most potent product”. None of these functions can be fulfilled directly by the waste management sector. Waste management is the end-point of a production and use chain, and is concerned with the best possible treatment of accumulated waste. However, waste management can give vital feedback to the upstream production and consumption processes. To form a control loop, these “measurements” must become a factor in the upstream processes, where they need to be taken into account. The Waste Prevention Programme and other instruments, such as holding polluters responsible, are suitable methods to shorten the response time of the control loop.

Theoretically, a sustainable ecological system of economy with minimal waste generation and optimal waste recovery should be able to develop spontaneously if the social costs, environmental costs and consequential costs for future generations are fully covered by the product prices and if all participants in the market are fully informed. An internalisation of all the social and environmental costs, however, hardly appears possible. Moreover, information deficits need to be offset in many places. Therefore, targeted waste prevention measures must be taken by the public authorities – in co-operation with industry and the consumers – as part of a medium to long-term strategy.

6.1.5. Requirements for the Waste Prevention Programme

Under the Waste Framework Directive, the EU Member States are obliged to prepare a waste prevention programme and issue a progress report in three-year intervals. This waste prevention programme should include the following elements:

- waste prevention objectives;
- a description of existing waste prevention measures;
- an assessment of the appropriateness of the sample measures listed in Annex IV of the Waste Framework Directive or other appropriate measures;
- the adopted prevention measures;
qualitative or quantitative benchmarks/objectives/indicators to monitor and assess the progress made with the adopted waste prevention measures.
The objective of the Waste Prevention Programme is to give a common framework and direction to all national initiatives for the reduction of waste accumulation and pollutants in material streams. The overriding aim is to decouple economic growth from the environmental lifecycle effects of waste streams.

By
- reducing material input and omitting polluting substances
- establishing material cycles
- supporting the use of technologies and techniques that use up less natural resources
- moving to more sustainable production and consumption models
- stimulating market demand for “efficient services” e.g. through a suitable public procurement policy
- minimising the hazards for human health and the environment
- “reusing” an object or substance (i.e. the new intended use of an object or substance [e.g. returnable bottles])
- “continuing to use” an object or substance (the non-intended, yet permissible use)
- should generally lead to
- an optimisation in resource efficiency
- a reduction of pollutants to a minimum in materials and goods streams
- a minimisation of emissions and
- a minimisation of pollutant dissipation (fine distribution) in the air, in water and in the soil during the entire lifecycle of the products (including downstream and upstream materials and goods streams)

The development of the programme is characterised by the following perspectives:
- the lifecycle perspective which helps identify those starting points at which the greatest effect can be achieved with the political measures
- the material perspective which defines the waste prevention targets, political instruments and the evaluation criteria for different material streams
- the integration of social and economic themes
- the interdisciplinary cooperation between the stakeholders to achieve the maximum synergy effect in waste prevention with other economic, social and environmental targets.

Furthermore, the following principles are to be observed:
principle of sustainability
principle of eco-efficiency and eco-sufficiency (minimal consumption of resources and minimal environmental impact to achieve a high life quality at a sustainable level)
principle of eco-sufficiency (minimal consumption of resources and minimal environmental impact to achieve a high life quality at a sustainable level)
principle of cost reflectiveness
principle of proximity (short transport routes along the lifecycle)
a waste management hierarchy (in principle, the potential for waste prevention should be exploited first, followed by the potential for product re-use, followed by the potential for material reuse, followed by the potential for energy recovery, followed by the potential for waste disposal.
principle of systemic thinking covering the entire lifecycle (consideration of the complete ecological rucksack)
polluter-pays principle and producer responsibility
precautionary principle
the principle by which environmental damage is combated, particularly at its source
principle of cost reflectiveness
principle of eco-efficiency and eco-sufficiency (minimal consumption of resources and minimal environmental impact to achieve a high life quality at a sustainable level)
principle of proximity (short transport routes along the lifecycle)
n a waste management hierarchy (in principle, the potential for waste prevention should be exploited first, followed by the potential for product re-use, followed by the potential for material reuse, followed by the potential for energy recovery, followed by the potential for waste disposal. However, all options must be considered simultaneously, and the mix of measures chosen should, in the long run, result in a system that minimises the environmental impact while at the same time achieving a high level of quality of life)
the principle stating that recovery comes before disposal is only applicable where no pollutants are released or diluted
waste, too, should be considered a resource
pollutant reduction
should generally taken into account in the material and goods streams;
can be achieved through the eco-design of product;
is also to be taken into account for recycling products;
A waste prevention strategy can be applied at any point in the value chain, from the extraction of raw materials over production and distribution to final consumption. The measures that result in the longest-term diminution of environmental degradation and exhibit the best cost-effectiveness ratio should be implemented first.
A waste prevention programme is not merely a plan defining a number of measures; much rather, it is a process that constantly evaluates the effectiveness of the plan and adapts it to the changing requirements at regular intervals.


The Waste Prevention and Recovery Strategy 2006 was the result of a consensus-finding process involving waste management experts and interest groups and was developed with the help of scientific studies.
The following environmental objectives had already been defined for the Waste Prevention and Recovery Strategy 2006:

- "reducing emissions"
- "minimising the dissipation of pollutants"
- "reducing pollutants"
- "conserving resources"
The main focuses are on:
- large-scale streams of materials and waste
- materials and waste with a high pollutant content
- products and waste of high symbolic significance for consumers' waste behaviour and
- innovative approaches
The action fields and sets of measures were formulated on the basis of these key points.
The following figure shows the measures originally planned in the Waste Prevention and Recovery Strategy 2006 and an assessment of the progress.
Starting points and measures of the Waste Prevention and Recovery Strategy 2006

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<tr>
<th>Main avenues</th>
<th>Sets of measures</th>
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<td>Large-scale streams of materials and waste</td>
<td>Prevention and recovery of construction and demolition waste</td>
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<td>High pollutant contents</td>
<td>Input/output optimisation</td>
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<td>Waste incineration &amp; use of substitute fuels/substitute raw material</td>
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<td>High symbolic significance for consumer behaviour</td>
<td>Product-based material flow analysis</td>
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<td>Innovative approaches</td>
<td>Ban on Ni-Cd batteries</td>
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<td>Reusable packaging</td>
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<td>Services instead of products</td>
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Starting points and measures of the Waste Prevention and Recovery Strategy 2006

- **Large-scale streams of materials and waste**
- **High pollutant contents**
- **High symbolic significance for consumer behaviour**
- **Innovative approaches**

made since, as well as the recommended next steps. The majority of planned measures were implemented and made substantial progress. For some of the measures, the required conditions had to be created first. These measures will be implemented in the Waste Prevention Programme 2011. The measures taken have proved expedient for the development of a sustainable economy in Austria.

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<td><strong>Envisaged measure</strong></td>
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<td><strong>Building pass package</strong></td>
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<td>Studies on refining the building pass concept</td>
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<td>Pilot projects to optimise the building pass concept and to prepare for the introduction of the building pass</td>
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| Development of a building pass standard | The following measures are being taken for building assessment systems:  
- harmonisation of the building assessment systems IBO ÖKOPASS and TQ to TQB and expansion of scope to include non-residential buildings, as well as increased consideration of the waste stage of the building lifecycle  
- definition of “klima:aktiv house” and “passive house” standards  
The EKON project provides the principles for building information management systems that could evolve into standards at a later stage. | |

<table>
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<th>Envisaged measure</th>
<th>Implemented measure</th>
<th>Assessment of the package</th>
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| **Low-waste construction package**                                               | > from 2007 to 2009, the “Building of Tomorrow” initiative of the Federal Ministry of Transport, Innovation and Technology saw a total of 40 projects that had to do with passive houses, energy efficiency, ecological materials and renewable energy | This package is specially geared to long-term changes in the construction sector. The expected effect is an increased application of the principles of low-waste construction. In the medium term, this package of measures will bring about increases in the material efficiency of buildings, a decrease in the amount of materials used as well as a reduction in the total amount, but also an improvement in the quality, of waste accumulated in construction. A reduction in the total amount of construction and demolition waste, and an improvement in its quality, is expected over the long run. The introduction of the TCO (total cost of ownership) principle in public procurement is an important cornerstone for low-waste building construction. While the other measures within the package initiated to date may be efficient and advance the objectives of the Waste Prevention and Recovery Strategy – particularly the objective of resource conservation/resource efficiency, but they must be supplemented with additional measures with a narrower focus on low-waste building construction. This should be done in conjunction with:  
> pilot projects for the development of innovative low-waste technologies and techniques  
> teaching aids for training skilled workers in “low-waste building construction” methods as part of their vocational education and training. |
| Model performance descriptions and standards for public tender: use of low-waste construction techniques, minimum standards for building materials employed and the application of lifecycle costs for the duration of a building’s life. | > Internet-based information note “ÖkoInform”  
> www.baubook.at – webpage “Ökologischer Wohnbau”  
> tools of the Austrian Association for the Recycling of Building Materials (ÖBRV)  
> sample waste management programmes  
> a host of different environmental building specifications for public developers for their own building projects, for new buildings and redevelopment  
> Provincial housing subsidies introduce minimum environmental building standards, some are mandatory (such as the ban on fluorine-containing, climate-change insulation materials), some as optional can-criteria, some with a bonus system for higher subsidy amounts  
> introduction of the total cost of ownership (TCO) as principle in public procurement in the Sustainable Public Procurement Action Plan |                                                                                                                                                                                                                      |
<p>| Teaching aids for training specialists in “low-waste construction” methods as part of their education |                                                                                                                                                                                                                      |                                                                                                                                                                                                                      |
| <strong>Extended use package</strong>                                                        | &gt; introduction of the total-cost-of-ownership (TCO) principle in public procurement                                                                                                                                                                                                 | The introduction of the TCO (total cost of ownership) principle in public procurement is an important cornerstone for extending the useful life of buildings. Standards aimed at extending the useful life of buildings to be applied in public procurement could lead to an actual extension of the useful life not only of public buildings but of other buildings as well, as it sets an example for others to follow. In the long run, this would lead to a reduction in material use and waste accumulation in construction, and contribute towards resource conservation. Building on the TCO principle, specific standards for the extended use of buildings for public tender purposes should be elaborated. |
| Standards for the extended use of buildings for public tender purposes            |                                                                                                                                                                                                                      |                                                                                                                                                                                                                      |</p>
<table>
<thead>
<tr>
<th>Envisaged measure</th>
<th>Implemented measure</th>
<th>Assessment of the package</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Selective dismantlement package</strong></td>
<td>Basics for construction site management and sorting islands in the RUMBA project of the City of Vienna. The Environment Agency Austria's publication &quot;Verwertungsorientierter Rückbau&quot; (&quot;Recovery-oriented dismantling&quot;) provides an overview of the current project status. ENeBa (Recovery of construction and demolition waste) is a real-life tested method to create an inventory of the mass and materials accumulated when a building is torn down. The ENeBa project is concerned with drawing up a plan for the sustainable use of construction and demolition waste. It is based on the supervision of the dismantling activities carried out on a number of residential buildings, an inventory of the waste fractions and an analysis of the material flows intrinsic to the accumulated waste.</td>
<td>Important parts of the originally planned package have been implemented. Further parts have yet to be carried out. In the medium term, the selective dismantling measures should result in an improvement in the quality of construction and demolition waste, a higher level of recycling, an increase in the recycling rate, reduction in recycling costs, resource conservation, as well as a decline in the dissipation of pollutants. Since this package is still in its pilot stage, no effects have been noted yet. The measures are efficient and in line with the times, as buildings are built with increasing levels of technology, causing additional pollution and placing even greater strain on dwindling levels of raw materials. Further measures include:  - continuation of the pilot projects  - making the application of ÖNORM B 2251 and ONR 192139 compulsory by writing them into the building regulations of the Federal Provinces. The introduction of a regime that makes the following compulsory: the production of a building site waste management programme, the drafting of a dismantling plan, pollutant surveys in buildings before dismantling and the installation of sorting stations on construction sites.</td>
</tr>
<tr>
<td><strong>Standards for the development of a dismantling plan and criteria for the dismantling of public buildings</strong></td>
<td>ONR 192130 “Investigation of pollutants in buildings before demolition”</td>
<td></td>
</tr>
<tr>
<td><strong>Regime by which the following become compulsory: production of a building site waste management programme, the drafting of a dismantling plan, pollutant surveys in buildings before dismantling and the installation of sorting stations on construction sites.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construction and demolition waste recycling package</strong></td>
<td>As part of the Green and Red Guidelines of the building Austrian Association for the Recycling of Building Materials (BRV), quality requirements for environmental compatibility were drawn up to ensure that the recycled construction materials are of good quality. In accordance with the treatment policy of Federal Waste Management Plan 2006, these quality criteria for environmental compatibility are in line with the state of the art for the recovery of all construction and demolition waste, and therefore their observance is compulsory.</td>
<td>The measures are in line with the original plan, but not all have been completed yet. These measures should bring about a very high recycling rate while keeping the dissipation of pollutants to a minimum. Required further steps:  - an ordinance making compliance with the quality standards, provisions on environmental compatibility and end-of-waste regulations compulsory.</td>
</tr>
<tr>
<td><strong>Quality standards and environmental compatibility provisions applicable equally to primary and recycled building materials.</strong></td>
<td>Minimum recyclate contents have been defined for the Austrian eco-label „Mineralisch Gebundene Bauprodukte“ (mineral-bound building material systems) (for construction materials that are not made of renewable materials). According to the Austrian Sustainable Public Procurement Action Plan, bonus points are awarded in public calls for tenders whenever construction materials with this label are used.</td>
<td></td>
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<tr>
<td><strong>Provisions on compulsory compliance with these standards</strong></td>
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</tr>
<tr>
<td><strong>Public procurement criteria for the use of recycled building materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>End-of-Waste Ordinance</strong></td>
<td>The Federal Ministry of Agriculture, Forestry, Environment and Water Management is currently planning an ordinance on waste treatment obligations and the end of waste for construction and demolition waste.</td>
<td></td>
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<tr>
<td><strong>Package for all levels of impact</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The teaching subjects “Low-waste construction”, “Extended use of buildings”, “Selective dismantling”, “Use of recycled building materials” and “Production and application of the building pass” are to be used more intensely in the basic and vocational training of specialists.</td>
<td>The Federal Ministry of Agriculture, Forestry, Environment and Water Management has addressed general universities and universities of applied sciences, asking them to include “low-waste construction and sustainability” in their curricula. The training course “Demolition projects and dismantling” of the Austrian Association for the Recycling of Building Materials (ÖBRV)</td>
<td>This package of measures marks a first step in this direction. Proper teaching and application of the standards “Low-waste construction”, “Extended use of buildings”, “Selective dismantling”, “Use of recycled building materials” and “Production and application of the building pass” should lead to a long-term reduction in both primary and secondary resource consumption and waste accumulation in construction. This would contribute to all targets of the Waste Prevention and Recovery Strategy. These measures will also increase the pressure of resources, which is once again becoming more prominent in the public eye. The originally planned measures are yet to be implemented.</td>
</tr>
<tr>
<td>The developed standards for „Low-waste construction”, „Extended use of buildings”, „Selective dismantling”, „Use of recycled building materials” and „Production and application of the building pass” are to be implemented within the framework of public procurement.</td>
<td></td>
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<tr>
<td></td>
<td>Introduction of the total-cost-of-ownership (TCO) approach in public procurement. Building products with minimum recyclate content are given additional points The adoption of provisions for low-waste construction in the Provincial building codes is recommended.</td>
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</tbody>
</table>
The set of measures designated “Input and/or output optimisation for waste incineration and the use of waste as alternative raw materials or substitute fuels”

<table>
<thead>
<tr>
<th>Envisaged measure</th>
<th>Implemented measure</th>
<th>Assessment of the package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of limit values for pollutants in substitute fuels and alternative raw materials</td>
<td>&gt; Guideline for Waste Fuels</td>
<td>The implemented measures mostly correspond to those originally planned. However, the focus has recently shifted away from wastes with a high calorific value to wastes with a low calorific value. The expected conclusion is that emissions from waste incineration should be minimised, and in the case of co-incineration, that the propagation of pollutants into products should be avoided as far as possible. This contributes to the objectives of emission reduction and minimisation of pollutant dissipation into the environment. Since the composition of waste streams is constantly changing due to the increasing mechanism and improvements in the treatment techniques for contaminated waste, comparative analyses of available treatment techniques for contaminated waste have become a continuous process rather than a one-off measure.</td>
</tr>
<tr>
<td>A comparative analysis of possible techniques to treat polluted waste, taking the precautionary principle into account and an integrated approach (with a focus on additional waste that has been incinerated since 1 January 2004)</td>
<td>&gt; drafting of a sampling plan for substitute fuels</td>
<td></td>
</tr>
<tr>
<td>A comparative analysis of possible techniques to treat polluted waste, taking the precautionary principle into account and an integrated approach (with a focus on additional waste that has been incinerated since 1 January 2004)</td>
<td>The Master Plan for Environmental Technology has been completed. Measure 14 of the Master Plan concerns the development of new recovery processes for waste with a low calorific value and a range of implementing measures. The following implementing measures have been carried out to date: &gt; assessment of the current situation, &gt; definition of focal points for research &gt; preparation of a rough implementation plan.</td>
<td></td>
</tr>
<tr>
<td>Development of further measures for the segregation of highly polluted waste and disposal in a suitably equipped plant, including treatment of residuals and recovery of certain heavy metals</td>
<td>&gt; product-specific material flow analysis of waste for heavy metals – development of methodology</td>
<td></td>
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<td></td>
<td>a detailed plan for the mode of procedure in the product-specific material flow analysis of waste for the next Viennese residual waste analysis</td>
<td></td>
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<tr>
<td></td>
<td>2009 Analysis of Recoverables and Residual Waste in Vienna</td>
<td></td>
</tr>
<tr>
<td>The set of measures designated “Product-specific material flow analysis”</td>
<td>&gt; product-specific material flow analysis of waste for heavy metals – development of methodology</td>
<td>The measures are in line with the original plan. However, only the first step has been implemented thus far. It is expected that products with a high heavy metal content can be identified and their use reduced. It is anticipated that the increasing use of technology in households will lead to an ever wider range of pollutants (especially heavy metals) in residual waste. The continuation of this set of measures is both currently necessary and advisable.</td>
</tr>
<tr>
<td>Studies to identify which products (consumer goods) are predominately responsible for heavy metals found in residual waste</td>
<td>&gt; study on the effects of a ban on nickel-cadmium batteries in cordless tools</td>
<td></td>
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<tr>
<td>Studies on alternatives to these products</td>
<td>&gt; preparation of a rough implementation plan.</td>
<td></td>
</tr>
<tr>
<td>Public information on products with high heavy metal content and possibilities of avoiding their use</td>
<td>&gt; preparation of a rough implementation plan.</td>
<td></td>
</tr>
<tr>
<td>The set of measures designated “Nickel-cadmium batteries”</td>
<td>&gt; study on theLifecycle assessment of reusable cups at large-scale events</td>
<td>The review process of the Batteries Directive (2006/66/EC) in September 2010 provided the option of banning the use of nickel-cadmium batteries in cordless tools.</td>
</tr>
<tr>
<td>Pushing through a strict, EU-wide ban on nickel-cadmium batteries</td>
<td>&gt; study on the lifecycle assessment of reusable cups at large-scale events</td>
<td></td>
</tr>
<tr>
<td>Information campaign to make reusable packaging easier to recognise for consumers</td>
<td>&gt; study on subsidisation schemes for reusable packaging</td>
<td>The proportion of reusable beverage cartons is steadily declining. Reusable systems have been developed in the transport packaging sector. Due to the high intake and recycling ratios of disposable packaging, the environmental advantages, and hence differences, of reusable packaging have diminished. For this reason, no social consensus has been established on more far-reaching regulations.</td>
</tr>
<tr>
<td>Motivational campaign for company decision-makers</td>
<td>&gt; the initiative “Nachhaltige Wochen” (sustainable weeks) or “Bewusst kaufen” (sustainable consumption)</td>
<td></td>
</tr>
<tr>
<td>Agreement with retail on the improved presentation of reusable packaging in shops.</td>
<td>&gt; the initiative “Nachhaltige Wochen” (sustainable weeks) or “Bewusst kaufen” (sustainable consumption)</td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Envisaged measure</th>
<th>Implemented measure</th>
<th>Assessment of the package</th>
</tr>
</thead>
<tbody>
<tr>
<td>The set of measures designated “Services instead of products”</td>
<td>▶ Quali Pro Second Hand: RUSO Guideline on the Re-use of Waste Electrical and Electronic Equipment in Austria</td>
<td>The studies and pilot projects carried out correspond to the original plan. The implementation of the next steps has had to be slightly postponed in order to draw up an implementation plan that determines which measures are truly needed and viable.</td>
</tr>
<tr>
<td>Exchange of ideas with municipalities that have gained pertinent experience in second-hand and repair centres; Pilot projects for setting up second-hand and repair centres in other municipalities (e.g. upgrading waste sites or collection centres for recoverables);</td>
<td></td>
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<td>Setting up an internet platform for information on possibilities of repair and re-use</td>
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<tr>
<td>A study to investigate whether the “Services instead of products” concept could be efficiently used elsewhere.</td>
<td>Study: „Services instead of products – Innovative services from the waste prevention perspective“.</td>
<td></td>
</tr>
<tr>
<td>The development of relevant projects will be promoted through funding in the pilot and market introduction phase using technical and legal extension services and by developing a suitable organisational platform.</td>
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</tbody>
</table>

6.3. Other waste prevention initiatives in Austria

This chapter deals with
▶ further current measures at national level
▶ waste prevention and recovery in the Provincial waste management plans;
▶ successfully completed projects in Austria (success stories)

6.3.1. Current measures at national level

The Waste Management Act of 2002 defines the scope of possibilities for waste prevention in Austria:
▶ The Waste Management Act of 2002 defines waste prevention as a basic principle of Austrian waste management.
▶ Section 8 of the Waste Management Act of 2002 provides that the waste prevention measures taken and the efficiency of these measures are to be presented in the Federal Waste Management Plan and specific provisions for a reduction of the waste amount and hazardous substance content in waste need to be developed.
Section 9 of the Waste Management Act of 2002 defines the targets and guidelines for sustainable waste prevention in Austria. According to sec. 10 of the Waste Management Act of 2002, a waste management programme needs to be drafted for specific plants. According to sec. 11 of the Waste Management Act of 2002 businesses with more than 100 employees are obliged to appoint a waste officer. Section 14 of the Waste Management Act of 2002 empowers the Federal Minister of Agriculture, Forestry, Environment and Water Management to define certain measures aimed at waste prevention.

Based on the Waste Management Act, a series of ordinances were issued, which aimed, in part, to reduce the amount of waste and, in part, to improve waste quality. Additionally, there are a large number of measures, which, building on the Chemicals Act and the Plant Protection Products Act, contribute to a reduction in the pollutants contained in waste, i.e. qualitative waste prevention.

**Ordinances based on the Waste Management Act which, at least in part, aim to prevent waste**

<table>
<thead>
<tr>
<th>Ordinance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>on the Prohibition of Certain Additives to Lubricants and the Use of Chain Saw Oils</td>
<td>(Federal Law Gazette No 647/1990)</td>
</tr>
<tr>
<td>on Waste Treatment Obligations (Waste Treatment Obligations Ordinance)</td>
<td>(Federal Law Gazette II No 459/2004)</td>
</tr>
<tr>
<td>on Waste Prevention, Collection and Treatment of Waste Batteries and Waste Accumulators</td>
<td>(Federal Law Gazette II No 159/2008)</td>
</tr>
</tbody>
</table>

In addition to the measures aimed directly at waste prevention, there are a large number of nationwide initiatives that contribute to resource efficiency, sustainable production processes, eco-efficient products and services, sustainable consumption and sustainable public procurement, thus promoting waste prevention in an indirect way.

**Ordinances based on the “Chemicals Act” and the “Plant Protection Products Act” which contribute to qualitative waste prevention**

<table>
<thead>
<tr>
<th>Ordinance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prohibiting the Use, Production and Distribution of Fully Halogenated Chlorofluorocarbons in Pressurised Packaging</td>
<td>(Federal Law Gazette No 55/1989) and Restricting / Banning the Use in Other Applications (Federal Law Gazette No 301/1990)</td>
</tr>
<tr>
<td>Prohibiting Halons (Federal Law Gazette No 576/1990) and Establishing a Halon Bank</td>
<td>(Federal Law Gazette II No 77/2000)</td>
</tr>
<tr>
<td>Prohibiting Halogenated Biphenyls, Terphenyls, Naphthalines and Diphenyl Methanes</td>
<td>(Federal Law Gazette No 210/1993)</td>
</tr>
<tr>
<td>Prohibiting Certain Party Halogenated Hydrocarbons (HCFC Ordinance)</td>
<td>(Federal Law Gazette No 750/1995)</td>
</tr>
<tr>
<td>concerning the Classification, Packaging and Labelling of Hazardous Substances and Preparations as well as the Safety Data Sheet (Chemicals Ordinance 1999, Federal Law Gazette II No 81/2000)</td>
<td>as amended by Federal Law Gazette II No 393/2008</td>
</tr>
</tbody>
</table>
### Examples of national initiatives for resource efficiency and sustainable production/products/services/consumption/public procurement and their respective targets (Environment Agency Austria 2011b)

<table>
<thead>
<tr>
<th>Lifecycle stage/Service field</th>
<th>Initiative</th>
<th>Targets of the initiative (excerpt)</th>
</tr>
</thead>
</table>
| Across all lifecycle stages  | The Austrian Strategy on Sustained Development 2002 | Conclusion of new voluntary agreements with companies to establish certified environmental management systems (EMAS)  
Creation of a nationwide voluntary system of „sustainability reports” for business enterprises  
Long-term: achieve a reduction (in absolute terms) in primary raw material consumption  
Steady increase in market share of eco-efficient products and services  
Reduced use of hazardous substances, materials and products  
Only products for which the impact on the environment and human health have been quantified and documented can be found on the market  
Decoupling traffic volume and economic growth  
Introduction of transport technologies with greater material and energy efficiency  
Reduction in the growth rate in soil-sealing from 10,000 m²/day to 1,000 m²/day by 2010 |
| The Austrian Strategy on Sustained Development (ÖSTRAT) | | Promotion of innovation, and the internalisation of external costs  
Promotion of integrated raw material management and introduction of quality criteria for raw materials  
Introduction of nationwide consistent criteria for public procurement  
Harmonisation and greening of public subsidy programmes, especially in the housing sector  
Eco-efficient products and information on sustained consumption should be made available  
Incentives for food awareness and efficient consumer behaviour in food consumption  
Applying sustainability criteria more often to public events  
Active implementation of the European Technology Action Plan (ETAP)  
Improved spatial planning to make transport more efficient |
| Resource Efficiency Action Plan | | Determination of lead measures and instruments to improve resource efficiency |
| Austrian Strategy on Sustained Development | | Enhance awareness for sustainability among students and teachers; networking of players in the fields of action “Environment” and “Sustained consumption” |
| Raw materials, primary resources | Austrian Raw Material Plan | Prevention of reckless exploitation of mineral raw materials  
Reduction of land required for the extraction of raw materials  
Minimised consumption of primary minerals  
Reactivation of abandoned mines where economically viable  
Use of environmentally sound mining processes that result in low emissions |
| Production eco-efficient products and services | Environmental Technology Master Plan (MUT) | Increase the market volume and global market share of Austrian environmental technology by achieving technology leadership  
By 2020, the GDP share of environmental technology should grow to 8%, providing employment to 40,000 persons, with an export ratio of 80% and a worldwide market share of 2.5%, accounting for 5% of the Austrian manufacturing output. |
| | Austrian Nanotechnology Action Plan | Provide information on the current production figures and applications of nanotechnology and nano-scaled materials  
Identify the specific need for action in Austria  
Propose recommended actions for the period until 2012 |
| Austrian Program on Technologies for Sustainable Development and Guiding Principles | | Implement „lighthouse” demonstration projects to assist market penetration of energy-efficient production processes and energy systems, and to promote the use of renewable energy sources, renewable resources and eco-efficient building materials |
| Building of Tomorrow | Factory of Tomorrow | Energy Systems of Tomorrow |
| Climate Strategy 2007 | | Raise the overall energy efficiency of the Austrian industrial sector  
Raise the share of electrical power generated from renewable resources and district heating  
Reduce nitrogen fertiliser use |
| Energy Efficiency Plan | | Energy saving reference value of 17.9 PJ for 2010 and 80.4 PJ for 2016 for Austria  
Develop and use energy-efficient technologies and solutions (e.g. minimise electricity consumption in standby mode)  
Achieve a 16% reduction in Austria’s overall energy consumption by 2016 |
### Examples of national initiatives for resource efficiency and sustainable production/products/services/consumption/public procurement and their respective targets (Environment Agency Austria 2011b)

<table>
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<th>Initiative</th>
<th>Targets of the initiative (excerpt)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production / eco-efficient products and services</strong></td>
<td>Climate and Energy Fund</td>
<td>Realise a sustained energy supply Reduce greenhouse gas emissions Increase research activity</td>
</tr>
<tr>
<td></td>
<td>Environmental support in Austria pursuant to the Environmental Support Act</td>
<td>Protect the environment by preventing or reducing pollution caused by waste, among other things (environmental support in Austria) Support (among other things) studies and investments in plants that employ cutting-edge technology, making them particularly suitable for the reduction of environmental pollution from waste (state of the art). Environmental support in Austria is, however, limited to the avoidance of hazardous waste.</td>
</tr>
<tr>
<td></td>
<td>Database of environmental engineering providers (<a href="http://www.ecolinx.at">www.ecolinx.at</a>)</td>
<td>Make the complex range of environmental and energy technology offerings as transparent as possible and/or market it efficiently to potential customers and partners</td>
</tr>
<tr>
<td></td>
<td>ACT Competence Centre (Austrian Clean Technologies) (<a href="http://www.act-center.at">www.act-center.at</a>)</td>
<td>Coordinate and provide an impetus for the measures detailed in the Environmental Technology Master Plan (MUT)</td>
</tr>
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<td></td>
<td>Green Events Austria</td>
<td>The initiative seeks to establish standards for sustainable events in the various event areas</td>
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<td></td>
<td>Austrian eco-label – Green Meetings</td>
<td>Certification for events and organisers who provide quality products and services with a low environmental impact</td>
</tr>
<tr>
<td></td>
<td>The Austrian eco-label</td>
<td>Improvement in quality of life and environmental quality Clear and transparent information High recognition value Environmental policies established by the business enterprises and organisations themselves High-level cooperation with optimal services</td>
</tr>
<tr>
<td><strong>Sustainable consumption in the public sector / events</strong></td>
<td>Austrian Sustainable Public Procurement Action Plan</td>
<td>Public administrative bodies exclusively buy products and services that meet a certain minimum degree of sustainability Support for “best available” products and services by providing funds to public procurement departments wishing to buy high-quality products and services while keeping an eye on sustainability</td>
</tr>
<tr>
<td></td>
<td>Guideline for greening efforts, particularly in public procurement, in the Federal Government’s scope of enforcement</td>
<td>Improvements in the environmental quality of public procurement to help promote product and service quality Integration of ecological aspects in public procurement</td>
</tr>
<tr>
<td><strong>Sustainable consumption in the private sector</strong></td>
<td>“Nachhaltige Wochen” (sustainable weeks) or “Bewusst kaufen” (sustainable consumption)</td>
<td>Change of consumers’ buying habits in favour of more sustainable products and services</td>
</tr>
</tbody>
</table>

### 6.3.2. Waste prevention and recovery in the Provincial Waste Management Plans

The following emblematic waste prevention and recovery targets and measures are set out for the Austrian Provincial waste management plans:

- promoting advisory service for business enterprises;
- providing help through regional programmes for environmental protection in business enterprises in efforts to develop waste management programmes, implement eco-audits and introduce EMAS and co-funding these programmes;
- further optimising the separate collection of collectibles (paper, waste glass, waste metal, plastic, biogenic waste, used cooking oil) and hazardous household waste through a periodic analysis of residual waste;
- contributing to a minimisation of waste in construction work and increased use of recycled building materials by having public authorities act as role models;
- creating customised waste prevention campaigns on the basis of residual-waste analyses, including campaigns for the prevention of food waste or for the redistribution of excess food to persons in need;
- promoting the extended use of equipment by publishing repair, hire and second-hand manuals;
- supporting the development of repair and re-use networks;
- supporting the expansion of the scope of services offered by collection points for recoverables to include acceptance and storage of...
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used products as a preparatory step for reuse
- providing public relations efforts through the Federal Provinces and waste management associations

6.3.3. Austrian success stories
Listed below are several very positive examples amongst the numerous waste prevention projects carried out in Austria:
- Under the Ecoprofit initiative (Ökologisches Projekt für Integrierte Umwelttechnik or Ecological Project for Integrated Environmental Technology), companies based in Graz are audited and implement measures to enhance resource efficiency and reduce waste accumulation and emissions. The 46 companies certified by ÖKO-PROFIT® implemented a total of 376 environmental measures in the 2008/09 programme year. This resulted in a documented cost reduction of more than € 2.1 million, while 34 tonnes of hazardous waste and 7,374 tonnes of non-hazardous waste were prevented (www.oekos-tadt.graz.at).
- The EcoBusinessPlan for Vienna includes special environmental programmes for preventive environmental protection, offering professional advice and help for the practical implementation of measures to Viennese business enterprises as well as effective environmental promotion. From 1998 to 2010, 817 business enterprises made use of EkoBusinessPlan services. This resulted in cost savings of € 68 million, as well as a waste reduction of 12,000 tonnes of hazardous and 119,000 tonnes of non-hazardous waste (www.wien.gv.at/umweltschutz/).
- For large events, a mobile cutlery service is available for hire in several Austrian municipalities. In Vienna, for example, the service provides reusable cutlery for up to 2,000 event participants. More than 88,000 reusable cups can be rented. In addition, 40% of the cleaning costs for a total of 600,000 cups is paid for (wenigermist.natuerlichwien.at).
- The Repair and Service Centre (R.U.S.Z.) offers low-price repair or proper disposal of electrical and electronic goods, to improve their energy-efficiency or prepare them for re-use and distribution to persons in need. In addition, long-term unemployed persons and persons with special needs are given an open-ended employment contract at R.U.S.Z (www.rusz.at).
- “ReparaturNetzwerk Wien”, founded in 1999, is the biggest repair network in Austria. More than 50 business enterprises, most of which are micro-businesses, offer qualified repair services. Membership in the network is tied to a number of criteria. The project receives funding from the City of Vienna and is advised by “die umwelt-beratung”. The members of this repair network carry out approx. 50,000 repairs a year, preventing roughly 650 tonnes of waste per year (www.reparaturnetzwerk.at).
- In 2009, the pilot stage of the ReVital project was launched. This project was carried out under the auspices of the Waste Association of the Federal Province of Upper Austria. This is the first Austrian network of municipal collection points for recoverables and social-sector re-use businesses modelled on the Waste Framework Directive that has set itself the aim of maximising the amount of reusable waste reintroduced to the market and to give the economic benefit of this primarily to the regional social-sector institutions. Currently, the network includes 39 points collecting recoverables in 10 districts or statutory cities, 6 shops and three large welfare organisations. Plans are to extend the network for it to reach across all of Austria (www.revitalis-tgenial.at).
- The “ÖkoKauf Wien” project was launched in 1999 with the aim of ensuring the consistent “greening” of the procurement processes of the administrative authorities, hospitals and public utilities of the City of Vienna. Catalogues of environmental criteria have so far been drawn up for almost all products, materials and services required by the city’s administrative authorities. The catalogues of criteria go hand-in-hand with simple and time-effective methods to improve the environmental assessment of products and services without losing sight of other factors such as economic efficiency, quality requirements and suitability for purpose. A network of more than 300 members from the private sector, central administration, local authorities and NGOs has also been established (www.wien.gv.at/umweltschutz/).
- The campaign to promote the prevention of food waste in housing complexes (“Lebensmittelelabfälle vermeiden in niederösterreichischen Wohnhausanlagen”) in Lower Austria has strengthened the public’s awareness of their own buying and consumption behaviour for food items; it also provides simple tools to help people use food more carefully; http://195.58.166.60/noeav/; http://www.noe.gv.at/Umwelt/Abfall/Ressourcenschonung/Lebensmittel_im_Abfall.html).
- Since 2005, ARA AG has been running a subsidy initiative for waste prevention (“Förderinitiative Abfallvermeidung”), in cooperation with the...
City of Vienna and the Austrian Federal Economic Chamber. The Federal Province of Lower Austria has also come on board. From 2005 to 2009, a total of 79 projects from the private and public sector were approved for subsidisation. The amount of waste avoided in the first year after implementation of the project totals approx. 9,000 tonnes. However, since the vast majority of projects are geared to long-term waste prevention, the amount of waste is continuously reduced year by year.

6.4. The Waste Prevention Programme 2011


Although the Waste Prevention Programme was initiated by the public sector, it is intended to serve as a programme for the Austrian waste management sector and therefore invites all stakeholders to participate in the realisation of Austria’s waste prevention potential. The programme measures were discussed with stakeholders in the waste management sector during a series of workshops, and the public was given an opportunity to comment on the programme. The feedback and comments were integrated into the programme provided they did not jeopardise its consistency.

First and foremost, the Waste Prevention Programme 2011 is a plan that encompasses active measures to support the prevention of waste. Underpinning these is a vision of how the Austrian waste management sector should operate in 2020; the measures were derived from targets and action fields (= focal points; see graphic).

6.4.1. Vision

The vision underlying the Waste Prevention Programme 2011 for the material and waste management system in Austria seeks to establish the following situation by 2020:

- The Austrian waste management sector has achieved the objectives of waste management law with a great deal of effectiveness and efficiency. Effectiveness and efficiency, resource conservation and environmental compatibility are ensured in the long run.
- A crucial step has been taken away from a “throwaway” society towards a sustainable society.
- Knowledge of material streams and waste streams has improved remarkably. The relevant data on material and waste streams is collected, represented and communicated on a routine basis. EU regulations have been harmonised at a high level, so that they can be implemented far more efficiently and transparently within the overall system. By and large, our reliance on raw materials, especially those materials with limited availability, has been reduced and the material closed-loop system has been further expanded and improved. This has also allowed us to diminish the environmental impact linked to our imports in the relevant countries of origin.
- The only products imported and exported are those for which further use and treatment are sure to constitute only a low-level environmental burden.
- Cost reflectiveness has become standard practice, and the responsibility for the products in the market is now for the most part borne by the producers and those who place them on the market, making for efficient resource utilisation. In addition to market forces, legislative measures play an important role in shaping the framework conditions.
- The pollutant content of key products has been reduced. The dissipation of pollutants during
production, use, recovery and waste disposal has been significantly reduced. The waste management sector plays a greater role in separating pollutants from the stream of materials and in neutralising pollutants.

6.4.2. Objectives and fields of action

In accordance with the provisions of the Waste Framework Directive (2008/98/EC) and the objectives under the Waste Prevention and Recovery Strategy 2006, the Waste Prevention Programme 2011 has the following objectives:

- decoupling economic growth from the environmental lifecycle effects of Austrian waste (including all upstream chains)
- reducing emissions
- minimising the dissipation of hazardous waste
- reducing pollutants
- resource conservation (particularly with respect to raw materials and energy sources)

In order to attain these objectives both effectively and efficiently, focal points need to be defined in the form of action fields. These fields of action were derived from experience gained with the Waste Prevention and Recovery Strategy 2006, the proposal under Annex IV of the Waste Framework Directive and from current material-related problem issues in Austria’s national economy. The measures are:

- preventing construction and demolition waste
- preventing waste in business enterprises
- preventing waste in households
- preventing food waste
- re-use.

6.4.3. Evaluating the measures proposed under Annex IV of the Waste Framework Directive

The Waste Framework Directive calls for an evaluation to determine whether the measures provided for under Annex IV of the Waste Framework Directive are actually relevant to the Waste Prevention Programme 2011. This evaluation is described in the table below.
### Waste prevention measures from Annex IV of the Waste Framework Directive (2008/08/EC); Progress achieved in the implementation in Austria and expediency for the Waste Prevention Programme 2011

|---|---|---|---|
| Planning measures and other economic instruments that promote the efficiency of resource conservation | To this end, Austria has a wide range of planning measures and instruments at its disposal, from various theme areas of the environmental and resource policy (see next column); however, these should be supplemen-ted by measures more closely targeting waste prevention (see two columns further). | The Resource Efficiency Action Plan (REAP) within the Austrian Strategy for Sustainable Develop-ment  
Kyoto Strategy 2007  
1. Energy Efficiency Plan  
Austrian Program on Technologies for Sustainable Development  
Sustainable Public Procurement Action Plan | Development of standards for building passes as building material information systems  
Entry of building pass data into the central building and apartment register  
Making the application of ÖNORM B 2251 and ÖN 192139 compulsory by writing them into the Federal Provinces’ building codes  
Regulation to make the following compulsory: creation of a construction site waste management programme, a dismantling concept, investigation of pollutants in buildings prior to dismantling and the installation of sorting points on construction sites  
Support in the organisation of excess foodstuffs from retail and distribution to those in need and the re-use sector |
| Support for research into and development of low-waste products and technologies | Austria has a system in place to subsidise research and development for eco-efficient, energy-efficient and climate-friendly products and environmental technologies (see next column). This system should be complemented by measures that put greater emphasis on the prevention of waste and the avoidance of using environmentally harmful products (see next column). | Support for research and development of energy-/material-efficient and environmentally sound technologies and services in the Environmental Technology Master Plan and in the Austrian Program on Technologies for Sustainable Development | Pilot projects  
for the development of low-waste technologies and techniques  
for selective dismantling/urban mining/re-use of construction and demolition waste, giving special consideration to the re-use of suitable construction components |
| Making low-waste products and technologies more widely used | Support is provided within the scope of research and development programmes, cleaner production initiatives and guidelines for public procurement, the dissemination and use of low-waste products and technologies, among other things (see next column). The Waste Prevention Programme should complement the existing contents with targeted measures (see two columns further). | Environmental Technology Master Plan  
Austrian Program on Technologies for Sustainable Development  
Environmental subsidies in Austria promote efficient technologies by funding projects for the prevention of hazardous waste.  
Austria’s Federal Provinces provide additional subsidies. | Teaching subjects “Low-waste construction”; development and distribution of teaching and learning tools  
Fact sheets on low-waste technologies and techniques for businesses and households  
Expansion of existing repair and re-use networks |
| Development of waste prevention indicators | The benchmarks against which to evaluate the success of the respective measures should be indicated for each measure under the Waste Prevention Programme. These benchmarks should make reference to existing indicators in regular use in order to avoid additional cost. | Waste generated according to the Federal Waste Management Plan and in the status reports  
Residual waste in the Federal Provinces  
Material flow indicators in the indicator reports on Austria’s Sustainability Strategy | For more information, please refer to the chapter „Assessment the sets of measures – expected effect, indicators and benchmarks, monitoring“ |
### Measures proposed under Annex IV of the Waste Framework Directive (2008/08/EC); Progress achieved in the implementation in Austria and expediency for the Waste Prevention Programme 2011

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<tr>
<td>Promotion of ecological design, giving environmental aspects due consideration</td>
<td>A wide range of initiatives to do with this topic already exist in Austria (see next column); these should be complemented with a number of targeted measures in the Waste Prevention Programme (see two columns further).</td>
<td>The Austrian eco-label Environmental Technology Master Plan and Austrian Program on Technologies for Sustainable Development Regional programmes for environmental protection in business enterprises</td>
<td>Development of building passes as a building material information system Pilot projects for the development of innovative low-waste technologies and techniques in construction Internet-based “best practice” fact sheets on waste-preventing techniques/technologies + information campaigns Initiation of cleaner production programmes</td>
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<tr>
<td>Provision of information on industrial techniques for waste prevention</td>
<td>Supplementing ongoing initiatives (see next column) with targeted measures in the Waste Prevention Programme (see two columns further) could contribute significantly to an enhancement in the efficiency of Austrian business enterprises.</td>
<td>Database of environmental engineering providers (<a href="http://www.ecolinx.at">www.ecolinx.at</a>) ACT Competence Centre (Austrian Clean Technologies)</td>
<td>Teaching/learning aids in “low-waste construction” Information on products with high heavy metal content and possibilities of avoiding their use Internet-based “best practice” fact sheets on waste-preventing techniques/technologies Public relations for re-use</td>
</tr>
<tr>
<td>Training measures for public authorities to include waste prevention conditions in the licensing according to the Waste Framework Directive and IPPC Directive</td>
<td>In Austria, waste prevention measures form part of the waste management programme suggested by the plant operators and subsequently checked by the authorities as part of the licensing scheme (see next column). Limiting the related training measures to public authorities would stop short of the aim. It is therefore recommend-ed that the waste management programme be evaluated within the framework of the Waste Prevention Programme, 2011 and to determine whether the authorities and/or the planners require further training and whether this training is, in fact, appropriate (see two columns further).</td>
<td>Pursuant to the Waste Management Act of 2002 and the Austrian Industrial Code (GewO), a waste management programme must be drawn up by all plants with more than 20 employees when applying for an operating licence. This waste management programme should outline all waste-relevant processes, material flows and waste streams, as well as all current and planned waste prevention measures (Federal Ministry of Agriculture, Forestry, Environment and Water Management 2008c).</td>
<td>Evaluation of the waste management programme for waste prevention as an instrument Training measures for the competent authorities concerning the inclusion of waste prevention requirements in waste management programme Further training for planners on the preparation of waste management programme and the increased consideration of waste prevention and re-use.</td>
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<tr>
<td>Prevention of waste production at installations not falling under the IPPC Directive 96/61/EC</td>
<td>Small and medium-sized enterprises in particular require support in identifying and implementing their waste prevention potential. Existing measures (see next column) should therefore be complemented by additional measures under the Waste Prevention Programme (see two columns further).</td>
<td>Waste management programme and qualified waste officer Support initiative for waste prevention Regional programmes for environmental protection in business enterprises Environmental support in Austria pursuant to the Environmental Support Act In Austria, there are approx. 19 sector programmes.</td>
<td>Best Practice fact sheets Initiation of cleaner production programmes Continuing education for waste officers in business enterprises Extension of subsidies for waste prevention efforts in business enterprises Support for environmental management systems such as EMAS training programmes Promotion of re-use</td>
</tr>
<tr>
<td>Awareness campaigns and support for business enterprises (especially SMEs) with financing and decision-making concerning waste prevention measures</td>
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<tr>
<td>Voluntary agreements for sector-specific waste prevention plans and objectives</td>
<td>In principle, voluntary agreements are deemed a valuable tool to promote waste prevention. In addition to the existing agreement (see next column), opportunities to make use of this tool should be utilised.</td>
<td>Sustainability Agenda 2008-2017 of the Austrian beverage packaging industry Green events</td>
<td>Prevention of waste food in business enterprises and in retail Build-up/consolidation of a re-use network</td>
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<td>Support for recognised environmental management systems, including EMAS and ISO 14001</td>
<td>Environmental management systems and waste prevention could be used for mutual advantage. Therefore, any opportunities presenting themselves for the integration of both approaches should be used.</td>
<td>Regional programmes for environmental protection in business enterprises in the Federal Provinces support the implementation of environmental management systems. EMAS-certified business enterprises are granted easements in the certification of products for the Austrian eco-label and extra points in public invitations to tender acc. to the Sustainable Public Procurement Action Plan.</td>
<td>Support for environmental management systems such as EMAS</td>
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**Measures that can affect the consumption and use phase**

| Economic instruments: incentives for environmentally sound purchasing | It is generally accepted that it will be necessary to teach people about lifestyle and to take measures that will result in a greater awareness and more information on immaterial consumption and waste-preventing behaviour to counteract the flood of advertising promoting more and ever faster consumerism. | The initiative “Nachhaltige Wochen” (sustainable weeks) or “Bewusst kaufen” (sustainable consumption) | Information on products with high heavy metal content and possibilities of avoiding their use. Internet-based best practice fact sheets. Information campaign on the possibilities of waste prevention. Support for waste advisors of the municipalities and waste management associations. Strengthening of waste prevention in “Nachhaltige Wochen” (sustainable weeks). Campaign to raise awareness of food waste and point out specific do’s and don’ts. Integration of food waste prevention in continuing education and training programmes for teachers, kindergarten teachers, appropriate teaching materials. Public relations for re-use: National Campaign. |
| Economic instruments: mark-up price for a packaging article or packaging component that would otherwise be made available free of charge | Such a mark-up would have to be sufficiently high to be “perceptible”; only then can it steer people in the direction of waste prevention. | Ordinance, the collection and recovery of packaging waste is financed by licensing fees. The licensing fees are weight- and material-specific for the amount of packaging placed on the market. These costs are included in the final product price paid by consumers. | Ordinance, the collection and recovery of packaging waste is financed by licensing fees. The licensing fees are weight- and material-specific for the amount of packaging placed on the market. These costs are included in the final product price paid by consumers. |
| | | | Supermarkets have been charging customers for carrier bags for quite some time. |
### Waste prevention measures from Annex IV of the Waste Framework Directive (2008/08/EC); Progress achieved in the implementation in Austria and expediency for the Waste Prevention Programme 2011

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<tr>
<td>Awareness measures and information for the general public or specific consumer segments</td>
<td>This may be the most important and central measure to promote waste prevention on the consumer side. Awareness-building involves making people take note of their own consumption behaviour, the values lost through inefficient consumption and the barriers to efficient consumption behaviour.</td>
<td>The initiative &quot;Nachhaltige Wochen&quot; (sustainable weeks) or &quot;Bewusst kaufen&quot; (sustainable consumption) Prevention programmes in the Federal Provinces Forum for environmental education (<a href="http://www.umweltbildung.at">www.umweltbildung.at</a>) RedUSE project to sensitise pupils at schools</td>
<td>Campaign to inform consumers of products with a high level of heavy metals and how to avoid them Internet-based best practice fact sheets Information campaign on the possibilities of waste prevention Support for waste advisors of the municipalities and waste management associations Strengthening of waste prevention in &quot;Nachhaltige Wochen&quot; (sustainable weeks) Campaign to raise awareness of food waste and point out specific do's and don'ts Integration of food waste prevention in continuing education and training programmes for teachers, kindergarten teachers, appropriate teaching materials Public relations for re-use: National Campaign</td>
</tr>
<tr>
<td>The promotion of trustworthy eco-labels</td>
<td>Currently, there are important initiatives underway for the promotion of eco-labeling (see next column). The building pass is like an eco-label that is to be introduced along with the Waste Prevention Programme.</td>
<td>Austrian eco-label &quot;Nachhaltige Wochen&quot; (sustainable weeks) Sustainability seal for long-life electrical and electronic equipment that is easy to repair</td>
<td>Development of standards of building passes as building material information systems</td>
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<tr>
<td>Agreements with industry: provision of information on waste prevention and environmentally sound products</td>
<td>The &quot;Nachhaltige Wochen&quot; (sustainable weeks) initiative already includes an agreement with industry on the provision of information regarding waste prevention and environmentally sound products. In addition, appropriate measures will also be taken for &quot;re-use&quot;.</td>
<td>&quot;Nachhaltige Wochen&quot; (sustainable weeks) or &quot;Bewusst kaufen&quot; (sustainable consumption)</td>
<td>Online sales portal for re-use products that is not tied to specific business enterprises Nationwide campaign promoting re-use and establishing a re-use umbrella brand</td>
</tr>
<tr>
<td>Criteria for environmental protection and waste prevention in public procurement</td>
<td>The public sector plays an important pioneering role in the development of a sustainable national economy and waste prevention. Existing measures (see next column) are complemented by additional measures (see two columns further).</td>
<td>Public Procurement Act &quot;Ecological Guidelines&quot; of the Federal Government ÖkoKauf Wien criteria &quot;Green Events Austria&quot; initiative Austrian Sustainable Public Procurement Action Plan</td>
<td>The developed standards for &quot;Low-waste construction&quot;, &quot;Extended use of buildings &quot;, &quot;Selective dismantling&quot; , &quot;Use of recycled building materials&quot; and &quot;Production and application of the building pass&quot; are to be implemented within the framework of public procurement. Integration of the topic &quot;prevention of food waste&quot; in manuals describing the process organisation of public facilities (such as canteens and hospitals) and application of &quot;prevention of food waste&quot; principles in public procurement Procurement guidelines that facilitate re-use: adaptation of procurement law and the relevant existing guidelines</td>
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<tr>
<th>Criteria for environmental protection and waste prevention in calls for tenders in the private sector</th>
<th>Evaluation of the expediency of integration into the Waste Prevention Programme 2011</th>
<th>Examples of current measures in Austria</th>
<th>Measures in acc. with the Waste Prevention Programme 2011</th>
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<tr>
<td>A waste prevention programme initiated by the public sector can only have a limited effect on private-sector procurement processes. The most effective influencing factor appears to be the role model effect of public procurement on private-sector procurement.</td>
<td>Various initiatives launched by the Federal Provinces promote the creation of repair networks.</td>
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#### 6.4.4. The sets of measures

The measures in the Waste Prevention Programme 2011 are derived from

- the above evaluations of the Waste Prevention and Recovery Strategy 2006 and the measures under Annex IV
- as well as technical and socio-economic analyses on the topics of material consumption, food waste and re-use.

Each set contains a number of measures. Some of these measures can be comprised into packages within the relevant sets.

#### 6.4.4.1. Set of measures: “Prevention of construction and demolition waste”

The aim of the set of measures for “prevention of construction and demolition waste” is to promote techniques and technologies aimed at extending the use and service life of buildings, avoiding the use of hazardous substances and facilitating the separation of hazardous from non-hazardous substances in order to achieve a breakthrough, ultimately reducing the amount of waste from construction, as well as the proportion of construction and demolition waste containing hazardous substances.

This set of measures comprises three packages of measures:

- building pass
- low-waste construction and extension of the useful life of buildings
- selective dismantling/urban mining/re-use of building parts

The building pass is a system providing information on the material make-up of a building and should contain the necessary information for optimal, low-
waste management of the respective building over its entire lifecycle. The building pass is a tool that serves to document construction activities, covering the building materials employed, technical equipment (e.g. the heating, plumbing and electrical systems) as well as recommended maintenance measures and also contains operating instructions for the building. It is issued by planners, surveyors and construction engineers and is presented to the owner of the building. The building pass forms the basis for an environmental assessment of the building.

The building pass package comprises the following measures:

- development of principles for the standardisation of building passes as building material information systems
- development of standards for building passes as building material information systems
- collection of building pass data in the central building and apartment register maintained by Statistics Austria: the key indicators on the material make-up of a building, as well as any hazardous substances (such as asbestos) should be accessible from the central building and apartment register

Many approaches already involve suitable planning techniques and the use of suitable technologies and techniques to diminish the use of material with a high environmental impact in construction, adapt building services to changing requirements, extend the service life of a building through suitable maintenance measures, ensure that materials can be re-used by ascertaining separability and identifiability, as well as to reduce waste accumulation during construction, renewal and dismantling. Some principles, however, require further refinement and practical testing. One particular challenge in this regard is the construction of buildings that remain resource and energy-efficient and climate-friendly throughout their entire life-cycle. Approaches that have proved effective must be made widely known and included in the vocational training of those technicians who are meant to apply them. However, it is also necessary to create a market for the application of these approaches. The public sector can play the important role of a forerunner in this process.

The package of measures for "low-waste construction" comprises the following measures:

- pilot projects for the development of innovative low-waste technologies and techniques
- development of teaching material and tools on the principles, planning techniques, as well as techniques and technologies for “Low-waste construction” for the training of specialists in vocational schools and schools of higher education
- the teaching subjects “Low-waste construction”, “Extended use of buildings", “Selective dismantling", “Use of recycled building materials" and “Production and application of the building pass" are to be used more intensely in the basic and vocational training of specialists
- the developed standards for “Low-waste construction", “Extended use of buildings", “Selective dismantling", “Use of recycled building materials" and “Production and application of the building pass” are to be implemented within the framework of public procurement

The current stock of buildings contains significant anthropogenic deposits of materials which may, in future, be of limited availability or accessibility in primary deposits. These materials are valuable resources that should be made available efficiently for secondary use through urban mining and selective dismantling once the service life of a building has expired. Pollutants should be extracted and discharged into a safe pollutant sink. ÖNORM B 2251 and rule ONR 192139 on selective dismantling provide an important starting point for this. However, these standards must become more widely used. In addition, the “prospecting” and use of anthropogenic deposits require much additional methodological and technical development.

The package of measures for “selective dismantling/urban mining/re-use of building parts” therefore comprises the following measures:

- pilot projects on selective dismantling, urban mining and the re-use of construction materials – for example, for the creation of a resource register as a basis for dismantling plans
- the recommendation to make the application of ÖNORM B 2251 and ONR 192139 compulsory under the Federal Provinces’ building codes
- the introduction of a regime by which the following becomes compulsory: production of a building site waste management plan, the drafting of a dismantling plan, pollutant surveys in buildings before dismantling and the installation of sorting points on construction sites

The collection and storage of building pass data in the central building and apartment register should strictly make use of existing Austrian instruments, initiatives and organisations – particularly the Österreichische Gesellschaft für Nachhaltiges Bauen ("Austrian Association for Sustainable Building
Construction”, ÖGNB), which has a great deal of experience with the development and application of integrated building assessment systems and serves as an independent platform for the assessment of buildings across systems and materials, involving all relevant stakeholders of the Austrian construction industry.

ÖGNB developed the “Österreichisches Gütesiegel für Nachhaltiges Bauen” (the Austrian quality label for sustainable building construction), which uses the Total Quality Building (TQB) assessment system to capture and assess building quality. Buildings are assessed over their entire lifecycle; ÖGNB uses all relevant aspects of international standardisation activities (e.g. CEN TC350) in its assessment methodology. ÖGNB is currently still working on the creation of an Austrian construction material database with the input of all relevant entities and economic players from the waste management industry; without this database, a comprehensive building assessment system is unthinkable.

6.4.4.2. The set of measures designated “Waste prevention in business enterprises”

The objective of the set of measures for “waste prevention in business enterprises” is to help Austrian businesses identify and realise their waste prevention potential.

The small and medium-sized enterprises in particular frequently do not have the human resources to internalise the waste prevention techniques – which are readily available in principle – or to obtain information on efficient technologies or optimise their business processes to minimise the use of material. Buying in help from outside in the form of cleaner production experts also appears to be outside their financial means. More easily accessible information, funding for external consulting and financing to kick-start investments in material efficiency could help remedy the situation.

If a systematic approach is adopted, such as those provided for by environmental management systems, is reasonable to expect that the waste prevention potential of a business or organisation can be determined using suitable material flow analyses. To cite an example, the provisions of the EU-EMAS regulation (1221/2009/EC) call for suitable measures to ensure waste prevention, re-use and resource efficiency in order to achieve a continuous improvement in environmental performance. The Federal Ministry of Agriculture, Forestry, Environment and Water Management therefore supports waste prevention measures implemented as part of the introduction and continuation of environmental management systems.

The compulsory preparation of waste management programmes is an instrument with which business enterprises can be prompted to recognise their waste prevention potential and take the relevant measures to tap this potential. To be effective, however, this instrument must be accepted by the business enterprises. The Waste Prevention Programme 2011 should be taken as an opportunity to check whether the use of the “waste management programme” instrument meets the original expectations put to it, and where necessary, to develop support measures that should help to ensure use of the existing potential of this instrument.

The set of measures for “waste prevention in business enterprises” is divided into two packages of measures:

- direct measures for business enterprises
- waste prevention as part of waste management programme in accordance with sec. 353 of the Industrial Code (GewO) and sec. 10 of the Waste Management Act (AWG).

The package of measures designated “Direct measures for business enterprises” comprises the following measures:

- Internet-based fact sheets on best practices for waste prevention techniques/technologies; this is based on the review and harmonisation of waste prevention tips issued by the Federal Provinces and is accompanied by an intense information campaign
6. Waste Prevention Programme

- launch of programmes for the advice-supported identification and realisation of waste prevention potential in business enterprises following the example of Ökoprofit in Graz or ÖkoBusiness-Plan in Vienna
- continuing education for in-house waste officers for the identification and use of the waste prevention and re-use potential
- continuation and intensification of the regional programmes for environmental protection by business enterprises under the auspices of the Federal Provinces and co-funded by the Federal Ministry of Agriculture, Forestry, Environment and Water Management: expansion of the scope of business subsidies for waste prevention to include prevention of non-hazardous waste (in parallel to the recommended continuation of the “Förderungsinitiative Abfallvermeidung”, a subsidisation scheme for waste prevention co-organised by ARA, City of Vienna, the Federal Province of Lower Austria and the Austrian Federal Economic Chamber)
- support for environmental management systems such as EMAS according to ISO 14001 or of responsible care as a means to ensure waste prevention, re-use and resource efficiency

Some of these measures will benefit greatly from being rolled out sector-by-sector. It should also be noted that many of the projects aim not only to reduce the total amount of waste accumulated but also to diminish the pollutants used.

The package of measures for “waste prevention as part of waste management programmes in accordance with sec. 353 of the Industrial Code (GewO) and sec. 10 of the Waste Management Act (AWG)” comprises the following measures:

- an evaluation of the waste management programme with the aim of building on this programme and achieving an improved integration of the aspects of waste prevention, re-use and resource efficiency
- training courses for the competent authorities on the inclusion of waste prevention/re-use requirements in the waste management programme to be presented for licence applications in accordance with the Industrial Code (GewO) and the Waste Management Act (AWG)
- continuing education for planners on the preparation of waste management programme and an increased consideration of waste prevention and re-use

6.4.4.3. The set of measures designated “Waste prevention in households”

It is the consumers who decide which needs should be satisfied and to what extent. They choose the products they wish to consume, thus deciding which products and production methods become established in the market. This means that private households exert a substantial influence on the environmental impact of the entire lifecycle, on the efficiency and sufficiency of the Austrian economy.

To be able to maintain the high quality level in the Austrian waste management sector, the population should be informed of the possibilities of waste prevention on an ongoing basis. The results of the product-specific material flow analysis under the Prevention Strategy 2006 can be used as reference. In addition, there is a need to build awareness for waste management issues and sustainable consumption behaviour. The waste advisors employed by the municipalities and waste management associations, as well as primary school pupils and youngsters as a target group, play a crucial role in this respect. The Waste Prevention Programme supports nationwide public relations activities and encourages cooperation with the Federal Provinces, municipalities (municipal associations), waste associations and private-sector entities. One key public relations element is the work of the munici-
pal environment and waste advisors who are organised nationwide and operate in public institutions such as schools and kindergartens, as well as in SMEs. The set of measures for “waste prevention in households” comprises the following measures:

- Internet-based fact sheets on best practices for waste prevention techniques, material- and energy-efficient technologies as well as waste prevention conduct in private households
- Information campaigns on waste prevention opportunities in households and similar institutions
- The availability of fact sheets and waste prevention through consumption behaviour that emphasises quality of life
- Support for waste advisors of the municipalities and waste management associations
- Strengthening of waste prevention in “Nachhaltige Wochen” (sustainable weeks) and in the “Bewusst kaufen” (suitable consumption) initiative
  - creating and distributing fact sheets on waste prevention
  - getting the local and regional authorities (particularly those concerned with environmental and waste advice) to help them reach a broad audience
  - bundling communication measures for sustainable consumption

6.4.4.4. The set of measures designated “Prevention of food waste”

Purpose and objective of this set of measures
The long-term aim of this set of measures is to reduce the accumulation of discarded foodstuffs in Austria. All relevant players, including producers, consumers and society at large, should contribute.

One of the objectives of the Federal Waste Management Plan is to reduce the accumulation of foodstuffs in the municipal and/or business waste collection system by diminishing the amount of foods discarded as waste. This set of measures does not aim to shift this type of waste to other disposal systems, such as composting by the waste producers themselves, which would also lead to a reduction in the total amount of waste.

This set of measures is aimed at foods which are still safe to eat without limitation at the time they are discarded or which would have been safe to eat if they had been eaten in time but which, for a variety of reasons, are not negotiable (production, industry, retail) or have not been eaten (private households) and are therefore discarded. “Foodstuff” is defined in Art. 2 of Regulation (EC) No 178/2002 laying down the general principles and requirements of food as “any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans”; the German term “Lebensmittel” is defined in sec. 3 of the Austrian Food Safety and Consumer Protection Act.

Sets of measures and instruments
The measures described in detail for each target group in the table below are each assigned to an instrument of implementation.
6. Waste Prevention Programme

Overview of measures for the prevention of food waste

<table>
<thead>
<tr>
<th>Instrument / Target group</th>
<th>Information campaign / Awareness building</th>
<th>Promotion programmes</th>
<th>Voluntary instruments</th>
<th>Legal instruments</th>
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<tr>
<td>Foodstuff production, industry, retail and trade</td>
<td>Integration in education, best practice</td>
<td>Training programmes</td>
<td>Incentive system (best practice), guideline</td>
<td>Liability when passed on, waste definition</td>
</tr>
<tr>
<td>Social institutions</td>
<td></td>
<td>Training programmes</td>
<td></td>
<td>Quality standard</td>
</tr>
<tr>
<td>Industrial kitchens &amp; catering trade</td>
<td>Integration in education, best practice</td>
<td>Training programmes</td>
<td>Incentive system (best practice)</td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td>Awareness building &amp; action options</td>
<td>Further development of measures, research subsidisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Society &amp; public administration</td>
<td>Integration in education, teaching and learning materials</td>
<td>Guidelines for public institutions</td>
<td>Match definitions, notification requirements, basic data, statistical recording, composition</td>
<td></td>
</tr>
</tbody>
</table>

Package of measures (target group) for food production, food industry, retail and trade

- Preparation and implementation of training programmes for employees, and integration of the topic in industry-specific vocational training (e.g. for retail merchant), e.g. by writing teaching materials, project classes, etc.
- Collection of best practice examples from business and publication of this information in brochures, Internet platform, etc. This measure can also be used as part of the incentive systems.
- Development of incentive systems for business enterprises with the objectives of 1) throwing away less food and 2) giving unspoilt left-over food to others. Existing incentive systems could be used as a basis for this, e.g. through integration into the eco-business plan, in environmental management programmes (training for assessors and advisors, awarding labels with an advertising effect and giving awards (e.g. “Sozialmarie”, “Integrationspreis”, ...). Mandatory documentation of the measures implemented within the business enterprises is important for the evaluation of the individual measures.
- Clarification of the legal situation concerning any claims for damages if the foodstuffs are passed on to welfare organisations and clear definition of the term “waste” when forwarding edible foodstuffs. Harmonisation of the legal framework for forwarding foodstuffs across all Federal Provinces.
- Development of a handbook as a support tool when it comes to passing on foodstuffs to welfare organisations in collaboration with an interdisciplinary team of law professionals, food businesses, social workers, food hygienists, etc. The target audience for this are the employees who are concerned with the implementation in food businesses, welfare organisations and transport companies.

Package of measures (target group) welfare organisations

- Regular training courses on handling foodstuffs for employees of welfare organisations
- Development of a quality standards (e.g. certificate, quality label) for welfare organisations that distribute food. The aim is to provide a better overview of the many projects and organisations (e.g. for donating companies) and to facilitate an obligatory assessment of the types of foods provided and their respective amounts for evaluation purposes.

Package of measures (target group) industrial kitchens and the catering trade

- Preparation and implementation of training programmes for employees, and integration of the topic in industry-specific vocational training (e.g. for chefs and other restaurant and catering staff, hotel management schools), e.g. by writing teaching materials, project classes, etc.
- Collection of best practice examples in the sector in a similar way as for producers, industry, retail and the catering trade
- Creation of incentive systems for suitable measures in production, industry, retail and the catering trade and integration into existing programmes
Package of measures (target group) households

- Creating awareness on the topic and showing how people can do things differently by introducing the subject matter into informational material, events and focus activities; also cooperation e.g. with environmental organisations (waste associations, Klimabündnis [Climate Alliance], …), nutritional advice organisations (Weight Watchers, dieticians, …), agricultural associations (Austrian Farmers’ Federation, Landjugend, …), life counselling organisations (debt advice, welfare advice) and educational organisations (continuing education courses, adult learning centres), the retail and catering trade, media partners (cooking shows, informational TV programmes, documentaries, …), persons who are role models (making careful handling of foodstuffs fashionable). Each of the projects should be properly documented for evaluation purposes.

(Further) development of measures to create framework conditions that allow for the steering of people’s behaviour towards a more mindful approach to food (pilot projects, research studies): these should be founded in theory and take into account expert knowledge (psychology, behavioural science, nutritional science, home economics, …)

Package of measures (target group) society and public administration for the prevention of food waste

- Introduction of the topic in the training and continuing education for teachers and kindergarten teachers, development of teaching materials for pedagogues and learning materials for kindergartens and schools (outings; collation of teaching material; conduct project weeks in cooperation with the school councils, …)

- Introduction of the topic “prevention of food waste” in manuals describing the process organisation of public institutions (such as canteens or hospitals) and application of “prevention of food waste” principles in public procurement

6.4.4.5. The set of measures designated “Re-use”

Definition and demarcation

Re-use means extending the use of commodities. Re-using products rather than replacing them with new products results in an increased conservation of raw materials and energy, as well as a reduction of waste quantities.

If a product is re-used rather than thrown away, this constitutes an immediate waste prevention measure, irrespective of whether the product was repaired or any other measures carried out beforehand. If it is thrown away by the owner, collected as waste (recoverables) and then subjected to a preparatory measure (e.g. checking, cleaning, maintenance or repair work), this constitutes “preparation for re-use”. This preparatory step for re-use is both a waste prevention measure (recovery) and an indirect waste prevention measure. It is situated before recycling in the five-level waste hierarchy of the Waste Framework Directive, occupying the second-highest level behind (direct) prevention. End of waste occurs when the item can be re-used for its original intended purpose without requiring any further treatment.

However, the preparation for re-use of a waste product is only preferable to the waste treatment measures at the lower levels of the hierarchy if its negative environmental impact is not greater than that of the lower measures. The entire lifecycle must be considered (“lifecycle approach”) when determining this impact.

Assuming this pre-requisite is met, the re-usable waste should be collected separately as a “recoverable” in accordance with the Waste Management Act (AWG) and subjected to preparation for re-use. In order to maximise the re-use of as large amounts of re-usable waste as possible, quality standards
must be introduced to promote re-use and its pre-
paration, and the development of the new market
segment “preparation for re-use” (the “re-use sec-
tor”) should be promoted.

Establishing regional re-use networks and
quality assurance
Unlike recycling, re-use has a smaller potential in
terms of quantity, but the variety of the different
product groups and products is far higher. Many
products groups require expert knowledge for the
preparation for re-use, and the range of eligible
specialised businesses is correspondingly high.
Thus, in order to achieve optimal exploitation of the
scale potential, it is necessary to solve the complex
logistical and organisational task that will allow re-
use, identify re-usable waste, collecting it separ-
ately and then channel it from the collection cen-
tres (generally municipal collection points for re-
coverables) or points of generation (generally in
business enterprises) to the relevant specialised
recovery businesses, and then forward it to the
appropriate sales channels.

It is therefore recommended that the local and re-
gional authorities, particularly the Federal Provinces
and waste management associations, set up the
“accredited centres and networks for repair and
re-use” called for in the Waste Framework Directive
(Art. 11 (1) and Annex IV paragraph 16), which will
then take on the tasks mentioned above. This
should be promoted with suitable nationwide sup-
port measures.

In this connection it would appear expedient to
build on the RepaNet network (a repair network in
Austria with the objective of promoting resource
conservation and employment in the environmental
sector), which has been active in the re-use sector
both nationally and internationally since 2004, and
position it as a platform for the support, develop-
ment, quality assurance and coordination of the
re-use sector.

When developing quality standards for the collec-
tion, handling and preparation for re-use of waste,
as well as the final negotiable products, the rele-
vant stakeholders should be involved as part of a
permanent re-use working group. The technical
standards should be drawn up in a generally ac-
cepted procedure for technical standards and
promoted as widely as possible. What needs to
be determined for the next amendment to the
Waste Prevention Programme and the Federal
Waste Management Plan is whether farther-reach-
ing legal measures are an appropriate way to op-
timise the re-use sector.

Supporting measures for the creation of the
re-use sector
The following groups of measures and individual
measures should be implemented in the form of
subsidies, support or under the auspices of the
local and regional authorities.

Package of measures to promote re-use
outside the waste management system
(waste prevention):

▸ public relations activities for re-use: national
campaign (coordinated with the other nation-
wide public relations activities on waste preven-
tion and recovery)
▸ promotion of product services, particularly by
conducting market entry research, pilot projects
and subsidising start-ups
▸ procurement guidelines that facilitate re-use:
adaptation of procurement law and the relevant
existing guidelines
▸ re-use within the public sector of re-usable items
disposed of by public sector institutions: ex-
amination of potentials, implementation of provi-
sions for public authorities

Measures to promote preparation for re-use
(waste recovery)

A) Package of measures for ubiquitous
geographic coverage and economic
consolidation of the re-use sector

▸ linking up municipal waste management, wel-
fare organisations and private-sector repair and
second-hand business enterprises: collating na-
tional and international good practice examples
of combined re-use and second-hand activities
in the waste management and social welfare
sectors; networking platform for active and in-
terested municipal and welfare organisations,
concepts for the distribution of re-use products
to socially disadvantaged households, e.g.
through household-related social services, so-
cial markets
▸ strengthening re-use business enterprises
through pan-business networking and innova-
tive cooperation models
▸ model concept and development of technical
solutions for re-use logistics
▸ setting up technical working groups to develop
joint solutions for the re-use sector in the follow-
ing areas: collection, logistics; preparation for
re-use; sales and marketing, public relations,
distribution; legal affairs; employee training
▸ coordination group for the subsidisation strategy
and coordination of start-up subsidies for re-use
projects
- modular model plan for regional re-use networks for regions with varying structures
- developing assistance resources for re-use business enterprises (permanent advice centre, sample business plans, implementation handbook, checklists, sample contracts, samples for cooperation models, informational material, guidelines on various topics, templates for forms, contracts, records, internal training documents and internal instructions regarding work procedures, etc.)
- contract terms for the re-use sector in waste collection, particularly concerning the collection systems in accordance with the Waste Management Act (AWG): drafting of sample contract clauses for all significant interface situations
- developing a modular training programme for various target groups (re-use business enterprises, collection centres, waste advisors and public authorities)
- developing an insurance service package on the “liability risk of re-use businesses”

B) Package of measures to improve market penetration of re-use products
- online sales portal for re-use products that is not tied to specific business enterprises
- implementing a nationwide campaign for re-use and creating a re-use umbrella brand to boost demand for re-use products (in coordination with the other nationwide public relations activities for waste prevention and recovery)
- marketing push to get re-use business enterprises on board
- think tank: product services and innovative re-use business models
- design manual for re-use shops
- application, subsidisation/co-financing of development projects for re-use

C) Package of measures to improve the quality of re-use products and services
- creating and implementing uniform quality standards for re-use networks,
- business enterprises, collection centres and products; test standards and rules of conduct for every relevant re-use product group
- adapting the structure of collection entities to the requirements for re-usable waste
- developing framework conditions concerning the logistics for the provision of re-usable products.

One significant barrier encountered during the preparatory steps for re-use of waste electrical and electronic equipment is the damage caused by inappropriate transportation and storage. Further research is needed to establish ways to ascertain proper storage and transportation.

6.4.5. Implementation timeline
The Waste Prevention Programme 2011 is not the beginning of waste prevention in Austria, but merely a further stage in an existing cyclical process of planning, application, assessment and refinement of waste prevention measures. Nevertheless, the Waste Prevention Programme 2011 should not be seen as yet another routine initiative, but is intended to give waste prevention new momentum and fresh ideas.
6. Waste Prevention Programme

6.4.6. Assessment of the sets of measures – expected effect, indicators and benchmarks, monitoring

The Waste Prevention Programme 2011 is a collection of measures that have already been launched, measures that are being adapted and measures introduced for the first time. The ongoing measures have been continuing without interruption. Modifications will be implemented as soon as possible. Which of the new measures will be tackled first will be determined immediately once the programme comes into effect.

It is probable that only part of the programme measures will be complete by 2017, when a new programme is scheduled to be launched. However, this part should constitute a significant portion of the 2011 programme.

The table below illustrates the expected impact of the set and package of measures of the Waste Prevention Programme 2011. Overall, the waste reduction programme should contribute to an increase in resource efficiency and more discerning consumption behaviour. Its effect should be such that it gives a strong impulse to move the Austrian economy in the direction of a sustainable, environmentally sound economy. While each individual measure taken by itself is unlikely to bring about any significant changes in the amount of waste, the programme as a whole should have the potential to guide the Austrian system on its long-term path towards resource conservation and a reduced environmental impact.
<table>
<thead>
<tr>
<th>Expected impact of the Waste Prevention Programme</th>
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<tbody>
<tr>
<td><strong>Set of measures</strong></td>
</tr>
</tbody>
</table>
| Prevention of construction and demolition waste | Building pass | Increase in market share of ecological buildings  
More efficient use of buildings  
A reduction in the total amount of construction and demolition waste, and an improvement in its quality, is expected over the long run. |
| Low-waste construction and extending the useful life of buildings | Increased application of the principles of low-waste construction. In the medium term, this package of measures will bring about increases in the material efficiency of buildings, a decrease in the amount of materials used as well as a reduction in the total amount, but also an improvement in the quality of waste accumulated in construction. A reduction in the total amount of construction and demolition waste, and an improvement in its quality, is expected over the long run. Standards aimed at extending the useful life of buildings to be applied in public procurement could lead to an actual extension of the useful life not only of public buildings but of other buildings as well, as it sets an example for others to follow. In the long run, this would lead to a reduction in material use and waste accumulation in construction, and contribute towards resource conservation. |
| Selective dismantling/urban mining/re-use | In the medium term, the selective dismantling measures should result in an improvement in the quality of construction and demolition waste, a higher level of recycling, an increase in the recycling rate, reduction in recycling costs, resource conservation, as well as a decline in the dissipation of pollutants. |
| Waste prevention in business enterprises | Direct measures for business enterprises | Identification of waste prevention potential in businesses, knowledge transfer, deployment of waste prevention techniques (incl. environmental management systems) and technologies, optimisation of business processes with the following results: reduced waste accumulation, lower pollutant contents, increase in resource efficiency. |
| Waste prevention in the Waste Management Concept acc. to sec. 353 Industrial Code and sec. 10 Waste Management Act | Full use is made of the potential of the waste management programme as an instrument with which to promote waste prevention, re-use and bring about improved resource efficiency in businesses. This gives businesses a better overview and planning targets to increase the efficiency of their processes and minimise costs and environmental degradation. |
| Waste prevention in households | Internet-based fact sheets on best practices, information campaigns, advice from waste advisors, promotion of waste prevention during the “Nachhaltige Wochen” (sustainable weeks) and in the “Bewusst Kaufen” (suitable consumption) initiative. | The recommended measures would constitute first steps towards tapping this potential and motivating the general public to engage in consumption behaviour with more self-control. |
| Foodstuff | Prevention of food waste in food production, industry, the retail and catering trade | Identification and implementation of the waste prevention potential for foodstuffs in businesses and distribution. Use of unsold foodstuffs in social markets. This leads to an improvement in food provisioning while at the same time avoiding resource consumption and waste treatment costs. |
| Foodstuffs for welfare organisations | Improved use of excess foodstuffs to give to those in need. Overall improvement in public health. |
| Prevention of food waste in industrial kitchens and the catering trade | Identification and implementation of the waste prevention potential for foodstuffs in industrial kitchens and businesses in the catering trade. This leads to a reduction in resource consumption and waste treatment costs. |
| Prevention of food waste in households | Exploitation of the waste prevention potential for foodstuffs in households through awareness campaigns and improved public information. This leads to an improvement in food provisioning while at the same time avoiding resource consumption and waste treatment costs. |
| Society and public administration for the prevention of food waste | Awareness and knowledge of the importance and opportunities for the prevention of food waste will increase in business circles, in public administration and in the general public. This will lead to a reduction in preventable food waste. |
Expected impact of the Waste Prevention Programme

<table>
<thead>
<tr>
<th>Set of measures</th>
<th>Package of measures</th>
<th>Expected impact of the package of measures and set of measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Re-use</strong></td>
<td>Promotion of re-use outside the waste regime</td>
<td>The measures in this set should create a market for re-use by jump-starting demand for second-hand products.</td>
</tr>
<tr>
<td>Measures for ubiquitous geographic coverage and economic consolidation of the re-use sector</td>
<td>Creation of the foundations for and surmounting the main obstacles for the establishment of re-use businesses as a nationwide sector or coordinated, efficient network with a good outlook and growth prospects.</td>
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</tr>
<tr>
<td>Measures for the improved market penetration of re-use products</td>
<td>Positioning of re-use products as efficient, competitive and marketable products; revenue increases for re-use products.</td>
<td></td>
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<tr>
<td>Measures to improve the quality of re-use products and services</td>
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Realisation of this effect should be monitored using selected indicators. In order to limit the costs of this monitoring scheme, the indicators are divided into two categories:

- core indicators to be compiled regularly, preferably in yearly intervals and
- indicators belonging to the extended indicator set, which should be compiled at least once by 2017.

Two important core indicators are the quantity of the key waste streams and material input. The extended indicator set mainly includes those describing waste quality and those that geared more to the individual measures. The table below shows the recommended indicators for the Waste Prevention Programme by core indicator or extended indicator set.

For future evaluations, the degree of implementation of the planned measures should also be used as a benchmark for the assessment of the progress made for each measure.

Indicators for the Waste Prevention Programme 2011 by core indicator and extended indicator set

Core indicators (should be determined in any case, annually if possible)

- Annual quantities of the following Austrian waste streams:
  - waste from households and similar establishments / capita
  - residual waste
  - quantity of separately collected packaging waste
  - quantity of separately collected hazardous household waste
  - mass of waste from trade and industry (not including municipal waste, not including construction and demolition waste)
  - quantities of hazardous waste generated
  - construction and demolition waste (without excavated earth)

Extended indicator set (should be determined if possible)

- For construction and demolition waste:
  - quantity of hazardous fractions
  - recycling rate
  - landfilled mass

- For residual waste:
  - quantity of hazardous fractions
  - mass of foodstuff (classified according to those in original packaging, in opened packaging, foodstuff remains, ...)

- For re-use:
  - Quantity and annual turnover of re-use business enterprise
  - mass, quantity or turnover (in euros) of the annually sold and used re-use products in the form of an estimate based on a survey of a few leading business enterprises

- For the level of knowledge of consumers and business enterprises:
  - selected questions on consumption/use behaviour, knowledge about existing possibilities of waste prevention and re-use and on the handling of waste
Information on agriculture, food, forests, environment and water:  
www.lebensministerium.at

The initiative REGION OF DELIGHT AUSTRIA highlights the importance of regional specialities:  www.genuss-region.at

The campaign vielfaltleben (livingdiversity) contributes to the fact that Austria belongs in terms of natural areas to the most diverse countries of Europe:  www.vielfaltleben.at

The action programme of the Ministry of Life on active climate protection:  www.klimaaktiv.at

The youth platform for awareness raising on water issues:  www.generationblue.at

The Austrian Eco-label guarantees the environmental soundness of products and services:  www.umweltzeichen.at

The Ecological Footprint is the easiest way of testing the future viability of your lifestyle. Calculate your personal footprint at:  www.mein-fussabdruck.at

The internet portal of Austria’s National Parks:  www.nationalparksaustria.at

“Organic” means healthy, high-quality foodstuffs which do not contain any spraying agents or antibiotics  www.biolebensmittel.at