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FEDERAL WASTE MANAGEMENT PLAN 2017
PART 1

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INTRODUCTION

1. INTRODUCTION

BASIC PLANNING CONCERNING SUSTAINABLE WASTE MANAGEMENT

IN ORDER TO ACHIEVE THE OBJECTIVES AND PRINCIPLES of the Waste Management Act 2002, the Federal Minister for Agriculture and Forestry, Environment and Water Management shall create a Federal Waste Management Plan at least every six years and publish it via the Internet. As of now, the sixth update is available. This chronicles the waste management measures adopted hitherto along with their efficiency.

A notification as per the Notification Act, Federal Law Gazette I No 183/1999, as amended, and in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services was made under number 2017/79/A.

1.1. GENERAL

The Federal Waste Management Plan shall include the following contents (Article 8(3) of the Waste Management Act 2002):

1. A survey of the waste management situation and an assessment of future developments of waste streams;
2. the regional distribution of plants for waste disposal and major plants for recovering waste;
3. an assessment of the need to decommission plants;
4. an assessment of the need for additional plant infrastructure to build and maintain a network of plants that will ensure self-sufficiency and ensure the treatment of waste in one of the nearest and most appropriate plants;
5. existing waste collection systems and an assessment of the need for new collection systems;
6. in the case of cross-border projects within the scope of preparing the Federal Waste Management Plan, an illustration of cooperation with member states that are affected and the European Commission;
7. specific stipulations derived from Article 1 of the Waste Management Act 2002
   - concerning the reduction in volume, pollutant content and adverse environmental and health impacts of waste,
   - concerning the promotion of preparatory activities for reuse, recycling, and other waste recovery methods, especially with regard to the conservation of resources,
   - concerning the environmentally friendly and economically purposeful recovery of waste,
   - concerning the disposal of unavoidable or non-recoverable waste,
   - concerning the shipment of waste either to or from Austria for recovery or disposal
8. the measures taken by the Federal Government in order to achieve these stipulations;
9. general strategies and specific arrangements for certain types of waste, in particular treatment requirements and programmes, including the strategy to achieve the reduction in biodegradable waste going to landfill in accordance with Article 5 of Directive 1999/31/EC on the landfill of waste, as amended by Regulation (EC) No 1137/2008, and waste planning in accordance with Article 14 of Directive 94/62/EC on packaging and packaging waste, as amended by Regulation (EC) No 219/2009.

Thus, the Federal Waste Management Plan provides a detailed insight into the Austrian waste industry (inter alia, via taking stock of waste streams and waste treatment plants) and derives specific measures, strategies and programmes from the latter (including the Austrian Waste Prevention Programme as well as further programmes that are required under EU law). These parts do not yield a direct legally binding effect.

As regards certain areas, the state of the art is described in the context of an "objectified general report". This applies for technical provisions under Chapters 3.11. (Animal by-products), 3.14. (Medical waste), 6.4.6. (Biogenic waste), 6.5.1.2. (Anaerobic treatment (fermentation)), 6.5.1.3. (Mechanical-biological waste treatment), 6.5.2. (Thermal waste treatment), 7. (Principles for the treatment of specific waste and material streams) and 9. (Guidelines for the shipment of waste). In this way, support is to be given to the enforcement authorities and their experts. According to the Waste Management Act of 2002, the state of the art of technology constitutes the prerequisite for approval, in particular for treatment plants.

Studies, guidelines, legal standards, etc. to which reference is made shall not be regarded as an element of the Federal Waste Management Plan 2017.

Figure 1: Government building at Stubenring, Vienna

Waste Prevention Programme

An important element of the Federal Waste Management Plan is the Waste Prevention Programme, which is geared towards the decoupling of economic growth from the environmental impacts associated with waste generation.

The Waste Prevention Programme must at least contain the following (Article 9a of the Waste Management Act 2002):

1. Targets for waste prevention measures;
2. a description of current waste prevention measures;
3. an assessment of the usefulness of measures given as an example in Annex 1 (Waste Management Act 2002) or other suitable measures;
4. qualitative or quantitative benchmarks for monitoring and assessing the progress achieved by the measures;
5. in the case of cross-border projects, an illustration of cooperation with Member States that are affected and the European Commission.

Objectives of the Waste Management Act 2002

The stipulations of the Federal Waste Management Plan must be underpinned by the objectives of the Waste Management Act 2002. Thus, waste management shall be aligned in such a way within the meaning of the precautionary principle and sustainability so that

1. adverse or detrimental effects on humans, flora and fauna, their livelihoods and their natural environment are prevented, or any detrimental effects on the general well-being of humans are otherwise kept to a minimum,
2. emissions from air pollutants and climate-relevant gases are kept as low as possible,
3. resources (raw materials, water, energy, countryside, land, landfill volumes) are conserved,
4. in the case of material recovery, the waste or the substances recovered therefrom do not have a higher risk potential than comparable primary raw materials or products from the same and
5. such waste is only left behind if sending it to landfill does not represent a risk to future generations.

1.2. THE DEFINITION OF WASTE

The definition of the term "WASTE" plays a central role in describing the waste management situation and the statements to be derived from it.

A conclusive assessment of whether waste exists or not can only be carried out in individual cases as opposed to a blanket assessment and must be based on an examination of all the circumstances. The end-of-waste status may only follow once recovery has actually taken place or the product characteristic has been legally defined.

The definition of waste is regulated as follows in the Waste Management Act 2002:

"Waste" is any movable material

- which the owner wishes to dispose of, or has already disposed of (intention to discard or subjective definition of waste) or
- which needs to be collected, stored, transported and treated as waste so that the public interest would not be prejudiced (objective definition of waste).

Consequently, an object shall be deemed to be waste if there is an intention to discard and/or there is a public interest in its collection and treatment as waste.

Subjective definition of waste - Intention to discard

Discarding means to surrender the custody of an item which is no longer used as intended, or can no longer be used as intended.

The fact that no proceeds can be obtained for an item is an indication that it is waste in the subjective sense; waste can, however, also have an economic value. If the item is sent for disposal or recovery, this shall imply discarding in accordance with waste legislation.

Objective definition of waste - Public interest

When determining whether waste exists or not in the objective sense, any dangers to the environment that arise from the items themselves and which could impede the collection and treatment of these items as waste must be taken into account. The actual risk potential to the environment of the materials in question shall be decisive whilst also taking into account the disposal and recovery routes.

Moveable items

The status as waste is essentially based on the fact that the item can be moved. Waste may also exist, however, if items combine with the ground in a manner that is detrimental to the environment (e.g. oil-contaminated soil).

Recoverables

"Recoverables" are

- waste materials which are separated from other types of waste, or
- substances which are obtained through a treatment of waste carried out in order to subject them to a recovery operation.

Examples of recoverables include waste paper, waste glass, scrap metals and waste edible fats.

Municipal waste

"Municipal waste" is waste from private households and other types of waste which, on account of its nature or composition, is similar to domestic waste. This includes fractions such as mixed municipal waste (residual waste), bulky waste or biogenic waste collected separately.

Hazardous waste

"Hazardous waste" is waste which has been determined as hazardous as per the List of Waste Ordinance.

Hazardous household waste

"Hazardous household waste" is hazardous waste that normally accumulates in private households. These hazardous household waste also include any hazardous waste from all other waste producers which is comparable with domestic waste in terms of type and quantity. In both cases, this waste is classed as hazardous household waste as long as it remains in the possession of the waste producers.

Examples of hazardous household waste include paints, lacquers, fluorescent tubes, medicinal products and batteries.

By-product

A substance or object is considered a by-product (no waste) 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 Article 1(3) of the Waste Management Act 2002) may be impaired.

The European Commission has issued a communication on this topic, summarizing the rulings of the European Court of Justice and giving examples of by-products (Communication of 17 October 2007, 6868/1/07 REV 1 (de), COM(2007) 59 final/2).

Note: Further key definitions of terms from the Waste Management Act 2002 are presented in Chapter 6.3.1. "Waste Management Act of the Federal Government 2002 (AWG 2002)".

1.2.1. EUROPEAN COURT OF JUSTICE (ECJ) CASE LAW ON THE DEFINITION OF WASTE

The following briefly illustrates the most important legal rules of the European Court of Justice concerning the definition of waste:

- The concept of "waste" within the meaning of the Directive on waste includes substances and objects which are capable of economic reutilisation (C-206/88 and C-207/88 "Vessoso and Zanetti").
- The concept of "waste" should not be understood to exclude substances and objects which are capable of economic reutilisation, even if the materials in question may be the subject of a transaction or quoted on public or private commercial lists (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 "Wallonie").
- The scope of the concept of "waste" depends on the meaning of the concept of "discard" (C- 129/96 "Wallonie").
- It may not be inferred from the mere fact that a substance (in the present case, LUWA bottoms or wood chippings) undergoes an operation listed in Annex II B to 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 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 reused directly without any prior processing and as part of the continuing process of production (C-9/00 "Palin Granit Oy").
- The intention to discard host rock and sand residue shall exist unless the owner uses them lawfully for the necessary backfilling of the galleries of the mines in question and provides sufficient guarantees that the specific substances to be used are identified and actually supplied for this purpose (C-114/01 "AvestaPolarit Chrome Oy").
- The definition of waste cannot be interpreted as referring conclusively to substances or materials that are supplied for, or are subject to, the disposal or recovery operations listed in Annexes II A and II B to this Directive or in these corresponding lists, or whose owners have the will or obligation for this purpose (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 reused 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 Waste Framework Directive (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 that is operated by a public waste water treatment undertaking in the application of Directive 91/271 concerning urban waste water treatment and the provisions adopted in its implementation shall be deemed to be waste within the meaning of the Waste Framework Directive. If waste water escapes from a sewer, then this shall be an instance where the waste water treatment undertaking, i.e. the owner of this water, "discards" it. The fact that the waste water is spilled accidentally does not alter the outcome (C- 252/05, "Thames Water Utilities").
- Hydrocarbons that are unintentionally spilled into the sea following a shipwreck, and which mix with water and sediment and then float along the coast of a Member State until they are washed up on shore, shall be deemed to be waste within the meaning of the Waste Framework Directive as they cannot be used or processed without prior processing (C-188/07 "Commune de Mesquer").
- Processed packaging waste shall only lose its status as packaging waste once this waste has been processed into a new material or a new product that has similar characteristics to the material from which it originated. Metal packaging waste shall no longer be deemed to be waste once it is reprocessed into steel sheets, ingots and coils (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, i.e., until the constitution of the finished products derived from the treatment process for which they are intended (C-457/02 "Niselli").
- Slurry which accumulates in an intensive pig fattening farm and is stored there until delivered to farmers, to be used by the latter for the purpose of fertilising their land, does not constitute "waste" but a by-product, if this grower wishes to exploit the slurry in a subsequent procedure under conditions which are economically advantageous for him, in which connection a precondition is that this reuse is not only possible but is certain, without requiring prior processing, as part of the continuing process of production (C-113/12 "Donal Brady").

Figure 2: Court of Justice of the European Union (G.Fessy©CJEU)

1.2.2. SUPREME ADMINISTRATIVE COURT (VWGH) CASE LAW ON THE DEFINITION OF WASTE

The question of whether an item should be treated as waste within the meaning of the Waste Management Act 2002 is frequently the subject of decisions taken by the Supreme Administrative Court. Taking into account the legal amendments, Supreme Administrative Court case law on the Waste Management Act 1990 can also be referred to for assessment of the definition of waste in the Waste Management Act 2002.

In its findings, the Supreme Administrative Court also refers repeatedly to the judgments of the European Court of Justice (cf. Supreme Administrative Court 28 April 2005, 2003/07/0017; Supreme Administrative Court 29 January 2004, 2000/07/0074), whereby the court has also made reference in this connection to the fact that the definition of waste in the Waste Framework Directive binds the Member States legal systems, which is why the Austrian definition of waste must be interpreted in accordance with the Directive (cf. Supreme Administrative Court 28 April 2005, 2003/07/0017). Individual legal rules of the key findings of the Supreme Administrative Court on the definition of waste are depicted below:

- It follows from the materials pertaining to the Waste Management Act 2002 (cf. Government bill 984, supplement to the stenographic records of the National Council, 21st legislative period) that a key objective of this Act is to transpose in full the Directive on waste and the Directive on hazardous waste, in particular by means of EU-compliant definitions (cf. Article 89(1) of the Waste Management Act 2002) and as regards the assessment of whether an item does or does not constitute waste, the criteria for the definition of waste should be used, whilst taking into account the case law of the ECJ and the public law courts, in which connection the concept of discarding is unchanged compared with the Waste Management Act 1990. The assessment as to whether certain items are to be regarded as waste does not change as a result of the power to issue statutory instruments standardised in Article 5(2) of the Waste Management Act 2002 and, as regards this assessment, it must be considered, as before, whether the subjective definition of waste is fulfilled, i.e. whether the owner of the items wishes to dispose of, or has already disposed of, them or whether the objective definition of waste is realised. Hence, for example, an item whose status as waste has ended in accordance with Article 5(1) leg. cit. (again) becomes waste as a result of the (renewed) subjective intention to discard on the part of the owner (cf. as a whole the government bill referred to, pp. 83, 84, 88; cf. Supreme Administrative Court 28 April 2005, 2003/07/0017).
- In accordance with the wording of the law, if either the subjective or objective definition of waste under the Waste Management Act 2002 is met, then this shall be sufficient for an item to qualify as waste within the meaning of the Waste Management Act 2002 – a cumulative presence of the requirements of both waste definitions shall not be necessary (cf. Supreme Administrative Court 23 April 2009, 2006/07/0164).
- An item that is deemed to be waste within the meaning of the Waste Management Act 2002 must be movable (with the exception of soil that is inseparably connected to the waste).
- Fulfilment of the subjective definition of waste shall not solely depend on the last owner's intention to discard. It shall be sufficient for one of the previous owners to have had the intention to discard (cf. Supreme Administrative Court 23 April 2009, 2006/07/0164).
- As regards the assessment of the subjective status as waste, it does not come down to either the separate intention to discard or to the intention in relation to a prospective use of the materials. An item shall namely qualify as waste if the intention to discard existed on the part of any previous owner (Supreme Administrative Court 15 September 2011, 2009/07/0154, Supreme Administrative Court 28 April 2005, 2003/07/0017).
- Discarding within the meaning of Article 2(1)(1) of the Waste Management Act 2002 can only be spoken about if the aim of transferring the item is to dispose of it in the first instance (relating to the Waste Management Act 1990: Supreme Administrative Court 4 July 2001, 99/07/0177).
- If materials have accrued during tunnelling, there is no doubt that at least one prime motive for shipment from the construction site to the company premises entails the fact that the building contractor wanted to dispose of this demolition material and, consequently, an intention to discard existed in this respect. Hence, the requirements for the subjective definition of waste within the meaning of Article 2(1)(1) of the Waste Management Act 2002 (Supreme Administrative Court 22 March 2012, 2008/07/0204) were satisfied.

- The inclusion of an item without any hazardous properties as waste within the meaning of Article 2 of the Waste Management Act 2002 shall be possible (cf. relating to the Waste Management Act 1990: Supreme Administrative Court 13 January 1993, 91/12/0194). Any threat to public interests shall be sufficient to justify any collection, storage, transport and treatment as waste (Supreme Administrative Court 24 November 2005, 2005/07/0084, cf. relating to the Waste Management Act 1990: Supreme Administrative Court 16 October 2002, 2002/07/0162; Supreme Administrative Court 20 February 2003, 2002/07/0133). Furthermore, Article 2(3) of the Waste Management Act 2002 does not lay down any concluding provision as to when status as waste shall be excluded (cf. relating to the Waste Management Act 1990: Supreme Administrative Court 20 October 1992, 92/04/0137; Supreme Administrative Court 21 March 1995, 93/04/0241). In the absence of any facts surrounding the exclusion of the status as waste, an additional step shall be required in order to examine whether the treatment of materials as waste can be attributed to a public interest within the meaning of Article 1(3) of the Waste Management Act 2002 (cf. relating to the Waste Management Act 1990: Supreme Administrative Court 25 July 2002, 2001/07/0043).
- The mere fact that a product contains sewage sludge qualifying as waste justifies the declaration of this product as waste. If, specifically, a mixture of input components is present, of which at least one of the components is waste, in which connection the input material mixture (inseparably) includes waste, the mixture itself constitutes waste (Supreme Administrative Court 6 November 2003, 2002/07/0159; Supreme Administrative Court 26 April 2013, 2010/07/0238). Sewage sludge constitutes waste (cf. Supreme Administrative Court 26 March 2009, 2006/07/0165; Supreme Administrative Court 7 December 2006, 2006/07/0059).
- Assignment to the waste catalogue under ÖNORM [Austrian Standard] S 2100 is not a requirement for fulfilment of the status as waste as per Article 2 of the Waste Management Act 2002 (Supreme Administrative Court 23 April 2009, 2006/07/0164).
- The assignment of materials to a specific code number of the list of wastes is not, in itself, indicative of the status as waste in the objective sense as per Article 2(1)(2) of the Waste Management Act 2002 because, prior to classification to the list of wastes, as a first step, the existence of waste in the context of the facts under Article 2(1) subparagraphs 1 and 2 of the Waste Management Act 2002 must be verified (Supreme Administrative Court 23 April 2014, 2012/07/0053).
- As regards the subordination of movable items (in this particular case an old car or a write-off) under the objective definition of waste, for the time being the imperilment of one of the interests listed in Article 1(3) of the Waste Management Act 2002 is necessary. Furthermore, the movable items may no longer be generally held to be new (Article 2(3)(1) of the Waste Management Act 2002) and may no longer be capable of being used as intended on account of their condition (e.g. not functioning properly) (Article 2(3)(2) of the Waste Management Act 2002). It must therefore involve movable items in this regard which are generally disposed of, according to prevailing public opinion (Supreme Administrative Court 22 April 2010, 2007/07/0015).
- As regards the generally held view within the meaning of Article 2(3)(1) of the Waste Management Act 2002, it comes down to the generally held relevant public perception and not to the subjective perspective of the holder of the item, which is why the asserted intention to restore on the part of the holder is not relevant. Compared with the facts regarding use of an item as intended, which is covered in Article 2(3)(2) of the Waste Management Act 2002, while Article 2(3)(1) obviously refers to the new item which is never used as intended (Supreme Administrative Court 22 April 2010, 2007/07/0015).
- As regards the realisation of the objective definition of waste under Article 2(1)(2) of the Waste Management Act 2002, the mere possibility of the imperilment of protected natural resources within the meaning of Article 1(3) leg. cit. shall suffice. It does not therefore come down to the fact that a specific hazardous situation can be verified (Supreme Administrative Court 24 May 2012, 2009/07/0123; Supreme Administrative Court 20 February 2014, 2011/07/0080).
- In the absence of an indication to the contrary - neither the definition under Article 2(4) of the Law on the rehabilitation of disused hazardous sites 1989 nor those definitions under Article 2(1) to (3) of the Waste Management Act 2002 contain a reference to the fact that only Austrian waste is covered - it shall be assumed that the provision under Article 3(1)(4) of the Law on the rehabilitation of disused hazardous sites 1989 shall apply to all waste (Supreme Administrative Court 23 April 2015, 2011/07/0012).

Figure 3: Waste bin in park

1.3. THE WASTE HIERARCHY

The waste hierarchy is a ranking of priority which forms the basis of the legislation in the area of waste management.

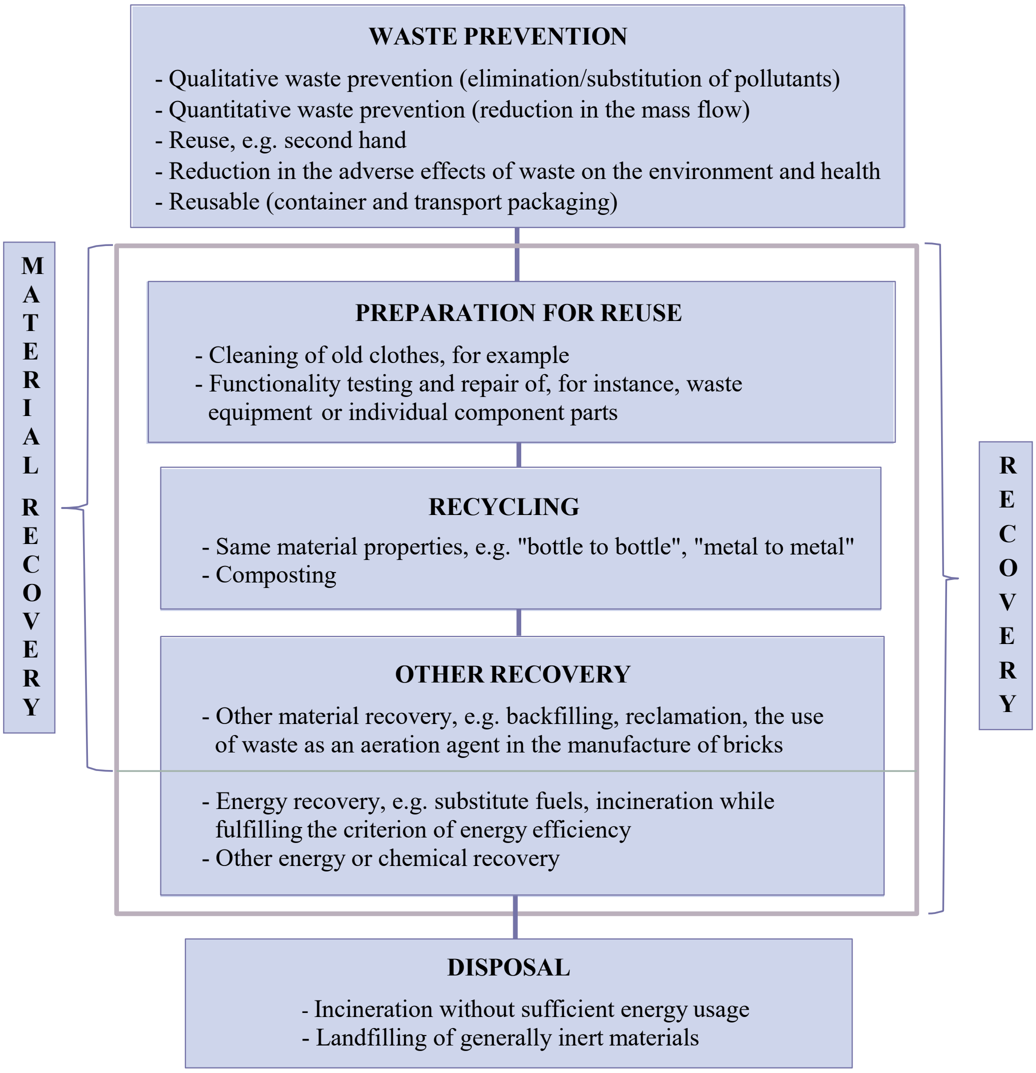


Figure 4: Waste hierarchy

Pursuant to the Waste Framework Directive, those options which, all in all, provide the best outcome from the point of view of preservation of the environment must be promoted. This may make it necessary to deviate from the waste hierarchy if, as a result of life-cycle thinking, another option proves to be better for preservation of the environment than that specified under the hierarchy. The better option presupposes that an improved outcome is achieved to a significant degree.

In the process, life-cycle thinking does not require any life-cycle analysis.

Especially in the case of contaminated waste, a deviation from the hierarchy may be required. For example, waste wood which has hazardous properties due to chemical wood treatment or which indicates such contamination based on its original intended purpose, must be treated harmlessly in a suitable thermal installation (e.g. railway sleepers, electricity pylons or impregnated waste wood for external use).

Toxicological findings repeatedly result in a ban or restriction on substances which have experienced broad application for an extended period. Hence, for example, certain fractions of plastics resulting from the processing of waste electrical equipment contain, in the meantime, prohibited flame retardants or flame retardants which are restricted in terms of their permitted application. For streams defined in this way, thermal treatment is to be preferred to a material recovery involving a dispersion of these pollutants.

1.4. EU CIRCULAR ECONOMY PACKAGE

In December 2014, the European Commission decided to withdraw the legislative proposal presented in July 2014 regarding waste with a reference to the submission of an even more ambitious proposal by the end of 2015. Subsequently, on 2 December 2015, the European Commission submitted a "circular economy package" which, in turn, comprises legislative proposals concerned with the revision of six directives in the area of waste and an EU action plan for the circular economy in the form of a notification.

In an Annex, the action plan lists in the region of 50 concrete legislative and non-legislative proposals to be implemented by 2020. These include proposals relating to the entire life cycle of materials and products, beginning with the increased use of sustainable raw materials, the manufacturing process for products, product design and consumption, through to the strengthening of the market for secondary raw materials, recycling and the disposal of waste. Due to the particularity of their products or value-added chains, targeted measures are envisaged in the case of key areas such as plastics, foodstuffs, critical raw materials, construction and demolition waste as well as biomass and bio-based products. Moreover, the transition to a circular economy as a result of horizontal measures in the areas of innovation and investment, for example by the provision of finances for project funding, is to be stimulated.

The legislative proposals amending the Waste Framework Directive (Directive 2008/98/EC) and the Packaging Directive (Directive 94/62/EC) make provision for an increase in the objectives concerning recycling and preparation for reuse of municipal and packaging waste for 2025 and 2030. The proposal amending the Landfill Directive (Directive 1999/31/EC) provides for a more significant restriction on the landfilling of municipal waste. In addition, definitions of terms and reporting requirements are to be harmonised by means of these amendments and also the proposed amendments relating to the Directive on end-of life vehicles (Directive 2000/53/EC), the Directive on waste electrical and electronic equipment (Directive 2012/19/EU) and the Directive on batteries (Directive 2006/66/EC). As a result, the individual waste-related directives are to be better harmonised with one another so as to avoid overlaps in future.

Likewise, the existing calculation methods for recycling targets are to be standardised. A greater utilisation of economic instruments in connection with waste management is to be encouraged; likewise, general requirements pertaining to extended producer responsibility schemes are to be introduced. Moreover, the proposals contain new measures aimed at encouraging the avoidance and reuse of waste.

Figure 5: Schematic diagram of the Circular Economy (source: European Commission)

2

OVERVIEW OF WASTE MANAGEMENT IN AUSTRIA

2. OVERVIEW OF WASTE MANAGEMENT IN AUSTRIA

2.1. WASTE MANAGEMENT DATA IN AUSTRIA

THE INVENTORY OF WASTE STREAMS and waste treatment plants in the Austrian waste management industry is based on data which originates from the following sources in particular:

- from the electronic data management (EDM) of the Federal Ministry of Agriculture and Forestry, Environment and Water Management (plant and core data register, waste balances);
- from the offices of the provincial governments and other Austrian administrative institutions;
- from interest groups and various institutions active in the waste management sector (e.g. waste management associations, collection and recovery systems, the Austrian Construction Materials Recycling Association (BRV), the Association of Austrian Waste Disposal Companies (VOEB), Agrarmarkt Austria (AMA), the Austrian Economic Chambers (WKÖ) and the Austrian Water and Waste Management Association (ÖWAV));
- from waste management studies;
- from plant operators;
- from the Environment Agency Austria (Umweltbundesamt).

The basis for this inventory is that data which was available up to the beginning of October 2016. Mass flows and data pertaining to the waste treatment plants relate to the year 2015, unless otherwise indicated.

Figure 6: Containers for the collection of recoverables

2.1.1. PROVINCIAL WASTE MANAGEMENT PLANS

The federal provinces shall draw up provincial waste management plans, reports and/or policies at regular intervals on the basis of the respective Provincial Waste Management Act. In addition, several federal provinces shall publish annually updated waste management reports or statistics on waste on their websites. The most up-to-date provincial waste management plans and published waste statistics of the federal provinces are listed below.

Burgenland

- Provincial waste management plan for Burgenland – updated 2013
- Waste data from the Burgenland waste association for the years 1993 to 2015

Carinthia

- Carinthian waste report and waste management concept – 3rd update 2012

Lower Austria

- Lower Austrian waste management plan – planning period 2016 - 2020
- Lower Austrian waste management report 2015

Upper Austria

- Upper Austrian waste management plan 2011
- Waste report 2014

Salzburg

- Salzburg waste management plan 2006

Styria

- Provincial waste management plan 2010
- Annual report on waste management in Styria 2015

Tyrol

- Ordinance of the Provincial Government of 1 December 1992 enacting a waste management concept (Provincial Law Gazette No 17/1993, as amended)
- Waste management concept for the Tyrolean provincial administration 2013

Vorarlberg

- Vorarlberg waste management plan – 2nd update 2006
- Vorarlberg waste management plan – 3rd update (in preparation)
- Waste management data for Vorarlberg 2014

Vienna

- Viennese waste prevention programme and the Viennese waste management plan (planning period 2013 - 2018) within the framework of the strategic environmental assessment 2011/2012
- Waste statistics
- Performance report 2015 from the Waste management, street cleaning and vehicle fleet department (MA 48).

2.2. SUMMARY OF THE ANALYSIS OF THE WASTE MANAGEMENT SITUATION IN AUSTRIA

In 2015, waste generation in Austria amounted to approximately 59.76 million tonnes. This includes primary waste generation of 57.10 million tonnes and 2.66 million tonnes of secondary waste, resulting from the treatment of primary waste (e.g. ash from waste incineration).

Figure 7 illustrates the progression of overall waste generation in Austria annually since 1990. Up to 2010, however, this amount also included a proportion of the residues from the treatment and processing of materials (e.g. from the production of foodstuffs and various wood residues), which was classified with the waste potential up until 2010, meaning that a direct comparison between current figures and historic waste generation is only partially possible.

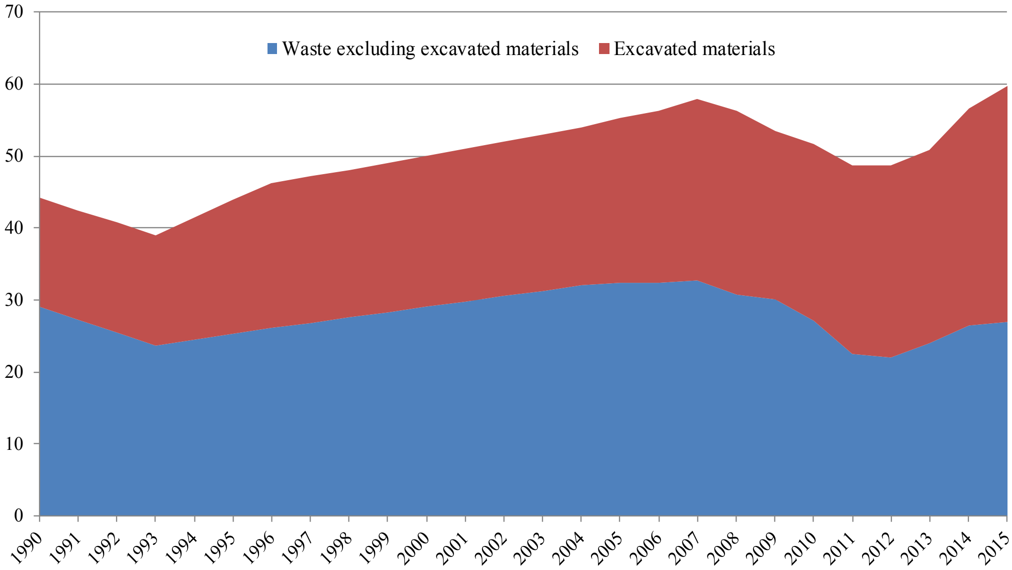


Figure 7: Waste generation [expressed in million tonnes] (up to 2010, including the amount of treatment and processing residues)

The generation of primary waste rose from 51.72 million tonnes in 2009 to 57.10 million tonnes in 2015, an increase of 10.4 %. This increase can primarily be attributed to the increasing quantities of excavated materials and construction.

The following trends can be identified regarding the emergence of selected waste streams::

Municipal waste from households and similar establishments (mixed municipal waste, bulky waste, hazardous household waste and waste electrical and electronic equipment, recoverables and biogenic waste)

All told, as regards municipal waste from households and similar establishments (approx. 4.16 million tonnes), an increase in the region of 6.8 % shall be recorded compared with the Federal Waste Management Plan 2011 (reference year 2009). Different trends show up, however, in connection with the individual waste fractions. The bulky waste generated has fallen in recent years, while the amount of mixed municipal waste generated has risen slightly and the volume of recoverables collected separately, along with biogenic waste in particular, has risen sharply.

Municipal sewage sludge

The decline in the amount of municipal sewage sludge generated of around 234,900 tonnes compared with the Federal Waste Management Plan 2011 (a drop in the region of 8 %) can be attributed to a statistical re-evaluation. From 2014 to 2015, a 1.8 % decrease in the amount of municipal sewage sludge generated was identifiable.

Waste from green areas

A recent study revealed that the amount of municipal waste generated from green areas (such as garden and park waste or biogenic cemetery waste), at approximately 472,000 tonnes, is considerably lower than the figure assumed in the Federal Waste Management Plan 2011.

Figure 8: Vienna Central Cemetery

Packaging waste

The separate collection of glass, metal and plastic packaging from households has increased from approximately 390,000 tonnes in 2009 to approximately 404,000 tonnes, a rise of 3.6 %. Furthermore, as regards the separate recording of all paper, paperboard and cardboard waste (from households and from commerce and industry), an increase in the region of 15 % was recorded.

Waste electrical and electronic equipment

Roughly 80,200 tonnes of waste electrical and electronic equipment were collected in 2015. This represents an increase in the region of 6 % compared with 2009. The collection rate during the years 2013 to 2015 was, on average, 47.4 % of the electrical and electronic equipment placed on the market. Hence, Austria complies with the target of 45 % prescribed by the EU Directive on waste electrical and electronic equipment (2012/19/EU).

End-of-life vehicles

In 2015, 250,000 cars were taken off the road. Of these, the majority were shipped from Austria as used vehicles. To curb the illegal cross-border shipment of end-of-life vehicles, specific checks are carried out concerning waste shipment as well as in pertinent companies.

Roughly 48,000 end-of-life vehicles, with a total weight of approximately 44,000 tonnes, were supplied for treatment in Austria. The weight of end-of-life vehicles treated in Austria thereby declined by 48 % compared with 2009. In 2015, the rate of reuse and material recovery in the case of the end-of-life vehicles treated was in the region of 87 %.

Wood waste

As regards wood treatment and processing, approximately 1.13 million tonnes of wood waste and in the region of 3.51 million tonnes of other residues accrued in 2015. The wood waste and residues are frequently recycled in the wood processing industry or in the paper and pulp industry. Bark, slabs, splinters, wood shavings and sawdust are also used as structural material in composting. Wood chips are thermally recovered for local and district heating.

Construction and demolition waste

Since the Federal Waste Management Plan 2011 (base year 2009), the amount of construction and demolition waste generated has increased by approximately 46 %, totalling roughly 10 million tonnes in 2015. This increase can be attributed to increased building activity and improved statistical recording.

Excavated materials

Compared with the Federal Waste Management Plan 2011, excavated materials have risen by 40 %. The amount of excavated materials generated across Austria particularly depends on large-scale building projects, such as the building of the Semmering and Brenner base tunnels or the construction of the Koralm Railway by Austrian Federal Railways. Improved statistical recording is another reason for the increased quantity.

Animal by-products

In 2015, approximately 1 million tonnes of animal by-products accrued. This was 40 % less than in 2009. A large part of this decline can be attributed to the increased use of whey (in whey powder production).

Asbestos

IIn 2015, roughly 65,000 tonnes of asbestos-containing waste were generated. This corresponds to a 16 % increase compared with 2009.

Used oils and mineral oil-based waste

The amount of waste oil generated in 2015 was approximately 34,000 tonnes and has stagnated over the past few years. In addition, approximately 2.2 million tonnes of used oils and mineral oil-based waste (including bitumen) accrued. In particular, the amount of bitumen generated increased sharply from approximately 576,000 tonnes in 2010 to 1.86 million tonnes. This is partly due to increased building activity but partly also due to more complete statistical recording.

Medical waste

The quantity of waste generated by medical institutions (excluding the municipal portion) amounted to approximately 40,641 tonnes in 2015, while the proportion of hazardous waste was around 2.9 %.

Incineration residues from combustion plants and from thermal waste treatment

The amount of incineration residues from combustion plants and from thermal waste treatment barely changed from 1.26 million tonnes in 2008 to 1.23 million tonnes in 2015.

Hazardous waste

In 2015, hazardous waste generation amounted to approximately 1.27 million tonnes. Since the Federal Waste Management Plan 2011, approximately 318,000 tonnes more were reported as hazardous waste. Around 133,600 tonnes of hazardous waste were shipped to Austria in 2015 for treatment. Approximately 263,100 tonnes of hazardous waste were exported.

Waste generation at a glance

The table below demonstrates the composition of the overall waste generation in Austria (refered to code number groups under ÖNORM S 2100). The extent to which municipal waste from households and similar establishments, excavated materials, construction waste and secondary waste contribute to overall waste generation can also be inferred from the table. The proportions are represented graphically in the following illustration.

Table 1: Waste generated in 2015 [t]

Group designations pursuant to ÖNORM S 2100 (2005)		Municipal waste from households and similar establishments	Excavated materials	Construction waste	Secondary waste	Other waste	Total
11	Food, beverage and tobacco waste					31,000	31,000
12	Waste plant and animal fat products					81,000	81,000
13	Waste from animal husbandry and slaughtering					0	0
14	Hides and leather waste					0	0
17	Wood waste	244,000				886,000	1,130,000
18	Pulp, paper and cardboard waste	660,000				1,014,000	1,674,000
19	Other waste from the processing and refinement of animal and plant products					0	0
31	Waste of mineral origin (excluding metal waste)	218,000	32,764,000	7,798,000	859,000	2,287,000	43,926,000
35	Metal waste	196,000			4,000	2,443,000	2,643,000
39	Other waste of mineral origin as well as waste from refining processes					2,000	2,000
51	Oxides, hydroxides, salt waste					108,000	108,000
52	Waste from acids, lyes, concentrates					75,000	75,000
53	Waste from plant treatment agents and pesticides as well as pharmaceutical products and disinfectants					12,000	12,000
54	Waste from mineral oil and coal refining products		10,000	1,860,000		251,000	2,121,000
55	Waste from organic solvents, paints, lacquers, glues, bonding agents and resins	19,000[1]				54,000	73,000
57	Plastic and rubber waste	27,000[1]			150,000	211,000	388,000
58	Textile waste (natural and chemical fibre products)	29,000				13,000	42,000
59	Other waste from chemical conversion and synthesis products					11,000	11,000
91	Solid municipal waste including similar commercial waste	1,831,000		339,000	1,228,000	960,000	4,358,000
92	Waste for biological recovery	936,000			354,000	780,000	2,070,000
94	Waste from water treatment, waste water treatment and water use				13,000	856,000	869,000
95	Liquid waste from waste treatment plants				55,000	52,000	107,000
97	Waste from medical institutions					41,000	41,000
Total (rounded off)		4,160,000	32,774,000	9,997,000	2,663,000	10,168,000	59,762,000

[1] *Municipal waste from households: The waste streams "Hazardous household waste" (approx. 19,000 t) and "Other recoverables" (approx. 27,000 t) were allocated to their "main generation groups" on account of the multitude of their individual waste fractions.*

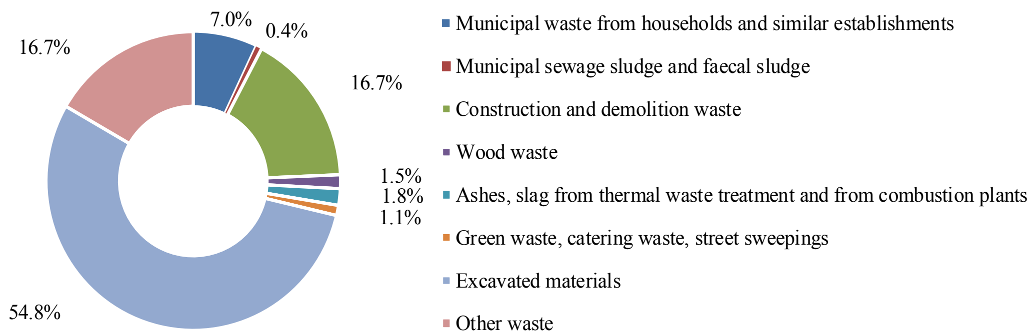


Figure 9: Composition of the overall waste generated in 2015 according to waste groups

Compared to 2009, it is most noticeable that the excavated materials have risen from approximately 23.46 million tonnes to roughly 32.77 million tonnes in 2015, i.e. an increase of 40 %. At 46 %, the waste generated from construction has risen more sharply since 2009. By contrast, there was only a moderate 7 % increase in the case of municipal waste from households and similar establishments.

Figure 10: Demolition work is especially relevant with regard to waste.

Overview of waste treatment

The treatment of all types of waste was divided up as follows in 2015:

- 47 % was recycled;
- 7 % underwent thermal treatment or recovery in plants which are subject to the Ordinance on waste incineration;
- 43 % was put in landfill;
- 3 % of the waste was processed in another manner (MBT [mechanical-biological treatment], CP [chemical/physical treatment], etc.).

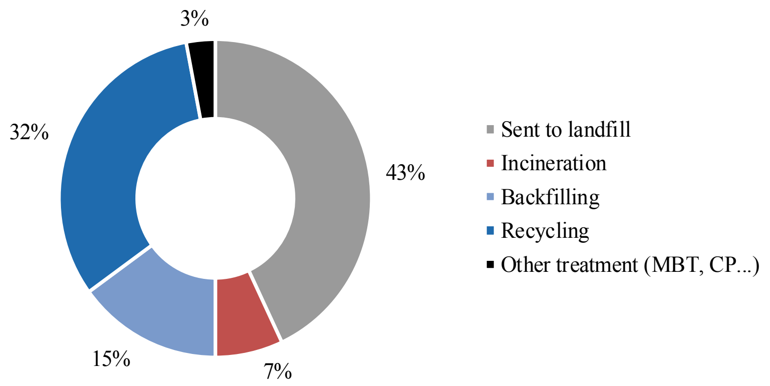


Figure 11: Recovery and disposal of waste in 2015 (basis: 59.76 million tonnes)

Figure 12 illustrates the various treatment ratios without considering the most massive waste stream of the excavated materials and documents the extent to which the waste is used further.

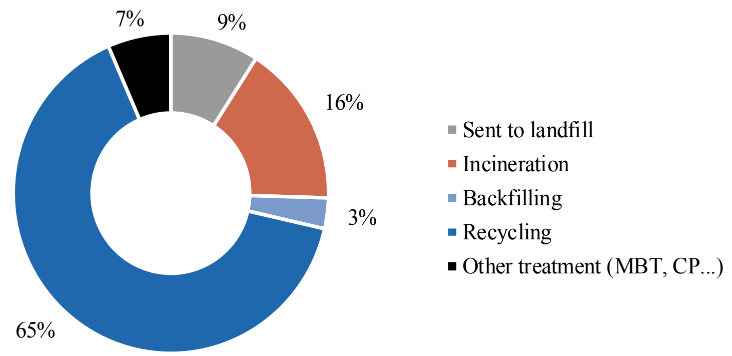


Figure 12: Recovery and disposal of waste, excluding excavated materials, in 2015 (basis: 26.99 million tonnes)

Overview of the waste treatment plants

In Austria, there are in the region of 2,500 waste treatment plants. A considerable proportion of the waste is treated in-plant. The table below shows the number of plants available for each treatment category.

Table 2: Waste treatment plants in Austria in 2015

Types of plants	Number
Thermal treatment plants for municipal waste	11
Thermal treatment plants (excluding municipal waste treatment plants)	54
Mechanical-biological treatment plants (MBT)	14
Anaerobic biological treatment plants (biogas plants)	152
Aerobic biological treatment plants (composting plants)	401
Physico-chemical treatment plants	51
Treatment plants for construction and demolition waste	420
Treatment plants for soils	15
Plants for the treatment of metal waste, waste electrical equipment and end-of-life vehicles	103
Plants for sorting and processing separately collected recoverables and other waste	181
Recovery plants for recoverables collected separately	101[1]
Selected processing plants for specific waste[2]	8
Landfills	999

[1] *In addition to the recovery plants for recoverables collected separately, waste is also used as substitute raw materials or as production accessories in industrial enterprises (cement industry, brick and tile industry, other production of building materials, iron and steel production, the chemical industry). Furthermore, waste is also supplied for recovery via backfilling measures. Both these recovery routes are illustrated in the current Federal Waste Management Plan in separate chapters.*

[2] *These include establishments for treating used batteries, grease- and oil-contaminated equipment, catalysts and contact materials as well as laden adsorbents.*

2.3. EVALUATION OF THE DEVELOPMENT OF WASTE STREAMS IN THE FUTURE

Objectives and fundamentals

With the evaluation of future waste streams and the proportions of the respective waste treatment technologies, the corresponding bases for the further development of the Austrian waste management industry are to be demonstrated. The need for this evaluation also arises from

- the changing framework conditions in waste management,
- the varying changes in the generated quantity of various wastes,
- the construction of new treatment plants,
- new findings relating to waste treatment.

In terms of evaluating future waste streams, consideration is given to the following key parameters and data, inter alia:

- the evaluations of the economic research institute (WIFO) and Statistics Austria regarding the economic growth anticipated in Austria from 2015 to 2017;
- the statistics and forecasts of Statistics Austria regarding population growth in Austria up to the year 2021;
- reported historical waste data (including the data for 2014/2015);
- the data sources compiled in the previous Federal Waste Management Plans and status reports;
- waste management measures (acts, ordinances, voluntary agreements, etc.), which have been concluded by the EU, the Federal Government or the provinces (WEEE Directive, End-of-Life Vehicle Ordinance, Batteries Ordinance, Sewage Sludge Ordinances, Recycling Wood Ordinance, Recycled Construction Materials Ordinance etc.).

An increase in Gross National Product totalling 10.5 % was taken as a basis for the period 2015 to 2021 regarding the evaluations of the mass of waste anticipated in 2021.

Statistics Austria is forecasting an Austrian population in the region of 8,991,000 by 2021.

Figure 13: Weather vane

Anticipated waste generated and methods of treatment in 2021

As regards an appraisal of the waste generated in 2021, those primary waste streams which are described subsequently in this Federal Waste Management Plan in separate chapters and extrapolated to give a figure for the overall waste generated were considered. All told, waste generation in Austria in 2021 will total in the region of 65.1 million tonnes.

The waste or waste streams with the presumably highest volumes in 2021 will be listed in Table 3.

Table 3: Waste streams with the highest level of generation

Type of waste	Volume in 2021 [t, rounded off]
Excavated materials - soils	35,916,000
Construction and demolition waste	10,312,000
Municipal waste from households and similar establishments	4,372,000

The table below shows the estimated volume of the waste streams considered in the Federal Waste Management Plan for the year 2021.

Table 4: Estimated volume of selected waste streams

Type of waste		Volume in 2021 [t, rounded off]
Municipal waste from households and similar establishments:		4,372,000
off: Mixed municipal waste from households and similar establishments (residual waste)	1,502,000	
Bulky waste from households and similar establishments	267,000	
Hazardous household waste collected separately	21,000	
Recoverables collected separately from households and similar establishments	1,512,000	
Biogenic waste collected separately from households and similar establishments	958,000	
Municipal sewage sludge		231,000
Other waste from residential areas:		662,000
off: Waste from green areas	485,000	
Catering waste	89,000	
Street sweepings	88,000	
Packaging waste		1,334,000
Waste electrical and electronic equipment		111,000
Waste batteries and accumulators		30,000
End-of-life vehicles		63,000
End-of-life tyres		60,000
Wood waste		942,000
Excavated materials - soils		35,916,000
Construction and demolition waste		10,312,000
Animal by-products		1,014,000
Asbestos waste		60,000
Used oils and mineral oil-based waste (including specifically contaminated soils)		2,076,000
Medical waste		34,000
Incineration residues from combustion plants and from thermal waste treatment		1,323,000
Selected Recoverables[1]		2,259,000

[1] *Flat glass, waste paper in total, ferrous scrap and non-ferrous scrap recorded separately in industry and commerce*

As regards the waste streams anticipated in 2021, it is assumed that the same methods of treatment are pursued as before. Owing to the existing plant capacities, despite the increasing quantities, it can be assumed that there will be no additional plant demand in the coming years. However, capacity adjustments cannot be ruled out for specific treatments or at a regional level.

2.4. ORGANISATION OF THE AUSTRIAN WASTE MANAGEMENT

Legal framework

Matters regulated at federal level

Article 10(1)(12) of the Austrian Federal Constitutional Act (Federal Law Gazette No 1/1930, as amended) stipulates that the legislation regarding hazardous waste exclusively comes under the jurisdiction of the Federal Government. As regards other types of waste (non-hazardous waste), the Federal Government shall only assume responsibility if a requirement exists following the adoption of uniform rules. This so-called "authority in case of need" does not only provide authorisation regarding the adoption of administrative police rules concerning proper disposal but also regarding measures connected with waste prevention, waste reduction and waste recovery and, hence, regarding economic policy measures. The Federal Government may draw on this "authority in case of need" if a national regulation is required on objective grounds. If the federal Government does not make use of its authority in case of need, the provincial legislator shall have jurisdiction.

For certain types of non-hazardous waste, including packaging waste, biogenic waste and construction and demolition waste, this authority in case of need has been claimed by the Federal Government. The Waste Management Act 2002 (Federal Law Gazette I No 102/2002, as amended) and associated ordinances bring together key areas of regulation in this regard concerning hazardous and non-hazardous waste and, in addition, transpose EU law in Austria. The most significant stipulations regulated at federal level in connection with collection and treatment responsibilities are briefly summarised as follows:

- **Waste labels, classification and traceability:** Wastes must be classified accordingly and an assessment undertaken as to whether the waste in question is hazardous or non-hazardous. In addition, records and reports concerned with ensuring the traceability of the waste streams must be carried out (List of Waste Ordinance, Ordinance relating to the determination of hazardous waste and hazardous household waste, Waste Record-keeping Ordinance, Ordinance on Waste Balance sheets).
  The Federal Government also provides guidelines within the framework of the Waste Management Act 2002, inter alia, concerning the handover, transport and treatment of hazardous waste (consignment notes). The Waste Management Act 2002 also contains provisions on specific waste streams as well as on transboundary shipment.
- **Extended producer responsibility:** Retailers of packaging, electrical equipment, motor vehicles and batteries must set up and operate a collection and recovery scheme that allows the end user to surrender these products free of charge as soon as these accumulate as waste. Furthermore, coordinating bodies are set up which are responsible, inter alia, for ensuring coordination of the information provided to the final consumers, including coordination of the financial settlement of the services undertaken by the municipalities and municipal associations (Waste Management Act 2002, Packaging Ordinance, WEEE Ordinance, Batteries Ordinance).
- **Collection of biogenic waste:** If biogenic materials are not recovered in the immediate vicinity of the household or the production site, this biogenic waste must be supplied for separate collection or taken to a designated collection point (Ordinance on the separate collection of biogenic waste).
- **Collection of hazardous household waste:** As required, but at least twice a year, the municipalities (municipal associations) shall implement or commission the implementation of a separate collection (hand-over point) of hazardous household waste, unless provision is made for these substances to be collected in the municipality (in the area covered by the association) in an alternative manner (Waste Management Act 2002).
- **Collection of waste electrical and electronic equipment (WEEE) from private households and of waste portable batteries and accumulators:** The municipalities (municipal associations) shall set up a hand-over point for WEEE from private households and for waste portable batteries and accumulators. WEEE and waste portable batteries and accumulators must be accepted free of charge at these hand-over points. The municipalities (municipal associations) may pass these on to collection and recovery schemes.
- **Waste treatment (disposal and recovery):** Waste treatment operators must satisfy corresponding requirements regarding their activities or the operation of their plants. Among other things, their task is to ensure that no avoidable risks for man and the environment shall arise from the transport, storage and treatment of the waste, as well as from the secondary raw materials produced or from the substances

ultimately disposed of (Waste Treatment Obligations Ordinance, Recycled Construction Materials Ordinance, Compost Ordinance, Recycled Wood Ordinance, Waste Incineration Ordinance, Ordinance on Mobile Plants for Treating Waste, Landfill Ordinance 2008).

- **Collection and treatment of waste which is not similar to domestic waste:** The polluter himself must ensure the removal and disposal or recovery of waste from trade and industry which is not similar to domestic waste[1].

Matters regulated in the provincial waste management laws

The provinces primarily hold jurisdiction over the municipal removal of municipal waste, the associated levying of waste charges and the design of plants for this waste. All nine federal provinces have enacted their own waste laws in this regard, in some cases with associated ordinances. Typically, provisions on the following areas can be found in the provincial waste management laws or in the corresponding ordinances:

- the collection and treatment of mixed municipal waste, bulky waste and biogenic waste,
- provincial waste management planning (including waste prevention measures),
- public relations work and providing information for the population,
- the enactment of removal orders by the municipalities,
- the establishment of waste management associations,
- obligations incumbent upon the property owners (and users) in the context of waste disposal,
- the obligation to connect to municipal collection or the obligation to tender delivery to the same,
- the setting and prescription of tariffs by the municipalities.

Figure 14: Road sweeping

[1] Similar to households: similar to waste from private households in terms of type or composition.

Collection and treatment of waste

As regards the various types of waste mentioned by way of example, the circumstances regarding the regulatory level, the responsibilities and the established collection schemes are typically depicted as follows:

Table 5: Responsibilities for waste collection or -treatment

Type of waste	Regulation of the collection and treatment responsibilities	Responsibilities for organising collection	Responsibility for organising treatment/recovery	Collection system (typical)
		Municipal waste		
Mixed municipal waste (residual waste)	Province	Municipality (associations)	Municipality / associations / province	Pick-up (collection) system, revolving emptying system
Bulky waste	Province	Municipality (associations)	Municipality / associations / province	Delivery to collection points for recoverables by citizens + collection system (loose)
Biogenic waste	Province	Municipality (associations)	Municipality (associations)	Pick-up (collection) system, revolving emptying system, level of use < 100%
Waste paper (non- packaging)	Province	Municipality (associations)	Municipality (associations)	Packaging and non- packaging mixed, collection and bring-it- yourself system (waste collection points), revolving emptying system
Waste paper (packaging)	Federal Government	Business (retailer)	Business (retailer)	
Waste glass (packaging)	Federal Government	Business (retailer)	Business (retailer)	Bring-it-yourself system (waste collection points), revolving emptying system
Lightweight packaging	Federal Government	Business (retailer)	Business (retailer)	Collection system (sacks) and bring-it- yourself system (containers which can be emptied at waste collection points)
Metal packaging	Federal Government	Business (retailer)	Business (retailer)	Bring-it-yourself system (containers which can be emptied at waste collection points)
Miscellaneous metal waste	Province	Municipality (associations)	Municipality (associations)	Delivery to collection points for recoverables
Hazardous household waste	Federal Government	Municipality (associations)	Municipality (associations)	Delivery to problematic substance collection points (fixed or mobile)
Waste electrical equipment	Federal Government	Municipality (associations) Business	Business (retailer)	Delivery to collection points for recoverables; take-back by commerce
		Operational waste		
Mixed municipal waste from industry - not collected from municipalities	Federal Government	Polluter / source of waste generation	Polluter / source of waste generation	Collection system, revolving emptying system and returnable containers
Paper (non- packaging)	Federal Government	Polluter / source of waste generation	Polluter / source of waste generation	Collection system, revolving emptying system and returnable containers packaging/ non- packaging, partly mixed, partly collected unmixed
Paper/cardboard (packaging)	Federal Government	Business (retailer)	Business (retailer)	Collection system, returnable containers/press containers, GESTRA (commercial street disposal) in bulk form
Construction waste / site waste	Federal Government	Polluter / source of waste generation	Polluter / source of waste generation	Collection system, returnable containers or loose
Other	Federal Government	Polluter / source of waste generation	Polluter / source of waste generatione	Collection system

The majority of the treatment plants for mixed municipal waste and bulky waste are in public hands. In the main, waste incineration plants are either wholly or partly owned by the provinces through private/public partnerships, in which connection these plants, in part, belong to the provinces directly, or also through subsidiaries (see Table 6). Mechanical-biological treatment plants are primarily owned by the municipalities or by the waste management associations established by them (see Table 7). Residual materials and mass- waste landfills are also largely publicly owned (predominantly by municipalities or their waste management associations). In terms of numbers, the majority of landfills are privately owned, although collectively these have a lower residual capacity (see Table 8).

With other waste types, the municipality and provincial share is much lower, and for example is dominated by private waste disposal companies as regards the treatment of biogenic waste, agricultural composing, sorting and processing plants and physico-chemical treatment plants.

Table 6: Status of ownership in the case of waste incineration plants for residual waste and bulky waste

Status of ownership	Number	Capacity [t/year]
Provinces, municipalities or associations (public)	5	1,065,000
Private/public partnership (combination of public and private)	4	1,226,000
Private enterprises	2	261,000
Total	11	2,552,000

Table 7: Status of ownership in the case of mechanical-biological treatment plants for residual waste and bulky waste

Status of ownership	Number	Capacity [t/year]
Provinces, municipalities or associations (public)	9	423,000
Private/public partnership (combination of public and private)	2	110,700
Private enterprises	3	122,000
Total	14	655,700

Table 8: Status of ownership in the case of residual materials and mass-waste landfills

Status of ownership	Number[1]	Remaining capacity [mio. m^3]
Provinces, municipalities or associations (public)	24	22.5
Private/public partnership (combination of public and private)	5	1.5
Private enterprises	34	15.1
Total	63	39.1

[1] *Landfills which are classed as both mass-waste and residual materials landfills have only been included once.*

Figure 15: Landfill base sealing

Waste management associations

In the majority of the federal provinces, municipalities have amalgamated into waste management associations on the basis of the provincial waste management laws. These associations undertake the waste management tasks of those municipalities who are members of the association. The scope of the tasks which are typically covered by the waste management associations varies markedly in the individual federal provinces. The range of tasks undertaken by these associations may include, for example, the organisation of collection, transport and treatment of the waste as well as the construction and operation of treatment plants and also the setting/levying of waste collection charges.

Collection and recovery schemes

Collection and recovery schemes are legal entities which can assume in a legally effective manner the obligations of an Ordinance in accordance with Article 13a and Article 14(1) of the Waste Management Act 2002 concerning the collection and treatment of certain products or waste and the furnishing of proof in this regard by the obligated parties.

Related Ordinances:

- Ordinance on the prevention and recovery of packaging waste and specific waste products (Packaging Ordinance 2014)
- Ordinance on waste prevention, collection and treatment of end-of-life vehicles (End-of-Life Vehicle Ordinance 2002)
- Ordinance on waste prevention, collection and treatment of waste electrical and electronic equipment (WEEE Ordinance 2005)
- Ordinance on waste prevention, collection and treatment of waste batteries and accumulators (Batteries Ordinance 2008).

The collection and recovery schemes require approval in accordance with Article 29 of the Waste Management Act 2002 by the Federal Minister for Agriculture and Forestry, Environment and Water Management, and are also subject to supervision by the latter. In particular, it must be demonstrated in this regard that collection, recovery and treatment can also actually be organised nationwide and that corresponding financing is available to cover the cost of this. An important principle here is the equal treatment of all of the parties involved, which also excludes discounts for bulk, and thereby ensures that small and large distributors are treated absolutely equally.

There are collection and recovery schemes available for collection and treatment in the near-household and commercial sectors. Collection and recovery schemes which look after both sectors, or which function for several products or collection categories, must provide for a strict separation between these business sectors.

The collection and recovery schemes for household packaging and commercial packaging, for end-of-life vehicles, for waste electrical equipment and used batteries which are approved, or authorised for further operation, can be taken from the website of the Federal Ministry of Agriculture and Forestry, Environment and Water Management.

Costs and financing

Depending on the status of the waste, the respective requirements pertaining to the treatment and the service offered, various costs shall arise in connection with the collection, transport and treatment of the waste.

The costs associated with the management of waste are associated with, among other things, the following revenues/sources of financing:

- in the municipal sector: charges payable by households, for example, in relation to the collection/treatment of residual waste and/or biowaste;
- in the commercial sector: the allocation of costs to the waste producer;
- revenues e.g. for recoverables, energy supplies, etc.;
- participant contributions concerning the placement on the market of products or packaging which are made to a collection and recovery scheme.

The shares of the funding in terms of the disposal costs are illustrated below.

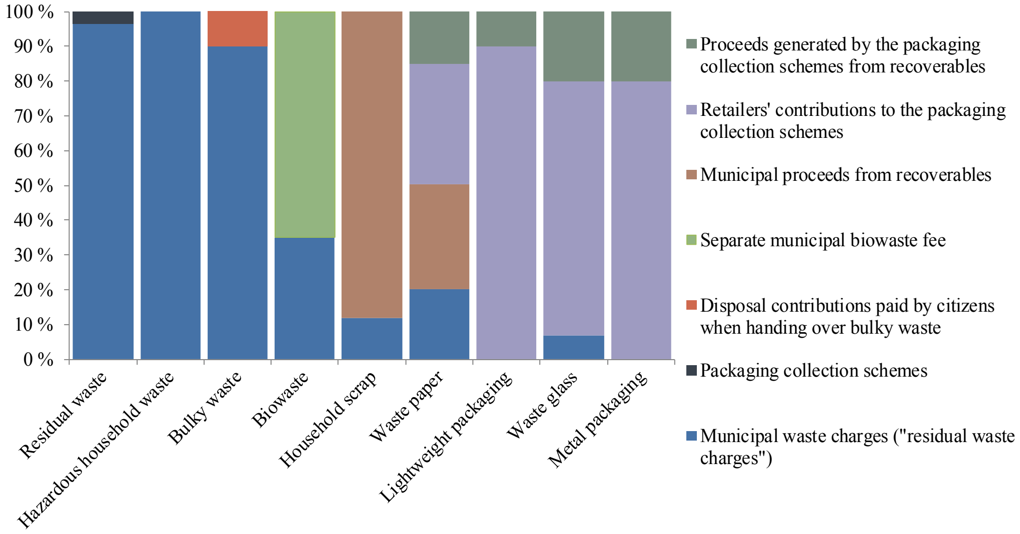


Figure 16: Sources of financing for covering the costs of waste collection and treatment (Source: Environment Agency Austria)

Setting of waste collection charges

The charges for disposing of waste accruing in households vary according to the municipality. Various models are used to specify the charges, in which connection, for the most part, container sizes and the frequency with which the collection containers are emptied are decisive.

The settlement structure and collection routes of varying lengths which are associated with this have an impact on the waste collection charges. There are also significant differences between the services presented, e.g. the opening hours of the collection points for recoverables. The disposal of bio-waste is already included in the price of residual waste disposal in several municipalities. Furthermore, additional fees are charged (with regional differences) in connection with the discharge of certain waste streams (e.g. for end-of-life tyres and construction waste).

A comparison between municipal waste charges is therefore only possible to a limited degree.

The figure below shows the trend in monies received in total in Austria via the waste collection charges. The increase can be attributed to enhanced services offered by the municipalities such as, for example, the expansion of collection points for recoverables and the more stringent standards associated with waste treatment, as well as to population growth and the higher number of households.

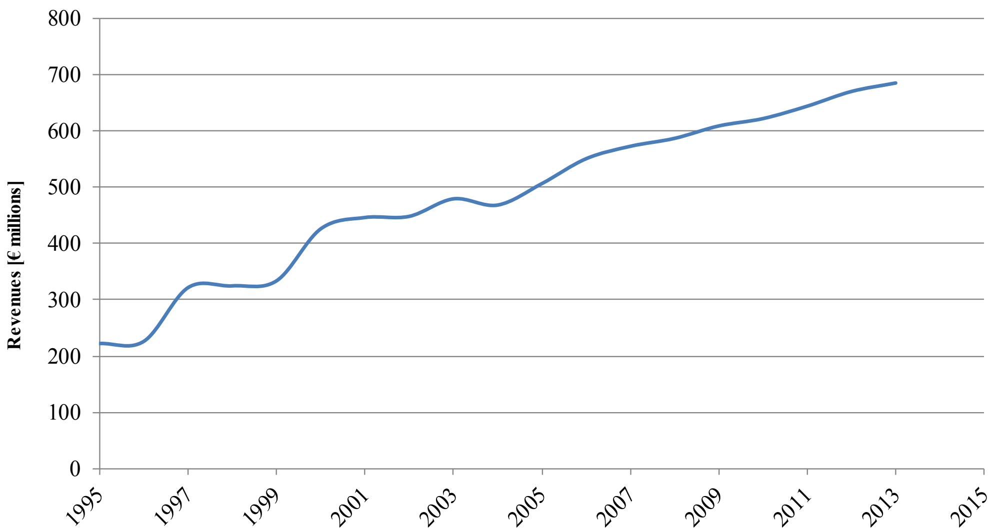


Figure 17: Monies collected via the waste collection charges in all of Austria's municipalities (source: Statistics Austria)

As regards waste whose collection and treatment is neither financed through municipal charges nor through monies from retailers, the party responsible for generating the waste shall pay the costs in the form of direct payments. This primarily concerns waste from trade and industry (those areas where retailers have obligations are exempt). As regards private households, this area is scarcely present (exceptions include, for example, on a case-by-case basis, end-of-life tyres or waste from building activities, if specific quantity limits are exceeded).

Figure 18: The settling of waste management services is performed via different financing sources.

Turnover and employment in the waste management sector

The number of employees in public and private waste management, as well as the corresponding estimated turnover, can be taken from Table 9.

Table 9: Turnover and employment in the waste management sector

	Private waste management	Municipal waste management	Total waste management
Turnover per year [€ millions]	approx. 4,000	approx. 1,200	approx. 5,200
Employees	approx. 25,000	approx. 14,800	approx. 39,800
(Source: Arge Österreichische Abfallwirtschaftsverbände [syndicate of Austrian waste management associations])			

Interconnectedness of the Austrian waste management industry

Austria's waste management industry is structured in such a way that as regards disposal (or, in the case of mixed municipal waste, as regards recovery as well), the principles of self-sufficiency and proximity are complied with. Waste for recovery is generally subject to less stringent requirements, so as to give consideration to the efficiency of the treatment plants and the capacity and specialisation thereof. Further information is included in Chapter 6.3.6 "Shipment of Waste" and in Chapter 9 "Guidelines for the shipment of waste".

3

SELECTED WASTE STREAMS

3. SELECTED WASTE STREAMS

3.1. MUNICIPAL WASTE FROM HOUSEHOLDS AND SIMILAR ESTABLISHMENTS

ACCORDING TO THE WASTE MANAGEMENT ACT 2002, "municipal waste" is waste from private households and other types of waste which, on account of their nature or composition, are similar to domestic waste. Municipal waste from households and similar establishments is primarily generated by households and public bodies, such as kindergartens or schools. Furthermore, this waste originates from commercial and industrial enterprises, public administration, hospitals, markets, agriculture and tourist establishments, if these are connected to the municipal domestic refuse collection or to a domestic refuse collection arranged on behalf of the municipality in question. This is dependent on the provisions under provincial law.

The municipal waste from households and similar establishments described in this chapter is made up of the following fractions - mixed municipal waste (residual waste), bulky waste, biogenic waste, hazardous household waste, waste electrical equipment, waste batteries and recoverables such as packaging, waste paper, waste glass, waste metals, waste plastics, waste textiles, etc. A detailed description of the respective waste streams is given in the following sub-chapters.

Volume

In 2015, approximately 4,160,000 tonnes of municipal waste from households and similar establishments accrued. In terms of the average population, this corresponds to a volume of municipal waste generated of 482 kg per person. The differences in the individual federal provinces depend on waste collection systems, second homes, tourism, etc.

Figure 19: Containers for the separate collection of recoverables

Table 10: Municipal waste from households and similar establishments – Volume generated according to Federal Provinces

Federal Provinces	Volume[t]	Volume [kg/inhabitant]
Burgenland	142,814	494
Carinthia	227,513	407
Lower Austria	855,129	520
Upper Austria	728,097	504
Salzburg	265,087	490
Styria	541,526	442
Tyrol	373,772	510
Vorarlberg	140,757	369
Vienna	885,464	488
Austria (rounded off)	4,160,159	482

Of the roughly 4.2 million tonnes of municipal waste from households and similar establishments, 40 % was supplied for treatment via public domestic-refuse collection as mixed municipal waste (residual waste) and bulky waste. Around 2.5 million tonnes, or 60 % of the total volume, was obtained through separate collections.

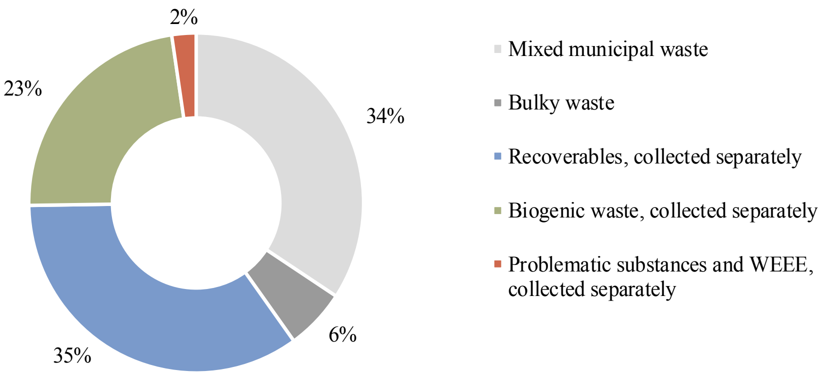


Figure 20: Municipal waste from households and similar establishments in 2015 - main fractions

Table 11: Municipal waste from households and similar establishments – Quantities and volumes

Waste designations	Quantities [t, rounded off]	Conversion [kg/m³]	Volumes [m³, rounded off]
Mixed municipal waste	1,431,600	130[1]	11,012,000
Bulky waste	244,200	100[1]	2,442,000
Hazardous household waste	19,100	100	191,000
Waste electrical and electronic equipment	78,900	200	394,000
Waste paper - packaging / printed matter	659,800	150[1]	4,399,000
Waste glass - packaging	218,500	280[1]	780,000
Scrap metals - packaging	28,900	50[1]	577,000
Scrap metals - domestic scrap (bulky waste collection)	88,100	200[1]	441,000
Waste plastics and composite materials - packaging	154,700	30[1]	5,157,000
Waste textiles	29,400	200[1]	147,000
Waste wood - packaging / bulky wood	244,200	370[1]	660,000
Other recoverables, including packaging	26,900	100	269,000
Biogenic waste	935,900	80[1]	11,699,000
Total (rounded off)	4,160,200		38,168,000

[1] *Conversion factors according to the "Lower Austrian Waste Management Report 2012"*

Of the approximately 1,450,400 tonnes of recoverables, packaging collected separately accounted for roughly 449,500 tonnes. This accounts for approximately 11 % of the total volume of municipal waste from households and similar establishments.

The volume of municipal waste from households and similar establishments rose by 6.8 % compared with 2009. Biogenic waste is the fastest-growing sector and the increase here can be attributed to the fact that in 2009, four of the federal provinces did not have any information on green waste. Mixed municipal waste remained relatively constant with an increase of 2.1 %.

Table 12: Change of municipal waste from households and similar establishments

Main fractions	2009 [t]	2015 [t]	Change [t]	Change [%]
Total volume of municipal waste from households and similar establishments	3,895,000	4,160,000	+ 265,000	+ 6.8
Mixed municipal waste	1,402,000	1,432,000	+ 30,000	+ 2.1
Bulky waste	259,000	244,000	- 15,000	- 5.8
Municipal waste collected separately from households and similar establishments	2,234,000	2,484,000	+ 250,000	+ 11.2
Hazardous household waste and WEEE	96,000	98,000	+ 2,000	+ 2.1
Recoverables	1,386,000	1,450,000	+ 64,000	+ 4.6
Biogenic waste	752,000	936,000	+ 184,000	+ 24.5

Figure 21: Collection of municipal waste in the household

Treatment

In 2015, around half of the approximately 4,160,000 tonnes of municipal waste from households and similar establishments was supplied for material recovery. More than 40 % underwent thermal treatment, while less than 10 % underwent mechanical-biological treatment.

The following tables and graphics show the volume of municipal waste from households and similar establishments according to waste fractions and federal provinces, the recovery and disposal of the individual waste fractions, and their development since 1989.

The following must be taken into consideration in this regard:

- Data source up to 2009: Values on volume according to information from the offices of the provincial governments (partly calculated or extrapolated by the Environment Agency Austria).
- Data source from 2010: EDM (annual waste balance sheets of the collectors/treatment plants).
- Resident-specific quotas for volume, recovery and disposal of municipal waste from the municipal sector are calculated on the basis of information provided by Statistics Austria (resident statistics).
- Information on waste electrical and electronic equipment and used batteries collected separately in the federal provinces is based on information provided by the Austrian Waste Electrical and Electronic Equipment Coordination Point.

Table 13: Municipal waste from households and similar establishments in 2015 – Volume according to Federal Provinces and fractions [t]

	B	C	LA	UA	S	St	T	V	Vie	A
Mixed municipal waste	35,006	97,326	230,869	167,285	93,315	155,889	96,563	31,795	523,545	1,431,593
Bulky waste	14,113	9,983	71,312	34,156	17,781	42,011	22,146	5,666	27,042	244,210
Hazardous household waste and batteries	770	1,233	6,159	4,103	1,038	2,223[1]	1,711	447	1,454	19,138
Waste electrical and electronic equipment	2,708	6,286	13,927	14,873	5,608	13,002	6,479	3,883	12,105	78,871
Paper, printed matter and packaging	23,398	39,694	128,421	115,342	44,249	94,352	59,809	31,499	123,046	659,810
Glass packaging	8,950	13,826	37,836	36,204	14,974	35,925	29,054	12,995	28,726	218,490
Metal packaging	1,458	1,554	5,915	4,751	1,278	5,186	3,548	2,134	3,020	28,844
Bulky metals	3,084	5,642	17,396	19,939	5,940	13,219	8,593	2,444	11,864	88,121
Textiles	2,076	1,717	5,240	5,855	349	4,487	2,535	3,124	4,023	29,406
Plastic packaging	7,628	7,427	26,820	33,071	10,556	28,203	23,671	10,515	6,810	154,701
Bulky wood and packaging	7,546	13,101	45,246	59,045	16,107	32,476	20,435	7,973	42,232	244,161
Other recoverables	344	1,315	4,873[2]	10,668	642	4,350	1,723	205	2,778	26,898
Biogenic waste	35,733	28,410	261,115	222,805	53,250	110,203	97,505	28,077	98,819	935,917
Total	142,814	227,514	855,129	728,097	265,087	541,526	373,772	140,757	885,464	4,160,160

[1] *According to the Styrian Annual Waste Management Report, the total amount of hazardous household waste and batteries accounted for 2,387 tonnes in 2015.*

[2] *In addition, 1,104 tonnes of waste edible fats were collected from households and similar establishments in Lower Austria.*

Figure 22: Refuse collection vehicle

Table 14: Recovery or disposal of municipal waste - Initial treatment stages in 2015

	Biological recovery		Material recovery (excluding biological recovery)		Treatment hazardous household waste / WEEE		Thermal treatment of processed fractions					Biological treatment	Landfill	
	Biogenic waste (organic waste collection bins) collected separately	Biogenic waste (green waste)collected separately	Recoverables collected separately	Recoverables sorted from the processing of mixed municipal waste and bulky waste	Hazardous household waste collected separately	WEEE collected separately	Direct delivery of mixed municipal waste and bulky waste	High-calorific fraction from the processing of mixed municipal waste / bulky waste	Recoverables collected separately	WEEE collected separately	Biogenic waste (organic waste collection bins) collected separately	Low-calorific fraction from the processing of mixed municipal waste / bulky waste	WEEE from processing, from separate collection, sorting residues	VOLUME [t]
B	14,000	21,300	41,900	1,700	800	2,300	0	14,700	12,600	300	400	32,700	100	142,800
C	12,200	15,800	66,500	600	1,200	5,400	90,000	5,200	17,800	600	400	11,500	300	227,500
LA	148,500	108,000	210,000	700	6,200	12,000	283,000	5,700	61,700	1,400	4,600	12,800	600	855,200
UA	69,300	151,400	206,900	600	4,100	12,800	200,900	0	78,000	1,500	2,100	0	600	728,200
S	34,900	17,300	71,800	3,900	1,000	4,800	0	33,200	22,300	600	1,100	74,000	200	265,100
St	65,300	42,900	167,700	6,900	2,200	11,200	0	59,200	50,500	1,300	2,000	131,800	500	541,500
T	49,700	46,300	113,600	600	1,700	5,600	100,800	5,400	35,700	600	1,500	11,900	300	373,700
V	14,900	12,800	55,800	1,300	400	3,300	800	11,000	15,100	400	500	24,400	200	140,900
Vie	84,200	12,000	177,400	0	1,500	10,400	550,600	0	45,100	1,200	2,600	0	500	885,500
A	493,000	427,800	1,111,600	16,300	19,100	67,800	1,226,100	134,400	338,800	7,900	15,200	299,100	3,300	4,160,400
Weight [t]	921,000		1,128,000		87,000		1,722,000					299,000	3,000	
Weight [%]	22.1		27.1		2.1		41.4					7.2	0.1	100.0

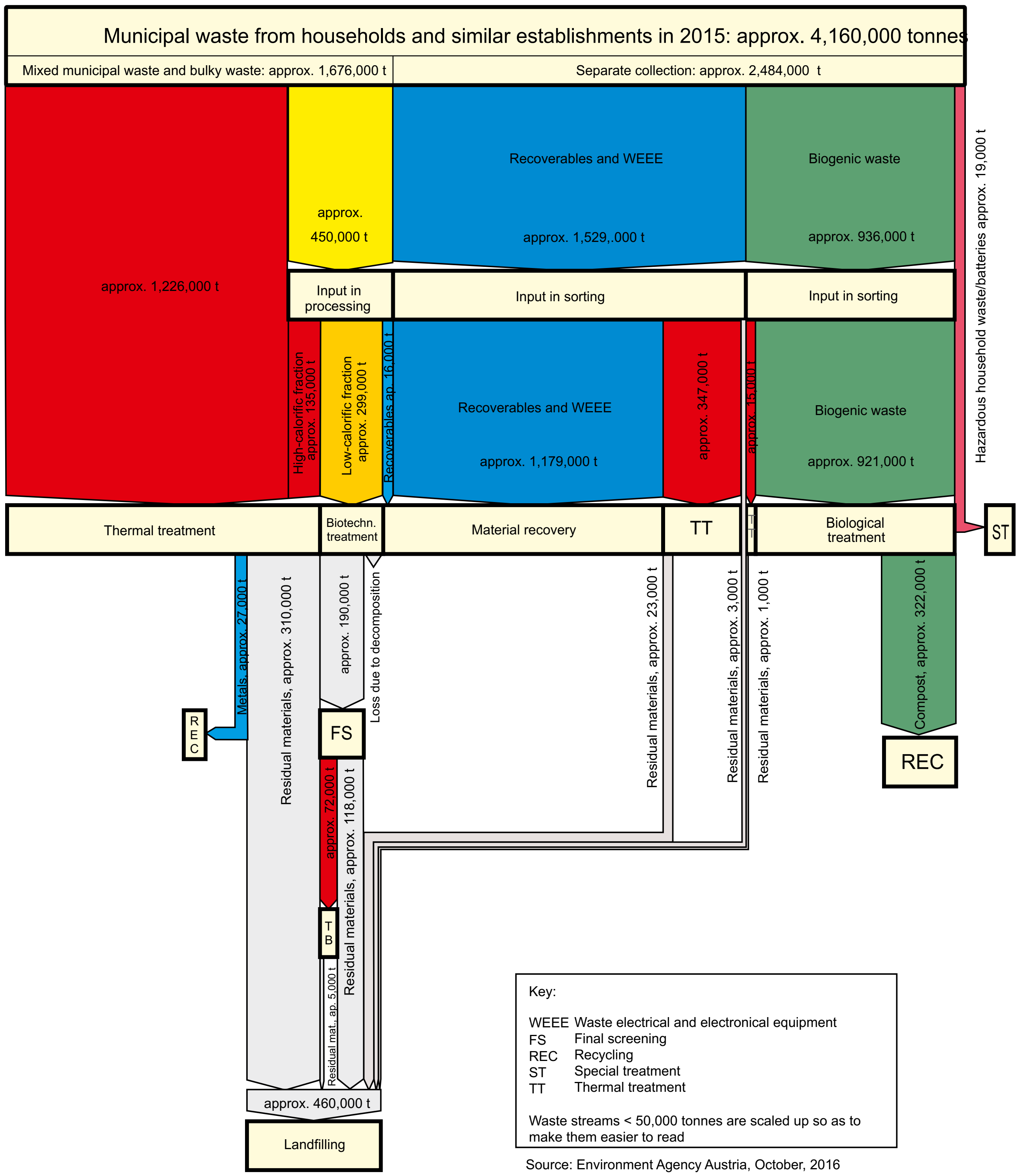
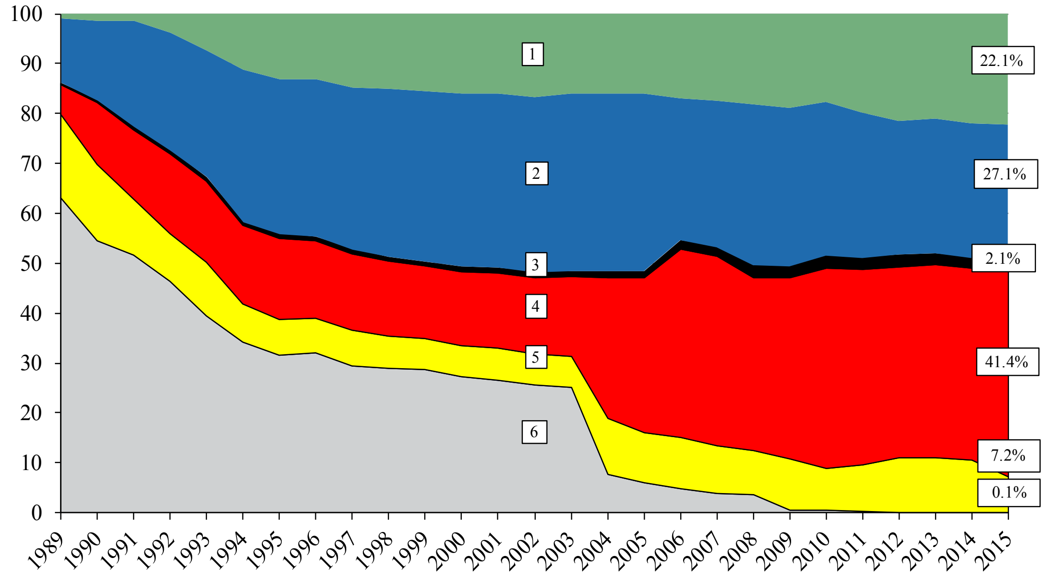


Figure 23: Municipal waste from households and similar establishments and their treatment processes



Caption:

1. Recovery of separately collected biogenic waste and of green waste
2. Recovery of separately collected recoverables
3. Treatment of hazardous household waste and of WEEE collected separately
4. Thermal treatment (waste incineration plant and co-incineration)
5. Biological treatment in (mechanical-biological) treatment plants
6. Landfilling without any pre-treatment
7. Landfilling following pre-treatment

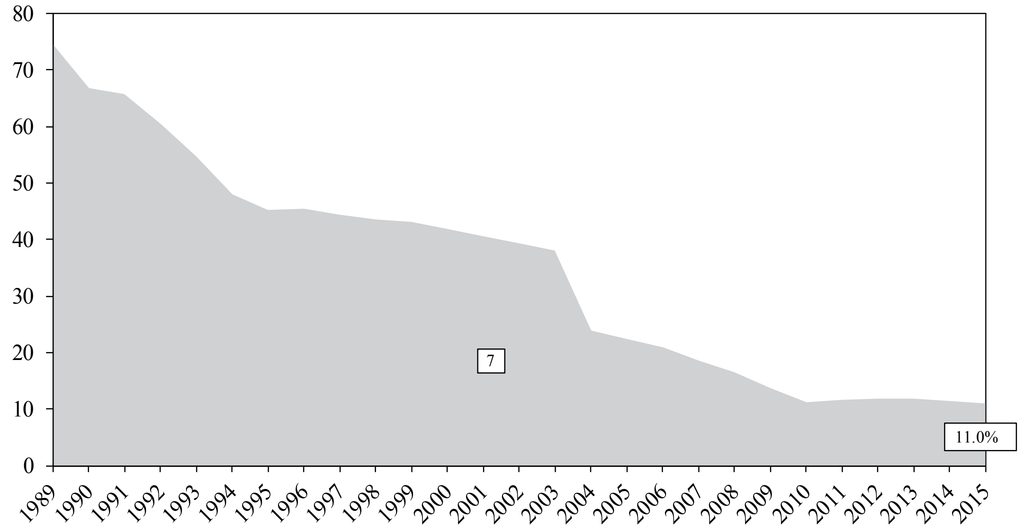


Figure 24: First treatment options of municipal waste from households and similar establishments 1989 – 2015 [in % by mass]

3.1.1. MIXED MUNICIPAL WASTE (RESIDUAL WASTE) FROM HOUSEHOLDS AND SIMILAR ESTABLISHMENTS

"Mixed municipal waste" is waste which originates predominantly from private households or which, on account of its nature or composition, is similar to domestic waste. In the waste management legislation in the federal provinces, it is sometimes described as "domestic waste" or "residual waste". Mixed municipal waste does not include recoverables collected separately, biogenic municipal waste, bulky municipal waste, waste electronic equipment, used batteries, hazardous household waste or street sweepings. This chapter only describes mixed municipal waste from the municipal sector.

The composition of the mixed municipal waste depends on a number of different factors. These include, for instance, the existing waste collection system, the socio-economic structure of the population or whether the households are situated in urban or rural locations. The key elements of mixed municipal waste are plastics and composite materials, organic fractions, paper and cardboard packaging.

Table 15: Composition of the mixed municipal waste

Fractions	Proportion [1] [%]	
Plastics packaging	7.10	17.58
Other lightweight packaging	1.10	
Plastics non-packaging	9.38	
Organics (incl. non-preventable food waste)	1.31	17.81
Preventable/partly preventable food waste	16.50	
Paper. paperboard and cardboard packaging	2.20	13.96
Paper. paperboard and cardboard non-packaging	11.76	
Sanitary products	9.64	9.64
Textiles	7.79	9.79
Footwear	2.00	
Inert materials	5.86	5.86
Glass packaging	3.80	4.86
Glass non-packaging	1.06	
Metal packaging	2.50	4.70
Metal non-packaging	2.20	
Other waste	4.01	5.71
Wood non-packaging	1.70	
Waste electronic equipment	0.77	1.54
Batteries incl. accumulators	n/a.	
Hazardous household waste/hazardous waste	0.77	
Sorting residue (non identifiable)	8.55	8.55
Total	100.00	100.00

[1] *Exemplary representation based on the example of residual waste sorting analysis in Styria in 2014.*
Sorting fraction according to the minimum requirements of the Guideline for the Implementation of Residual Waste Analyses (Federal Ministry of Agriculture, Forestry, Environment and Water Management 2017)

Volume

In 2015, the volume of mixed municipal waste from households and similar establishments was approximately 1,431,600 tonnes. The amount of waste generated per head varies between 83 kg in Vorarlberg and 289 kg in Vienna. The differences can be attributed to many causes, including provisions under provincial law, existing collection systems, the number of second homes, the level of tourism or the proportion of waste from commercial enterprises which is disposed of jointly.

Table 16: Mixed municipal waste – Volume according to Federal Provinces

Federal Provinces	Volume [t]	Volume [kg/inhabitant]
Burgenland	35,000	121
Carinthia	97,300	174
Lower Austria	230,900	141
Upper Austria	167,300	116
Salzburg	93,300	172
Styria	155,900	127
Tyrol	96,600	132
Vorarlberg	31,800	83
Vienna	523,500	289
Austria	1,431,600	166

Figure 25 shows the trend in the volume of waste generated from 1991 to 2015. Starting from a high level in 1991, the volume of mixed municipal waste generated from households and similar establishments decrease appreciably in the first instance as a result of the entry into force of the ordinances on the separate collection of packaging, biogenic waste and waste generated from construction. Over the last 10 years, the outright volume of waste generated has stagnated, even though population numbers have risen by 4.6 %.

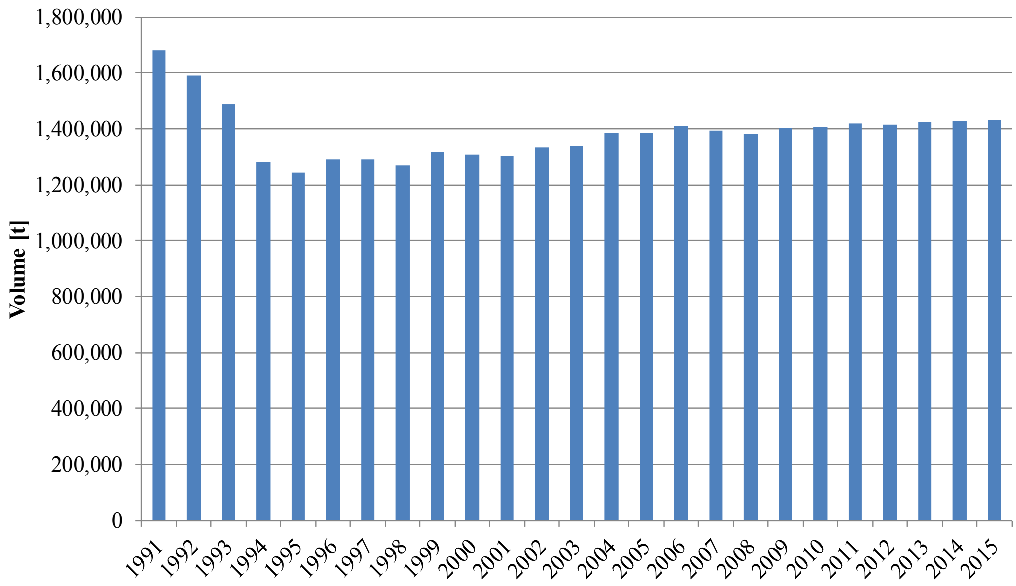


Figure 25: Volume of mixed municipal waste from the municipal sector 1991-2015

Collection and treatment

Mixed municipal waste from households and similar establishments is largely disposed of in the collection system through public domestic refuse collection or private enterprises. The latter are instructed to effect collection by municipalities or waste management associations. The waste from agriculture, service companies, small business enterprises and public bodies which is similar to that generated by households is predominantly collected together via domestic refuse collection.

In 2015, 1,162,100 tonnes of mixed municipal waste were subjected to thermal treatment directly or following processing in the initial treatment stage, while 255,600 tonnes underwent biological treatment. 13,900 tonnes of recoverables separated out from the municipal waste were recycled.

3.1.2. BULKY WASTE FROM HOUSEHOLDS AND SIMILAR ESTABLISHMENTS

Bulky waste from households and similar establishments includes waste which cannot be collected via customary waste containers on account of their size or shape and which cannot be assigned to any recoverables collection.

The composition of the bulky waste is extremely heterogeneous and dependent on various influencing factors. These factors include legal provisions in the federal provinces, the population's settlement and social structures and the existing removal scheme and container size, but also the nature, frequency and costs of bulky waste collection. Key elements of the bulky waste are furnishings, including furniture, mattresses and sanitary fittings, as well as wood and wood-based materials.

Volume

The volume of bulky waste from households and similar establishments generated in 2015 totalled approximately 244,200 tonnes. The volume generated per head in the individual federal provinces was between 15 and 49 kg. This range also ensues on the basis of the preliminary collection of recoverable fractions, e.g. treated waste wood or components from iron, which takes place to a varying extent in the federal provinces or municipalities. The quantities specified are therefore scarcely comparable.

Table 17: Bulky waste from households and similar establishments – Volume

Federal Provinces	Volume [t]	Volume [kg/inhabitant]
Burgenland	14,100	49
Carinthia	10,000	18
Lower Austria	71,300	43
Upper Austria	34,200	24
Salzburg	17,800	33
Styria	42,000	34
Tyrol	22,100	30
Vorarlberg	5,700	15
Vienna	27,000	15
Austria	244,200	28

The volume of bulky waste from households and similar establishments which has been generated since 1991 has seen an upward trend. The increase can be attributed to the population increase, to the rise in living standards and to a reduction in the useful life of consumer goods such as furniture, for example.

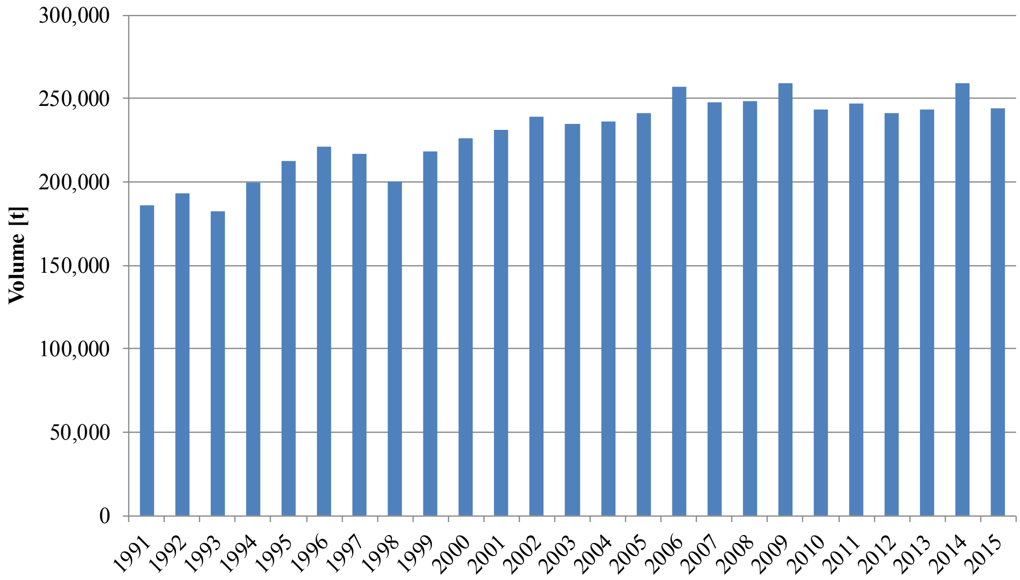


Figure 26: Volume of bulky waste from households and similar establishments 1991-2015

Collection and treatment

Bulky waste is predominantly collected through the bring-it-yourself system at the collection points for recoverables, although there is also collection on demand or the street collection of bulky waste. A large part of the bulky waste is sorted and predominantly undergoes thermal or biological treatment following a grinding process. Scrap metals sorted from the bulky waste enter recycling establishments. Sorted untreated and treated waste wood is thermally recovered or recycled in the wood material industry.

3.1.3. SEPARATELY COLLECTED HAZARDOUS HOUSEHOLD WASTE

Hazardous household waste is hazardous waste that normally accumulates in private households. These hazardous household waste also include hazardous waste from all other waste producers which is comparable with domestic waste in terms of type and quantity. In both cases, this waste is classed as hazardous household waste as long as it remains in the possession of the initial waste producers.

In Austria, old stocks of plant treatment agents and pesticides, old paints and varnishes, medicinal products, asbestos cement, aerosol dispensers (aerosol cans), medical waste, liquid waste mineral oils (waste oils) and solid waste contaminated with grease and oil, among other things, are collected as hazardous household waste. Furthermore, chemical residues, lyes, acids, solvents and mercury-containing waste are disposed of as hazardous household waste. Waste electrical and electronic equipment and batteries are each covered in their own separate chapters.

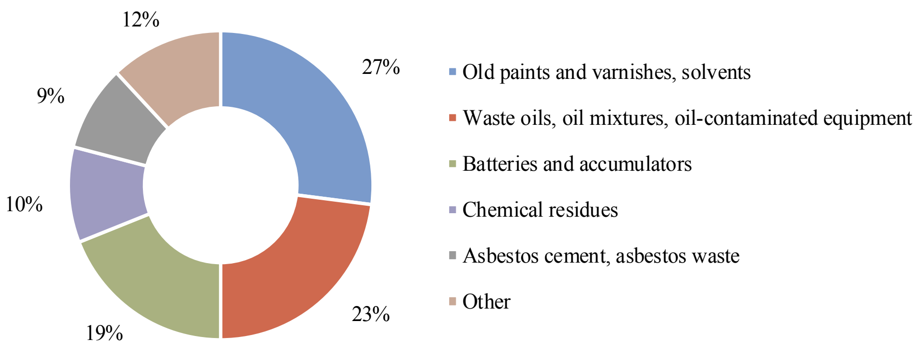


Figure 27: Composition of hazardous household waste

As shown in Figure 27, the most important hazardous household waste in terms of quantities are old paints and varnishes, solvents, waste oils and oil mixtures, as well as asbestos cement and chemical residues.

Volume

In 2015, the volume of hazardous household waste collected separately was approximately 19,140 tonnes, in which connection a per capita rate of between 0.8 kg and 3.7 kg was achieved in the individual federal provinces.

Table 18: Volume of hazardous household waste

Federal Provinces	Volume [t]	Volume [kg/inhabitant]
Burgenland	770	2.7
Carinthia	1,230	2.2
Lower Austria	6,160	3.7
Upper Austria	4,100	2.8
Salzburg	1,040	1.9
Styria [1]	2,220	1.8
Tyrol	1,710	2.3
Vorarlberg	450	1.2
Vienna	1,460	0.8
Austria	19,140	2.2

[1] *According to the Styrian Annual Waste Management Report, the total volume of hazardous household waste and batteries accounted for 2,387 tonnes in 2015..*

Collection and treatment

Given their hazardous constituents, hazardous household waste must be collected separately from the other types of municipal waste. These substances are collected several times a year through stationary collection points for hazardous household waste in the municipalities or at mobile collection points. Sometimes, the hazardous household waste, including out-of-date medicines, waste oils or copier toners, are taken back free of charge by the specialist stores.

Following presorting, hazardous household waste undergo physico-chemical treatment or are treated thermally, while utilising their energy content

3.1.4. SEPARATELY COLLECTED RECOVERABLES FROM HOUSEHOLDS AND SIMILAR ESTABLISHMENTS

Pursuant to Article 2(4) of the Waste Management Act 2002, as amended, 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."

Depending on the respective collection region, in addition to packaging, a variety of recoverables are collected separately by the households or similar establishments. Examples include rigid plastic, toys and CDs, in which connection the number of separated fractions varies across the federal provinces. The following fractions are recorded separately across Austria:

- Waste paper, paperboard and cardboard packaging - packaging and printed matter
- Waste glass (clear and coloured glass) – packaging
- Scrap metals – packaging
- Scrap metals – household scrap
- Waste textiles, including footwear
- Lightweight fraction – packaging
- Waste wood – packaging
- Bulky waste wood
- Other recoverables such as fats/frying oils, flat glass, end-of-life tyres, other plastics and others.

Volume

Approximately 1.45 million tonnes of recoverables from household collection were collected separately in 2015. This corresponds to roughly one third of the volume of municipal waste generated from households and similar establishments.

Table 19: Recoverables from households and similar establishments – Volume

Separately collected recoverables [1]	2015
Volume [t]	1,450,400
Volume [kg/inhabitant]	168
Share [%] of the volume of municipal waste from households and similar establishments	35

[1] *Excluding recoverables sorted from mechanical-biological treatment plants and mechanical treatment*

Figure 28: Waste glass collection

As can be gathered from Table 20, by far the largest share was accounted for by waste paper, paperboard and cardboard packaging.

Table 20: Recoverables from household – Collection-volume by fractions

Fractions	Quantity [t][1]	Quantity [kg/inhabitant]
Waste paper, paperboard and cardboard packaging, packaging and printed matter	659,800	76.5
Waste glass - packaging	218,500	25.3
Scrap metals - packaging	28,900	3.3
Scrap metals - scrap	88,100	10.2
Waste textiles	29,400	3.4
Waste plastics - packaging	154,700	17.9
Waste wood - packaging and bulky wood	244,100	28.3
Other recoverables	26,900	3.1
Total recoverables (rounded off)	1,450,400	168

[1] *Excluding recoverables sorted from mechanical-biological treatment plants and mechanical treatment*

Table 21: Recoverables from household – Collection-volume according to Federal Provinces

Federal Provinces	Quantity [t][1]	Quantity [kg/inhabitant]
Burgenland	54,500	188
Carinthia	84,300	151
Lower Austria	271,700[2]	165
Upper Austria	284,900	197
Salzburg	94,100	174
Styria	218,200	178
Tirol	149,300	204
Vorarlberg	70,900	186
Vienna	222,500	123
Austria (rounded off)	1,450,400	168

[1] *Excluding recoverables sorted from mechanical-biological treatment plants and mechanical treatment*
[2] *In addition, 1,104 tonnes of waste edible fats were collected from households and similar establishments.*

Collection and treatment

The recoverables from household collection are collected via the regionally differentiated collections of packaging in the collection or bring-it-yourself systems or via collection points for recoverables.

In 2015, on average 77 % of the roughly 1.45 million tonnes of recoverables following corresponding sorting was supplied for recycling, while roughly 23 % was supplied for thermal recovery.

3.1.5. SEPARATELY COLLECTED BIOGENIC WASTE FROM HOUSEHOLDS AND SIMILAR ESTABLISHMENTS

In accordance with the Ordinance on the separate collection of biogenic waste, Federal Law Gazette No 68/1992, as amended, biogenic waste has a high organic, biodegradable proportion and is therefore especially suitable for composting and fermentation. Biogenic waste collected separately can be subdivided as follows:

- Green waste from the garden and green areas, such as grass clippings, tree and shrub cuttings, flowers, foliage
- Waste from the preparation of foodstuffs as well as leftovers.

Remarks regarding vegetable residues from the commercial and industrial processing of dishes can be found in Chapter 3.3.2 "Catering waste". Biogenic waste which accrues in public and semi-public areas is depicted in Chapter 3.3.1 "Biogenic waste from green areas".

The composition of the biogenic waste collected separately from households and similar establishments depends on the time of year, annual rainfall, the settlement structure, etc.

Volume

In 2015, 935,900 tonnes of biogenic waste from households and similar establishments were collected separately. This corresponds to roughly one quarter of the volume of municipal waste generated. In 2015, between 51 kg and 159 kg of biogenic waste were collected per person (Table 23). These variations are also related to the degree of use of the organic waste collection bins and/or the proportion of home composting.

Table 22: Biogenic waste from households and similar establishments

Biogenic waste	2015
Volume [t]	935,900
Volume [kg/inhabitant]	108
Share [%] of the volume of municipal waste from households	22

Table 23: Biogenic waste from households and similar establishments – Volume

Federal Provinces	Organic waste collection bins[1] [t]	Green waste[2] [t]	Total [t]	Total [kg/inhabitant]
Burgenland	14,400	21,300	35,700	124
Carinthia	12,600	15,800	28,400	51
Lower Austria	153,100	108,000	261,100	159
Upper Austria	71,400	151,400	222,800	154
Salzburg	36,000	17,300	53,300	98
Styria	67,300	42,900	110,200	90
Tyrol	51,200	46,300	97,500	133
Vorarlberg	15,300	12,800	28,100	74
Vienna	86,800	12,000	98,800	54
Austria	508,100	427,800	935,900	108

[1] Biogenic waste which is recorded separately with the help of organic waste collection bins.
[2] Recorded by means of container collection and the collection point for recoverables or fed directly to a composting plant.

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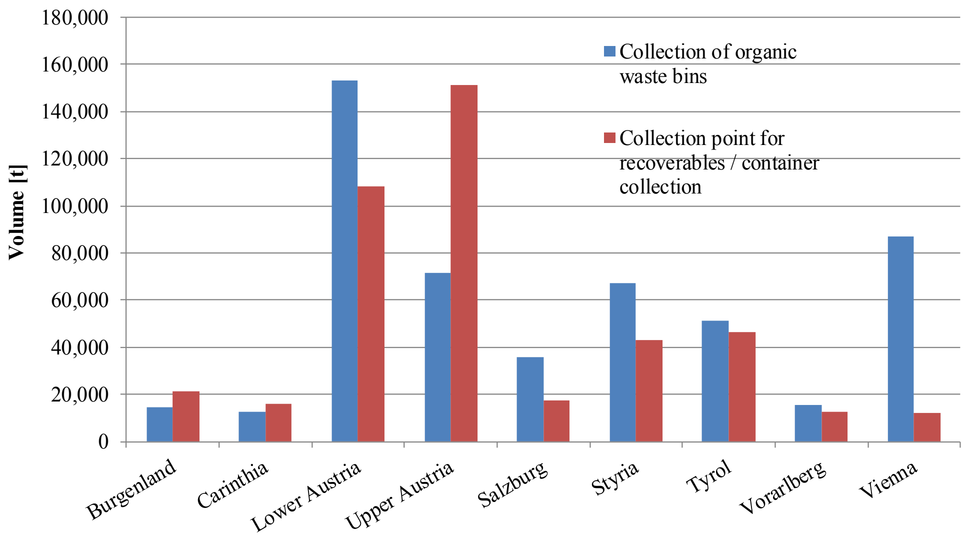

Figure 29: Biogenic waste from households and similar establishments in 2015, separated according to the nature of the collection

Collection and treatment

The majority of biogenic waste from households is collected via the organic waste collection bin, which is mostly disposed of in the collection scheme. In contrast, green waste and shrub cuttings from household gardens are also taken to the existing collection points or direct to composting plants.

Biogenic waste which is collected separately is recovered in agricultural, municipal or commercial composting and biogas plants. The compost is subsequently utilised in agriculture, for fertilising public green spaces, such as parks, cemeteries, sports grounds, etc., dispensed to the population or used in horticulture and landscaping. The biogas originating in biogas plants is used to generate energy and heat. The digestate is used either for composting or is directly recovered for agricultural purposes.

Non-recoverable residual materials, such as plastics, which are separated by screening during rough presorting or following the treatment process, are thermally recovered.

Figure 30: Composting plant – waste becomes a product

3.1.5.1. HOME AND COMMUNITY COMPOSTING IN HOME GARDENS

Home and community composting constitutes a permissible recovery of biological materials for producing composts. As regards home composting or household garden composting, the residents of a single- or multiple-family dwelling utilise their biogenic materials on their own green areas or gardens. As regards community composting, the residents of townhouse communities, cooperative association buildings or housing complexes join forces and compost their biogenic kitchen and garden residues together according to the principle of home composting. Home and community composting has an important role to play, especially in rural areas, since, apart from the amount of work involved, no charges are incurred.

The materials incorporated into home and community composting comprise leftovers, grass clippings, tree and shrub cuttings, flowers, foliage, etc. The composition varies by season and is dependent on the settlement structure. Hence, for instance, in urban areas, the proportion of kitchen waste is higher than in rural areas.

Volume

In 2015, it is estimated that 1.5 million tonnes of biogenic materials were recovered across the country through home and community composting. Hence, an annual volume of 177 kg per person can be assumed. The volume was determined on the basis of a study from the "Environmental protection" specialist department in the province of Upper Austria, in collaboration with the provincial statistical service, and was adapted to regional circumstances.

The biogenic residues incorporated into home and community composting were not included in the figure for the overall amount of waste generated, as these shall not be deemed waste within the meaning of the 2002 Waste Management Act.

Treatment

The biogenic materials are collected and composted in separate household gardens and allotments, mostly in compost silos or in latticed or wire mesh containers. The resulting compost is, in turn, used on the separate gardens.

3.2. MUNICIPAL SEWAGE SLUDGE

Municipal sewage sludge is a mixture of solid matter and water which accumulates when waste water is treated in municipal sewage treatment plants.

The solids contained in sewage sludge consist of a mixture of solid ingredients which were separated from the waste water (primary sludge) and the bacterial sludge produced by microbes (surplus sludge). The sewage sludge is separated from the waste water in secondary settlers. In the majority of sewage works, the sewage sludge also undergoes anaerobic treatment in order to break down further the organic substances that are still included. This is followed by the thickening, dewatering and drying of the sewage sludge in some cases.

Approximately 5 % of Austrian households are not connected to the public sewer system. Waste water from these households is collected in closed home treatment establishments, in cesspools and similar establishments. Mostly, the sewage collected is conveyed by transporting it to municipal sewage works.

Sludge generally contains plant nutrients such as nitrogen, phosphorous, sulphur or lime. Sewage sludge may also, however, be contaminated with substances such as poorly biodegradable organic compounds, heavy metals, nanomaterials, pathogenic microorganisms or hormonally active substances.

Volume

In 2015, all told, approximately 234,900 tonnes (calculated as dry matter (DM)) of sewage sludge were generated by the municipal sewage treatment plants with a capacity upwards of 2,000 P.E.$_{60}$[2].

Treatment

In 2015, the treatment of approximately 239,800 tonnes (DM) of municipal sewage sludge was recorded statistically. Of this,

- approx. 19 % was applied to agricultural areas;
- approx. 52 % underwent thermal treatment by making use of the waste heat (also decentralised);
- approx. 29 % was treated in another manner (e.g. mechanical-biological treatment, composting, soilification).

The table below shows the volume of sewage sludge in the municipal sewage works with a capacity upwards of 2,000 P.E. $_{60}$[2] and treatments in each federal province. In Vorarlberg in 2015, the treated mass exceeded the volume by approximately 4,900 tonnes since stocks of sewage sludge granulate were depleted in a sewage works.

Table 24: Volume and treatment of municipal sewage sludge

		Statistically recorded treatment [t DM, rounded off]			
Federal Provinces	Volume [t TM, rounded off][1]	Agriculture	Thermal treatment	Other Treatment[4]	Treatment, total
Burgenland	11,000	3,900	0	7,100	11,000
Carinthia	13,000	700	7,300	5,000	13,000
Lower Austria[2]	44,500	18,500	8,500	17,500	44,500
Upper Austria	36,200	18,900	14,300	3,000	36,200
Salzburg	13,100	0	12,700	400	13,100
Styria	22,400	3,800	10,100	8,500	22,400
Tyrol	17,400	0	3,500	13,900	17,400
Vorarlberg[3]	9,800	1,000	0	13,700	14,700
Vienna	67,500	0	67,500	0	67,500
Total [t]	234,900	46,800	123,900	69,100	239,800
Recovery / disposal [%]		19	52	29	100

[1] Volume generated in Austria's municipal sewage works with a capacity of upwards of 2,000 P.E.$_{60}$

[2] Data taken from 2013

[3] The higher recovery quantity in the region of 4,900 tonnes compared with the yield is the result of the depletion of sewage sludge granulate from the stocks (depot) of the municipal sewage treatment plant in Dornbirn. The majority of the granulate from this depot was composted and used for recultivation.

[4] Examples of "other treatment" include mechanical-biological treatment, composting, soilification.

[2] Load that is organically and biodegradable with a biochemical oxygen demand of 60 g of oxygen per day within five days (BOD5).

3.3. OTHER WASTE FROM RESIDENTIAL AREAS

3.3.1. BIOGENIC WASTE FROM GREEN AREAS

This chapter describes that biogenic waste which accrues in public and semi-public areas and is assigned to the following types of waste:

- municipal garden and park waste
- cemetery waste
- roadside greenery.

Municipal garden and park waste includes plant residue from green spaces, parks and sports grounds. This includes grass clippings, foliage and tree and shrub cuttings. Cemetery waste is predominantly biogenic waste that arises as a result of the upkeep of graves and cemeteries. It comprises flowers, wreaths, soil, etc. Depending on the form of waste sorting at the cemetery, cemetery waste exhibits shares of non-compostable impurities, including candle remains, non-degradable parts of posies and wreaths, plastic ribbons, etc. The biogenic waste resulting from the maintenance of streets and car parks is designated as roadside greenery. This involves grass clippings, tree and shrub cuttings. Roadside greenery is often contaminated with littering waste and may be polluted with heavy metals.

Volume

In 2015, approximately 472,300 tonnes of biogenic waste from green areas accrued across Austria.

Table 25: Biogenic waste from green areas

Fractions	Quantity [t]
Municipal garden and park waste	188,800
Cemetery waste	62,700
Roadside greenery (grass clippings and foliage)	220,800
Total	472,300

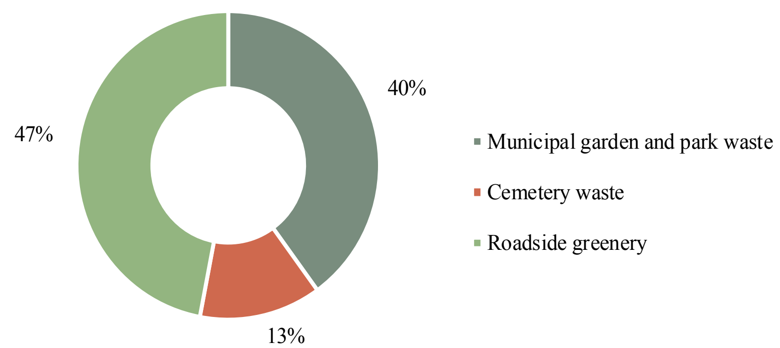

Figure 31: Biogenic waste from green areas according to the types of waste

Collection and treatment

Municipal garden and park waste is mostly collected loose by the municipalities, sometimes shredded and recovered in green waste composting plants or jointly with biowaste. Tree and shrub cuttings serve as structural material in the composting process. Cemetery waste is collected using troughs which are often positioned in the cemetery area. Depending on the degree of contamination and the type of waste collected, cemetery waste is composted or undergoes treatment in mechanical-biological or thermal plants. Roadside greenery is collected by the road administrations responsible and then undergoes biological or thermal recovery.

A not insignificant proportion of the municipal garden and park waste, along with the roadside greenery, remains at the place where it is generated and decomposes without being taken to treatment plants. This proportion is not included in the figure for the overall amount of waste generated.

The composts produced from biogenic waste from green areas are used to fertilise public green areas in sports grounds and parks, gardens and cemeteries, are utilised in agriculture or used in private gardens and landscaping.

3.3.2. CATERING WASTE

Catering waste is food scraps which originate from catering establishments, food wholesalers and commercial kitchens, such as those in hospitals, canteens and barracks. This involves plant and animal waste resulting from the sale and preparation of dishes as well as residues from the consumption of foodstuffs. Catering waste consists of foodstuffs past their expiry date, preparation leftovers, such as bones, peelings, pips, seeds or meat, and of leftovers which have not been consumed. Catering waste also includes, however, unspoilt foodstuffs which have exceeded their best before date or which sometimes have not exceeded their best before date. The composition of catering waste that is collected separately depends on the collection system, consumer behaviour exhibited by inhabitants, the geographical location of the place where it is generated and the time of the year.

Remarks regarding catering waste originating from international means of transport can be found in Chapter 3.11. "Animal by-products".

Volume

In 2015, approximately 117,700 tonnes of catering waste accrued.

Collection and treatment

Catering waste is largely collected by commercial waste disposal firms. The receptacles are either changed or cleaned and disinfected on site. The waste from small catering establishments or from regions where no commercial collection of catering waste is available can be disposed of, in the event of a volume of, at maximum, 80 litres/week and upon the explicit consent of the competent municipal institution, via the municipal collection for biogenic waste. The collection and treatment of catering waste is subject in any event to the provisions as per Regulation (EC) No 1069/2009 containing hygiene requirements for animal by-products not intended for human consumption.

Catering waste is largely recovered in biogas and composting plants. Only a small percentage is thermally recovered.

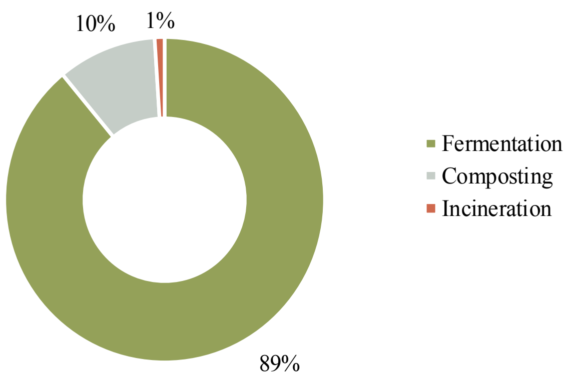

Figure 32: Catering waste, recovery

3.3.3. STREET-CLEANING RESIDUES

The waste which accumulates during street cleaning and the cleaning of squares and parks is designated as street-cleaning residues. This occasionally also includes the contents of public waste containers.

Street-cleaning residues consist of mineral fractions such as grit, dust or abraded material from the carriageway which is interspersed with biogenic components from roadside greenery, foliage and soils. Street-cleaning residues also include pollutants such as salt and de-icing products, abraded particles from tyres and brake linings, parts of the carriageway and road markings. Heavy metals from motor exhaust fumes and residues from engine leaks or accidents are also included to a limited extent. Furthermore, street-cleaning residues include carelessly discarded waste (littering), such as chewing gum, cigarette ends and packaging, as well as occasionally waste from public waste containers which are positioned on streets as well as in squares and parks.

The mineral portion is roughly two-thirds and the organic portion one-third of the street-cleaning residues. The composition of street-cleaning residues varies significantly according to the time of year and the place where the waste is generated. While an increased portion of grit is present in the street-cleaning residues during springtime, an increased amount of foreign matter, such as packaging, can be found in the street-cleaning residues during summer. Foliage accounts for an increased proportion of the autumnal street-cleaning residues. The composition and level of heavy metal contamination also depends on the volume of traffic. Consequently, there are clear differences between urban and rural places where waste is generated.

Volume

In the region of 86,000 tonnes of street-cleaning residues were recorded in 2015.

Collection and treatment

Street-cleaning residues are largely collected separately, whereby around 70% of the sprinkled grit can be collected for processing. Two-thirds of the grit brushed in with a broom is available for reuse under optimal conditions and following corresponding preparation.

A further portion is used as a recycled construction product.

Depending on the treatment method of the mixed municipal waste which is customary in a particular place, the contents of public waste paper bins and the non-recyclable portion of the street-cleaning residues either undergo mechanical-biological or thermal treatment. The remaining portion is deposited in the corresponding landfill class depending on the pollution level.

Figure 33: Road-sweeping vehicle

3.4. PACKAGING WASTE

Pursuant to the Packaging Ordinance 2014, Federal Law Gazette II No 184/2014, packaging material, packaging aids or pallets used for the containment, protection, handling, delivery and presentation of goods which are manufactured from various packaging materials constitute packaging.

Packaging materials include the following:

- paper, cardboard, paperboard and corrugated cardboard;
- glass;
- wood;
- ceramics;
- metals;
- textile fibres;
- plastics;
- laminated beverage cartons, other bonded materials;
- other packaging materials, in particular on a biological basis.

Volume

Across Austria, approximately 1.3 million tonnes of packaging waste (collected separately and in mixed fractions, including residual waste or commercial waste) currently accrues on an annual basis.

Table 26: Volume of packaging waste

	Volume [t]				
Packaging material	**2011**	**2012**	**2013**	**2014**	**2015**
Paper, paperboard and cardboard	501,978	516,420	518,101	542,419	553,267
Glass	271,999	271,292	272,639	272,676	274,485
Metal	62,515	63,905	57,400	55,982	56,840
Plastic	264,152	271,808	288,714	291,968	294,888
Wood	91,170	88,265	89,820	93,338	89,352
Other	40,245	41,884	45,022	47,145	42,414
Total	1,232,059	1,253,574	1,271,696	1,303,528	1,311,246

Treatment

Depending on the type of packaging material, the nature of the collection and the place where the waste is generated/collected, different forms of recycling and other recovery are available.

Paper, paperboard and cardboard packaging is collected in the near-household sector together with other paper products (e.g. magazines, newspapers, advertising materials and suchlike) in waste paper collection containers. The waste paper collected is used in the production of toilet paper, newspapers, printed matter and packaging from paper, cardboard, paperboard and corrugated cardboard. The paper, paperboard and cardboard used may pass through the production and recycling process on several occasions. On average, fibres may pass through the recycling process about six times. Fibres that are too short are then separated together with ink residues and other contaminants from the production process.

Across Austria, approximately 80,600 collection containers for clear and coloured glass are available for the separate collection of used glass packaging. The waste glass collected undergoes several sorting processes in the glassworks (manual sorting, magnetic separators, screens). At the same time, impurities/contaminants are also removed. The separate collection of clear and coloured glass is necessary since, during the production of clear glass, mingled coloured glass would result in discolourations. Following the sorting process, the waste glass, together with glass raw materials (quartz sand, lime, dolomite and soda), is melted down at approximately 1,600 °C and used in the production of new glass packaging. The proportion of waste glass is up to 90 % in the case of green glass and up to 60 % in the case of clear glass.

Metal packaging which is collected separately is sorted in sorting plants or shredder operations and foreign matter and impurities are separated. 100 % of the sorted metal packaging is recycled. Ferrous metals are used in steel production as a high-quality raw material. Aluminium packaging is sorted out by manual sorting or by means of eddy current separators. Aluminium is infinitely reusable and recyclable without losing its specific characteristics (e.g. conductivity, deformability).

In Austria, a variety of models are available in the household sector for the separate collection of lightweight packaging (collective term for packaging from plastics, bonded materials, wood, textiles, ceramics and bio packaging). There will either be a joint collection of all lightweight packaging in the yellow sack (collection system) or in the yellow bin (bring-it-yourself system), or a systematic collection of plastic bottles (hollow body collection). In several regions, lightweight packaging and plastic bottles are also collected together with metal packaging and then sorted automatically.

Plastic packaging that has been collected is sorted according to different kinds of plastics and the impurities removed. Subsequently, the sorted plastic packaging is crushed, washed, dried, melted and processed into granular material. The granular material is then used in plastics processing companies as a raw material during the production phase. Since the different kinds of plastics melt at different temperatures, precise sorting of the plastic packaging is necessary in order to produce a high-quality plastic granulate. Unsorted packaging plastics may either be crushed and agglomerated into coarse granules in order to produce, for example, simply shaped products such as slabs or channels or, following crushing, are used as secondary fuels for energy production in industry.

The high-grade methods of material recovery include, for example, bottle-to-bottle recycling, where PET bottles which are collected separately are used in the manufacture of new PET beverage bottles following colour sorting and a special cleaning procedure.

The wooden packages collected are sorted, crushed and treated and then processed into shavings. The shavings are used in the timber industry in the production of chipboard, in incineration plants for generating energy and as structural material in the composting of biogenic waste.

The recycling and/or recovery rates specified in Table 27 relate to the packaging volume. Here, the net packaging masses (without misses, impurities, etc.) are considered that are materially or materially/energetically recovered. On top of the thermal recovery of packagings that are collected separately, energetic recovery also takes account of the incineration of packagings (that were not collected separately) in the residual waste in incineration plants featuring energy recuperation.

Table 27: Recycling and recovery of packaging waste in Austria [%]

	Recycling and recovery rate									
Packaging material	**2011**		**2012**		**2013**		**2014**		**2015**	
Paper, paperboard and cardboard	84.52	96.91	84.90	96.99	84.28	97.65	84.9	97.7	84.9	97.7
Glass	82.78	86.09	82.88	87.06	84.79	88.76	84.5	88.9	85.6	89.5
Metal	62.14	62.14	61.38	61.38	87.46	87.46	87.0	87.0	87.2	87.2
Plastic	34.79	100.00	34.65	100.00	34.38	100.00	33.6	100.0	33.6	100.0
Wood	21.14	100.00	21.48	100.00	20.32	100.00	19.9	100.0	18.1	100.0
Other	28.68	100.00	25.44	100.00	24.87	100.00	25.5	100.0	25.9	100.0
Rates. total	65.82	93.75	65.91	93.99	66.58	96.07	66.6	96.2	67.1	96.3

3.5. WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

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 (WEEE) includes the electrical and electronic equipment that is considered waste pursuant to Article 2 of the Waste Management Act 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.

Electrical and electronic equipment is characterised by a complex design and great diversity of material. The constituents range, inter alia, from critical raw materials, such as precious metals, to substances with properties which pose a risk to health and/or to the environment, such as heavy metals or persistent organic pollutants.

Placing electrical and electronic equipment on the market

In Austria in 2015, 186,644 tonnes of electrical and electronic equipment were placed on the market.

Table 28: Electrical and electronic equipment placed on the market

	Equipment for households [t]	Equipment for trade [t]	Equipment, total [t]
Large equipment	82,016	6,510	88,526
Refrigerators and freezers	27,515	3,026	30,541
Visual display unit (VDUs) including cathode-ray tube equipment	13,177	264	13,441
Small electrical equipment	48,084	4,130	52,214
Lamps	1,888	34	1,922
Total	172,680	13,964	186,644

Collection and volume

Waste electrical and electronic equipment is collected in Austria through collection centres for recoverables or sometimes through municipal bulky waste collection, through stationary and mobile municipal problematic substance collection centres and by specialist retailers and disposal companies. As regards WEEE from private households, a free-of-charge take-back option exists.

In 2015, approximately 80,246 tonnes of WEEE in total was collected by registered collection points. The table below shows the trend in the quantities of WEEE collected in total from the private and commercial sectors since 2007. For 2015, the proportions for the individual equipment categories are also listed.

Table 29: Trend in the quantities of WEEE collected [t]

	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Large equipment	16,337	16,530	20,526	19,838	19,104	18,605	19,190	19,194	20,283	25 %
Refrigerators and freezers	13,914	14,290	14,761	12,966	13,123	12,617	12,342	11,831	12,773	15 %
Visual display unit (VDUs) including cathode-ray tube equipment	16,052	16,390	19,019	18,737	18,553	18,537	16,832	15,415	15,295	20 %
Small electrical equipment	17,252	17,330	20,393	21,844	23,789	26,691	27,478	30,393	30,978	39 %
Lamps	971	920	863	870	895	952	993	892	917	1 %
Total	64,526	65,460	75,562	74,255	75,464	77,402	76,835	77,725	80,246	100 %

A portion of the (potential) volume of waste electrical equipment is not collected via registered collection points. This may be due to the following:

- Waste electrical equipment is supplied to the Austrian waste management industry via other collection channels as registered collection points. Waste electrical equipment with a high proportion of scrap iron (especially large appliances such as washing machines) is collected together with scrap iron at bulky waste collection points, for example. Sorting analyses and studies show that the average proportion of waste electrical equipment in mixed municipal waste is only around 1 %.
- Equipment is frequently not handed over for collection immediately at the end of use, but is instead stored temporarily for extended periods.
- Working equipment (e.g. VDUs) are exported abroad and reused there.
- Waste electrical equipment is shipped illegally to neighbouring countries through organised collections directly from households. Some waste electrical equipment is extremely coveted due to its composition (high metal content) as it can still be resold for a profit.

Treatment

The aim of treating WEEE is the reclamation of recyclable recoverables and the separation of components containing pollutants. To this end, WEEE undergoes specific processing in separate plants. The complex design of the equipment, which is constructed using a variety of joining techniques, is often very laborious to disassemble into its individual components. Manual activities are therefore largely limited to the removal of components and assemblies for reuse or to remove any harmful substances. Materials are largely separated by means of automated crushing and sorting techniques.

In Austria, there are currently around 40 plants available for the initial treatment of waste electrical and electronic equipment. Large electrical equipment is treated in shredders. Harmful substances and/or component parts featuring a high pollutant content are separated out beforehand prior to crushing pursuant to the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 363/2006, as amended. The separation into ferrous and non-ferrous metal and other residues meets current state-of-the-art requirements. For small electrical appliances and VDUs, there are treatment methods available based on prior manual disassembly and mechanical processing which ensure extensive recovery of the materials contained therein, such as metal, glass and plastics. Harmful substances (e.g. CFCs, VOCs and mercury switches) are also removed from refrigerators, freezers and air-conditioning appliances in special treatment plants prior to recovery of the metal, plastic and glass. Lamps are separated mechanically in encapsulated establishments with exhaust air collection and purification and separated out into different types of material.

Table 30 shows the recovery, reuse and recycling rates of waste electrical and electronic equipment (in terms of the quantity collected) for 2015.

Table 30: Recovery, recycling and reuse of WEEE

Equipment category	Recovery rate[1] [%]	Reuse and recycling rate [%]
Large household appliances	91	86
Small household appliances	93	74
IT & T equipment	93	77
Home electronics	93	81
Lighting equipment	93	74
Gas discharge lamps	95	94
Tools	92	75
Toys, leisure and sports equipment	93	74
Medical devices	91	74
Surveillance and recording equipment	93	75
Dispensers	91	89

[1] *Recovery rate = reuse and recycling rate + thermal recovery rate*

3.6. WASTE BATTERIES AND ACCUMULATORS

Waste batteries and accumulators include those batteries and accumulators which are regarded as waste within the meaning of Article 2 of the Waste Management Act 2002, as amended. Waste batteries and accumulators are found in private households, in the commercial sector, in administrative bodies and other service areas, as well as in industry and in the automotive sector. Depending on the area of application, a distinction is made between portable batteries, automotive batteries and industrial batteries.

Batteries and accumulators, or waste batteries and accumulators, have one or more voltaic cells which consist of electrodes and an electrolyte as well as a metal and/or plastic housing. Depending on the battery type, lead, iron, manganese, nickel, zinc, cadmium or also graphite account for a high percentage. Lithium or mercury are found in lower percentages. Plastic components may account for up to 10%. Potassium hydroxide, ammonium chloride or sulphuric acid, for example, and, in the case of lithium batteries, organic or inorganic electrolytes (e.g. propylene carbonate, thionyl chloride) are used as electrolytes.

Collection and volume

Waste portable batteries are collected in Austria through stationary and mobile municipal problematic substance collection centres as well as through trade and industry by means of separate collection boxes. As regards the final consumer of waste portable batteries, a free-of-charge take-back option exists. Industrial and automotive batteries are collected through the vehicle trade or automotive workshops, as well as through disposal companies, and sometimes through municipal collection points for recoverables. As regards the final consumer of automotive batteries, a free-of-charge take-back option exists.

Figure 34: Numerous collection points make the separate collection of waste portable batteries easier.

In 2015, 2,299 tonnes of waste portable batteries and 14,044 tonnes of used automotive batteries were collected. In the case of industrial batteries, no obligation to report the quantities collected exists as per the Batteries Ordinance, Federal Law Gazette II No 159/2008, as amended.

The trend in portable batteries placed on the market in Austria, as well as the collection thereof, is depicted in Table 31.

Table 31: Placement on the market and collection of (waste) portable batteries

Year	Quantity placed on the market [t]	Quantity collected [t]	Collection rate [1] [%]	Minimum collection rate (across the) EU [%]
2009	3,272	1,705	-	-
2010	3,642	1,647	-	-
2011	3,614	1,738	49.5	-
2012	3,717	1,909	52.2	25.0
2013	3,892	1,976	52.8	25.0
2014	4,087	2,097	53.8	25.0
2015	4,547	2,299	55.1	25.0

[1] *Calculation as per Annex I to the Directive on batteries*

Treatment

The aim of treating waste batteries and accumulators is the reclamation of scrap metals such as lead, nickel, cadmium or lithium, of plastics and of other individual components such as graphite. To this end, it is necessary that, in addition to the separate collection of lead acid batteries, mixed collections of portable batteries are sorted into individual battery types such as zinc-carbon batteries, alkaline manganese batteries, nickel-cadmium batteries, nickel-metal hydride batteries or lithium-ion batteries. As regards the recycling processes, the separation and collection of harmful substances contained therein, such as cadmium or mercury, must be guaranteed by corresponding technologies. As regards the collection and treatment of waste batteries and accumulators, the fire hazard as a result of electrical shorts or mechanical damage must be impeded by means of appropriate measures (especially in the case of lithium batteries). Particularly for the collection, storage and treatment of lithium batteries, there are new provisions under the Ordinance on Waste Treatment Obligations (also confer Chapter 6.4.5.).

In Austria, waste portable batteries are only sorted in one plant. In one plant, waste batteries and accumulators are disassembled beforehand. The sorted portable batteries are shipped from Austria for further treatment. In one further plant, lead storage cells are opened up mechanically, plastic components and acid are separated and the lead-containing components moved directly to the associated secondary lead works for reclamation of the lead.

In Austria in 2015, the average recycling efficiencies, which were calculated in accordance with Regulation (EU) No 493/2012 as the mass of recovered ourtput fractions to the mass of the attributable inputs into the recycling plants, as regards portable batteries and accumulators exceeded 80% each time in all three categories of portable batteries (lead-acid batteries, nickel-cadmium batteries, other batteries).

Figure 35: Recovery of lead from vehicle batteries

3.7. END-OF-LIFE VEHICLES

Within the meaning of the End-of-life Vehicle Ordinance (Federal Law Gazette II No 407/2002), end-of-life vehicles are used vehicles (passenger cars and vehicles used to carry goods with a permitted total weight not exceeding 3.5 tonnes, and three-wheel motor vehicles, with the exception of motor tricycles) which the owner wishes to dispose of, or has already disposed of, or whose disposal as waste is necessary because they pose a danger to the environment. Vehicles which are no longer roadworthy or safe to operate, or where the costs of repair exceed the present value, shall generally be classified as end-of-life vehicles.

(Untreated) end-of-life vehicles which have accrued constitute hazardous waste since these vehicles generally contain hazardous substances such as fuels (petrol, diesel), engine oils, oil filters, brake fluids and coolants, batteries, capacitors containing PCBs and suchlike.

End-of-life vehicles have a very heterogeneous, complex composition, comprising roughly 10,000 individual parts and around 40 different materials (approx. 50-60 % steel, approx. 10-12 % cast iron, 3-8 % non-ferrous metals (aluminium, copper), 10-20 % plastics, rubber and textiles, 2-3 % glass, 2-5 % fluids (engine oils, brake fluids, coolants, residual fuels, screenwash, etc.) and 5-10 % other materials). Despite the great diversity of materials, various components may continue to be used as replacement parts or a significant portion of the materials supplied for recycling.

Figure 36: End-of-life vehicle

Volume

In 2015, according to Statistics Austria, around 4.75 million passenger cars were registered in Austria. Every year in Austria, approximately 250,000 passenger cars are taken off the road. Of these, only a portion are supplied for recovery in Austria while the majority of the vehicles taken off the road are shipped abroad as used vehicles.

Treatment

In Austria, there are around 700 enterprises (motor vehicle dealers, workshops, waste disposal companies, recyclers, secondary raw materials dealers, shredder operators) which take on end-of-life vehicles free of charge. The collection points for end-of-life vehicles are published on the website of the Federal Ministry of Agriculture and Forestry, Environment and Water Management.

End-of-life vehicles are treated and recovered in approved enterprises in accordance with the state of the art. Minimum technical requirements concerning the storage and treatment of end-of-life vehicles can be found in Appendix 1 to the End-of-life Vehicle Ordinance.

Following acceptance of the end-of-life vehicles, these are drained (ecologically damaging fuels and liquids are removed). In workshops and approved recovery operations, saleable used parts (e.g. engines, gears, alternators, headlights, seats, control elements, axle components, body panels and suchlike) are removed and stored temporarily until sold. The pre-treated end-of-life vehicles are separated out in one of the six shredder plants across Austria into directly recoverable metal flows and shredder waste. The shredder waste then undergoes further treatment.

The Directive on end-of life vehicles stipulates the following recovery rates for EU Member States beginning 2015: 85 % for reuse and recycling and 95 % for recovery in total. In Austria in 2015, the rate for reuse and recycling was 86,9 %. The overall rate for reuse and recovery was 96,9 %. The total weight of the 47,926 end-of-life vehicles shredded in 2015 was in the region of 43,934 tonnes.

3.7.1. END-OF-LIFE TYRES

End-of-life tyres are tyres that are generally no longer suitable or authorised for their original purpose. Reasons for disposal may include, for example, insufficient tread depth, embrittlement of the rubber compound or other damage to the body (carcass).

Tyres are made up of a mixture of substances comprising:

- natural rubber (approx. 24 %)
- synthetic rubber (approx. 21 %)
- soot and active fillers (approx. 26 %)
- steel wires (approx. 16 %)
- textile fabrics (approx. 3 %)
- oils and other ingredients (approx. 10 %).

Volume

The volume of end-of-life tyres in 2015 was in the region of 55,950 tonnes. Around 23,300 tonnes of end-of- life tyres were shipped to Austria in 2015, while approximately 20,500 tonnes were shipped from Austria.

Treatment

Approx. 3,000 tonnes of end-of-life tyres underwent retreading. Following mechanical processing operations, approximately 25,400 tonnes underwent material recovery and 33,300 tonnes underwent thermal recovery in Austrian plants.

Figure 37: Transport of end-of-life tyres and chips of end-of-life tyres

3.8. WOOD WASTE AND RESIDUES FROM THE TREATMENT AND PROCESSING OF TIMBER

Bark, slabs, splinters, wood shavings, sawdust, wood dust and slurries, construction and demolition waste wood, chipboard waste, old furniture, impregnated wood (poles, sleepers, etc.), as well as wooden packaging and timbers with hazardous contamination, are referred to as "wood waste and residues from the treatment and processing of timber". Such waste is produced by sawmills, carpenters' shops, the paper and cellulose industry, the furniture and wood material industry, the construction industry, agriculture and forestry, horticulture and landscaping as well as by private households and similar establishments.

Volume

2015 saw a volume of 1,130,000 tonnes of wood waste.The largest proportions in terms of the volume of wood waste are accounted for by "construction and demolition waste wood" (approx. 345,000 tonnes), "wooden packaging and wood waste that is not contaminated" (approx. 304,000 tonnes) and "wood waste from treatment and processing" (approx. 231,000 tonnes).

The table belows shows the volume of wood waste, structured into code numbers.

Table 32: Volume of wood waste

Code numbers	Waste designation	Volume [t]
17101	Bark from treatment and processing	45,300
17102	Slabs and splinters	9,100
17103	Sawdust and wood shavings	161,300
17104	Wood sanding dust and sludge	15,500
17114	Dust and sludge from the manufacture of chipboard	129,200
17115	Chipboard waste	36,500
17201	Wooden packaging and uncontaminated wood waste	304,100
17202	Construction and demolition waste wood	345,100
17207	Railway sleepers	32,000
17209	Wood impregnated with creosote (stakes, poles and others)	2,700
17212	Sawdust and wood shavings contaminated with inorganic chemicals	4,100
17213	Wooden packaging, wood waste and wood wool contaminated with organic chemicals	1,700
17216	Sawdust and wood shavings contaminated with organic chemicals, with hazardous properties	1,000
17218	Organically treated wood waste	41,700
	Other wood waste [1]	900
Total (rounded off)		1,130,000

[1] *e.g. stakes and poles impregnated with salts, sawdust and wood shavings contaminated with organic chemicals, without hazardous properties; wood wool, recycled wood*

Additionally, bark, slabs and splinters, as well as sawdust and wood shavings, accrue as by-products. Hence, given the number of trees felled annually, an additional potential volume of approximately 3,508,000 tonnes can be assumed.

Treatment

Sawdust, slabs and splinters are primarily recycled in the chipboard industry as well as in the paper and cellulose industry. A large part of the accruing bark is used on-site, predominantly for energy recovery in the paper and timber industry. The remainder is thermally recovered in biomass and district heating systems. Uncontaminated wood is reused in horticulture and landscaping, for example. By contrast, impregnated wood is incinerated while utilising its energy content.

3.9. CONSTRUCTION AND DEMOLITION WASTE

Materials which accumulate during construction and demolition activities in building construction, civil engineering, road and bridge building constitute construction and demolition waste. 90 % of this arises during the demolition, conversion and restoration of buildings. Only around 10 % of the waste accumulates during the construction of new buildings. In building construction, this waste primarily includes concrete, brick and other demolished masonry. This accounts for around 70 % to 90 % of the total quantity. The remainder predominantly comes from wood, metal and various site waste as well as hazardous waste in part. In civil engineering, in addition to excavated materials, waste consisting of formwork timber and iron reinforcing, as well as concrete debris, accumulates. In road construction, asphalt and concrete debris, as well as excavated materials, are usually produced. When building and restoring track installations, ballast is produced in addition to the waste specified above.

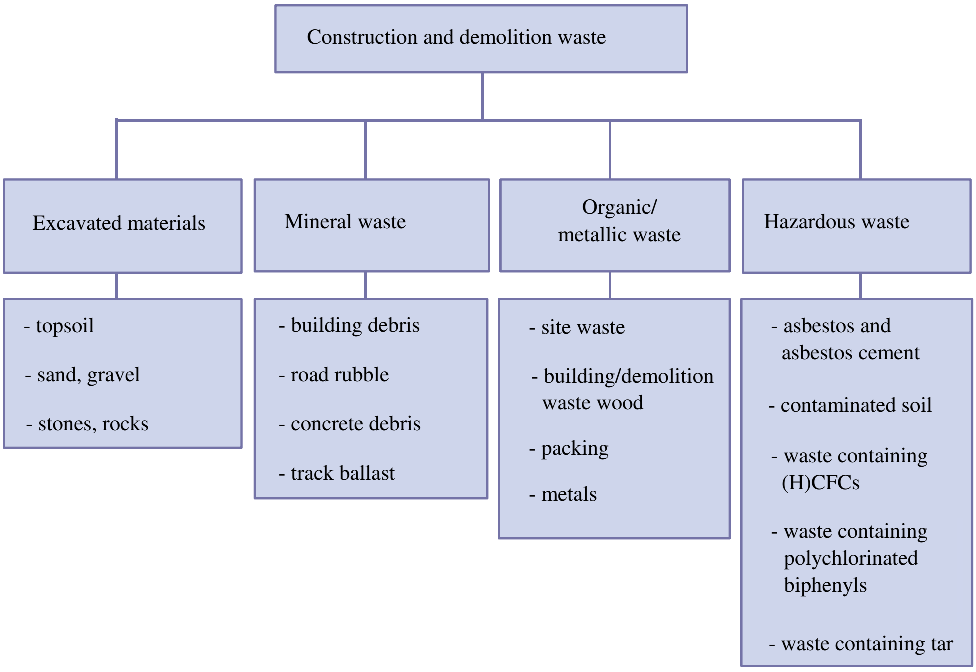

Figure 38: Overview of the composition of construction and demolition waste

Excavated materials, packaging, asbestos and hazardous waste are each covered in their own separate chapters. Remarks regarding construction and demolition waste can be found in Chapter 3.8 "Wood waste and residues from the treatment and processing of timber".

Table 33: Selected construction and demolition waste

Waste designation	Composition
Building debris	bricks, concrete, ceramics, rocks, tiles, mortar, rendering
Road rubble	asphalt rubble, concrete, base materials
Concrete debris	construction components or ready-made concrete parts, concrete carriageways, screed
Track ballast	special aggregates
Bitumen, asphalt	asphalt rubble
Other mineral construction and demolition waste, non-hazardous	glassfibre mat, ceramics, gypsum
Site waste (no building debris)	various building materials and elements arising from new builds, conversion and demolition, especially consisting of plastic, wood, metal, insulating materials, plasterboard and packaging

Volume

In 2015, approximately 10 million tonnes of construction and demolition waste accrued. This averages out at around 1,160 kg per person. Depending on the economic situation facing building construction and civil engineering, in Austria, the volume varies year by year and cannot therefore be predicted precisely.

Table 34: Volume of construction and demolition waste

Code numbers	Waste designation	Volume [t]
Mineral construction and demolition waste		
31409	Building debris (no site waste)	2,843,000
31409 18	Building debris (no site waste, only mixtures of selected waste from construction and demolition activities)	320,000
31410	Road rubble	703,000
31427	Concrete debris	2,767,000
31427 17	Concrete debris (only selected waste from construction and demolition activities)	646,000
31467	Track ballast[1]	299,000
54912	Bitumen, asphalt	1,860,000
	Other mineral construction and demolition waste, non-hazardous	220,000
		9,658,000
Other construction and demolition waste		
91206	Site waste (no building debris)	339,000
Total		9,997,000

[1] *Track ballast stems from several public and private companies.*

Collection and treatment

The waste is generally collected directly on site by waste disposal and demolition companies using several skips. Small quantities of building debris, for instance, may also be delivered to municipal collection points for recoverables. To ensure separate collection and high-quality recovery, the Recycled Construction Materials Ordinance, which entered into force in January 2016, Federal Law Gazette II No 181/2015, as amended, contains provisions in the following areas:

Obligations in the case of construction and demolition activities:

- Separation and treatment of waste which accumulates during construction and demolition activities
- Manufacture and end-of-waste status of recycled building materials.

In 2015, in the region of 8.3 million tonnes of construction and demolition waste - hence the majority - were supplied to a recovery facility. As follows from Figure 39, these quantities are increasing steadily.

Table 35: Construction and demolition waste in recovery facilities

Code numbers	Waste designation	Recovery [t]
Mineral construction and demolition waste		
31409	Building debris (no site waste)	2,307,000
31409 18	Building debris (no site waste, only mixtures of selected waste from construction and demolition activities)	219,000
31410	Road rubble	679,000
31427	Concrete debris	2,577,000
31427 17	Concrete debris (only selected waste from construction and demolition activities)	531,000
31467	Track ballast[1]	168,000
54912	Bitumen, asphalt	1,656,000
	Other mineral construction and demolition waste, non-hazardous	149,000
		8,286,000
Other construction and demolition waste		
91206	Site waste (no building debris)	1,000
Total		8,287,000

[1] *Track ballast stems from several public and private companies..*

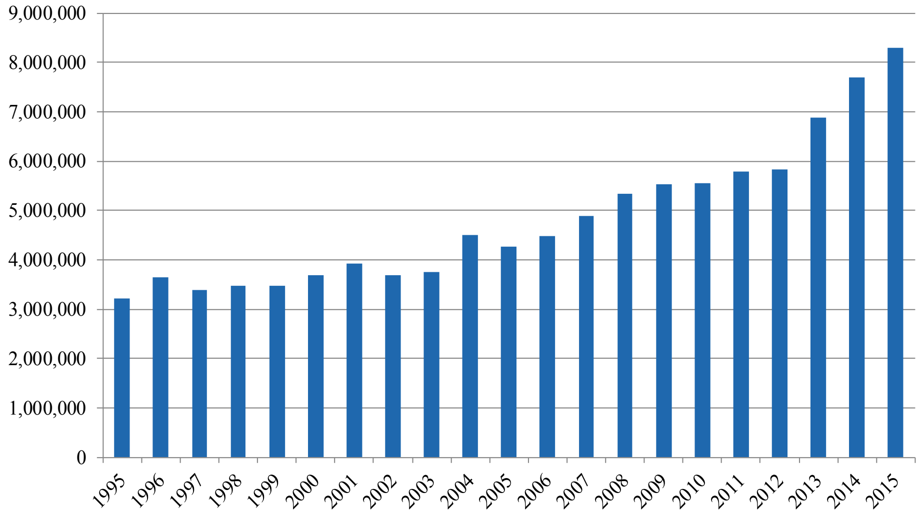

Figure 39: Construction and demolition waste in recovery facilities [t]

In the course of structural measures, roughly 670,000 tonnes of construction and demolition waste were additionally used for technical fills. Approximately 640,000 tonnes of construction and demolition waste were deposited in landfills.

Table 36: Construction and demolition waste – Storage in landfills

Code numbers	Waste designation	Landfilling [t]
Mineral construction and demolition waste		
31409	Building debris (no site waste)	466,000
31409 18	Building debris (no site waste, only mixtures of selected construction and demolition activities)	23,000
31410	Road rubble	8,000
31427	Concrete debris	23,000
31427 17	Concrete debris (only selected waste from construction and demolition activities)	4,000
31467	Track ballast[1]	30,000
54912	Bitumen, asphalt	21,000
	Other mineral construction and demolition waste, non-hazardous	65,000
Total		640,000

[1] *Track ballast stems from several public and private companies.*

Figure 40 illustrates the trend in construction and demolition waste sent to landfill from 1999 to 2015.

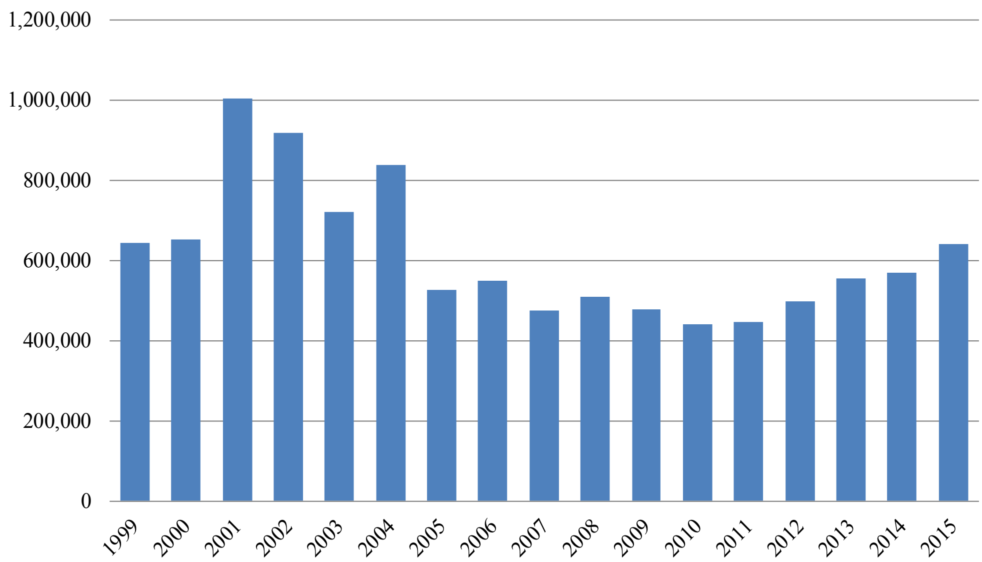

Figure 40: Landfilling of construction and demolition waste [t]

3.10. EXCAVATED MATERIALS – SOILS

Excavated materials accrue when excavating or clearing the soil or subsoil. A distinction is drawn between the material flows listed in Table 37.

Excavated material primarily consists of mineral constituents and can exist in pure form or as a mixture, such as ballast, gravel, sand, broken rock, earth, humus or loam.

Volume

In 2015, the volume of excavated materials and soils was approximately 32.8 million tonnes.

These statistics, and hence the volume of waste generated, do not include that predominant portion of excavated materials which, without complying with the definition of waste, is used directly at the place where the waste is generated or on the same building site to balance the mass or for building purposes.

Table 37: Excavated materials - Volume in 2015

Code numbers	Waste designation	Designation of the specification	Volume [t]
31411 29	Excavated soil	Excavated soil material with background pollution	18,158,000
31411 30	Excavated soil	Class A1; "Recovery as agricultural recultivation layer"	1,944,000
31411 31	Excavated soil	Class A2; "Recovery as underground backfill"	4,857,000
31411 32	Excavated soil	Class A2G; "Recovery in groundwater fluctuation zone"	1,346,000
31411 33	Excavated soil	Inert waste quality	1,024,000
31411 34	Excavated soil	Technical fill material containing less than 5% by volume of non-soil constituents	181,000
31411 35	Excavated soil	Technical fill material containing more than 5% by volume of non-soil constituents	36,000
31423 36	Oil-contaminated soils	Excavated soil material as well as excavated fill material, hydrocarbon-contaminated, non-hazardous	66,000
31424 37	Other contaminated soils	Excavated soil material and excavated fill material, otherwise contaminated, non-hazardous	1,260,000
31625	Soil sludge, sand sludge, diaphragm wall excavation		89,000
54504 88	Crude oil-contaminated earth, excavated soil and demolition material	Declassified	10,000
			28,971,000
Excavated materials used for terrain corrections, establishment of embankments, etc			3,803,000
Total			32,774,000

Treatment

Roughly one-third of the excavated materials was reused in 2015. Single-origin excavated materials, such as ballast, gravel and sand, are mostly recovered as filling and fill material for terrain corrections. Soils, humus and loam are used in horticulture and landscaping. For reasons of legal certainty, approval as an excavated material landfill is increasingly preferred in this regard, which is part should explain the substantial increase in landfilled quantities that have been reported.

Contaminated excavated materials underwent microbiological or physico-chemical treatment in 14 stationary soil treatment establishments.

Around 23.3 million tonnes of non-hazardous excavated materials were deposited in landfills. Waste under code number SN 31411 29 "Excavated soil, with background pollution" accounted for the largest proportion of landfilled excavated materials.

Approximately 64,000 tonnes of excavated materials were shipped from Austria in 2015.

Table 38: Excavated materials, quantities deposited in 2015

Code numbers	Waste designation	Designation of the specification	Volume [t]
31411 29	Excavated soil	Excavated soil material with background pollution	15,326,000
31411 30	Excavated soil	Class A1; "Recovery as agricultural recultivation layer"	1,116,000
31411 31	Excavated soil	Class A2; "Recovery as underground backfill"	3,655,000
31411 32	Excavated soil	Class A2G; "Recovery in groundwater fluctuation zone"	1,048,000
31411 33	Excavated soil	Inert waste quality	763,000
31411 34	Excavated soil	Technical fill material containing less than 5 % by volume of non-soil constituents	15,000
31411 35	Excavated soil	Technical fill material containing more than 5 % by volume of non-soil constituents	2,000
31423 36	Oil-contaminated soils	Excavated soil material as well as excavated fill material, hydrocarbon-contaminated, non-hazardous	65,000
31424 37	Other contaminated soils	Excavated soil material and excavated fill material, otherwise contaminated, non-hazardous	1,220,000
31625 91	Soil sludge, sand sludge, diaphragm wall excavation	Solidified	87,000
54504 88	Crude oil-contaminated earth, excavated soil and demolition material	Declassified	10,000
Gesamt			23,307,000

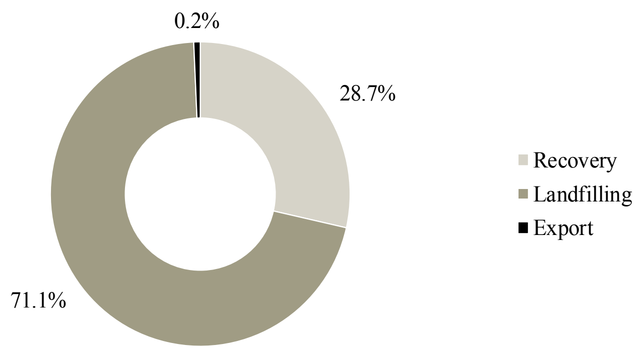

Figure 41: Treatment of excavated materials

Figure 42: Recultivated area

3.11. ANIMAL BY-PRODUCTS

Animal by-products means entire bodies or parts of animals, products of animal origin or other products obtained from animals, which are not intended for human consumption, including oocytes, embryos and semen. Animal by-products originate from the processing of milk, slaughtering and meat processing, the food retail sector (former foodstuffs of animal origin), restaurants, and catering establishments as well as central kitchens and household kitchens (catering waste of plant and animal origin), agriculture and international travel.

Pursuant to EC Regulation No 1069/2009 on animal by-products, animal by-products are classified into three categories which reflect the degree of risk that they pose to public and animal health. Each of these categories covers different animal by-products with specific stipulations concerning use and disposal.

Category 1 animal by-products:

This category comprises materials which originate from processing and do not give any indications of a communicable disease:

- 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 leftovers from means of transport operating internationally.

Category 2 animal by-products:

These materials do not come from risk sectors but are of an origin that may be subject to animal diseases or possible contamination as well as animal by-products that do not come directly from food production or that reveal defects:

- manure and digestive tract contents;
- animal materials collected when treating sewage (e.g. from slaughterhouses);
- animal products containing drugs;
- animals or animal parts that do not fall into category 1 and are not slaughtered for human consumption (ill animals, animal disease, etc.);
- colostrums and milk unfit for consumption (e.g. containing inhibitors);
- floatation sludge or pressure filter residues from fattening enterprises and slaughterhouses;
- slurry.

Category 3 animal by-products:

This category comprises materials which originate from processing and do not give any indications of a communicable disease:

- body parts of slaughtered animals;
- blood, hide, hooves, feathers, wool, horns, hair and furs of animals, with no clinical indications of communicable diseases;
- bones and greaves;
- blood from animals other than ruminants that were slaughtered in a slaughterhouse;
- catering leftovers (including waste edible fats) assigned to biogas establishments or composting;
- former foodstuffs of animal origin;
- milk and milk products as well as waste and by-products from dairies and cheese-making operations;
- egg shells.

According to the Community provisions, individual materials belonging to category 3 (e.g. carcasses, blood, fatty tissue, etc.) are fit for consumption but are generally not intended for human consumption on commercial grounds.

Volume

In 2015, approximately 1,043,800 tonnes of animal by-products were generated.

Table 39: Animal by-products in 2015 – Volume

Animal by-products	Volume [t]
Whey from the production of cheese and quark	357,200[1]
Animal by-products from slaughtering	293,500
Animal by-products from meat processing	129,700
Carcasses of fallen stock[3]	28,600
Küchen- und Speiseabfälle, tierische Anteile enthaltend	117,700
Ehemalige Lebensmittel tierischen Ursprungs	39,500
Speiseabfälle aus dem grenzüberschreitenden Verkehr	1,600
Speiseöl, -fette, Fettabscheiderinhalte mit tierischen Anteilen	22,600
Wirtschaftsdünger	53,400[2]
Gesamt (gerundet)	1,043,800

[1] *Excluding whey used in the production of whey powder (approx. 1,006,200 tonnes, of which roughly 225,900 tonnes are shipped from Austria)*

[2] *Only farmyard manure which is treated in biogas or composting plants*

[3] *Animals that were not slaughtered but died for other reasons*

The quantities of animal by-products generated from slaughtering and meat processing amounted to approximately 423,200 tonnes. Of this figure, specified risk material (SRM) accounted for around 18,200 tonnes. In particular, SRM includes skulls, brains, eyes, tonsils (adenoids), spinal columns, spinal marrow, intestines and tripe from the slaughter of cattle, sheep and goats. In this regard, depending on the species of animal, there are sometimes different age limits from when one of the body parts mentioned becomes SRM.

Approximately 33,400 tonnes of category 1 animal by-products have accrued (including fallen stock and waste from international transport). Around 137,400 tonnes of category 2 materials have accrued, along with approximately 873,000 tonnes of category 3 materials.

Animal by-products only constitute waste within the meaning of the Waste Management Act 2002 if they are supplied to a specific waste treatment plant such as an incineration or co-incineration plant or are destined for treatment in a biogas or composting plant (Article 3(1)(5) of the Waste Management Act 2002). Accordingly, approximately 323,800 tonnes of animal by-product waste accrued in 2015..

Table 40: Quantity of waste animal by-products generated in 2015

Waste from animal by-products	Volume [t]
Whey from the production of cheese and quark[1]	76,100
Slaughterhouse waste from slaughtering	
Waste from meat processing	52,400
Catering waste	117,700
Catering waste from international transport	1,600
Cooking oil, cooking fat, contents of fat separators containing animal substances	22,600
Farmyard manure[2]	53,400
Total (rounded off)	323,800

[1] *Excluding whey used in the production of whey powder (approx. 1,006,200 tonnes, of which roughly 225,900 tonnes are shipped from Austria)*

[2] *Only farmyard manure which was treated in biogas or composting plants (total quantity of farmyard manure: approx. 25 million tonnes)*

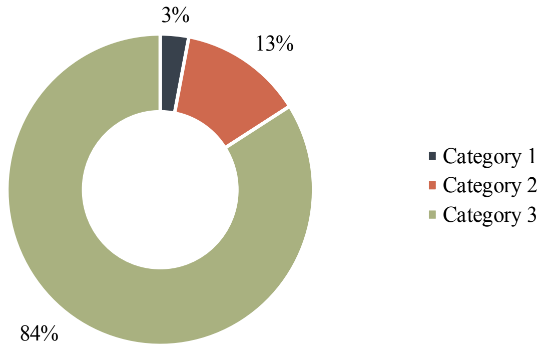

Figure 43: Animal by-products in 2015 - share by category (100% = 1,043,800 tonnes)

Treatment

The collection and use/recovery of animal by-products must be carried out in operations that are authorised in accordance with Regulation (EC) No 1069/2009. These operations include those where fat is processed (including waste edible fats), operations that manufacture pet food, operations for the manufacture of pharmaceuticals and medicinal products, biogas and composting plants.

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

Permitted treatments for category 1 animal by-products are incineration/co-incineration or utilisation as a fuel, whereby pre-treatment and/or processing is required depending on the material. Apart from incineration, following appropriate pre-processing, category 2 animal by-products may also be processed in authorised recovery establishments or in biogas or composting plants and used as organic fertiliser or soil improvers. Category 3 animal by-products may be used in the same way as category 2 materials. In addition, several materials may be used as feed for farm animals and fur animals, and as pet food.

All three categories may also be used in the production of derived products as per Articles 33, 34 and 36 of the Regulation referred to. According to the EU Regulation, under certain conditions, landfilling would also be permitted for all three categories. This is prohibited in Austria, however, as a result of the Landfill Ordinance.

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

- drying plants for the production of lactose and milk powder
- intermediate waste processing operations, such as skin and fur processors and tanneries or sanitising establishments for slaughterhouse waste
- rendering plants for all categories of waste
- (co-)incineration plants
- biogas and composting plants.

As regards the collection and processing of animal by-products and specific risk material, each federal province has granted authorisation to one operator in accordance with its regional laws.

Almost all of the skins of cattle, calves, sheep and goats can be made into leather and hides. Pigskins are predominantly reused in the pet food industry. Goose and duck feathers and down are used to make bedding (pillows or cushions). Excrement and the stomach contents of animals ready for slaughter are recovered as organic fertiliser for use in agriculture or recovered in biogas and composting plants.

Specialised operations or rendering plants further process category 3 materials into various products (e.g. into dog and cat food, animal fat, into bone, blood and feather meal, leather or gelatine).

Table 41: Destination of animal by-products generated in 2015

Destination	Quantity [t]
Rendering plants	300,400 [1]
Biogas plants	299,300
Composting plants	22,900
Incineration plants	1,600
Feeding of whey	76,100
Leather processing, other destination (gelatine, pet food), drinking whey	134,700
Shipment from Austria	208,800
Total (rounded off))	1,043,800

[1] *Total raw materials processed: 356,900 tonnes, of which roughly 56,500 tonnes are raw materials shipped to Austria*

Raw whey remaining in Austria which has not been processed into powder was, for the most part, used as animal food at delivery operations or at fattening farms (approx. 76,100 tonnes). Larger quantities were also used in biogas plants (around 53,100 tonnes). Further possible uses included use in industry (26,800 tonnes) and the production of whey beverages (approx. 11,400 tonnes). Approximately 166,700 tonnes of raw whey were shipped from Austria.

Whey used in the production of whey powder, lactose and lactalbumin (around 1,006,200 tonnes, of which approx. 225,900 tonnes abroad) was not regarded as an animal by-product.

299,300 tonnes of animal by-products, especially catering waste, dairy waste, slaughterhouse waste and farmyard manure and, to a lesser extent, cooking oil and cooking fat, along with former foodstuffs of animal origin, were fermented in biogas plants.

22,900 tonnes of animal by-products (mainly (semi-luxury) food scraps and farmyard manure) were treated in composting plants.

The 1,600 tonnes of catering waste from international means of transport were supplied for thermal recovery.

Animal by-products in processed form (meat and bone meal, animal fat)

If meat and bone meal and animal fat are produced, category 1 and 2 animal by-products are processed under high-pressure sterilisation.

Meat and bone meal and animal fat in categories 1 and 2 are incinerated in waste incineration plants, thermal power stations or cement plants, and also in rendering plants, while utilising their energy content. Category 2 meat and bone meal is also used as fertiliser. Apart from incineration, category 3 meat and bone meal and animal fat is also:

- used in the chemical industry or
- in the production of animal feed;
- processed in biological recovery plants;
- used as fertiliser.

In rendering plants, in the region of 90,800 tonnes of "meat and bone meals" and approx. 37,200 tonnes of "animal fats" were produced during the treatment of approximately 356,900 tonnes of raw materials (328,300 tonnes of slaughterhouse waste and 28,600 tonnes of fallen stock). The majority of the raw materials used (around 84 %) originated from Austria.

Of the meat and bone meals produced, almost two-thirds (66 %) was shipped from Austria. 13 % was supplied for technical use, 8 % thermally recovered, 10% was used in agriculture as fertiliser and 3 % was used as animal feed/pet food.

Of the animal fats produced, almost three-quarters (73 %) were shipped from Austria. 6 % underwent thermal recovery, 17 % was used in the production of biodiesel and 3 % in the animal feed industry.

3.12. ASBESTOS WASTE

Asbestos occurs in nature as a fibre-forming mineral. Up to the end of the 1980s, asbestos was used in many products on account of its resistance to heat and fire, its insulating properties and its chemical stability. Asbestos was used in the building industry, for example, as a sealing material, as air-placed asbestos, or in asbestos cement sheets, but was also used, inter alia, in electric storage heaters or in floor and wall coverings.

Where products containing asbestos are not used or treated properly, respirable fibres can be released which, when inhaled, may cause cancer. Therefore, the placement on the market of products containing asbestos is generally prohibited.

Volume

The table below shows the trend in the quantity of asbestos waste generated. Since around 2004, the asbestos products placed on the market prior to 1990 have increasingly accrued as waste. Up to 2015, the volume of asbestos cement (SN 31412) - the most common asbestos-containing waste - increased roughly fivefold.

Table 42: Volume of asbestos-containing waste in Austria [t]

Code numbers	Wast designation	2004	2009	2010	2011	2012	2013	2014	2015
31412	Asbestos cement	12,600	56,100	54,800	58,100	60,800	61,100	58,500	64,800
31437	Asbestos waste, asbestos dust	1,600	640	11,000[1]	930	890	300	400	340

[1] *The high volume of SN 31437 in 2010 can be attributed to a one-off renovation project*

Treatment

Asbestos waste is hazardous waste which can be sent to landfill following appropriate pre-treatment. Under certain conditions, asbestos waste may be deposited at landfills for non-hazardous waste in specific sections.

The following table shows the quantities of asbestos-containing waste deposited at landfills since 2008.

Table 43: Asbestos-containing waste deposited at landfills [t]

Code numbers	Waste designation	2008	2009	2010	2011	2012	2013	2014	2015
31412	Asbestos cement	44,700	56,100	35,800	54,200	58,700	63,200	59,200	66,500
31437	Asbestos waste, asbestos dust	300	640	12,200[1]	400	300	300	1.000	200

[1] *The high quantity of landfilled waste can be attributed to a one-off renovation project*

In 2013, 2014 and 2015, the landfilling of asbestos waste exceeded the respective volume. The difference can be attributed to asbestos waste which was separated from other types of waste during sorting/processing.

Figure 44: Roof shingles containing asbestos

3.13. WASTE OILS AND MINERAL OIL-BASED WASTE (INCLUDING SPECIFICALLY CONTAMINATED SOILS)

This chapter considers waste under the code number group (SNG) 54 "Waste from mineral oil and coal refining products" in ÖNORM S 2100 "List of Waste" (2005) and the waste under code number (SN) 31423 "Oil- contaminated soil".

Essentially, the types of waste under SNG 54 "Waste from mineral oil and coal refining products" involve liquid and solid hydrocarbons, mixtures/emulsions of hydrocarbons with aqueous liquids or solids which are contaminated with hydrocarbons. The majority of the types of waste under SNG 54 are basically classified as dangerous since they have properties which pose a risk to the environment, which may be detrimental to health or which are highly flammable. Some types of waste can be declassified if they demonstrably exhibit no hazardous properties. Some types of waste are solidified in the course of treatment.

Volume

In 2015, a volume of waste generated under SNG 54, including SN 31423 "Oil-contaminated soils", of around 2.21 million tonnes was recorded. With around 1.86 million tonnes, bitumen and asphalt (SN 54912), which are also listed in Chapter 3.9 "Construction and demolition waste", contribute 85% of this volume (although they are not recorded twice in the overall amount of waste generated). Furthermore, in 2015, approximately 115,000 tonnes of oil-contaminated soil or earth accumulated. In addition, even larger quantities of waste oils, oil separator contents and various types of emulsions/sludges contributed significantly to the volume of SNG 54.

With a quantity of 26 tonnes, the volume of waste containing PCBs/PCTs [polychlorinated biphenyls and polychlorinated terphenyls] in 2015 was similar to the volumes generated in previous years.

Figure 45: Oil-contaminated soil

The table below shows the trend in the volume of waste under SNG 54 and SN 31423 "Oil-contaminated soils" for the period 2010 to 2015.

Table 44: Volume of waste oils and oil-containing waste according to the most important waste types [t]

Category	Code numbers	hazardous (g)/ non hazardous (ng) g/ng	Waste designation	2010	2011	2012	2013	2014	2015
Waste oils	54102	g	Waste oils	34,900	36,500	34,200	31,900	33,100	34,000
		g	Other waste oils	2,100	1,700	1,400	2,100	2,300	2,200
Chemical waste (containing oil)	54402	g	Drilling and grinding oil emulsions, emulsion mixtures	32,600	29,700	30,900	36,000	44,100	41,200
	54702	g	Oil separator contents (petrol separator contents)	33,500	29,300	27,700	32,500	33,700	38,300
	54408	g	Other oil and water mixtures	29,000	22,400	21,600	27,700	27,900	30,000
	54701	g	Sand filter contentscontaining oil or cold cleaning solvent	14,800	11,900	13,600	13,200	14,000	15,200
	54930	g	Equipment contaminated with solid grease and oil (vehicle workshop, industrial and garage waste)	13,800	12,800	8,500	12,700	10,200	10,800
		g	Other hazardous chemical waste (containing oil)	12,500	11,500	10,000	14,200	12,000	13,400
		ng	Non-hazardous chemical waste (containing oil)	2,100	800	1,300	1,400	1,300	1,800
Industrial effluent sludges (containing oil)	54703	g	Sludge from oil- separating plants	19,000	1,900	9,100	11,600	13,300	9,300
	54715	g	Sludge from container cleaning (e.g. from barrels, containers, tankers, tank wagons)	9,300	7,500	7,200	7,800	7,000	3,700
	54501	ng	Drilling fluid and cuttings, oil free	14,400	18,300	24,300	18,400	6,800	12,500
		g	Other hazardous industrial effluent sludges (containing oil)	8,900	3,500	6,900	17,200	13,100	5,300
Waste containing PCBs	54110	g	Electrical equipment containing PCBs and PCTs	21	20	17	8	23	22
	54111	g	Other waste containing PCBs and PCTs	7	0	17	56	2	4
Soils (contaminated with oil)	54504	g	Crude oil- contaminated earth, excavated soil and demolition material	1,800	23,400	7,500	17,000	9,800	4,600
	54504 88	ng	Crude oil- contaminated earth, excavated soil and demolition material	12,700	7,200	27,400	41,800	48,700	10,000
	31423	g	Oil-contaminated soils	44,100	18,100	31,100	21,200	45,300	34,700
	31423 36	ng	Oil-contaminated soils	67,400	35,700	76,400	115,000	43,400	66,000
Other waste under SNG 54	54710	g	Grinding sludge containing oil	6,200	4,300	3,900	4,300	5,300	7,000
	54912	ng	Bitumen, asphalt	575,600	917,000	765,000	1,583,000	1,633,500	1,860,000
	54912 77	g	Bitumen, asphalt	500	5,400	5,700	5,800	6,800	21,300
Total (rounded off)				935,000	1,199,000	1,114,000	2,015,000	2,012,000	2,221,000

Treatment

In 2015, approximately 22,900 tonnes of waste oils (SN 54102) were incinerated. Roughly 15,900 tonnes were shipped abroad for treatment. Hence, the entire primary quantity of around 34,000 tonnes and approximately 4,800 tonnes of secondary waste, which arises, for example, during the separation of waste emulsions, were treated. A large part of the bitumen/asphalt (SN 54912, approx. 1,835,000 tonnes) was recovered. Around 5 % of the waste under SNG 54 and oil-contaminated soils were deposited in landfills (in some cases following treatment). This primarily concerned bitumen and asphalt and around 65 % of the oil-contaminated soils and earths.

The table below shows the quantity of landfilled waste under SN 31423 and SNG 54 for the period 2010 to 2015.

Table 45: Landfilled waste [t] under SN 31423 and code number group 54

Code numbers	Waste designation	2010	2011	2012	2013	2014	2015
54504 88	Crude oil-contaminated earth, excavated soil and demolition material	101,200	71,000	27,400	30,000	32,500	9,700
31423(+36)	Oil-contaminated soils	18,800	37,000	74,300	98,700	46,100	65,300
54912	Bitumen, asphalt	7,100	8,900	12,700	29,000	25,800	21,000
54701 88	Sand filter contents containing oil or cold cleaning solvent	2,500	0	1,200	300	300	0
54501	Drilling fluid and cuttings, oil free	400	0	15,400	1,500	1,000	500
Total		130,000	116,900	131,000	159,500	105,700	96,500

Figure 46: Collection of waste oils

3.14. MEDICAL WASTE

Waste from medical institutions originates from establishments which are subject to the

- Pharmacists, Doctors and Dentists Act as well as the Midwives' Act,
- Act on hospitals and sanatoria,
- Healthcare and Nursing Act,
- AIDS Act,
- Blood Safety or Veterinarians Act,
- the code of conduct applicable to piercing and tattooing by registered cosmeticians (beauticians) or from
- medical and veterinarian testing, study and research institutions.

Waste from medical institutions as per ÖNORM S 2104 is subdivided into the following:

Group 1 - Waste that is not hazardous inside or outside medical institutions

This group includes non-hazardous waste such as municipal waste and similar waste, bulky waste, biogenic waste, street sweepings and recoverables (e.g. plastic, glass, paper, metal and cardboard packaging; X-ray films).

Group 2 - Waste that may only pose a risk of infection or injury within medical institutions but does not need to be disposed of as hazardous waste

Waste within this group is subdivided into:

- Waste with no risk of injury (SN 97104), such as wound dressings, plaster casts, nappies and disposable articles
- Waste with a risk of injury (SN 97105), such as hypodermic needles, lancets and scalpels
- Wet waste (SN 97104) includes, for example, disposables filled with sucked-off secretions which may leak during transport
- Anatomical substances (SN 97103).

Group 3 - Waste that is hazardous inside and outside medical institutions and therefore requires special treatment in both areas (SN 97101 gn)

This group includes, for example, non-disinfected microbiological cultures and waste containing hazardous pathogens.

Group 4 - Other waste which accrues in medical institutions

Waste in this group includes waste derived from medicinal products, disinfectants, mercury and mercury- containing residues, photochemicals, laboratory waste and chemical residues, laboratory animals and bodies and body parts of animals, animal faeces, kitchen and canteen waste, and electrical and electronic devices.

Figure 47: Out-of-date medicines

Volume

The quantity of waste generated by medical institutions (excluding the municipal portion) amounted to approximately 40,641 tonnes in 2015, while the proportion of hazardous waste was around 2.9 %.

Table 46: Waste from medical institutions - Volume

Code numbers	Waste designation	Volume [t]
97101	Waste which may prove hazardous inside and outside medical institutions, e.g. waste containing hazardous pathogens as per ÖNORM S 2104 - hazardous	1,154
97102	Disinfected waste, with the exception of hazardous waste	2,515
97103	Anatomical substances	33
97104	Waste that may only pose a risk of infection or injury within medical institutions, as per ÖNORM S 2104	36,095
97105	Hypodermic needles and other potentially injurious pointed or sharp objects such as lancets, scalpels and suchlike, as per ÖNORM S 2104	837
97105 77	Hypodermic needles and other potentially injurious pointed or sharp objects such as lancets, scalpels and suchlike, as per ÖNORM S 2104 - dangerously contaminated	7
Total		40,641

Treatment

The treatment of waste from medical institutions is laid down by the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004, as amended, or by ÖNORM S 2104 "Waste from medical institutions".

Group 1:

- Recoverables, including packaging material and separately collected fractions (paper and paperboard, glass, metal and plastics), as well as sorted parts of the bulky waste, are recycled.
- Biogenic waste is supplied for composting or to biogas plants.
- The non-recyclable portions of the plastic packaging and bulky waste are thermally recovered while utilising their energy content.
- Mixed municipal waste is either subjected to mechanical-biological pre-treatment followed by thermal recovery of the high-calorific fraction and depositing of the landfill fraction, or else it is incinerated directly.

Group 2:

- Waste with a risk of injury must be collected in containers that are sufficiently pierce-resistant and unbreakable, leak-proof, tightly sealed and opaque, and must be supplied for thermal treatment. The use of press containers should be refrained from to the extent possible. Containers which contain only non-infectious medical waste may be collected together with mixed municipal waste in accordance with provincial-law regulations, provided they are supplied for thermal treatment in a safe manner. Containers shall be permanently sealed prior to being handed over to an authorised waste collector or treatment plant, or prior to incorporating them in the mixed municipal waste collection.
- Waste with no risk of injury and wet waste must be collected in sufficiently tight drums, transport containers or suitable vehicles, transported and then treated thermally.
- Anatomical substances must undergo thermal treatment or be buried.

Group 3:

Non-disinfected microbiological cultures and waste containing hazardous pathogens must be disinfected prior to preparing the waste and supplied for thermal treatment.

Group 4:

- Waste derived from medicinal products is supplied for thermal treatment.
- Disinfectants, laboratory waste, chemical residues and photochemicals are incinerated or may undergo physico-chemical treatment. Where possible, fixing baths are supplied for recycling.
- Waste electrical and electronic equipment and, in some cases, mercury and mercury-containing residues are recycled where possible.
- The mercury and mercury-containing residues which cannot be recycled shall undergo physico- chemical treatment.
- Laboratory animals and bodies and body parts of animals are supplied for rendering or incinerated.
- Catering waste and sometimes animal faeces are recovered biologically.

In the case of waste of animal origin, the provisions of Regulation (EC) No 1774/2002, as amended, containing hygiene requirements for animal by-products not intended for human consumption must be taken into consideration.

Approx. 93 % of the medical waste specified in Table 46 are thermally treated, and approx. 3 % go directly to mechanical-biological treament plants, whereas 4 % are exported. 75 % of the hazardous waste specified in Table 46 are thermally treated, and 25 % are exported.

Figure 48: Medical waste

3.15. INCINERATION RESIDUES FROM COMBUSTION PLANTS AND FROM THERMAL WASTE TREATMENT

Code number group 313 (ÖNORM S 2100) specifies the residues from incineration. These include ash, slag and dust and other residues from:

- waste incineration plants,
- combustion plants in which high-calorific value waste is co-incinerated and
- other combustion plants (such as thermal power stations).

Volume

Comparing 2008 with 2015, the quantity of wood ash (SN 31306) increased significantly. The volume of "fly ash and dust from other combustion plants" (SN 31301), "slag and ash from waste incineration plants" (SN 31308) and "fly ash and dust from waste incineration plants" (SN 31309) remains constant overall. As regards the majority of other residues from incineration, the volume declined somewhat. All told, since 2008, the volume under code number group 313 has barely changed (see the table below).

Table 47: Ash and slag from thermal waste treatment and from combustion plants

		Volume [t]				
Code numbers	**Waste designation**	**2004**	**2008**	**2013**	**2014**	**2015**
31301 31301 77	Fly ash and dust from other combustion plants	522,000	229,100	245,400	239,400	297,500
31305	Brown coal ash	67,000	73,200	8,300	65,500	65,400
31306 31306 70 31306 72 31306 74 31306 77 31306 91 92303 92303 71	Wood ash, straw ash Plant ashes	100,000	148,911	133,500	190,600	186,100
31307 31307 77	Boiler slag	16,400	1,412	6,700	7,500	300
31308 31308 88	Slag and ash from waste incineration plants	380,400	356,400	551,300	543,500	531,500
31309 31309 88	Fly ash and dust from waste incineration plants	338,800	368,700	212,200	171,100	123,600
31312 31312 88	Solid saline residues from the flue gas purification of waste incineration plants and waste pyrolysis plants	3,800	7,660	8,900	6,700	8,100
31314 31314 88	Solid saline residues from the flue gas purification of combustion plants for conventional fuels (excluding FGD [flue gas desulphurisation] gypsum)	5,400	112	400	500	700
31315	FGD gypsum	130,000	71,200	11,900	11,700	14,900
31316 31316 88	Slag and ash from waste pyrolysis plants	276	47	60	35	27
31317	Fly ash and dust from oil-fired plants	1,600	58	25	2	47
Total (rounded off) [millions of tonnes]		1.57	1.26	1.18	1.24	1.23

Treatment

Of the waste under group 313 in 2015, approximately 407,000 tonnes were recycled (of which around 139,000 tonnes as substitute raw materials in the Austrian cement industry). Around 805,000 tonnes were deposited in above-ground landfills in Austria. The roughly remaining 17,000 tonnes were shipped abroad to be deposited in landfills underground.

In Austria in the period from 2008 to 2015, the landfilling of ash, slag and dust from thermal waste treatment and from combustion plants increased by 46 % (see the table below).

Table 48: Quantities deposited at Austrian landfills from waste group 313 [t]

Code numbers	Waste designation	2004	2008	2013	2014	2015
31301	Fly ash and dust from other combustion plants	1,100	3,000	21,700	88,000	89,100
31305	Brown coal ash (including solidified)	100	6,200	7,300	4,900	2,500
31306	Wood ash, straw ash	23,700	72,600	58,300	51,300	38,500
31307	Boiler slag	500	1,400	510	400	300
31308 31308 88 31308 91	Slag and ash from waste incineration plants [declassified or solidified]	360,200	356,400	578,400	571,500	592,700
31309 31309 88 31309 91	Fly ash and dust from waste incineration plants [declassified or solidified]	26,100	58,100	105,700	71,300	70,600
31312 31312 88 31312 91	Solid saline residues from the flue gas purification of waste incineration plants and waste pyrolysis plants [declassified or solidified]	1,100	3,900	7,800	3,500	7,200
31314 31314 88	Solid saline residues from the flue gas purification of combustion plants for conventional fuels (excluding FGD gypsum) [declassified]			1,200	1,100	900
31315	FGD gypsum	49,100	48,600	2,000	2,500	2,700
Total		461,900	550,200	782,910	794,500	804,500

Figure 49: Ash from an incineration plant

3.16. SELECTED OTHER WASTE

This chapter considers the volume and the treatment of other waste groups which are listed separately on account of their importance for the Austrian waste management industry. These waste groups comprise various types of mineral and metallic waste, waste from the manufacture of cellulose and the processing thereof, paper and paperboard waste, plastic and rubber waste, residues from the mechanical/biological treatment of waste and sludge from the treatment of sewage.

Volume

The table below shows the volume of selected "other" waste in 2015. This is supplemented by the fact that in the metal industry large quantities of slag arise which can be partly regarded as by-products (in the event of compliance with the requirements of the Waste Management Act 2002). The overall annual volume of blast furnace slag in 2015 is approx. 1.6 million tonnes and that of converter slag and electric furnace slag is approx. 930,000 tonnes. The following table gives only the waste volume that has been reported.

The quantities depicted also include scrap metals, waste paper and used plastics from households and similar establishments (around 800,700 tonnes in total). The quantities of hazardous fractions are also included in the total quantities depicted (around 310,400 tonnes in total). The municipal waste from households and similar establishments is depicted in detail in Chapter 3.1 and the hazardous waste in Chapter 3.17.

Table 49: Selected other waste - Quantities generated in 2015

Waste group	Waste designation	Volume [t]	of which	
			Hazardous	from households and similar establishments
181 + 184	Waste from the manufacture of cellulose and the processing thereof	197,300	0	0
187 + 91201	Paper and paperboard waste (including packaging material and cardboard packaging)	1,477,900	1,500	660,500
311	Spent lining, blast furnace and foundry waste	205,800	0	0
312	Metallurgical slag, dross and dust	1,191,700	228,800	0
316	Mineral sludge	164,000	29,800	0
351	Iron and steel waste	2,152,300	900	115,400
353	Non-ferrous metal waste	357,300	31,400	5,800
57 (ohne 57502 und 578)	Plastic and rubber waste (not including end- of-life tyres and shredder residues)	197,000	2,200	19,000
941 + 947 + 948 + 949	Sludge from water and waste water treatment, residues from the sewage system and waste from water utilisation	634,100	15,800	0
Total		6,577,400	310,400	800,700

Treatment

In 2015, roughly one third of the **waste from the manufacture of cellulose and the processing thereof** (quantity generated in 2015: 197,300 tonnes) in the brick and tile industry was used as an aeration agent. Smaller quantities (roughly 5 % of the quantity generated) were landfilled. The remainder of the waste from the manufacture of cellulose and the processing thereof was thermally recovered.

Paper and paperboard waste (quantity generated in 2015: 1,447,900 tonnes) is almost recycled in full - mainly in Austria. The fibres separated during the production process are thermally recovered in paper mills. Paper and paperboard waste are also shipped to Austria from abroad in appreciable quantities for the purpose of recycling.

Spent lining, blast furnace and foundry waste (quantity generated in 2015: 205,800 tonnes) was predominantly landfilled (98 % of the quantities generated). Smaller quantities (totalling around 2 % of the volume) were recycled in Austria or abroad.

Roughly 73 % of the **metallurgical slag, dross and dust** (quantity generated in 2015: 1,191,700 tonnes) was recycled or backfilled in Austria or abroad in 2015. A small portion (approx. 2 %) underwent physico-chemical treatment in Austria. The remainder was landfilled in Austria.

Around 83 % of the **mineral sludge** (quantity generated in 2015: 164,000 tonnes) was landfilled. Approximately 9 % underwent physico-chemical treatment in Austria. Around 6 % was thermally treated in Austria in the cement industry. Roughly 2 % was used for backfilling.

Iron and steel waste (quantity generated in 2015: 2,152,300 tonnes) and non-ferrous metal waste (quantity generated in 2015: 357,300 tonnes) are almost recycled in full (approx. 60 % of the metal waste in Austria and the remainder abroad). In addition, metal waste is shipped to Austria from abroad in appreciable quantities for recycling.

Around 80% of the **plastic and rubber waste** (quantity generated in 2015: 197,000 t) was recycled at home or abroad. The remainder largely underwent thermal recovery (approx. 17 %). Small portions were treated in physico-chemical plants or in plants for the treatment of metal waste (around 3 % in total).

Figure 50: Rubber waste (end-of-life tyres)

Sludge from water and waste water treatment, residues from the sewage system and waste from water utilisation (quantity generated in 2015: 634,100 tonnes) largely underwent thermal recovery (approx. 73 %). 10 % (sludge from the manufacture of cellulose and paper) was recovered at home or abroad as an aeration agent. Roughly 13 % (inorganic fractions) was landfilled. The remainder was treated in physico-chemical plants or in mechanical-biological treatment plants.

3.17. HAZARDOUS WASTE

Hazardous waste is specified in Article 4 of the List of Waste Ordinance, Federal Law Gazette II No 570/2003. Further information are included in Chapter 6.3.3. Hazardous waste occurs in all sectors of the economy but also as hazardous household waste in private households. The amounts of hazardous waste which are most relevant in terms of quantities originate from soil remediation and the metal and chemical industries.

Volume

In 2015, some 1,265,600 tonnes of hazardous waste were generated in Austria. This corresponds to roughly 2 % of the total volume of waste in Austria.

Table 50: Hazardous waste - Quantities generated in 2015[1]

Code numbers	Waste designation	Quantities [t, rounded off]	Share of the volume of hazardous waste [%]
31424	Other contaminated soils	142,300	11.2
31223	Dust, ash and dross from other smelting processes	125,900	9.9
31412	Asbestos cement	64,800	5.1
31309	Fly ash and dust from waste incineration plants	59,200	4.7
31308	Slag and ash from waste incineration plants	58,000	4.6
35203	Motor vehicles, machines and machine parts, with environmentally significant levels of hazardous components or constituents (e.g. starter batteries, brake fluid, motor oil)	43,900	3.5
31211	Salt slag containing aluminium	43,700	3.5
54402	Drilling and grinding oil emulsions and emulsion mixtures	41,200	3.3
54702	Oil separator contents (petrol separator contents)	37,900	3.0
31423	Oil-contaminated soils	34,700	2.7
54102	Waste oils	34,000	2.7
31203	Slag from non-ferrous metal smelting	32,000	2.5
17207	Railway sleepers[2]	32,000	2.5
54408	Other oil and water mixtures	30,000	2.4
35322	Lead storage cells	27,200	2.1
52725	Other aqueous concentrates	24,000	1.9
35230	Small waste electrical and electronic equipment with an edge length of less than 50 cm, with hazardous properties	22,600	1.8
54912 77	Bitumen, asphalt, dangerously contaminated	21,300	1.7
51113	Other metal hydroxide sludges	19,800	1.6
52102	Acids, acid mixtures, inorganic	17,700	1.4
55374	Solvent and water mixtures without halogenated solvents	16,500	1.3
94801	Sludge from sewage treatment with hazardous constituents	15,300	1.2
35212	VDUs including cathode-ray tube equipment	15,300	1.2
54701	Sand filter contents containing oil or cold cleaner solvent	15,100	1.2
55370	Solvent mixtures without halogenated organic components, paint and varnish thinners (e.g. "cellulose thinners"), including antifreeze	13,000	1.0
31217	Filter dust containing non-ferrous metal	12,800	1.0
35205	Refrigeration and air-conditioning equipment containing HCFC, HFC or HC-based refrigerants (e.g. propane, butane)	12,700	1.0
52103	Acid, acid mixtures with application-specific additives (e.g. pickling, ion exchange eluates)	11,500	0.9
54930	Equipment contaminated with solid grease and oil (vehicle workshop, industrial and garage waste)	10,800	0.8
31620	Gypsum sludge with production-specific harmful additives	10,100	0.9
	Total	1,045,300	83
	Around 300 further types of waste	220,300	17
Total (rounded off)		1,265,600	100

[1] *July 2016 version; data base: Annual waste balance sheets as per the Waste Balance Ordinance (Federal Law Gazette II No 497/2008*

[2] *Railway sleepers derive from various public and private railway companies.*

Transboundary waste shipments

In 2015, all told, approximately 133,600 tonnes of hazardous waste from abroad was delivered to Austrian treatment plants. Approximately 263,100 tonnes of hazardous waste were shipped abroad for recovery or disposal.

The most important types of hazardous waste shipped to Austria in terms of quantities were waste under SN 31435 "Used filter materials and absorbents with application-specific harmful additives" (27,300 tonnes), waste under SN 31308 "Slag and ash from waste incineration plants" (17,600 tonnes) and waste under SN 59507 "Catalysts and contact materials" (15,700 tonnes).

The most important types of hazardous waste shipped from Austria in terms of quantities were waste under SN 31223 "Dust, ash and dross from other smelting processes" (109,500 tonnes), SN 31211 "Salt slag containing aluminium" (43,800 tonnes) and SN 17207 "Railway sleepers" (22,900 tonnes).

Further details on waste shipments from or to Austria are presented in Chapter 4.14 "Transboundary shipment".

Declassifications

Several types of waste shall essentially be regarded as hazardous waste on the basis of the precautionary principle. However, if proof can be furnished on the basis of a chemical/analytical investigation in accordance with the state of the art that a certain type of waste which is essentially regarded as hazardous under law does not, in a given case, have any hazardous properties generally, or under landfill conditions, then the waste may be declassified as non-hazardous. Certain types of hazardous waste cannot be "declassified", however. A declassification of this hazardous waste is therefore not permitted.

The declassification must be reported to the Federal Minister for Agriculture and Forestry, Environment and Water Management.

The declassification may be performed for a single batch ("single batch declassification") or for a waste from a defined process of a consistent quality ("process declassification"). It can either be carried out by the waste holder ("standard declassification") or, for the purpose of landfilling, by the landfill owner in connection with deposition at the waste disposal site ("declassification for landfilling").

First and foremost, slag and ash from waste incineration and contaminated excavated materials are declassified. Waste which is already declassified by producers is included in the volume of non-hazardous waste. Waste which is declassified by waste holders other than producers (e.g. landfill owners) is included in the volume of hazardous waste.

Treatment

Hazardous waste must either be treated in plants approved for this purpose in Austria or abroad or disposed of in underground landfill sites.

Pursuant to Article 16(1) of the Waste Management Act 2002, as amended, the depositing of hazardous waste on overground landfill sites is essentially prohibited. Pre-treated asbestos waste and waste containing tar may, however, also be deposited on landfill sites designed for non-hazardous waste in structurally separate compartments. In 2015, around 66,700 tonnes of asbestos waste were deposited in this way. Underground landfill sites are not currently operated in Austria. Around 16,200 tonnes of hazardous waste were taken abroad in order to dispose of it in underground landfill sites.

In 2015, around 16 % of the hazardous waste in Austria underwent thermal recovery or was treated. Around 27 % of the hazardous waste was treated in domestic physico-chemical plants.

Hazardous waste electrical and electronic equipment undergoes specific processing in separate plants before a recovery of materials contained therein, including metal, plastic or glass, can take place.

End-of-life vehicles are first drained. Saleable used parts are removed and reused. The pre-treated end-of-life vehicles are separated out in shredder plants into directly recoverable metal flows and shredder waste.

Lead storage cells are pre-treated mechanically and the components containing lead recycled at an Austrian secondary lead works. The sorted portable batteries are shipped abroad for recovery.

Figure 51: Lithium batteries

All told, around 27 % of the hazardous waste was able to be recycled in 2015 either in Austria or abroad. 23 % of the hazardous waste was pre-treated in such a way that the waste no longer had any hazardous properties or was able to be declassified. For example, contaminated soils were largely treated in special treatment plants.

In the illustration below, the proportions of the various methods for treating the hazardous waste are represented graphically.

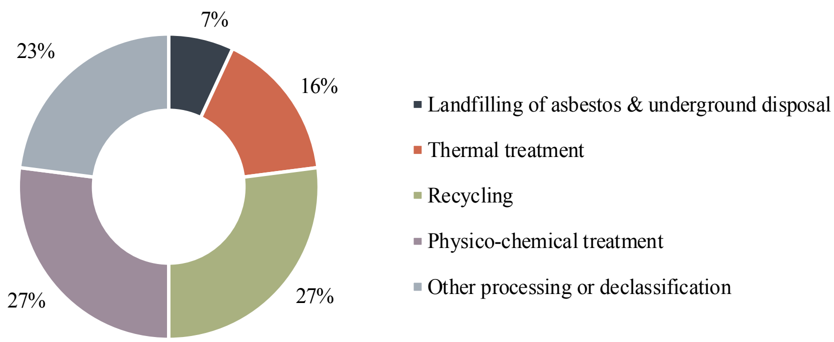

Figure 52: Recovery and disposal of hazardous waste

4
TREATMENT PLANTS

4. TREATMENT PLANTS

ALL TOLD, IN 2015, roughly 2,500 plants concerned with waste recovery and disposal were operational across Austria.

Table 51: Waste treatment plants in Austria

Types of plants	Number
Thermal treatment plants for municipal waste	11
Thermal treatment plants (excluding municipal waste treatment plants)	54
Mechanical-biological treatment plants (MBT)	14
Anaerobic biological treatment plants (biogas plants)	152
Aerobic biological treatment plants (composting plants)	401
Physico-chemical treatment plants	51
Treatment plants for construction and demolition waste	420
Treatment plants for soils	15
Plants for the treatment of metal waste, waste electrical equipment and end-of-life vehicles	103
Plants for sorting and processing separately collected recoverables and other waste	181
Recovery plants for recoverables collected separately	101[1]
Treatment plants for specific waste	8
Landfills	999

[1] *In addition, waste is also used as substitute raw materials or as production accessories in industrial enterprises (cement industry, brick and tile industry, other production of building materials, iron and steel production, the chemical industry). Furthermore, waste is also supplied for recovery via backfilling measures. Further information on this is contained in Chapters 4.10.3. and 4.10.4.*

4.1. THERMAL TREATMENT PLANTS FOR MUNICIPAL WASTE

In 2015, 11 plants for the thermal treatment of municipal waste with a total capacity in the region of 2,6 million tonnes were operational in Austria. In seven plants based, first and foremost, on grate firing, mixed municipal waste or bulky waste and residues from the mechanical recycling of waste are thermally treated. In four plants based on fluidised bed technology, primarily residues from the mechanical recycling of waste and sewage sludge are used.

Table 52: Thermal treatment plants for municipal waste

Thermal waste treatment	Firing/waste use	Capacity [tonnes/year]
Spittelau waste incineration plant, Vienna	Grate firing (mixed municipal waste)	250,000
Flötzersteig waste incineration plant, Vienna	Grate firing (mixed municipal waste)	200,000
Pfaffenau waste incineration plant, Vienna	Grate firing (mixed municipal waste)	250,000
Wels waste incineration plant	Grate firing (mixed municipal waste)	305,000
Dürnrohr waste incineration plant	Grate firing (mixed municipal waste)	525,000
Waste incineration plant KRV Arnoldstein	Grate firing (mixed municipal waste)	96,000
Zistersdorf waste incineration plant	Grate firing (mixed municipal waste)	130,000
Fluidised bed furnace 4 - Simmeringer Haide, Vienna	Fluidised bed (residues from the mechanical recycling of waste, sewage sludge)	110,000
Lenzing residual material recovery	Fluidised bed (residues from the mechanical recycling of waste, residues from the processing of waste paper, sewage sludge)	300,000
Residual material thermal power plant, Linz	Fluidised bed (residues from the mechanical recycling of waste, sewage sludge)	255,000
ENAGES [Energie- und Abfallverwertungs GesmbH], Niklasdorf	Fluidised bed (residues from the mechanical recycling of waste, sewage sludge)	131,000
Total (rounded off)		2.6 million

Data source: EDM (Juli 2016 version)

In 2015, approximately 2.4 million tonnes of waste were incinerated in these plants, resulting, in total, in around 650,000 tonnes of secondary waste (in particular slag and ash).

Table 53: Main types of waste and corresponding quantities of waste used in thermal treatment plants for municipal waste

Code numbers	Waste designation	Quantity, 2014 [t]	Quantity, 2015 [t]
91101	Municipal waste and similar commercial waste	1,036,662	1,026,667
91103	Residues from the mechanical recycling of waste	890,514	891,561
94501	Anaerobically stabilised sludge (digested sludge)	104,606	107,481
18407	Residues from the processing of waste paper	81,375	91,319
91401	Bulky waste	64,429	68,584

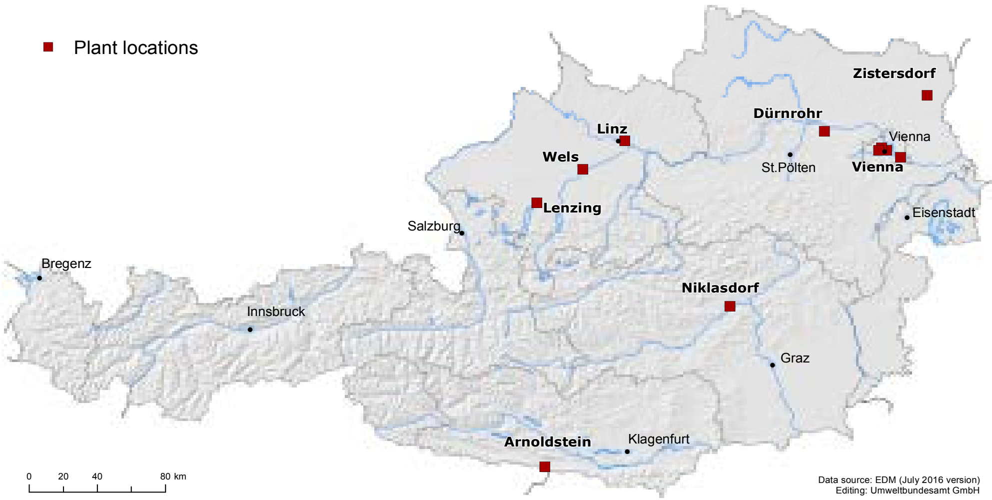

Figure 53: Thermal treatment plants for municipal waste in 2015

Figure 54: Thermal treatment plants for municipal waste

4.2. THERMAL TREATMENT PLANTS (EXCLUDING TREATMENT PLANTS FOR MUNICIPAL WASTE)

In addition to the plants for treating municipal waste, in 2015, 54 thermal treatment plants were operational. These come under the scope of the Ordinance on the incineration of waste, Federal Law Gazette II No 389/2002, as amended. Plants for the thermal treatment of vegetable waste from agriculture and forestry or of fibrous vegetable waste from the production of raw pulp and pulp-based paper, where this waste is incinerated at the place of production and the heat generated utilised, are not therefore taken into account, for instance. So-called co-incineration plants (e.g. enterprises in the cement industry, the energy industry, the wood pulp and paper industries and the wood material industry) which use waste as a regular or additional fuel, as well as plants for the thermal treatment of hazardous waste, are also included.

In these thermal treatment plants, around 1.8 million tonnes of waste were incinerated in 2015. This primarily involved the types of waste listed in Table 54.

Tabelle 54: Main types of waste and corresponding quantities of waste used in thermal treatment plants (excluding treatment plants for municipal waste)

Code numbers	Waste designation	Quantity [t]
94802	Sludge from the mechanical waste-water treatment in pulp and paper producion	299,147
91108	Substitute fuels, quality assured	270,395
94302	Excess sludge from the biological treatment of waste water	189,142
17202	Construction and demolition waste wood	96,971
94803	Sludge from the biological treatment of waste water originating from the manufacture of cellulose and paper	95,963

The Federal Minister for Agriculture and Forestry, Environment and Water Management shall publish annually, pursuant to Article 18 of the Ordinance on the incineration of waste, Federal Law Gazette II No 389/2002, as amended, a report for the public on the functioning and monitoring of the (co-)incineration plants. This report covers implementation of the processes and the level of emissions into air and water compared with the limit values. This report also gives a list of all thermal treatment plants (excluding municipal waste treatment plants).

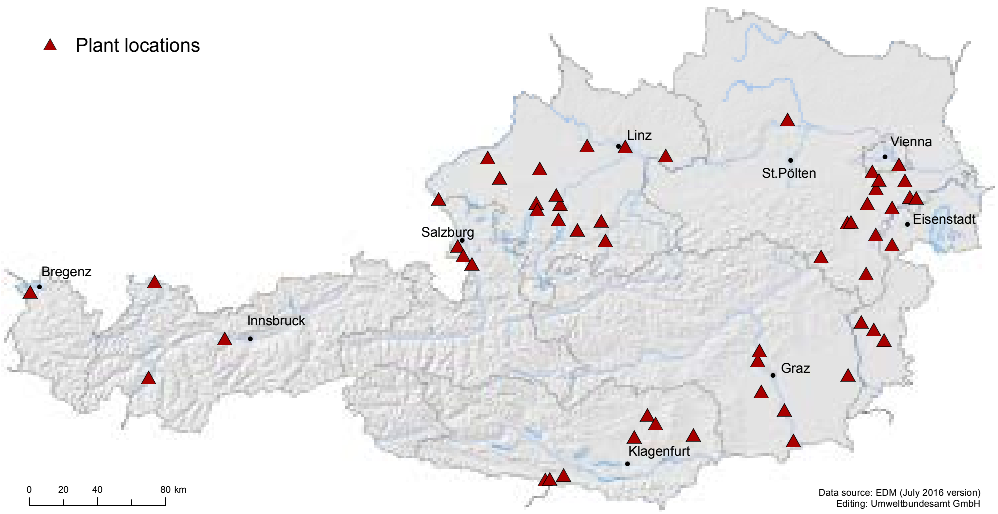

Figure 55: Thermal treatment plants (excluding thermal treatment plants for municipal waste)

4.3. Mechanical-biological treatment plants

The mechanical-biological treatment of waste combines mechanical and biological processes for the treatment of mixed municipal waste, similar commercial waste and sewage sludge, as well as other waste which is suitable for treatment. The mechanical and biological processes may each take place at separate locations in this regard. Only mechanical processing plants are depicted in Chapter 4.10.1 "Plants for sorting and processing". The biological treatment of contaminated soil, even after preliminary sieving or similar mechanical treatment, is described in Chapter 4.8 "Treatment plants for soils".

Austrian mechanical-biological treatment plants essentially pursue the following objectives:

- Separation of the entire waste stream following mechanical removal of impurities/recyclables into a high-calorific fraction for further thermal recovery and biological treatment of the remaining biogenic share for further landfilling. The aim of biological treatment is the decomposition of organic substances (to decompose and convert the biodegradable components) through the application of aerobic processes.
- Biological drying of the entire waste stream following mechanical removal of impurities/recyclables and further thermal recovery of the waste. The aim of biological drying is to reduce as far as possible the moisture content in the waste stream and thereby increase the calorific value.

At the end of 2015, 14 plants for the mechanical-biological treatment of municipal waste and other waste were in operation. The approved mechanical-biological treatment plant capacity was in the region of 655,700 tonnes, while the mechanical-biological treatment plant capacity according to current operational concepts was around 545,700 tonnes.

In 2015, the Wiener Neustadt mechanical-biological treatment plant resumed operation with a capacity of 24,000 tonnes/year (in form of a biological drying process).

Table 55: Mechanical-biological treatment plants

Federal Provinces	Site	Authorised MBT capacity in tonnes
Burgenland	Oberpullendorf	82,000
Lower Austria	Fischamend	27,000
	St. Pölten	88,000
	Steinthal[1]	10,000
	Wiener Neustadt	24,000
Salzburg	Bergheim – Siggerwiesen	140,000
	Zell am See[2]	40,000
Styria	Aich-Assach	9,500
	Frohnleiten	93,700
	Halbenrain	80,000
	Hartberg	4,500
	Liezen	25,000
Tyrol	Kufstein	15,000
	Lavant	17,000
Austria		655,700

July 2016 version
[1] *post-rotting only at the location*
[2] *only currently operational as a mechanical treatment plant*

In 2015, roughly 439,375 tonnes of waste were processed in mechanical-biological treatment plants. The following types of waste were used as a matter of priority:

- SN 91101 "Municipal waste and similar commercial waste", at around 55 %,
- SN 91103 "Residues from the mechanical recycling of waste", at around 24 %,
- SN 91307 "Fractions for disposal that are processed for biological treatment", at around 7 %,
- SN 91401 "Bulky waste", at around 4 %,
- SN 94502 "Anaerobically stabilised sludge", at around 4 %,
- waste under other code numbers, at around 6 %.

The output from the mechanical-biological treatment plants is disposed of or recovered as follows:

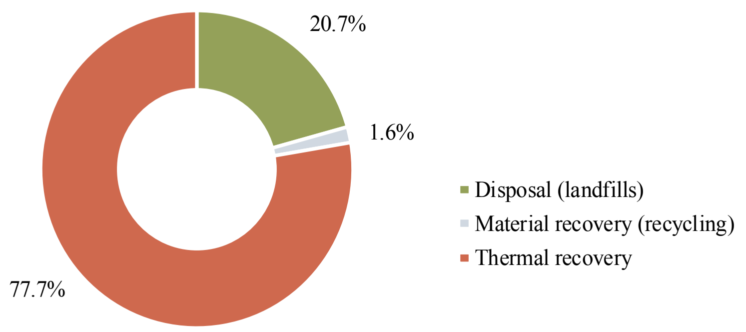

Figure 56: Destination of the plant output from mechanical-biological treatment plants in 2015

Overall, 342,907 tonnes were identified as output from the mechanical-biological treatment plant for the year 2015. When disregarding the quantities in stock, there would be a theoretical rotting/drying loss of approx. 22 % for the 2015 calendar year when comparing input and output.

By switching the process to drying alone prior to further thermal recovery at the Frohnleiten and Wiener Neustadt mechanical-biological treatment plants, there was a significant increase in the proportion for further thermal recovery compared with 2014. Roughly 1.6 % of the output quantities accrue as ferrous and non- ferrous metals and can subsequently be supplied for recycling.

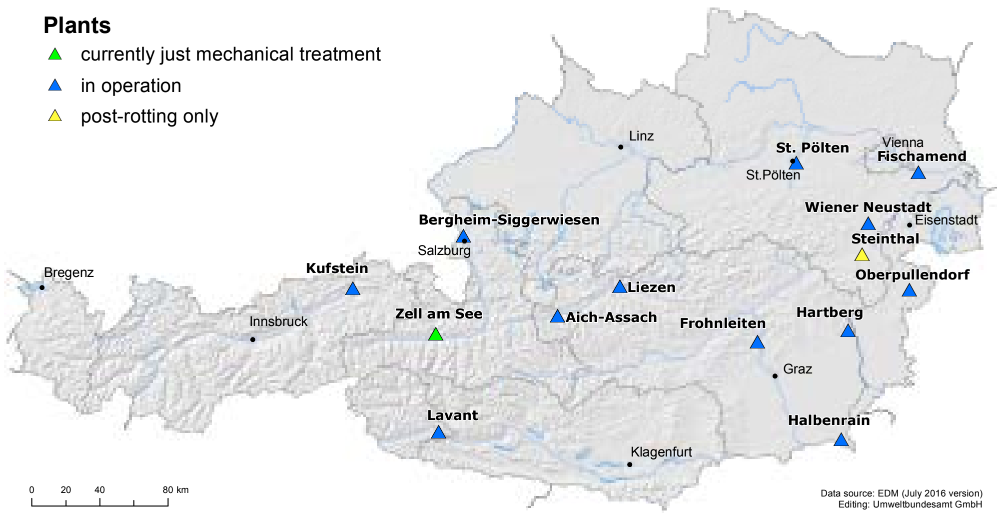

Figure 57: Mechanical-biological treatment plants in 2015

4.4. ANAEROBIC-BIOLOGICAL TREATMENT PLANTS (BIOGAS PLANTS)

In biogas plants, biogenic materials are biodegraded (fermentation) under anaerobic conditions (without oxygen). With a few exceptions, compostable materials are also suitable for fermentation. Lignin-rich (ligneous) materials, such as tree and shrub cuttings, are unsuitable for fermentation, however, since lignin does not undergo anaerobic decomposition. Source materials which also contain animal by-products as per Regulation (EC) No 1069/2009 on animal by-products must undergo a hygienisation step.

The biogas generated is made up of around 60 % methane and can be used as a source of energy (production of electrical energy and/or heat, processing of biogas into biomethane). In accordance with corresponding regulations under law, the accruing digestate may be applied as fertiliser to agricultural areas, composted or thermally treated.

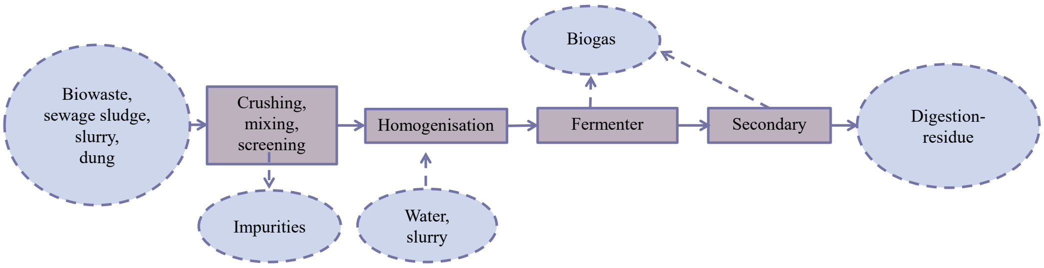

Figure 58: Simplified schematic diagram of a biogas plant (source: Environment Agency Austria)

In addition to biogas plants, digestion tanks of sewage treatment plants in which waste is co-fermented are also included under anaerobic biological treatment plants. Plants which do not have any authorisation to treat waste as per Article 24a of the Waste Management Act 2002 are not included.

In 2015, there were 152 biogas plants in operation - of which 41 plants are sewage works which also treat biogenic waste - with a minimum capacity of around 1 million tonnes. All told, approximately 580,000 tonnes of biogenic waste were recovered in these plants, in which connection the following types of waste were primarily used:

- SN 92402 "Catering waste which includes edible animal fats"
- SN 92450 "Mixtures of waste under waste groups 924 and 921, which contain animal substances, for fermentation"
- SN 92425 "Dairy waste"
- SN 92403 "Cooking oil, cooking fat, contents of fat separators containing animal substances".

Figure 59: Biogas plant

Table 56: Biogas plants

Federal Provinces	Number	of which sewage treatment plant	Minimum capacities [t/a]
Burgenland	2	1	26,300
Carinthia	10	4	23,900
Lower Austria	13	2	141,000
Upper Austria	31	2	255,000
Salzburg	6	3	28,000
Styria	30	0	323,800
Tyrol	30	25	122,400
Vorarlberg	29	4	106,700
Vienna	1		21,500
Austria	152	41	1,048,600

Data source: EDM analyses (July 2016 version)

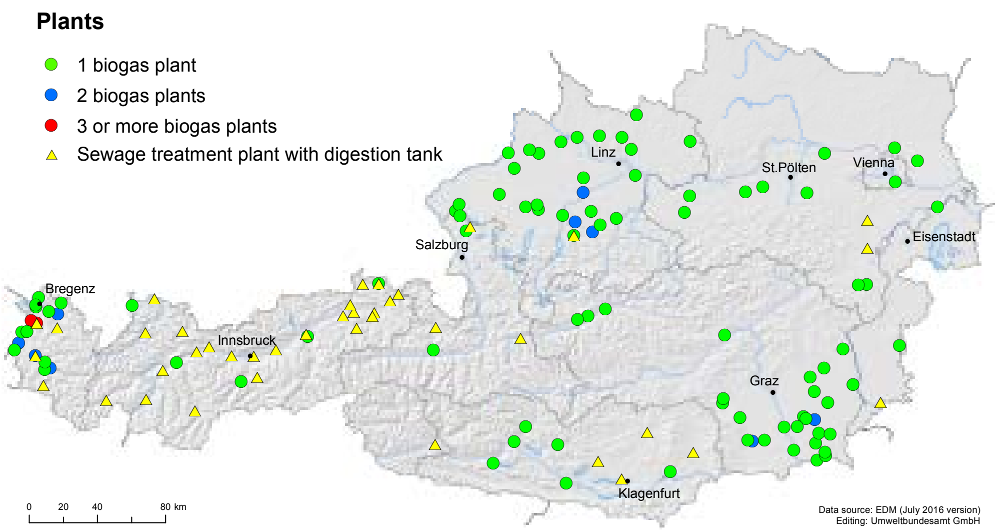

Figure 60: Biogas plants in 2015

Figure 61: Mobile biogas plant

4.5. AEROBIC BIOLOGICAL TREATMENT PLANTS (COMPOSTING PLANTS)

Depending on the process engineering, as regards composting, a distinction can be drawn with regard to mixing between static or dynamic systems, with or without forced ventilation and, as regards encapsulation, between open or sealed systems.

Compost is the rotted product derived from the treatment of organic materials and/or biogenic waste from separate collection after aerobic rotting that has been largely completed and that meets predefined quality requirements for use or for the placing on the market. The generated composts are reintroduced into the economic cycle for different fields of application according to defined qualities (in keeping with the Compost Ordinance, Federal Law Gazette No 292/2001 or Federal State Statutory Rules). Compost is mainly used for fertilisation and soil improvement in the area of agriculture and in hobby gardens. In addition, it can be used for soil recultivation or as a mixing constituent for the production of culture media, cultivated soil and composted earth.

Austria has many decentralised plants with lower capacities. In Austria in 2015, a total of 401 plants with a processing capacity of at least 1.5 million tonnes/year were operational (see Table 57).

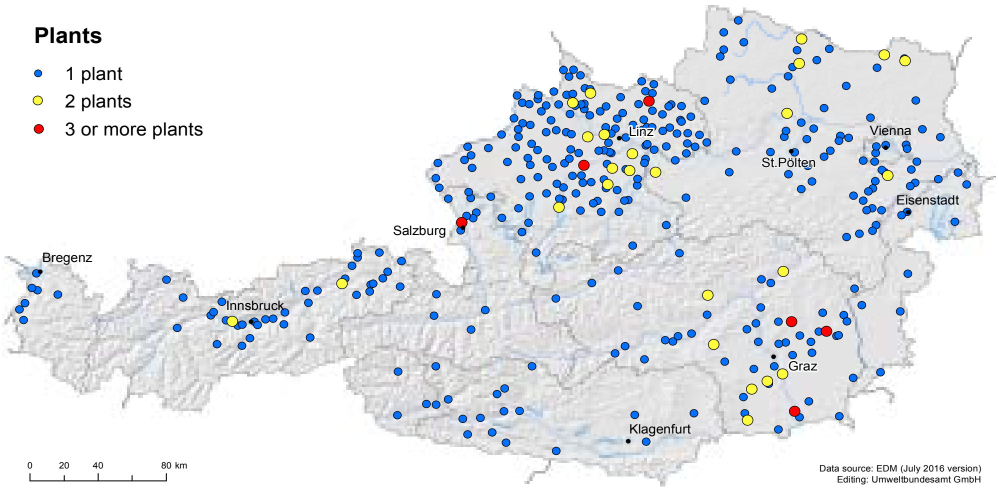

Figure 62: Composting plants in 2015

Figure 63: Composting plant

Table 57: Composting plants

Federal Provinces	Number	Minimum capacities [t/a]
Burgenland	8	62,020
Carinthia	16	59,720
Lower Austria	80	524,210
Upper Austria	159	305,340
Salzburg	15	83,720
Styria	69	197,755
Tyrol	44	105,980
Vorarlberg	7	60,790
Vienna	3	154,715
Austria	401	1,554,250

Data source: EDM (July 2016 version), ARGE Kompost & Biogas and surveys conducted by the Environment Agency Austria

In the composting plants, around 1.14 million tonnes of waste were treated in 2015. As the most significant types of waste in terms of quantities, the following types of waste (as a percentage of the total input) were incorporated:

- SN 92401 "Mixtures of waste under waste groups 924 and 921, which contain animal substances, for composting", at around 20 %,
- SN 92201 "Municipal quality sewage sludge", at around 14 %,
- SN 92105 "Wood" specification 67 "Tree and shrub cuttings", at around 13 %,
- SN 92102 "Grass clippings, foliage", at around 11 %,
- SN 92199 "Processed waste as per the Compost Ordinance, as amended, without animal substances", at around 9 %,
- waste under other code numbers, at around 33 %.

All told in 2015, at least 339,200 tonnes of composts of varying qualities (inter alia quality compost A+, A and quality sewage sludge compost) were produced in the plants considered. By way of residual materials from composting, around 150,300 tonnes accrued for further treatment.

Figure 64: Shredded tree and shrub cuttings

4.6. PHYSICO-CHEMICAL TREATMENT PLANTS

Physico-chemical treatment plants primarily treat hazardous waste, with the aim of reducing the risk potential to such an extent that facilitates subsequent environmentally sound disposal and allows partial streams to be supplied for recovery. In 2015, a total of 51 physico-chemical treatment plants were operational across Austria. Together, these have a treatment capacity in the region of 1.2 million tonnes/year. This involved both plants for treating organic (organic physico-chemical waste treatment plants) and/or inorganic (inorganic physico-chemical waste treatment plants) waste and plants for solidifying and stabilising waste.

Most of the input to physico-chemical plants can be classified into the following categories:

- liquid and semi-solid organically contaminated waste:
  e.g. (drilling and grinding oil) emulsions, solids and oily water, contents of oil and petrol separators, residues from tank cleaning and businesses in the metal- and mineral oil- processing industries, as well as petrol stations and vehicle repair shops.
- liquid and semi-solid inorganically contaminated waste:
  e.g. acids, alkalis, cyanide, nitrite, chromatic and heavy metal-containing waste water and thin slurries from the metal-processing industry, the electro-technical industry and the galvano-technical industry.

As regards the pre-treatment of ash and slag from incineration plants prior to landfilling, seven stabilisation and solidification plants are available. All told in 2015, approximately 602,000 tonnes of waste were treated in these plants.

Table 58: Physico-chemical treatment plants

Federal Provinces	Inorganic physico-chemical waste treatment plant	Organic physico-chemical waste treatment plant	Inorganic / organic physico-chemical waste treatment plants	Solidification/ stabilisation plants	Total
Burgenland	0	2	1		3
Carinthia	0	1	1		2
Lower Austria	1	7	1	1	10
Upper Austria	1	1	4		6
Salzburg	0	2	2		4
Styria	0	6	1	4	11
Tyrol	1	3	1		5
Vorarlberg	0	1	1		2
Vienna	4	1	1	2	8
Austria	7	24	13	7	51
Capacity [t/year]	131,800	269,200	387,600	420,900	1,209,500
Input [t/year]	9,823	69,536	228,152	294,677	602,188

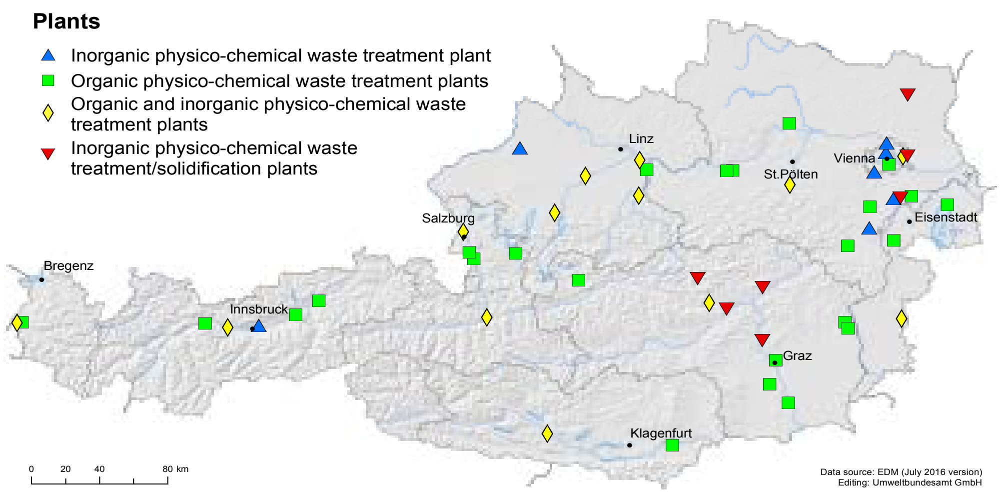

Figure 65: Physico-chemical treatment plants in 2015

4.7. TREATMENT PLANTS FOR CONSTRUCTION AND DEMOLITION WASTE

Treatment plants for mineral construction and demolition waste assist in the processing of mineral waste including, in particular, building debris, concrete debris, road rubble and asphalt rubble as well as excavated materials. The aim is the extraction of usable secondary raw materials which are used as aggregates in the production of building materials or as fill material, base material or backfilling material.

To this end, stationary, mobile and semi-mobile plants are used. Stationary plants are wholly fixed establishments or those which are operated at one location over an extended period. Within the meaning of the Waste Management Act 2002, mobile treatment plants are operated at various locations, each time for a period not exceeding six months.

While the mobile plants usually employ crushers and screens, stationary plants have several modules which can be connected in series in any order required. In contrast to mobile plants, semi-mobile plants are not equipped with permanently installed travel gear.

In 2015, 420 plants were available for treating construction and demolition waste. Consideration must be given in this regard to the fact that roughly half of the plants are mobile and hence are used across provincial boundaries.

Table 59: Treatment plants for construction and demolition waste

Federal Provinces	Number
Burgenland	23
Carinthia	33
Lower Austria	97
Upper Austria	69
Salzburg	40
Styria	48
Tyrol	76
Vorarlberg	23
Vienna	11
Austria	420
Data source: EDM (July 2016 version)	

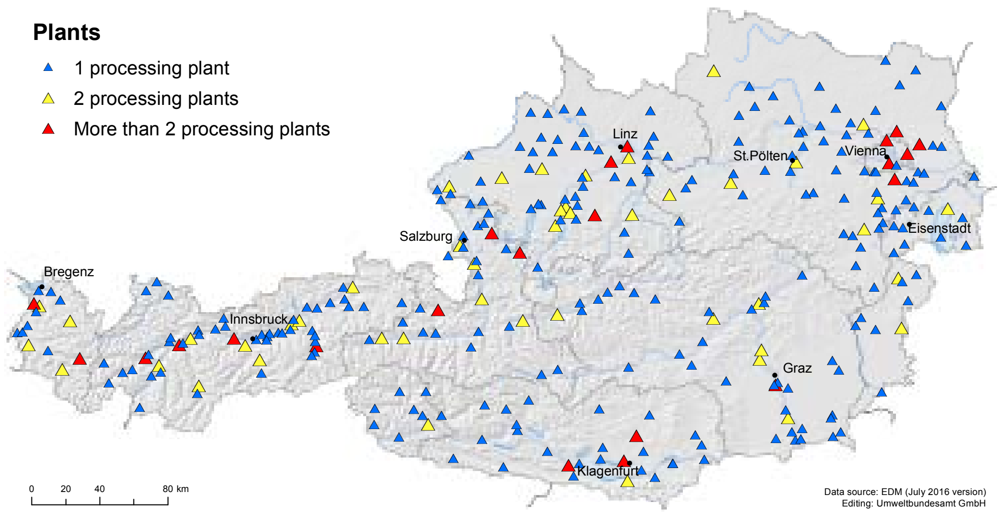

Figure 66: Treatment plants for construction and demolition waste in 2015

Figure 67: Mobile plant for the processing of mineral construction and demolition waste

Input streams

A minimum capacity for the treatment plants for construction and demolition waste of approximately 12 million tonnes shall be assumed. In 2015, approximately 9,7 million tonnes of construction and demolition waste and excavated materials were treated in these plants. The table below lists the main types of waste according to code numbers and the level of input into the treatment plants.

Table 60: Significant waste types and the corresponding input in treatment plants for construction and demolition waste

Code numbers	Waste designation	Input [t]
31427	Concrete debris	2,576,000
31409	Building debris (no site waste)	2,272,000
54912	Bitumen, asphalt	1,656,000
31411 29	Excavated soil with background contamination	1,033,000
31410	Road rubble	677,000

Figure 68: Wet processing of mineral construction and demolition waste

4.8. TREATMENT PLANTS FOR SOILS

Both contaminated soils and other hazardous and non-hazardous types of waste are treated in a special treatment plant for soils. The level of contamination is reduced in this respect to the extent that the limit values for assignment to specific landfill classes are achieved or partial streams can be supplied for recovery.

To achieve these objectives, treatment shall possibly involve several stages, depending on the nature and degree of the contamination. At the same time, flows of material between plants with different treatment techniques are also possible. During soil treatment, microbiological and physico-chemical processes are used along with, to a lesser extent, thermal processes.

During microbiological treatment, a mixture of nutrients is added to the soils being treated. Organic harmful substances are broken down by microorganisms or converted into biomass. Frequently, plant structure materials are added. For decomposition, continuous ventilation or the addition of oxygen, as well as purification of the exhaust air, is required. In microbiological treatment plants in Austria, in the main, the dynamic biopile technique is used. Generally, one or more mechanical treatment steps precede actual biological treatment. Here, impurities such as iron parts or rocks are separated and the material to be treated sieved to a specific grain size.

During physico-chemical treatment, principal extraction or soil decontamination processes are employed. Extraction procedures involve the classification, crushing or drying of the contaminated soils followed by separation of the pollutants in the extractor. During the soil decontamination processes, either pure water or water with additives, such as surfactants, acids or alkalis, are used as a washing fluid. In the course of this, the pollutants are separated from the soil and are present in the washing fluid in a dispersed form. The contaminated waste water and sludge fractions either undergo physico-chemical, microbiological or thermal retreatment.

During the thermal processes, in addition to the organic contamination, volatile inorganic compounds are also removed. Material utilisation of the soil materials may also involve the use of soils in corresponding thermal treatment plants.

Figure 69: Soil treatment plant

Plant numbers in Austria

In 2015, 15 plants for treating soils were operational in Austria. This includes ex-situ plants, i.e. the contaminated soil is removed from the site and supplied to the treatment plants. 13 plants utilise microbiological processes while two employ physico-chemical processes. The latter also include solidification and stabilisation plants and dry and wet processing. In addition to the stationary treatment plants, mobile plants are operational which are deployed on site directly through mobile soil-air suction.

Table 61: Stationary treatment plants for soils

Federal Provinces	Plant site	Operator	Process
Carinthia	Arnoldstein	ALTEC Umwelttechnik	microbiological
Lower Austria	Sankt Pantaleon-Erla	HAELA Abfallverwertung GmbH	microbiological
	Schwadorf bei Wien	Mikrobiologische Abfallbehandlungs GmbH	microbiological
	Schönkirchen	OMV Austria Exploration & Production	microbiological
	Neusiedl an der Zaya	OMV Austria Exploration & Production	microbiological
Upper Austria	Linz	Arge GROUND UNIT	physico-chemical
	Ternberg	Bernegger GmbH	physico-chemical
	Schwarzenthal	M.E.G. Mikrobiologische Erddekontamination GmbH	microbiological
Salzburg	Nußdorf am Haunsberg	Bauer + Moosleitner Entsorgungstechnik GmbH	microbiological
Styria	Unterrohr	Herbst Entsorgungsgesellschaft mbH	microbiological
	Lannach	Saubermacher AG	microbiological
Tyrol	Vill-Zenzenhof	Bauentsorgungsgesellschaft mbH	microbiological
	Mils	Erdbau Arno Schafferer GmbH	microbiological
	Inzing	Freudenthaler GMBH Co KG	microbiological
	Stafflach	Huter Recycling und Transport GmbH	microbiological

Data source: EDM (July 2016 version)

Figure 70: Stationary treatment plants for soils in 2015

Around 140,000 tonnes of waste were treated in the treatment plants for soils in 2015. In addition, hazardous and contaminated excavated materials are treated in the physico-chemical plants where predominantly other types of hazardous waste are also treated (see Chapter 4.6 "Physico-chemical treatment plants").

4.9. PLANTS FOR THE TREATMENT OF METAL WASTE, WASTE ELECTRICAL EQUIPMENT AND END-OF-LIFE VEHICLES

In 2015, plants for treating metal waste, waste electrical equipment and end-of-life vehicles were operated at a total of 103 locations in Austria, in which connection some locations have several plants. Their treatment capacity is in the region of 1,800,000 tonnes per year.

At six locations, metal waste is processed in **large shredders** having a treatment capacity totalling 590,000 tonnes per year. In addition to new scrap or production residues from the metal processing industry, the following metal waste in particular is used in large shredders: various mixed and collected scrap, such as municipally collected household scrap, end-of-life vehicles, waste electrical and electronic equipment, material from the collection of metal packaging and fractions from the mechanical processing of municipal waste (scrap from waste incineration and mechanical-biological treatment plants). Prior to being introduced to large shredders, end-of-life vehicles are drained and any harmful substances removed, while recyclable components are disassembled. This pre-treatment is either undertaken where the large shredder is located or at automotive workshops or other end-of-life vehicle handlers. Some of the waste electrical and electronic equipment introduced to large shredders was previously pre-treated in special WEEE treatment plants.

Furthermore, **waste electrical and electronic equipment** is treated in a total of 43 plants across Austria.

As regards the treatment of **refrigerators and freezers**, four plants are available across Austria with a treatment capacity of approximately 16,000 tonnes per year. In one of these plants, only the first treatment stage - the emptying of the refrigeration circuit - can be carried out; the waste appliances are then passed on for further processing. Treatment of the insulating foam and the sorting of recoverable materials such as metals and plastics, is carried out in the remaining three plants.

Lamps may be processed in a treatment plant with a treatment capacity totalling 1,500 tonnes per year. Treatment is based on the shredder principle. Manual sorting of special lamp units in LED lamps, halogen lamps, compact fluorescent lamps, sodium arc lamps, etc. is also carried out in one of these plants. As regards the treatment of lamps which have a high mercury content, like high- pressure mercury arc lamps, no treatment options are available in Austria and they are therefore shipped from Austria for treatment.

VDUs are treated in Austria in 10 plants in total, with a capacity of around 22,000 tonnes. Cathode ray tubes are either separated manually or by means of a heating wire process. Flat screens are treated mechanically in a plant with a capacity of 1,500 tonnes per year.

Figure 71: Treatment of cathode ray tubes

Small electrical appliances are dismantled manually in around 20 plants. A further four plants with a minimum capacity of 132,000 tonnes per year are available for the treatment of small electrical appliances by means of mechanical reduction. Components containing pollutants are either removed beforehand or sorted out manually following crushing. Large electrical appliances are crushed in the six large shredders already mentioned as well as in a smaller shredder.

Photovoltaic panels are currently released manually from metal parts; the glass components are supplied for commercial waste. Specific plants for the treatment of photovoltaic panels are currently not available in Austria.

Figure 72: Photovoltaic plant

Other mechanical processing of various types of waste containing metal (such as fractions from large shredders and WEEE treatment plants) or metal composites, such as printed circuit boards, is carried out at 24 locations. These locations also include four so-called post shredder technology plants (PSTs) with a treatment capacity of 304,000 tonnes per year and plants for the recovery of residual metal contents from various types of slag.

Scrap cutters are operated in at least 33 of these locations. Special **shredders for processing cables** are operated at 20 locations. Three locations have plants for **briquetting metal chips and sludges** with a minimum capacity totalling 64,000 tonnes per year.

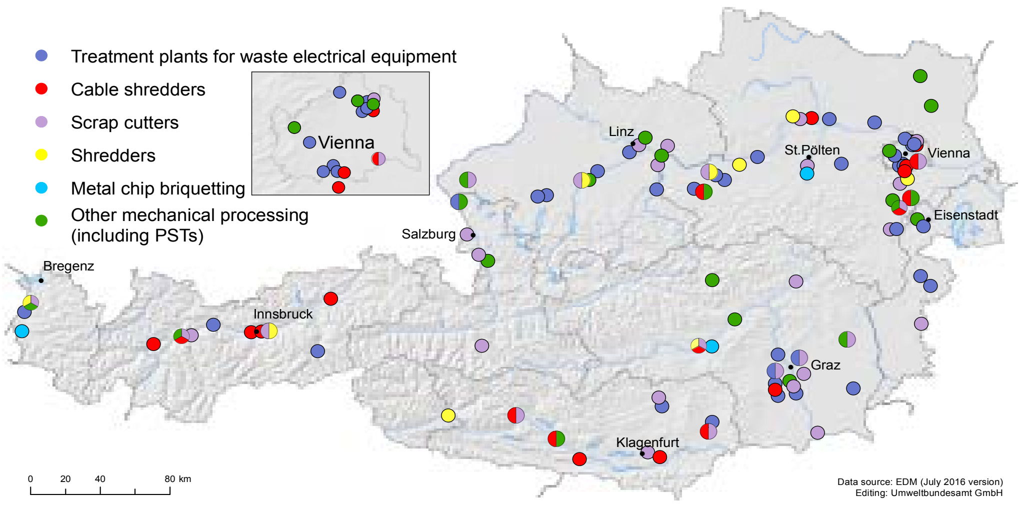

Figure 73: Plants for the treatment of metal waste, waste electrical equipment and end-of-life vehicles in 2015

4.10. PLANTS FOR THE TREATMENT OF SEPARATELY COLLECTED RECOVERABLES AND OTHER WASTE

4.10.1. PLANTS FOR SORTING AND PROCESSING

This chapter covers those plants which carry out processing/sorting/conditioning as pre-treatment for further treatment stages. The pre-treatment is effected in this regard for separately collected waste streams (e.g. glass, wood, paper, plastics, textiles, organic waste) and also for mixed waste which originates from households and similar establishments, as well as from trade and industry.

The objective of pre-treatment is the separation of various waste fractions (e.g. by classification, sorting, ferrous and non-ferrous metal separation) and conditioning (e.g. through reduction, drying, pelletisation) in order to improve the quality of the waste and facilitate further recovery. Plants which are connected directly to a recovery facility, both in terms of function and spatially, are not dealt with in this chapter. Processing plants for metal waste (scrap cutters, metal chip briquetting, cable paring or stripping) are considered in Chapter 4.9 "Plants for the treatment of metal waste, waste electrical equipment and end-of-life vehicles".

In Austria in 2015, a total of 181 sorting and processing plants were operational, having an annual capacity of approximately 4.75 million tonnes. All told, around three million tonnes of waste were pre-treated in the plants under consideration. As the most significant types of waste in terms of quantities, the following types of waste were incorporated:

- SN 91101 "Municipal waste and similar commercial waste", at around 31 %,
- SN 18718 "Waste paper, paper and paperboard, uncoated", at around 16 %,
- SN 91103 "Residues from the mechanical recycling of waste", at around 8 %,
- SN 91207 "Lightweight fraction from the collection of packaging", at around 7 %,
- SN 91401 "Bulky waste", at around 5 %,
- other SN at around 33 %.

Table 62: Plants for sorting and processing

Federal Provinces	Number	Capacities [t/year]
Burgenland	4	54,640
Carinthia	11	233,315
Lower Austria	32	694,175
Upper Austria	45	1,005,600
Salzburg	17	418,025
Styria	21	838,830
Tyrol	28	473,085
Vorarlberg	11	359,250
Vienna	12	672,490
Austria	181	4,749,410

Data source: EDM (July 2016 version)

A distinction can be drawn between the following types of plant, considered according to the types of waste: waste glass processing (capacity: approx. 79,540 tonnes), waste wood processing (approx. 637,470 tonnes), waste paper processing (approx. 753,645 tonnes), waste plastic processing (approx. 182,750 tonnes), waste textiles processing (approx. 19,825 tonnes), biowaste processing (approx. 39,920 tonnes), substitute fuel processing (approx. 558,730 tonnes); furthermore, plants involved with general mechanical treatment (approx. 2,477,530 tonnes) which cannot be assigned to a treatment directly or plants which carry out several activities.

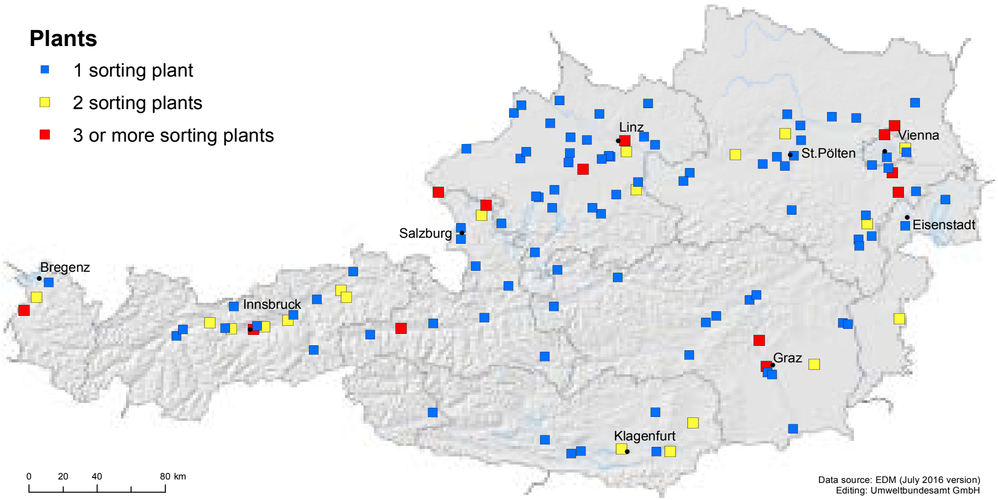

Figure 74: Plants for sorting and processing of waste in 2015

4.10.2. RECOVERY PLANTS FOR SEPARATELY COLLECTED RECOVERABLES

In Austria in 2015, 101 plants for recycling recoverables collected separately from households and similar establishments, as well as from trade and industry and from the processing of waste, were operational. All told, the minimum capacity of recovery plants for recoverables is around 7,580,000 tonnes per year.

Table 63: Recovery plants for recoverables collected separately

Recoverable	Number	Minimum capacity [t]
Scrap metals	31	3,290,000
Waste paper and cardboard packaging	13	2,400,000
Waste wood	4	944,000
Waste glass	6	312,000
Waste plastics	34	318,000
Waste edible fats	13	321,000
Data source: EDM (July 2016 version)		

The recycling of **scrap metals** takes place in 31 plants with a minimum capacity of approximately 3,290,000 tonnes/year.

Scrap metals are predominantly used in plants for producing iron and steel. This primarily involves the waste type "iron and steel waste, impure". Furthermore, punching and cutting waste, ferrous packaging and containers, non-ferrous metal scrap, non-ferrous metal packaging and copper scrap are used.

The most significant waste type in terms of quantity which is used in plants for producing non-ferrous metals is aluminium scrap, followed by copper scrap and light-alloy skimmings containing aluminium. Always in substantially smaller quantities, types of waste containing metal, sometimes hazardous waste types, were used.

In iron foundries, the waste type "iron and steel waste, impure" was used almost exclusively.

The waste type largely used in non-ferrous foundries is copper scrap, followed by non-ferrous scrap metal, non-ferrous metal packaging, punching and cutting waste, lead and zinc scrap and tin sweepings, as well as aluminium scrap and aluminium foil.

Waste paper and cardboard packaging is recycled in 13 plants with a minimum capacity totalling 2,400,000 tonnes of waste paper per year. This predominantly involves paper mills which manufacture paper, cardboard and paperboard as well as toilet paper. Two plants manufacture insulating materials.

Waste wood is used in four plants in the production of particle and fibre boards. The minimum capacity for using waste wood in these plants is around 944,000 tonnes per year. The most significant waste type in terms of quantity is construction and demolition waste wood, followed by wooden packaging and wood wastes along with sawdust and shavings of natural, clean, uncoated wood.

As regards the recycling of **waste glass**, six plants are available with a minimum capacity of approximately 312,000 tonnes per year. This involves glassworks which manufacture packaging glass, domestic glass and also technical glass as well as plants which manufacture building materials from glass, including glass wool and foam glass.

As regards the recycling of **waste plastics**, 34 plants are available with a minimum capacity of 318,000 tonnes per year. Regranulates, flakes or ground material are produced in 17 plants. Eight plants also manufacture plastic or semi-finished products. 11 plants manufacture styrofoam.

As regards the recovery of **waste edible fats**, 13 plants are available with a minimum capacity of approximately 321,000 tonnes per year. The majority of these plants use waste edible fats in the production of biodiesel. Two plants make soap. In the main, fats (e.g. deep-frying oils) are used. Fatty acid residues are also used to a lesser extent. Waste edible fats are also used in biogas plants. These are described in Chapter 4.4 "Anaerobic biological treatment plants (biogas plants)".

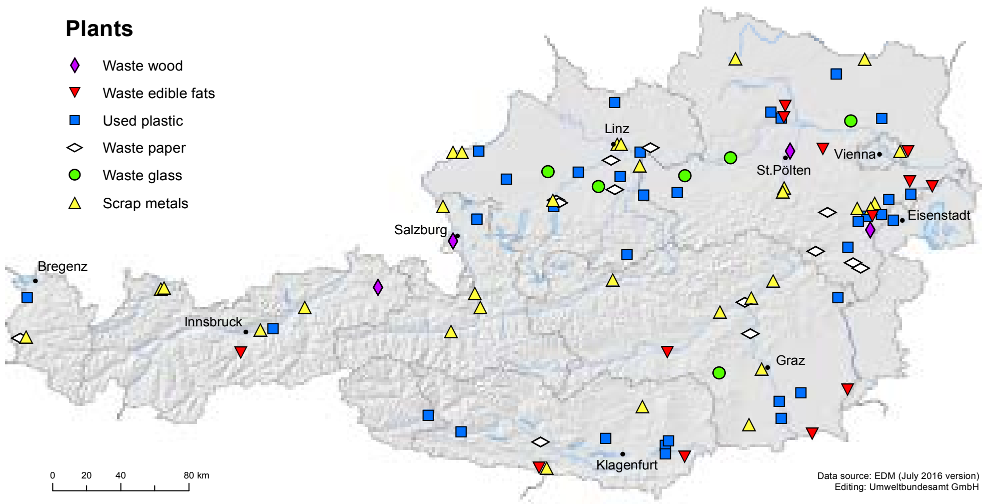

Figure 75: Recovery plants for recoverables collected separately in 2015

Figure 76: Separately collected paperboard

4.10.3. RECOVERY PLANTS FOR OTHER TYPES OF WASTE

In the following industrial production sectors, waste is increasingly used as substitute raw materials:

- Cement industry
- Brick and tile industry
- Other production of building materials
- Iron and steel production
- Chemical industry.

In addition to the incineration of waste[3], in the cement industry, mineral waste[4] is also used as substitute raw materials for material recovery. Ashes from diverse origins, such as coal ashes, wood and straw ash, fly ash and dusts from combustion plants, followed by ceramics, account for the majority of the waste used as substitute raw materials in the cement industry. In addition, in particular, slag from various origins and a variety of mineral sludges are used. Building sector waste, such as construction waste, concrete rubble or gypsum, forgescaling, casting moulds and sands, blowroom sand deposits, blasting sand residues and fireclay, is used in small quantities.

Waste from the paper and pulp industry, or from paper recycling, accounts for the major part of the waste used in the brick and tile industry. In addition, sawdust and wood shavings, oilseed residues, excavated soil material and drilling mud, as well as casting moulds and sands, are used.

In the other production of building materials, such as the production of concrete, screeds, plasters, insulating material, etc., waste is likewise used whereby, in the main, ashes from diverse origins, such as fly ash and dusts from combustion plants, as well as wood and straw ash, are utilised. Furthermore, casting moulds and sands, blast furnace and foundry waste, electric arc furnace slag and converter slag, FGD gypsum, glass and ceramics with production-specific additives, silicic acid and quartz waste, spent lining from metallurgical processes and polystyrene are used.

In addition to the recycling of metal waste[5], waste is also used as a means of production and thermally recovered in iron and steel production. This involves plastic waste, which also serves as a reducing agent in the blast furnace, and the widest possible variety of wastes containing oil.

In the chemical industry, types of waste such as acid waste and metal-bearing wastes are used as substitute raw materials.

4.10.4. BACKFILLING

As a result of quarrying for sand, gravel, marl, clay or stone, or as a result of building activities, cavities, shafts, excavations and uneven terrain arise. These may also be backfilled with waste on grounds of technical and environmental usefulness and taking into consideration specific quality criteria, such as pollutant content or leaching behaviour. The quality of the materials used for backfilling shall depend on whether this involves backfilling following dry or wet extraction. The quality of the waste used must comply with the criteria for material recycling as per the Recycled Construction Materials Ordinance or the stipulations under the Federal Waste Management Plan 2017 (Chapter 7.8 "Treatment principle-Excavated materials" and Chapter 7.11. "Treatment principle - Non-mining waste - recovery in underground backfilling").

In 2015, approximately 3.6 million tonnes of waste in Austria were backfilled or used for recultivations and technical fills. This predominantly involved excavated materials.

[3] Most cement plants are also plants for the thermal recovery of waste. The number of plants as well as the volume of waste incinerated in them is represented in Chapter 4.2. "Thermal treatment plants (excluding municipal waste treatment plants)"

[4] The assignment of waste used in cement plants for the purpose of incineration and/or as substitute raw material is conducted on the basis of the typical calorific value of the waste types.

[5] Plants for the generation of iron and steel are also plants for the processing of recoverables. The number of plants as well as the volume of metal waste used in them is represented in Chapter 4.10.2. "Recovery plants for recoverables collected separately".

4.11. TREATMENT PLANTS FOR SPECIFIC WASTE

Eight plants are operational specifically for the processing of used batteries and accumulators, grease- and oil-contaminated equipment, catalysts and contact materials as well as laden adsorbents.

Three plants are available for the treatment of **waste batteries and accumulators**. In one plant, used portable batteries that are collected mixed are sorted manually into different battery types, such as various button cells, nickel-cadmium batteries, alkaline manganese batteries, etc. The sorted used portable batteries are shipped from Austria for further treatment. In one plant, used batteries and accumulators (predominantly industrial batteries) are disassembled beforehand. In one further plant, lead storage cells are opened up mechanically, plastic components and acid are separated and the lead-containing components incorporated into the associated secondary lead works for reclamation of the lead.

As regards the treatment of **equipment contaminated with solid grease and oil** (vehicle workshop, industrial and garage waste, SN 54930), three plants are available. In the course of this, the inhomogeneous waste is separated into various fractions, including metal fractions, high-calorific fractions and residual fractions. The metal fraction is recycled. High-calorific fractions are supplied for thermal recovery.

Depleted **catalysts and contact materials** from the chemical, petrochemical, pharmaceutical or foodstuff industries which contain vanadium, molybdenum or nickel are supplied for recovery in a plant.

One plant is available for reactivating **laden adsorbents** such as charcoal, for example.

Figure 77: Collection bin for mineral waste oil

4.12. LANDFILLS

In 2015, across Austria, 999 landfills were available for waste deposit. The reports from the plant operators revealed a quantity deposited of approximately 25.84 million tonnes in 2015. How the quantities deposited have changed over time is depicted in Figure 78. Excavated soil material (code number (SN) 31411 Sp. 29-34) is shown separately on account of the high percentage by mass.

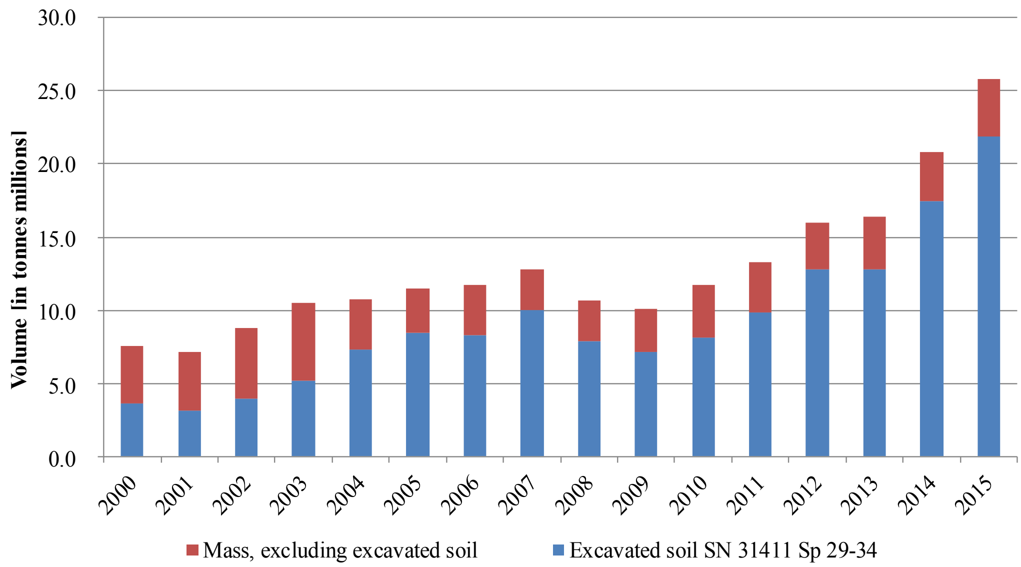

Figure 78: Amounts deposited between 2000 and 2015 (data source: Landfill database of the Environment Agency Austria and eBalance sheets)

As in previous years, "waste of mineral origin" - waste group 31 under ÖNORM S 2100, constitutes the vast majority of the waste deposited. In 2015, approximately 24.21 million tonnes of this waste stream were deposited.

Table 64: Significant types of waste deposited in landfills in 2015

Waste types	Code number (SN)	Amounts deposited [t, rounded off]	Share [%]
Excavated soil	31411 Sp 29-34	21,909,000	84.8
Other contaminated soils	31424 37	1,220,000	4.7
Slag and ash from waste incineration plants	31308 88 und 91	593,000	2.3
Mineral building debris (excluding construction site waste)	31409 und 31409 18	489,000	1.9
Other waste		1,632,000	6.3
Total		25,843,000	100.0

In accordance with the stipulations of the Landfill Ordinance, no untreated municipal waste and similar commercial waste is deposited any more in Austrian landfills.

Table 65: Classification of landfills according to landfill categories and subcategories as well as free landfill volume

Landfill types	Number of landfills reporting	Free landfill volume [in m^3 millions]
Excavated material landfill	801	94.6
Inert waste landfill	35	5.6
Construction and demolition waste landfill	87	15.1
Residual materials landfill	47	31.6
Mass-waste landfill	29	7.5
Total	999	154.4

Generally speaking, an increase in the registered excavated material or construction and demolition waste landfills was recorded. This does not always involve newly established landfills or landfill compartments but sometimes also involves existing plants which have now been added to the master data register. Accordingly, the free remaining capacity has also increased.

The quantity of deposited excavated soil material has risen significantly. This can be partly attributed to the rise in the registration of excavated soil material landfills and the electronic reporting of deposited masses in the EDM (Electronic Data Management – Environment) portal, but also as a result of increased building activity, like tunnelling, power plant construction and railway construction.

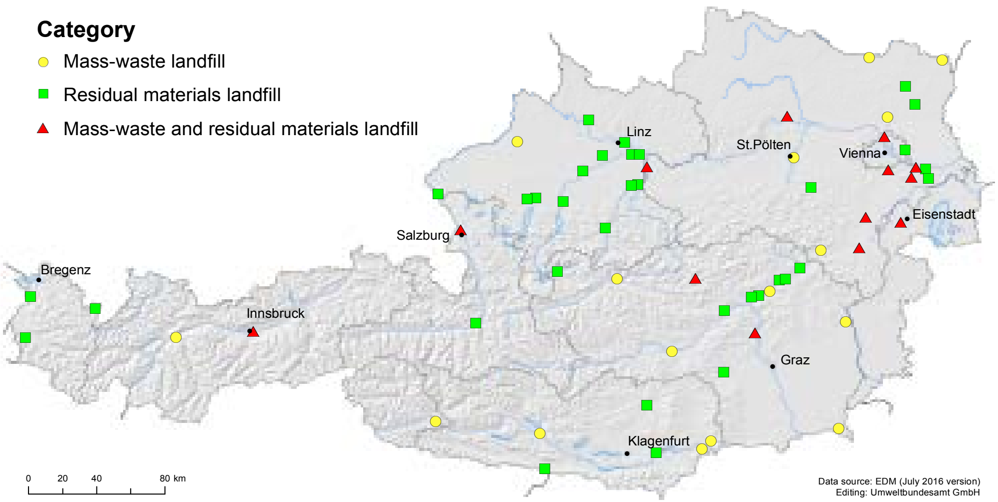

Figure 79: Mass-waste and residual materials landfills in 2015

Figure 80: Landfill

4.13. CHANGES IN THE PLANT BASE COMPARED TO THE FEDERAL WASTE MANAGEMENT PLAN 2011

This Federal Waste Management Plan lists approximately 300 more waste treatment plants than the Federal Waste Management Plan 2011. The changes are essentially justified by:

- actual changes in the plant base as a result of the commissioning of new plants or the decommissioning of existing ones;
- changes to the methodology whereby individual plants are regarded as autonomous plants (e.g. plants which are located in the same place, but which perform different tasks, are increasingly considered separately as autonomous plants).

In 2012, the residual material combined heat and power station in Linz was brought on line. Compared to the Federal Waste Management Plan 2011, the number of **plants for the thermal treatment of municipal waste** increases as a result from 10 to 11 plants while the annual capacity rises from 2.3 million to 2.6 million tonnes.

As regards **thermal treatment plants (excluding municipal waste treatment plants)** (within the scope of EU Directive 2010/75/EU on industrial emissions), there was an increase in both the number (from 49 to 54) and the capacity (from 2.2 million to 2.7 million tonnes).

The number of **mechanical-biological treatment plants (MBT)** decreased from 16 to 14. The decline in the annual capacity from 741,100 tonnes to 655,700 tonnes can also essentially be attributed to the suspension of two mechanical-biological treatment plant with a continued valid approval.

A slight decrease from 157 to 152 plants was also recorded in the case of **anaerobic biological treatment plants (biogas plants)**. However, the minimum capacity rose from 860,000 tonnes to just over 1 million tonnes. This is primarily because the information relating to approved capacities at existing plants was corrected.

In the case of **aerobic biological treatment plants (composting plants)**, there was a clear decline in the number of plants from 465 to 401. This can primarily be attributed to the reassessment of the versions (identification of decommissioned plants) and a comparison with EDM data which was carried out in 2013. Despite the decline in the number of plants, the minimum treatment capacity ascertained rose from 1.3 to 1.5 million tonnes. Alongside an actual increase in capacities due to the construction of new plants, this can also be attributed to improved information relating to approved capacities of existing plants.

Figure 81: Biological recovery plant

The number of **physico-chemical treatment plants** rose from 43 to 51. With a minimum treatment capacity in the region of 1.2 million tonnes per year, this figure is similar to the one published in the Federal Waste Management Plan 2011.

Compared to the Federal Waste Management Plan 2011, the number of **processing plants for construction and demolition waste** and the annual capacity rose from 400 to 420 and from approximately 8 million tonnes to approximately 12 million tonnes respectively. In particular, the increase in plant capacities can essentially be attributed to an improvement in the information relating to approved capacities of existing plants.

Chapter **4.9 "Plants for the treatment of metal waste, waste electrical equipment and end-of-life vehicles"** describes plants which were included in the Federal Waste Management Plan 2011 in the chapters "Plants for the treatment of waste electrical or electronic equipment" and "Shredder plants for scrap metals". Compared to the Federal Waste Management Plan 2011, as regards the treatment of WEEE, the number of plants rose slightly from around 40 to 43, the number of large shredders remained unchanged at six and, in the case of post shredder technology plants, a fourth installation was brought on line. Furthermore, this chapter also now illustrates scrap cutters, cable shredders, plants for briquetting chips and sludges as well as plants used for other mechanical processing of the waste streams mentioned. In summary, 103 plants for the treatment of metal waste, waste electrical equipment and end-of-life vehicles with a minimum capacity in the region of 1.8 million tonnes per year are mentioned all told. As a result of the other way of looking at these waste streams, the previous chapters of the Federal Waste Management Plan 2011 are no longer directly comparable with the current description in this chapter.

As regards the **plants for sorting and processing separately collected recoverables and other waste**, their number declined from 187 to 181. This can essentially be attributed to a more accurate classification of such plants to other chapters/types of treatment (e.g. plants for the treatment of metal waste). Despite the slight decrease in the number of plants, the minimum treatment capacity ascertained rose from approximately 2.9 to 4.75 million tonnes. Alongside an actual increase in capacities due to the construction of new plants, this can be attributed to improved information relating to approved capacities of existing plants.

The number of **recovery plants for recoverables** has doubled. This can be attributed to a significant increase in plants in the areas of scrap metal and used plastic recovery. Furthermore, 14 recovery plants used to recover waste edible fat were added which were listed in the Federal Waste Management Plan 2011 as 18 plants in the chapter "Selected processing plants for specific waste". Currently, this chapter shows a total of 101 plants with a minimum capacity of around 7.5 million tonnes per year.

The new Chapter **4.10.3. "Recovery plants for other types of waste"** includes waste being used as a substitute raw material or as production accessories in industrial enterprises (cement industry, brick and tile industry, other production of building materials, iron and steel production, the chemical industry).

In Chapter **4.11. "Treatment plants for specific waste"**, two types of plant (those used to treat soils and waste oils) are no longer contemplated or these were moved to other chapters. The remaining plants assist in the treatment of used batteries and accumulators, equipment contaminated with solid grease and oil (workshop waste), depleted catalysts and contact materials and laden adsorbents.

The total number of **landfills** has risen considerably (from 666 to 999 plants). The main reason for this is the fact that the number of registered excavated material landfills has increased substantially (from 462 to 801). This does not necessarily just involve newly established landfills or landfill compartments but sometimes also existing plants which have now been added to the electronic reporting system (EDM). The number of inert waste landfills has risen from 13 to 35 while the number of residual materials landfills has risen from 40 to 47 plants. In contrast, the number of mass-waste landfills for depositing, inter alia, treated municipal waste has declined appreciably from 46 to 29 plants. The number of construction and demolition waste landfills has fallen from 90 to 87. In keeping with the increase in the number of plants, the total available landfill volume is also increasing from approximately 77 to approximately 154 m^3 million, in which connection the highest growth was recorded in the case of excavated material landfills, with residual materials landfills in second place. The only decline was in connection with mass-waste landfills. A further factor behind the significant rise in the remaining capacities over recent years is also the increasing scope of the landfill volumes.

4.14. TRANSBOUNDARY SHIPMENT

Notified shipments

The data relating to the notified shipments is based on analyses arising from the EDM application "eShipments" which, in electronic form, includes all notifications of shipments to or from Austria as well as the associated shipment messages, reports of receipt and reports regarding recovery/disposal. In 2015, approximately 822,100 tonnes of notified waste in total were shipped across borders from Austria while roughly 659,300 tonnes were shipped in the opposite direction.

In the notifications on the shipment of waste to Austria, the treatment process which was most important in terms of quantities was the R3 procedure (Recycling/reclamation of organic substances which are not used as solvents; 42 % of the total quantity), followed by R1 (Use principally as a fuel) and D 10 (Incineration on land) (overall approx. 29 %). The treatment processes in the notifications on waste exports that were most important in terms of quantities were R1 and D10 with overall approx. 41 % of the overall quantity and R4 (Recycling/reclamation of metals and metal compounds; 22 %) as well as R3 (approx. 10 % of the total quantity) and R5 (Recycling/reclamation of other inorganic substances; appr. 10 %).

The quantities shipped to Austria with a notification originated predominantly from Germany (approx. 38 % of the total quantity), Italy (24 %), Slovenia (approx. 15 %) and Switzerland (approx. 14 %). The most important destination countries of the notified shipments from Austria in 2015 were Germany (approx. 45 % of the total quantity), Slovakia (approx. 20 %) and the Czech Republic (approx. 13 %).

Further information is included in Chapter 6.3.6. "Waste shipments" and in Chapter 9 "Guidelines on the shipment of waste".

Table 66: Notified waste shipments to Austria in 2015

Code numbers	Hazardous	Waste designations	Imports [t]
17201		Wooden packaging and wood waste, not contaminated	195,100
91103		Residues from the mechanical recycling of waste	119,900
91108		Substitute fuels, quality assured	42,000
31411 29		Excavated soil	37,000
31435	g	Used filter materials and absorbents with application-specific harmful additives (e.g. diatomite, activated earths, activated carbon)	27,300
17102		Slabs, splinters of natural, clean, uncoated wood	18,100
31308	g	Slag and ash from waste incineration plants	17,600
17115		Chipboard waste	16,700
59507	g	Catalysts and contact materials	15,700
57801		Light fraction from shredding, low-metal	14,400
17202		Construction and demolition waste wood	10,800
91107		High-calorific fraction from processed municipal and commercial waste and processed construction site waste, not quality-assured	10,700
18407		Residues from the processing of waste paper	10,000
17101		Bark from treatment and processing	9,000
55220	g	Solvent mixtures containing halogens	8,800
55374	g	Solvent-and-water mixtures without halogenated solvents	8,500
35322	gn	Lead storage cells	7,200
91207		Lightweight fraction from the collection of packaging	6,900
31489		Casting moulds and sands after casting	6,900
		Other imports of around 80 different types of waste	76,700
Total			659,300

Table 67: Notified waste shipments from Austria in 2015

Code numbers	Hazardous	Waste designations	Exports [t]
91108		Substitute fuels, quality-assured	174,300
31223	g	Dust, ash and dross from other smelting processes	109,500
91101		Municipal waste and similar commercial waste	88,400
31411 29		Excavated soil, excavated soil material with background contamination	51,300
17201		Wooden packaging and wood waste, not contaminated	46,800
31211	g	Salt slag, containing aluminium	43,700
91107		High-calorific fraction from processed municipal and commercial waste and processed construction site waste, not quality-assured	39,200
94802		Sludge from the mechanical treatment of waste water originating from the manufacture of cellulose and paper	31,400
17207	g	Railway sleepers	22,900
92212		Municipal sewage sludge	17,300
54102	g	Waste oils	16,000
31411 33		Excavated soil, inert waste quality	11,200
57804		Heavy fraction from shredding	10,400
31309	g	Fly ash and dust from waste incineration plants	9,700
31205		Light-alloy skimmings, containing aluminium	9,000
31217	g	Filter dust, containing non-ferrous metals	9,000
91207		Lightweight fraction from the collection of packaging	7,700
18407		Residues from the processing of waste paper	7,300
31466	g	Glass and ceramics with production-specific harmful additives	6,500
17202		Construction and demolition waste wood	6,300
94301		Preliminary sewage sludge	5,100
17201 1		Wooden packaging and wood waste, not contaminatedt	5,100
		Other exports of around 110 different types of waste	94,000
Total			822,100

Shipment of "green list" waste for recovery

No notification is required for the shipment of "green list" waste for recovery within the EU (an Annex VII form as per Article 18 of the EC Shipment Regulation must be carried on board).

"Green list" waste that is shipped from Austria particularly includes various types of metal waste (approx. 1.10 million tonnes), metallurgical slag (approx. 562,000 tonnes) and waste paper and cardboard packaging (approx. 213,000 tonnes). Also, in the case of the "green list" waste shipped to Austria, metal waste was the most important fraction with approximately 1.455 million tonnes in total, followed by roughly 773,000 tonnes of waste paper and cardboard packaging (SN 18702, 18718, 91201).

According to the annual waste balance sheet reports, in 2015, waste totalling in the region of 2.90 million tonnes was shipped from Austria across borders, while approximately 3.36 million tonnes were shipped to Austria. These quantities include the notified shipments (659,300 tonnes to, and 822,100 tonnes from, Austria) and all shipments of "green list" waste for recovery.

5

WASTE PREVENTION PROGRAMME

5. WASTE PREVENTION PROGRAMME 2017

5.1. INTRODUCTION

The availability of raw materials is limited. The exploitation of natural resources and the negative impact on the environment associated with this should not, or must not, exceed the capacity of the environment to renew itself. The EU's aim is to realise a sustainable and competitive economy based on a resource- and energy-efficient economic system. The economy is to grow while the consumption of resources and damage to the environment are to fall as far as possible.

European Commission initiatives in this regard range from the Thematic Strategy for Waste Prevention and Recycling from 2005 to the EU Action Plan for the Circular Economy.

The waste management policy contributes to the environmental and resource targets by preventing waste, by reducing the use of harmful substances, by establishing an efficiently functioning circular economy which utilises waste as resources and, if necessary, conveys harmful substances to a safe pollutant sink.

According to the EU Waste Framework Directive and the Waste Management Act 2002, waste prevention is therefore understood to mean all measures that are taken before a product becomes waste and which reduce the following:

- the quantity of waste, including through the reuse of products or the extension of their service lives;
- the adverse effects of the waste on the environment and on human health or
- the pollutant content in products.

The EU Waste Framework Directive obliges Member States to draw up a waste prevention programme. By means of a waste prevention programme, the waste prevention measures in Austria are to be given an environmental policy framework and a common goal. The waste prevention programme shall be updated no later than every six years. The objectives and measures to be included in this programme shall aim to break the link between economic growth and the various environmental effects linked to waste generation.

Annex IV to the EU Waste Framework Directive and Annex 1 to the Waste Management Act 2002 contain examples of measures, the expediency of which shall be assessed within the framework of the waste prevention programme.

The principles behind waste prevention in Austria were laid down in the White Paper on Waste Prevention and Recovery from 2007. By

- reducing the use of materials and avoiding polluting substances,
- supporting technologies and techniques that consume fewer natural resources,
- switching to more sustainable production and consumption patterns,
- stimulating the market demand for "sustainable services" or through appropriate procurement in the public sector (public procurement),
- minimising the risks to human health and the ecological hazards,
- "reusing" items (this means using an item again for its intended purpose (e.g. reusable bottle)),
- "continuing to use" items (the authorised use of an item but not for its intended purpose) and
- closing materials cycles,

all in all,

- an optimisation of resource efficiency as a contribution to the conservation of resources,
- a minimisation of the pollutant content in the flows of materials and goods,
- a minimisation of emissions and
- a minimisation of dissipation (fine distribution) of harmful substances into the air, into water and into the soil throughout the entire life cycle of the products (including upstream and downstream material and goods flows)

is to be achieved.

Figure 82: Waste prevention is on top of the agenda

The development, selection and implementation of waste prevention measures is characterised by the following aspects:

- the life cycle aspect, which can be used to identify those starting points at which policy measures can have the greatest effect;
- the material aspect, by means of which waste prevention targets, policy instruments and assessment criteria can be defined for various material flows (e.g. for foodstuffs);
- the integration of social and economic issues;
- interdisciplinary cooperation between the parties affected to achieve a maximum synergy effect for waste prevention with other economic, social and environmental protection targets.

The following must also be observed:

- the precautionary principle;
- the principle of sustainability;
- the principle of efficiency (that procedure which has the greatest environmental benefit given the costs outlaid must be promoted);
- the principle of eco-efficiency and eco-sufficiency (minimum resource consumption and minimum environmental effects to achieve a high quality of life at a sustainable level);
- the holistic whole life cycle approach (consideration of the entire ecological rucksack);
- the principle of cost transparency;
- producer responsibility and the "polluter pays" principle;
- the principle of preventing adverse environmental effects with a focus on their origin;
- implementation of the waste hierarchy (in principle, the potential for waste prevention should be exhausted ahead of the potential for preparation for reuse and the recycling of materials and this potential, in turn, should be exhausted ahead of the potential for energy production and, ultimately, the potential for waste disposal). However, all options must be considered at the same time and the mix of measures chosen which, in the long term, has the smallest impact on the environment;
- a reduction in pollutants
  - must generally be expedited in the flows of materials and goods;
  - can be achieved through the eco-design of products;
  - must also be considered in relation to recycled products.
- a waste prevention programme can be applied at any point in the value-added chain, from the extraction of raw materials, through production and distribution, to end consumption. Those measures which reduce the environmental effects in the most sustainable manner and demonstrate the best cost-to-effectiveness ratio must be taken first.

A waste prevention programme is not only a plan that defines measures, but also a process during which the effectiveness of the plan is constantly evaluated and the plan adapted to changing requirements at regular intervals. In keeping with this principle, the Waste Prevention Programme 2017 is conceived as an enhancement of the Waste Prevention Programme 2011.

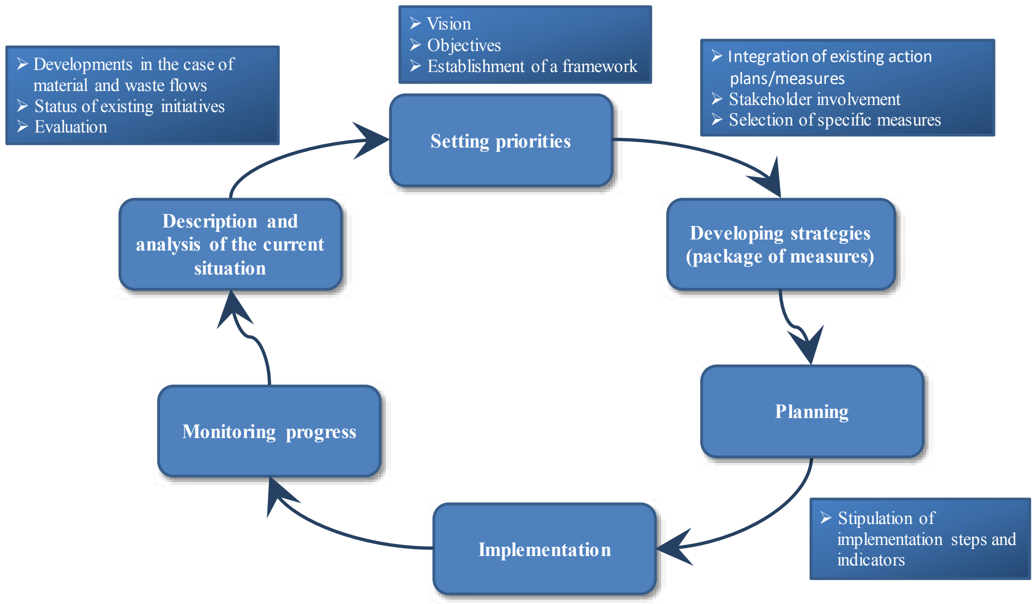

Figure 83: Development of a national waste prevention programme

The measures in the 2017 programme are based on an analysis of the framework conditions (see Chapter 5.2. "Framework conditions") and the results of the evaluation of the Waste Prevention Programme 2011 as well as the requirements laid down in the Waste Framework Directive and the Waste Management Act 2002 (see also in this regard Chapter 5.7.3. "Assessing proposals for measures under Annex 1 to the Waste Management Act 2002 and Annex 4 to the EU Waste Framework Directive"). The measures were discussed in several workshops with stakeholders and the public was given an opportunity to comment on the programme.

The Waste Prevention Programme 2017 is a mixture of measures that have already been started, measures that have been adapted, and new measures. It can be assumed that not all of the programme‘s measures will be completed by 2023, when a new programme is scheduled to start.

Although the waste prevention programme originates from public administration, it is conceived as a programme for the whole of Austria and invites all stakeholders to cooperate in the implementation of Austria‘s waste prevention potential at a local, regional and provincial level. At the same time, the only very limited impact of regulations solely concerned with waste management on the production and consumer sectors must also be taken into consideration.

The Federal Environment Agency (UBA) was commissioned with the evaluation and update of the 2011 Waste Prevention Programme. The project report will be made available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

5.2. FRAMEWORK CONDITIONS

In implementation of the Waste Prevention Programme 2011, progress was especially achieved in the area of prevention of food waste and in the area of reuse. Nevertheless, further measures are required in all action areas under the waste prevention programme, in which connection the following framework conditions are to be emphasised.

- Raw material prices have declined somewhat; the unpredictability of future prices and price volatility has continued to increase.
- There continues to be a lack of information on the substances used.
- In the construction sector, untapped potential remains regarding extending the service life of buildings and regarding urban mining.
- The use of composite materials in the construction sector is increasing.
- Small- and medium-sized enterprises in particular frequently do not have sufficient capacity to worry about improving business operations and processes beyond the core business and to keep pace with technological developments.
- There remains significant potential for developing more durable, repairable and easily reusable "green" products with a low pollutant content, including from the point of view of safeguarding critical metals and the optimal, environmentally friendly handling of materials of the future.
- The spotlight is increasingly on hazardous waste.
- Knowledge of sustainable behaviour frequently (still) fails to bring about actual changes in behaviour.
- Awareness of high paper consumption, which is associated with mailshots, has risen again.
- Despite the progress achieved, on account of the significant impact on the environment, which is associated with the wasting of food, there is a continuing need to be concerned about preventing foodstuff waste; the need to involve newly consulted consumers is an important issue in this regard.
- In the majority of Austria's regions, there is the potential to develop reuse activities further.
- It continues to be difficult to quantify in concrete terms the effect of individual waste prevention measures.

The Waste Prevention Programme 2017 is primarily a plan of active measures which aim to support waste prevention. The development of measures is based on a vision of how the Austrian waste management industry should function in future and derives measures from these aims and action areas (= focus areas) (see Figure 84).

Figure 84: Waste Prevention Programme 2017 – from vision to action

5.3. VISION

The vision of the Waste Prevention Programme 2017 for Austria's material and waste management system may be described as follows:

- The objectives of the Waste Management Act 2002 will be achieved in Austria with a high level of effectiveness and efficiency. Resource conservation and environmental compatibility are guaranteed in the long term, especially as a result of implementing a circular economy.
- Knowledge of material and waste flows has improved significantly. Relevant information on material and waste flows is collected, presented and communicated as a matter of routine.
- The stakeholders are very knowledgeable about measures in all areas of waste prevention (e.g. concerning foodstuffs, buildings and construction and demolition waste, reuse, repair).
- The pollutant content in key products has been reduced. The dissipation of pollutants during product creation and use and the recovery or disposal of waste has been significantly reduced. Waste management is increasingly making a contribution to the separation of pollutants from the materials' flow management and to the neutralisation of pollutants.
- Only products and materials whose continued use and further treatment has a minor impact on the environment enter or leave the country.
- We have succeeded in reducing the use of raw materials, especially in the case of materials with limited availability, and in expanding recirculation further. This has allowed the environmental effects associated with imports to be limited in the country of origin.
- An important step has been taken from a throwaway society to a sustainable society.
- Cost transparency, extensive responsibility on the part of producers and product distributors, and thereby a sustainable utilisation of resources, have prevailed.

Figure 85: The vision is the driving force behind further development.

5.4. OBJECTIVES AND ACTION AREAS

The objectives defined in the previous programme will also continue to be followed by the Waste Prevention Programme 2017:

- to break the link between economic growth and the life cycle environmental effects of Austrian waste (including all upstream chains)
- to reduce emissions
- to minimise the dissipation of pollutants
- to reduce pollutants
- to conserve resources (with a focus on the conservation of raw materials).

In order to effectively and efficiently implement these objectives, focus areas must be defined in the form of action areas. An evaluation of the Waste Prevention Programme 2011 and the proposals under Annex 1 to the Waste Management Act 2002, as well as an analysis of the challenges which are anticipated for the coming years, revealed that the action areas of the Waste Prevention Programme 2011 are to continue to be adapted. Consequently, the action areas under the Waste Prevention Programme 2011 are continued as action areas under the Waste Prevention Programme 2017:

- Prevention of construction and demolition waste
- Waste prevention in enterprises and organisations
- Waste prevention in households
- Prevention of food waste
- Reuse.

Figure 86: Halving food waste by 2030 – our objective

Waste prevention is a concept that is designed to impact basically on planning, production and demand fulfilment processes. It constitutes an integral approach to use synergies in the course of the entire circular economy. This broad approach pursues basic strategic goals. Narrowing down the objectives to narrowely defined fields of application would disrupt the integral approach and exclude important fields of application.

5.5. MEASURES UNDER THE WASTE PREVENTION PROGRAMME 2017

Defining fields of action serves the purpose of pooling the planned measures in such a way so as to reach a synergy effect. The field of action of construction and demolition waste is necessary in order to translate into practice the waste prevention potential for one of the waste streams harbouring the biggest quantities by way of respective measures. The fields of action of "Waste Prevention in Enterprises and other Organisations" and "Waste Prevention in Households" result from the provisions of Annex 1 to the Waste Management Act 2002 requiring waste prevention measures for the conceptual design, production and distribution phase as well as for the consumption and utilisation phase. Moreover, these two action areas sport a pronounced need for action as well as a considerable potential that is expressed by the terms of sustainable production and sustainable consumption.

Also for the action areas of "Prevention of Food Waste" and "Reuse", there is pronounced need for action and huge development potential. The production of food and the manufacturing of basically reusable products are, in multiple ways, linked to a huge environmental impact and to the use of natural resources. Also the EU, OECD and UNEP strategy documents point to the importance of these two action areas.

The action areas include, on the one hand, measures under the previous waste prevention programme which are to continue or start afresh and, on the other, new measures. For the action areas, those measures are chosen which appear particularly suited to contributing to the aforementioned objectives of the waste prevention programme over the coming years. The measures are consolidated in part into packages of measures.

The following subchapters show, in a first step, a list of planned measures for each action area, and, after that, explanatory notes on the choice of measures, and, in a final step, a list of expected effects. Overall, the 2017 Waste Prevention Programme is to serve as an impetus towards a sustainable and environmentally-sound Austrian national economy. Whereas changes of a rather limited extent are expected from the individual measures, the programme's overall potential should be to contribute to the development of Austria towards the sparing use of resources, the reduction of the environmental impact and sustainable consumption.

5.5.1. ACTION AREA "PREVENTION OF CONSTRUCTION AND DEMOLITION WASTE"

Package of measures "Low-waste construction and extending the useful life of buildings"

- Pilot projects and other measures for developing innovative low-waste technologies and techniques
- Preparation of teaching materials and learning aids on the principles, planning techniques, techniques and technologies for low-waste construction
  - concerning the extraction and reuse of entire building components arising from the demolition of buildings
  - for the training of specialists in vocational schools and schools of higher education. These teaching materials and learning aids are increasingly involved in the school and vocational further education and training of specialists. The teaching content comprises the following: "low-waste construction", "extending the useful life of buildings", "selective demolition", "use of recycled building materials".
- Inclusion of the topic "low-waste construction" in the planning phase and further education and training relating to this area.
- PR work in cooperation with the building guilds to win over master-builders, architects and planning offices to apply "low-waste construction" techniques
- Promoting extension of the useful life of public buildings
- Promoting the exchange of know-how and experiences in the area of education on the topics of extension of the useful life of buildings as well as the recyclability of components and building parts.

Package of measures "Design and reuse of parts of buildings"

- Promoting flexible buildings ("eternal envelope, flexible interior")
- Developing basic principles for standardising a building material information system – alternatives to the building pass for including the main components of a building are to be reviewed
  - Subsequently:
    Defining standards for a building material information system
    Reviewing the inclusion of this data in the central Building and Housing Register operated by Statistics Austria
- Developing standards concerning a waste prevention design, the avoidance of harmful substances and impurities and the reparability, separability and reusability of building components and materials
- Including principles of waste prevention and reuse in professional and university education
- A stakeholder process concerned with increased reuse of building components
- Promoting the use of recycled building materials, e.g. through inclusion in specifications of works, especially in public procurement
- Pilot projects concerned with urban mining and the reuse of building components
  - Funding research/development and pilot projects concerned with surveying, documenting, extraction and commercial exploitation of entire building components arising from the demolition of buildings
- Verifying the possibility of tying housing subsidies to the share of recycled construction products used in the building that is to be rehabilitated as well as verifying possibilities to green the funding models, and in particular those relating to building rehabilitation
- Recommendation to implement the obligation for developing a waste management concept for the construction site in the provincial building regulations

DESCRIPTION OF THE ACTION AREA "PREVENTION OF CONSTRUCTION AND DEMOLITION WASTE"

The need to "prevent construction and demolition waste" arises, first and foremost:

- from the significant environmental effects, high material consumption and comparatively high quantity of waste generated in the construction sector;
- from a lack of awareness that closure of the cycle must already be borne in mind at the planning stage of a building;
- from a lack of information regarding the structure of the existing buildings;
- from the reuse of building components which is rendered more complicated if they are made up of bonded materials.

The aim of the action area "Prevention of Construction and Demolition Waste" is to promote techniques and technologies aimed at extending the service life and useful 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.

Regarding the prevention of construction and demolition waste, significant efforts are already underway concerning how, by means of suitable planning techniques and the use of corresponding technologies and techniques, to reduce the use of materials and avoid those which have a significant impact on the environment, to adapt building services to changing requirements, to extend the service life of a building through suitable maintenance measures, to facilitate the reuse of materials by ascertaining separability and identifiability and to reduce waste accumulation during construction, renewal and dismantling. Some approaches, 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. Furthermore, initiatives that have proven effective must be made widely known and included in training. As regards implementation, however, it is also necessary to create a market for the building components and materials recovered. The public sector can play an important leading role in this regard.

In developing innovative technologies and techniques, the aim, on the one hand, is to conserve resources and achieve a high level of material efficiency and a low level of waste generated and, on the other, to achieve high energy efficiency. In developing innovative low-waste technologies and techniques, consideration is given to the aspect of affordable housing.

The teaching materials and learning aids on "low-waste construction" (including the prevention of building materials containing harmful substances) and on the reuse of building components are increasingly involved in the educational and vocational further education and training of specialists and in the advanced training of public purchasers (specialists within the offices and procurement agencies which issue the invitations to tender). Building-related training includes the topic of the reuse of building components. One example of the exchange of know-how and experiences in the area of education on the topics of extending the useful life of buildings as well as of recyclability is the Erasmus+ project "KATCH_e Knowledge Alliance on Product-Service Development towards Circular Economy and Sustainability in Higher Education".

The fact that buildings are vacant is frequently the precursor to their demolition. New utilisation models for buildings may at best prolong the useful life of the existing structures.

The inventory of buildings used currently includes important anthropogenic stores of materials, the availability or accessibility of which may become limited in the future at primary storage establishments. In any case, these materials are to be regarded as valuable resources which are to be made available for secondary use in an efficient manner, in the form of selective demolition, following the end of initial use. Pollutants must thereby be discarded and conveyed to a safe pollutant sink.

Work on the waste prevention programme has shown that a detailed building pass is too expensive with respect to the topicality of the information. Now, other possibilities are to be reviewed. Hence, a building construction and underground construction land register (including infrastructure networks) has been drawn up for parts of Graz. It is therefore examined in the first instance whether further building construction and underground construction land registers can be drawn up in an efficient manner according to the Graz model. In the course of this, possibilities are included of linking material data to information on the useful life of buildings.

It is also examined whether information from the existing energy performance certificates and building evaluations can be used.

The waste prevention and reuse potential in the construction sector is essentially determined at the design stage. Therefore, the "design" sector constitutes an additional focal point in the waste prevention programme. In this regard, consideration should also be given to the aspect of affordable housing.

ANTICIPATED EFFECT OF THE ACTION AREA "PREVENTION OF CONSTRUCTION AND DEMOLITION WASTE"

Package of measures "Low-waste construction and extending the useful life of buildings"

In the mid-term, the package of measures is to foster the application of low-waste-construction principles and thus lead to a higher materials efficiency of buildings and to a reduction of the materials used. A reduction of the generated quantities and an improvement of the quality of construction and demolition waste can be expected in the long term. Standards regarding the extension of the useful life of public buildings may also serve as role models for other buildings.

Package of measures "Design and reuse of parts of buildings"

The measures contained in the package constitute first steps for planning building structures in such a way so as to be able to reuse their building components after the first utilisation phase has expired. In the mid-term, this is to contribute to boosting the reuse potential of building structures used in industrial as well as in housing construction.

Using a building material information system, it should be possible to predict the amount of materials built in, and the reuse and recycling potentials available. This way, it is possible to estimate where potentials and need for action for measures for extending the useful life lie. Furthermore, the information serves the preservation of a good quality of demolition materials and a good potential for reusing the building components. The system also provides basic information regarding approval authorities, funding and political emphasis.

5.5.2. ACTION AREA "WASTE PREVENTION IN ENTERPRISES AND OTHER ORGANISATIONS"

Package of measures "Design"

- Developing standards concerning a waste prevention design, the avoidance of harmful substances and the reparability, separability and reusability of product parts and packagings
- Giving consideration to repair, reuse and recycling designs in design curricula
- Verifying the eficiency of voluntary measures for the Europe-wide abandoning of microplastics in consumer products and, if required, efforts on the part of Austria to ban microplastics in such products.
- Austrian delegates will champion at EU level measures concerned with both extending the technical service life and reparability of appliances and also in terms of engendering trust that these appliances also last longer when used appropriately.
- Austrian delegates are also championing the introduction of an information obligation at EU level regarding
  - the period of availability of replacement parts;
  - the average service life of the products

Package of measures "Direct measures"

- Other best practice fact sheets on techniques and technologies that prevent waste, accompanied by an intensive information campaign
- Further training of company waste officers in terms of identifying and realising waste prevention and reuse potential
- The development of waste prevention documentation for technical schools and educational institutions on specific issues
- Continuation of the regional programmes co-financed by the Federal Ministry of Agriculture and Forestry, Environment and Water Management concerning corporate environmental protection in the federal provinces regarding the advice-supported identification and realisation of waste prevention potential, including the establishment of further incentives for repeated participation; new emphasis on material efficiency
- Intensification of environmental support in Austria in the areas of "Prevention of hazardous waste" and "Resource management"
- Continuation of the promotion of the collection and recovery schemes from the point of view of waste prevention
- Continuation of the support of environmental management systems such as EMAS, ISO 14001, Responsible Care or EFB+ as a means of waste prevention, reuse and resource efficiency
- The organisation of events held by public institutions, enterprises and associations as "green events" (considering the Austrian Eco-Label for Green Meetings and Green Events)
- Raising awareness on the part of persons involved in the decision-making process regarding the importance of waste prevention and resource conservation measures, along with measures concerned with Environmental Management Accounting and sustainable participation in consultancy programmes
- The dissemination of information regarding possibilities for extending the useful life of material goods, e.g. software upgrades instead of purchasing a new appliance
- The disclosure of information relating to repairs to repair and reuse companies
- The continuation and further development of the Sustainability Agenda 2008-2017 of the Austrian beverage packaging industry
- Canvassing further undertakings to sign the agreement on reducing the numbers of disposable carrier bags
- An examination of whether additional provisions are required concerning the relationship between product volume and the volume of packaging ("deceptive packaging")
- The introduction of public procurement criteria concerning

    - products which have been created in accordance with the principles of waste-reducing design;
    - products which have been awarded the Austrian Eco-Label
    - durability and reparability;
    - consideration of operating and reacquisition costs
- Full exploitation of the opportunities for extending the useful life of material goods in the public sector
- Increased communication of the public procurement criteria as an example of private procurement

Package of measures "Waste prevention in the waste management concept"

- Sector-related blueprints with good examples of waste prevention
- Waste management concept tool for schools: Teacher training

DESCRIPTION OF THE ACTION AREA "WASTE PREVENTION IN ENTERPRISES AND OTHER ORGANISATIONS"

With the help of cooperation across Europe and as a result of corresponding Austrian representation in the bodies of the European Union, standards are to be introduced at EU level for waste prevention design and information obligations regarding product service life. Furthermore, in future, the information regarding how a product can be repaired is to accompany the product in connection with the life-cycle phases.

The aim of the package of measures entitled "Direct measures" is to support Austrian enterprises and organisations, including the public administration, in identifying their waste prevention potential in this regard and to then realise this. All in all, intensive support for enterprises to raise resource efficiency is taking place. The focus on waste prevention was hitherto selective.

Figure 87: Implementation of prevention potentials in companies boosts economic activity

Small and medium-sized enterprises in particular frequently do not have the human resources to learn the waste prevention techniques that are fundamentally available, to catch up on efficient technologies and to optimise the operational processes in terms of minimal material consumption. External support from cleaner production specialists often appears unaffordable at first. The aim therefore is easy access to information, the financing of external consulting and the start-up financing in terms of material efficiency.

The following must be added to the regional programmes for corporate environmental protection in the federal provinces: These programmes provide kick-off funding for external consulting for the improvement of operational processes and for investment for boosting material efficiency. In most cases, these programmes have a special focus on small-and-medium-sized enterprises. Also in areas and industries where the regional programmes have already been very successful hitherto, a great number of enterprises have still not been reached. An investigation is ongoing as to which industries/enterprises have still not been reached thus far and the reasons why these enterprises have not yet participated. Proposals designed to overcome the barriers are being worked out and implemented. Previous experience shows that enterprises are frequently only able to develop particularly effective waste prevention measures which go beyond standard measures following a period of extended participation in the regional programmes. Repeated participation in the programmes is therefore to be expedited.

The willingness to debate the issues is to be increased through the drive to increase awareness on the part of decision-makers in enterprises. Among other things, increasing reference is made to the fact that during the assessment of waste prevention measures, consideration must be given not just to the waste costs that are saved but also to the material and labour costs saved.

In the field of environmental management systems, since 2017, the Eco-Management and Audit Scheme [EMAS] has integrated the new ISO 14001: 2015 and therefore combines the life cycle-oriented perspective in the environmental management system with the additional requirements in the context of EMAS environmental management, including, in particular, legal compliance, mandatory environmental reporting and continuous improvement of the environmental performance. In the field of environmental management systems implemented by waste disposal companies, EFB+ brings the information of the public close to the provisions relating to the EMAS environmental declarations.

By also applying a systematic approach, as provided for by an environmental management system, it is anticipated that the waste prevention potential of an enterprise or another organisation can be identified by corresponding material flow analyses. For example, measures on waste prevention, reuse and resource efficiency must be implemented in accordance with the stipulations of the EU-EMAS Regulation (1221/2009/EC) in order to achieve a continual improvement in environmental performance. The Federal Ministry of Agriculture and Forestry, Environment and Water Management therefore supports waste prevention measures that are implemented through the introduction and continuation of environmental management systems.

Tight budget requirements shall mean that products involving low investment costs are purchased and developed. This is often to the detriment of the service life of the products or to operating costs. The need exists to develop competitive, reusable products low in harmful substances with a long service life and which are easy to repair, and which do not cost much to operate.

Additionally, in the events sector, a significant, and partially still untapped, waste prevention potential exists. Events are to be increasingly organised as green events. This means, inter alia, in the case of events arranged by public institutions, enterprises and associations, reusable packaging or reusable cutlery, as well as mobile drinking-water wells, are increasingly used, while "give-aways" are dispensed with. For the purpose of guidance, the provisions of the Austrian Eco-Label (confer Chapter 6.7.8.) can be used.

The Sustainability Agenda 2008-2017 for Beverage Packagings as well as the additional agreement "Voluntary commitment for resuable packaging 2011" devised by the Austrian beverage industry is being developed further on the basis of an evaluation made by the social partners. This is, in particular, designed to improve the CO_2 balance of the agenda's signatories and to promote the use of reusable beverage packagings. In this context, the following measures are to be examined:

- funding of the development of reusable packaging or reusable packaging schemes, so as to be able to better fulfil the demands of the final consumers (e.g. lightweight packaging)
- offering more 0.33-litre reusable bottles for beer
- agreements in the areas of production and trade regarding
  - an expansion of the beverages offered in reusable packaging as well as equivalent positioning on the shelves with beverages in single-use packaging
  - the layout of special sales areas for beverages in reusable packaging
  - the optimum design of the take-back areas for reusable packaging (ease of accessibility/attainability)
  - price campaigns are conducted to the same extent for beverages in reusable and single-use packaging
  - discount campaigns/competitions for beverages in reusable packaging, e.g. through reverse vending machines
- the design of labels (recognisability of reusable packaging)
- the processing and distribution of information to consumers regarding the environmental and economic advantages of reusable drinks packaging

The mandatory creation of waste management concepts offers an instrument that should encourage enterprises to identify waste prevention potential and to initiate waste prevention measures. The advantages of this instrument must increasingly be highlighted. As regards model waste management concepts and the corresponding training documents, in particular, a prioritisation regarding additional waste prevention measures is to be presented with the first update to the waste management concept.

The Federal Ministry of Agriculture and Forestry, Environment and Water Management has developed a new waste management concept tool for schools. This tool demonstrates, from an ecological and commercial point of view, that handling various natural resources in a responsible manner makes an important contribution to protecting our environment and reduces the quantities of waste. Teachers are to be trained subsequently.

Figure 88: For schools, a waste management concept tool is available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. .

ANTICIPATED EFFECT OF THE ACTION AREA "WASTE PREVENTION IN ENTERPRISES AND OTHER ORGANISATIONS"

Package of measures "Design"

With this set of measures, steps are being made to develop, place on the market and find a market for durable, repairable, environmentally-sound and reusable products. Among other things, this counteracts an actual or perceived deterioration of product qualities (obsolescence).

Package of measures "Direct measures"

The set of measures contributes to the enhanced identification of existing waste prevention and reuse potentials in enterprises and other organisations as well as to their further development and implementation via waste-preventing techniques. The optimisation of operational processes is to lead to reduced waste quantities and to a lower content of harmful substances in products and waste and makes a key contribution to the sparing use of resources.

In the mid-term, it is to be expected that the topic of waste prevention will become an integral part of event planning for almost all public events.

Waste prevention in waste management concepts

The measures contained in this package are to encourage enterprises and schools to deal more in-depth with the identification and implementation of their waste prevention potentials.

5.5.3. ACTION AREA "WASTE PREVENTION IN HOUSEHOLDS"

Package of measures "Waste prevention in households"

Updating and further development of "www.bewusstkaufen.at"

- An increase in the amount of information provided through waste disposal consultancy for establishing sustainable purchasing and usage behaviour
- Information campaigns on waste prevention opportunities, in particular through consumer behaviour which is geared to quality of life
- Waste disposal consultancy training in the packaging sector through the packaging coordination centre; promoting the issue of waste prevention
- The further development and implementation of enhanced information and motivational campaigns, including for migrants
- A review of the use of social media, including with respect to timely responses in the case of false reports
- The promotion of repair options (e.g. repair networks, repair cafés), including corresponding information provision
- Raising awareness on the issue of reusable drinks packaging at consumer level, e.g. through continuation of the initiative "Sag's am Mehrweg" [Use reusables] or through a reuse initiative on the part of trade
- Raising awareness of waste prevention, in particular regarding disposable carrier bags and coffee capsules
- An awareness campaign concerning the fact that the delivery of unaddressed post can be avoided by affixing corresponding tips to the postbox
- Raising awareness concerning giving consideration to eco-labelling when making purchasing or service-related decisions
- Extension or updating of the guidelines concerning the awarding of the Austrian Ecolabel
- Exchanging information in the context of stakeholder platforms concerning waste prevention

DESCRIPTION OF THE ACTION AREA "WASTE PREVENTION IN HOUSEHOLDS"

Consumers shall determine which needs have to be satisfied and to what extent. They choose the products and decide which products shall succeed on the market. As a result, households have an important influence on the environmental effects of the entire life cycle as well as on the efficiency and sufficiency of the Austrian national economy. Awareness of this must be reinforced.

The population is to be informed continuously of the waste prevention opportunities. Furthermore, it is necessary to promote awareness about sustainable consumer behaviour and waste management concerns. In order to coordinate the measures that are designed to yield a pertinent impact, it is planned to set up a stakeholder platform convening once a year.

Via a webpage, with the aid of social media and traditional information media, the "www.bewusstkaufen.at" initiative promotes sustainable consumption. One emphasis in this context is on raising awareness for the availability of durable products and their advantages for the consumer and the environment. The "www.bewusstkaufen.at" initiative shows good practice examples, publishes a consumers' guide, and organises a contest of ideas including online voting and discussions with experts.

A core measure of the waste prevention programme is the public relations work undertaken by the Federal Government, provinces, municipalities (municipal associations) and waste management associations, as well as by the economy. A key element of this measure is the activity organised across Austria by the municipal environmental and waste consultants who, furthermore, will also exert their influence in public bodies such as schools and kindergartens as well as in small and medium-sized enterprises.

A significant waste prevention potential exists, first and foremost, in the case of food waste (for the avoidance thereof, a separate action area was defined, see Chapter 5.5.4. "Action area "Prevention of Food Waste"").

The following must be added as background to the information and motivational campaigns: A study in Germany has shown that the main reason for a reduction in the useful life of certain electrical appliances over the past decade was not the worsening quality of the appliances. The useful life has primarily declined on account of the expectation that the service life of the appliances has fallen. Therefore, an increased amount of information on the actual potential useful life of the appliances is required.

In principle, many consumers are interested in sustainable consumer behaviour. A greater incentive is required to actually implement sustainable, needs-oriented consumption, inter alia, through direct contact with the waste con-sultants. Information and motivational campaigns must be tailored to the different target groups.

An important topic is constituted by the reduction of beverage packaging. In a first step, this topic includes fundamental approaches, such as the enhanced use of tap water, and, in a second step, also measures for raising awareness for the advantages of reusable packaging to promote the enhanced use of reusable packaging. One example of this is the "Steiermarkflasche (Styria bottle)" that is being used by 58 wineries and distributed via more than 112 retail markets. When returning the used bottle, consumers have the value of the bottle refunded. In 2016, 3.5 million reusable bottles were saved with this scheme. (also see the Sustainability Agenda in the action area "Waste prevention in Enterprises and other Organisations").

ANTICIPATED EFFECT OF THE ACTION AREA "WASTE PREVENTION IN HOUSEHOLDS"

These measures are designed to disseminate knowledge to households concerning opportunities for waste prevention, repair and reuse and to strengthen the motivation to utilise existing waste prevention potentials and to cover their needs through more resource-conserving consumption.

In the medium term, the quantity of waste generated by households, in particular the volume of paper and packaging waste, should rise at a slower rate than population and disposable income.

Figure 89: "Pfiat di Sackerl" (Good-bye, bag) initiative for the prevention of disposable carrier bags

5.5.4. ACTION AREA "PREVENTION OF FOOD WASTE"

Package of measures "Food production, processing and trade"

- Pilot projects for optimising implementation of the mitigation potential; the concepts and descriptions of the measures developed must be made available to all undertakings in the sector
- Collection of examples of best practice from selected sectors and publication of the information via the Internet
- Studies on the potential of preventable food waste during production and in processing companies
- Further ascertainment of the avoidable food waste in trade and in private households
- Continuation of the training programmes for employees in production, processing and trade and integration of the topic in sector-specific training
- Continuation of the cooperation partnership within the framework of the initiative "Food items are precious!"
- Resumption of the Viktualia award for raising awareness and as an incentive for enterprises to prevent food waste
- Updating of the handbook "Passing on foodstuffs to welfare organisations" on the basis of experience acquired and in consideration of the modified framework conditions
- Certification marks for commercial enterprises which pass on foodstuffs

Package of measures "Welfare organisations"

- Preparation of a quality standard for welfare organisations which pass on foodstuffs
- Regular training courses on handling foodstuffs for employees of welfare organisations
- Establishment of a joint planning platform for the participating welfare organisations
- Support with expansion of the storage and cooling infrastructure on the part of the welfare organisations
- Ascertainment of the quantity of foodstuffs passed on

Package of measures "Consumption away from home"

- Pilot projects for optimising implementation of the mitigation potential; the concepts and descriptions of the measures developed should then be made available to all undertakings in the sector
- Collection and publication of examples of best practice
- Training programmes for employees and integration of the topic in sector-specific training
- Promoting the Austrian Ecolabel in the area of group catering, the catering trade and accommodation services
- Integration of the topic in the guidelines of the workflow organisation of public bodies (e.g. canteens, hospitals)
- Measures designed to prevent food waste in the context of public procurement

Package of measures "Private households"

- Nationwide and regional campaigns targeting households: Creating awareness on the topic of "Prevention of food waste" and showing how people can do things differently by integrating the subject matter into informational material, events and focus activities
- (Further) development of measures to create framework conditions that allow for the steering of people's behaviour towards a more mindful approach to food
- Information campaigns concerning the best-before-date and use-by-date and the ability to enjoy certain foods following expiry of the best-before date
- Integration of the topic of food waste prevention in continuing education and training programmes for teachers (including kindergarten teachers)

Package of measures "Basics"

- Standardising compilation methods, e.g. in the case of sorting analyses
- Review and further development of the criteria concerning the Austrian Ecolabel and public procurement

DESCRIPTION OF THE ACTION AREA "PREVENTION OF FOOD WASTE"

The long-term objective of the action area "Prevention of Food Waste" is the reduction in the volume of avoidable food waste in Austria across all areas of the value-added chain, i.e. from production through to consumption. In particular, in accordance with the UN's 2030 Agenda for Sustainable Development (see Chapter 6.3.8. "United Nations Environment Programme (UNEP)", avoidable food waste in private households and in the area of trade is to be halved by 2030.

In particular:

- a sustainable management of foodstuffs in the areas of agriculture, production and trade is to be encouraged
- the coordination of supply and demand in connection with the transfer of foodstuffs is to be promoted and the infrastructure for buffering between supply and demand extended
- sustainable management of foodstuffs in commercial kitchens and in the hospitality industry is to be encouraged
- the awareness of the environmental impacts associated with food consumption and of the value of the foodstuffs or the avoidable food waste is to be raised
- the awareness that foodstuffs may be enjoyed even after the best before date is to be disseminated
- the data uncertainties associated with the avoidable food waste are to be reduced.

The subject of the action area is avoidable foodstuffs. These are those foodstuffs which, at the time of their disposal, are still fit for human consumption or which would have been enjoyed if used in good time.

The "Food items are precious" initiative comprises a comprehensive action programme on the prevention of food waste. On the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management which deals with this initiative, there is a more detailed description of the measures of the action programme, such as "United Against Waste", "smart kitchen", or "Ist das noch gut" (Is this still edible).

LEBENSMITTEL SIND KOSTBAR!

Figure 90: Logo of the initiative for the prevention of food waste

Regarding the cooperation partnership "Food items are precious!", it must be noted that undertakings in the discounted foodstuffs trade are also invited to participate in this cooperation partnership.

As regards the best before date, reference is also made to the fact that it is examined at EU level which foodstuffs do not require a best before date.

The aim is to reduce food waste across all life-cycle phases of the foodstuffs. In the case of private households or consumption away from home, however, the effect achieved in terms of avoiding environmental effects is the greatest since the whole supply chain is to be included in the environmental impacts and this is influence by the behaviour of consumers.

ANTICIPATED EFFECT OF THE ACTION AREA "PREVENTION OF FOOD WASTE"

Package of measures "Food production, processing and trade"

This package of measures is designed to facilitate more efficient production, processing and distribution of foodstuffs and to realise the food waste prevention potential in enterprises and during distribution.
Foodstuffs which cannot be sold are increasingly handed out in special social (discount) markets. By 2030, food waste in the retail trade is to be reduced by 50 %.

Package of measures "Welfare organisations"

This package of measures shall contribute to ensuring that foodstuffs which cannot be sold are increasingly handed out on social markets and at food banks. This will lead to an improvement in food provisioning while at the same time reducing resource consumption and waste treatment costs. By buffering supply and demand, the potential is extended further and increasingly realised.

Package of measures "Consumption away from home"

The level of information regarding the options for preventing food waste in commercial kitchens, in the hospitality industry and in accommodation establishments is increasing; as a result, resource consumption and waste treatment costs are to be reduced considerably.

Package of measures "Private households"

This package of measures shall result in an increase in the level of information regarding the options for preventing food waste in households and more motivation to utilise these options. As a result, the quantity of avoidable food waste generated in the household sector should diminish. By 2030, there should be a 50% reduction in food waste.

Package of measures "Principles"

Analyses in different federal provinces are comparable and the total volume can be determined more easily. The principles regarding the quantity of food waste generated and the estimate of waste prevention potential are improving.

Figure 91: Sustainable consumption reduces food waste

5.5.5. ACTION AREA "REUSE"

Package of measures "Reuse"

- Further expansion and consolidation of the reuse networks in the federal provinces, tailored to the opportunities and potential available there
- Expansion of the reuse collection of waste electrical equipment in the municipalities
- Extension of the reuse collection to other usable goods
- Providing information for consumers on reuse, promoting exchange areas and similar initiatives
- Examples of best practice regarding collection and treatment of waste equipment and other products so as to be fit for reuse
- Reuse platform for exchanging experience and information
- Survey of the number of reuse companies, the quantity collected annually and the quantity of reuse products sold annually
- "Think tank": Product services and innovative reuse models and innovative reuse business models
- Promotion of product services, particularly by conducting market entry research, pilot projects and subsidising start-ups
- Overall analysis of the textile material flows in Austria
- Review of the creation of a label for sustainable textile collection and recovery
- Procurement guidelines that facilitate reuse: Adaptation of procurement law and the relevant existing directions for action
- Continued use of reusable material assets within the public sector: Development and implementation of guidelines for public bodies, supported by motivational campaigns
- Verification of tax-law measures for the areas of reuse and repair in the framework of a green tax reform

DESCRIPTION OF THE ACTION AREA "REUSE"

Over recent years, development of the reuse networks has acquired significant momentum. This momentum should be used to establish reuse as extensively as possible in Austria. To this end

- other markets for reuse products are to be established
- the supply of waste equipment which can be reused is to be guaranteed by supporting the increased delivery of appliances which are no longer used
- the potential for reuse within public bodies is to be implemented
- new reuse products and support services (such as home deliveries, for instance) are to be developed.

In the campaigns, the reuse of (waste) electrical equipment, waste textiles, furniture, bicycles and other used products is advertised. The sale, in a reusable state, of appliances which are no longer used or needed is also advertised, however.

ANTICIPATED EFFECT OF THE ACTION AREA "REUSE"

This package of measures shall result in an increase in the supply of high-quality used products for reuse and in an increase in demand for products for reuse among the broader population and public bodies.

5.6. ASSESSMENT OF THE PACKAGES OF MEASURES – INDICATORS AND BENCHMARKS, MONITORING

As to whether the effects specified in Chapters 5.5.1. to 5.5.5. are also actually realised should be determined by means of well-chosen indicators. To hold the effort to a certain extent, the indicators are divided in:

- core indicators, which are determined yearly
- indicators of the extended indicator sets.

The amount of important waste streams counts to the core indicators. To the extended indicators belong above all identification numbers which describe the waste qualities or are stronger oriented in the single taken measures.

Core indicators (collected annually)

Annual quantities of the following Austrian waste streams:

- municipal waste from households and similar establishments per capita per year
- mixed municipal waste (residual waste) per capita per year
- quantity of packaging and paper waste collected separately per capita per year
- quantity of biogenic waste collected separately per capita per year
- quantity of hazardous household waste collected separately per capita per year
- mass of waste from trade and industry (volume of primary waste minus municipal waste, construction and demolition waste and excavated materials) per capita per year
- quantities of hazardous waste generated per capita per year
- construction and demolition waste (excluding excavated soil materials) per capita per year

Extended indicator set

For construction and demolition waste:

- reuse and recycling rate
- quantity sent to landfill

For mixed municipal waste:

- composition
- quantity of avoidable foodstuffs and leftovers per capita per year

For reuse:

- quantity of reusable used products collected per year
- number of reuse enterprises
- quantity of reuse products sold annually per year

For future evaluations, the degree of implementation of the planned measures should also be used as a benchmark of the progress made.

5.7. WORK ON THE WASTE PREVENTION PROGRAMME 2017

5.7.1. EVALUATION OF THE WASTE PREVENTION PROGRAMME 2011

The action areas of the Waste Prevention Programme 2011 were derived from the experiences of the Waste Prevention and Recovery Strategy 2006, the proposals under Annex IV to the EU Waste Framework Directive and from current material-related problems in the Austrian economy. The action areas of the Waste Prevention Programme 2011 are as follows:

- Prevention of construction and demolition waste
- Waste prevention in enterprises
- Waste prevention in households
- Prevention of food waste
- Reuse.

For each action area, several measures (highlighted in grey in Chapters 5.7.1.1. to 5.7.1.5.) were specified to be implemented in the longer term.

5.7.1.1. ACTION AREA "PREVENTION OF CONSTRUCTION AND DEMOLITION WASTE"

Development of basis for standardising building passes as a building material information system

Diese Maßnahme wurde umgesetzt. Ein detaillierter Gebäudepass wäre zu aufwändig, es sollen daher andere Möglichkeiten zur Erfassung der Hauptbestandteile eines Gebäudes überprüft werden.

Definition of standards for building passes as a building material information system

Inclusion of building pass data in the central Building and Housing Register operated by the Federal Institute "Statistics Austria"

These measures should not be implemented until the building information model instrument has established itself in Austria.

Pilot projects for developing innovative low-waste technologies and techniques

These measures were implemented in part in the context of the Federal Ministry of Transport, Innovation and Technology Programme entitled "House of the future". Examples of this include a low-waste thermal insulation system and also modular designs.

The aim in future is also to achieve high levels of material efficiency and low levels of waste produced in connection with the development of energy-efficient technologies. In any event, corresponding pilot projects are advisable in future too.

Preparation of teaching materials and learning aids on the principles, planning techniques, techniques and technologies for "low-waste construction" for training experts at vocational and higher institutions

The learning content on "low-waste construction", "extending the useful life of buildings", "selective demolition", "use of recycled building materials" and the "creation and use of the building pass" will increasingly be incorporated into the educational and vocational training of specialists.

The "RAABA" project deals with the adaptation of existing curricula with respect to the reuse of whole building components.

Further steps were initiated with the "SInnDesign" project. Continuation of the measures is sensible and necessary.

The standards developed for "low-waste construction", "extending the useful life of buildings", "selective demolition", "use of recycled building materials" and the "creation and use of the building pass" are to be implemented within the framework of public procurement.

Implementation of this measure is still outstanding.

Realisation of the standard concerning "selective demolition" follows from application of the Recycled Building Materials Ordinance (Federal Law Gazette II No 181/2015, as amended).

Pilot projects on selective dismantling, urban mining and the reuse of construction materials – for example, on the creation of a resource register as a basis for dismantling plans

The ongoing pilot projects create valuable insights but also pose new research questions. Further pilot projects are therefore necessary.

The RAABA project provided an initial overview for Austria regarding the reuse of whole building components.

The recommendation to make the application of ÖNORM B 2251 and ONR 192139 compulsory under the provincial building ordinances

Transposed by means of the Recycled Building Materials Ordinance.

The introduction of a regime by which the following becomes compulsory: the drawing up 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 obligation to draft a dismantling plan and to carry out pollutant and impurities surveys on larger buildings or line structures prior to dismantling is implemented nationwide by means of the Recycled Building Materials Ordinance. Furthermore, building developers are obligated, as a result of this ordinance, to ensure provision of the areas and establishments required for separation.

The obligation to draw up a building site waste management concept is realised in the provincial regulations of Vienna and Salzburg.

Figure 92: Reuse of building components

5.7.1.2. ACTION AREA "WASTE PREVENTION IN ENTERPRISES"

Internet-based best practice fact sheets on techniques and technologies that prevent waste, accompanied by an intensive information campaign
Interesting sources are available with the descriptions of the measures promoted under the regional programmes concerning corporate environmental protection, e.g. the EcoBusiness plan, Vienna, and examples of best practice of EMAS enterprises. The dissemination of examples of best practice should be intensified.
Launch of programmes for the advice-supported identification and realisation of waste prevention potential in enterprises
A high level of support programmes for the conservation of resources was achieved which can contribute to waste prevention. Not all enterprises have been reached as yet.
Continuing education for in-house waste officers for the identification and utilisation of the waste prevention and reuse potential
A high level has been achieved. The further development of the economy and waste prevention techniques requires a continuation of this measure.
Continuation and intensification of the regional programmes concerning corporate environmental protection under the auspices of the federal provinces and co-financed 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 (alongside the recommended continuation of the "Support initiative for waste prevention", co-organised by the Altstoff Recycling Austria AG, the city of Vienna, the province of Lower Austria and the Austrian Chamber of Commerce)
As regards the regional programmes, a high level was achieved in several federal provinces. In the case of environmental support in Austria, resources can be used to prevent the occurrence of hazardous waste. In terms of content, however, the prevention of non-hazardous waste can be supported in the context of resource management. The number of projects funded in these areas is small, however. It is unclear whether the small number of funded projects was a consequence of the funding guidelines or a lack of interest. In any event, a substantial increase in the projects funded by the UFI with a focus on waste prevention and resource management is sensible.
Environmental management system support, including EMAS, ISO 14001 or Responsible Care, as a means of waste prevention, reuse and resource efficiency
A current study proves the environmental effectiveness of EMAS also with regard to the reduction in the quantity of waste generated and improved waste management: 283 organisations covering 1,086 locations were EMAS certified (as at: December 2015). This measure should therefore be continued.
An evaluation of the waste management concept
The evaluation took place. For many enterprises, the creation of waste management concepts is the inducement to concern themselves with waste prevention. The waste management concept should therefore be continued as an instrument of waste prevention and aids provided to identify waste prevention potential and corresponding waste prevention techniques.

Further training courses for the competent authorities on the inclusion of waste prevention/reuse requirements within the framework of the waste management concepts to be presented in connection with licence applications in accordance with the Industrial Code and the Waste Management Act 2002;

Further training for planners on the creation of waste management concepts and the increased focus on waste prevention and reuse

Realisation of the waste management concept was evaluated as part of a study. This revealed that the waste prevention measures which are feasible for an enterprise can be better identified internally. The experts in the local authorities and the planners can only provide impetus in discrete instances. In the future therefore, the focus will be on the training of staff within the enterprise.

5.7.1.3. ACTION AREA "WASTE PREVENTION IN HOUSEHOLDS"

Internet-based best practice fact sheets on waste prevention techniques, material- and energy-efficient technologies and on waste prevention behaviour in private households

The webpage www.bewusstkaufen.at contains a plethora of corresponding information and the sustainability assessment of 2,175 household items.

There are also various webpages concerned with this topic, e.g. those of the federal provinces or the waste management associations.

This measure is thereby implemented. It is expedient to continue the information pages and update them on an ongoing basis.

Information campaigns on

- waste prevention opportunities in households and similar establishments,
- the availability of fact sheets and
- waste prevention through consumption behaviour that emphasises quality of life

Support for waste advisors in the municipalities and waste management associations

A stronger focus on waste prevention in the "Sustainable weeks" and "Being aware of what you buy" initiatives by

- drawing up 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 wider audience,
- bundling communication measures for sustainable consumption

Figure 93: Waste prevention by way of needs-oriented consumption

There are several initiatives, especially in the public sector, which include information campaigns; effecting changes in consumer behaviour will take longer, however.

An increase in the amount of information provided on the actual potential service life of the equipment, greater motivation to actually implement a sustainable, needs-oriented consumption and having direct contact with the waste consultants seem necessary.

5.7.1.4. AREA OF ACTIVITY "PREVENTION OF FOOD WASTE"

Preparation and implementation of training programmes for the staff and integration of the topic in sector-specific training, e.g. for the retail trade

The level of knowledge exhibited by enterprise staff in relation to the prevention of food waste has certainly increased. There is a need for initial training and education in relation to the schooling of new employees and for the purpose of maintaining awareness.

Collection of examples of best practice from the economy and publication of the information via brochures, internet platform

A brochure has been published. Examples of best practice for preventing food waste specifically in relation to food processing companies are still pending. The key problem associated with implementation of this measure lies in the range of sectors and techniques to be considered.

Development of incentive schemes for undertakings with the objectives of

- disposing of less food or
- passing on leftover food which has nothing wrong with it.

Existing incentive schemes can be used as a basis, e.g. integration into the eco-business plan, into environmental management programmes (training of assessors and advisors, awarding of an effective promotional award or prize (such as Sozialmarie, the Integration Award, etc.)).

Food is primarily passed on by retail establishments (total amount passed on in 2013: 11,100 tonnes). Further incentives are also brought about through awards (e.g. the Viktualia award) or the positive impact on marketing.

The retail sector in particular has extended its cooperation with welfare organisations.

Clarification of the legal position regarding any liability claims when passing on food to welfare organisations or clarification of the term "waste" when passing on 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.

The most important issues are clarified by means of the handbooks devised.

Regular training courses on handling foodstuffs for employees of welfare organisations

This measure is ongoing.

Preparation of a quality standard (e.g. certificate, quality seal) for welfare organisations which pass on foodstuffs

This measure has not yet been implemented.

Preparation and implementation of training programmes for employees and integration of the topic in sector-specific training

Collation of examples of best practice from the sector

Creation of incentive schemes analogous to corresponding measures in production, industry, retail and the catering trade and integration into existing programmes

These measures are implemented within the framework of the "United Against Waste" initiative.

In the area of commercial kitchens, accommodation services and the catering trade, a relatively large potential for preventing food waste was identified. Realisation of this potential should also result in appreciable cost savings.

Creating awareness on the topic of "Prevention of food waste" and showing how people can do things differently by integrating the subject matter into informational material, events and focus activities

(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, studies)

A nationwide campaign (TV, print media) was conducted in order to make people aware of the problems.

In principle, there is a large amount of interest in preventing food waste. Even though an intensive array of measures has already been undertaken hitherto in this sector, awareness needs to be raised further in order to bring about a change in behaviour.

Integration of the topic of food waste prevention in continuing education and training programmes for teachers and the preparation of training documents and learning materials for kindergartens and schools

Training documents have been realised within the framework of the initiative "Food items are precious!". Integration of the topic in continuing education and training programmes for teachers ought to be pursued more intensively.

Integration of the topic "Prevention of food waste" in the guidelines of the process organisation of public bodies (such as canteens or hospitals)

The "United Against Waste" initiative compiles the basics which may be used in the preparation of these guidelines.

Consideration of the prevention of food waste in public procurement

There are appropriate specifications as a result of the EcoBuy (ÖkoKauf) guidelines for Vienna. The application of these specifications in all areas of public administration should be guaranteed in the next step.

5.7.1.5. ACTION AREA "REUSE"

Public relations work on reuse: national campaign

Since no umbrella brand was implemented across the federal provinces in relation to the reuse sector, a nationwide campaign is less expedient.

Promotion of product services, particularly by conducting market entry research, pilot projects and subsidising start-up

Recent experience has shown that "service instead of purchase" has a market, especially in the price segment above € 1,000. This is utilised by enterprises although there are limited cases of application for households.

Procurement guidelines that facilitate reuse: adaptation of procurement law and the relevant existing directions for action

The Federal Ministry of Agriculture and Forestry, Environment and Water Management champions the fact that criteria governing reuse in public procurement are also laid down during transposition of the EU Directive on public procurement (Directive 2014/24/EU) in Austria.

Reuse of reusable items disposed of by public authorities: examination of areas of potential, implementation of provisions for public bodies

This measure is still to be implemented.

Collating examples of good practice from at home and abroad of combined reuse and second-hand activities in the waste management and socioeconomic sectors;

Networking platform for active and interested municipal and welfare organisations, concepts for the distribution of reuse products to socially disadvantaged households, e.g. through household-related social services, social markets

Strengthening reuse enterprises through pan-business networking and innovative cooperation models

Model concept and development of technical solutions for reuse logistics

Technical working groups which develop joint solutions for the reuse sector

Coordination group for the funding strategy and coordination of start-up subsidies for reuse projects

Modular sample concept for regional reuse networks for regions with varying structures

Aids for reuse enterprises (permanent advisory body, sample business plans, implementation manual, checklists, sample contracts, sample cooperation models, information documents, topic-specific instructions, templates for forms, contracts, records, internal training documents and internal instructions for working procedures, etc.)

Contractual terms for the reuse sector in the area of waste collection, particularly within the framework of collection schemes in accordance with the Waste Management Act 2002: drafting of sample contract clauses for all significant interface situations

Modular training programme for various target groups (reuse enterprises, collection centres, waste advisors and public authorities)

Reuse networks were established in seven federal provinces. The level of development ranges from established across the province (ReVital in Upper Austria) to a pilot stage. As a result, the comprehensive establishment and economic consolidation of the reuse sector is a good deal closer. A further exchange of experience across the country is helpful in this regard.

At the present time, social enterprises are unable to develop any long-term business segment strategies in the reuse sector based on the funding guidelines for developing the labour market. In this regard, stable, long-term funding strategies are required. The actual economic activities undertaken by social enterprises should be taken into consideration by the funding authority. The circular economy and greenjobs approach could provide an inter-agency framework here.

Insurance service package on the "liability risk for reuse enterprises"

Clarification was provided of the fact that the liability risk for reuse enterprises can be covered by employer‘s liability insurance.

Online sales portal for reuse products that is not tied to specific enterprises

In Lower Austria, the sales portal www.sogutwieneu.at was set up.

In federal provinces in which a reuse network is well established and this network operates a website, an online sales portal that is not tied to specific enterprises is probably not required (also simply because private online portals for second-hand goods are currently thriving in any case).

Nationwide reuse campaign

Creation of a reuse umbrella brand

Offensive to attract reuse enterprises

A nationwide campaign, nationwide umbrella brand and offensive to attract reuse enterprises did not prove necessary since the reuse sector is currently also developing apace without these measures.

"Think tank": product services and innovative reuse business models

Several experts are addressing the issue of product services and innovative reuse business models; a "think tank" has not been established as yet.

Furthermore, a reuse conference was arranged; this topic was the focal point during Re-source 2016.

Design manual for reuse shops

Significant progress was achieved in the design of reuse shops. A good example is Contrapunkt in Klagenfurt.

A design manual was provided by ReVital.

Collection boxes (reuse box) for reusable goods are provided in some regions.

Figure 94: "48er Tandler" - the Vienna used-goods market

Submission, subsidisation/co-financing of development projects on the subject of reuse
Development projects on the subject of reuse were promoted.

Creating and implementing uniform quality standards for reuse networks, enterprises, collection centres and products; test standards and directions for action for every relevant reuse product group
The existing norms and standards are currently adequate, based on recent experience.

Adapting the structure of collection entities to the requirements for reusable waste (with thought given to careful storage and appropriate transport)
The 2014 amendment to the WEEE Ordinance laid down the obligation incumbent upon municipal collection points to create a separate collection channel for reusable waste electrical equipment and binding cooperation with a reuse enterprise. In the case of collection points for recoverables which do not participate in reuse networks, there is still a need for the collection structure to be adapted.

5.7.2. EVALUATION OF THE WASTE PREVENTION PROGRAMME 2011 USING INDICATORS

The following trends can be deduced on the basis of the indicators laid down in the Waste Prevention Programme 2011:

During the period 2004 to 2007, annual growth in the quantity of municipal waste generated by households and similar establishments per capita averaged 2.4 %. During the period 2007 to 2015, the rate of annual growth in terms of the quantity of municipal waste generated was only 1.0 %.

The quantity of residual waste generated during the period 2004 to 2015 rose in a relatively uniform manner with an average growth rate of 0.32 % per year. This rate of growth is slower than the rate of population growth, which averaged 0.49 % per year.

The volume of waste from trade and industry decreased by 21 % from 2007 to 2015.

The cause of this decline and the low growth rates in the quantities of waste generated since 2007 may be the low level of economic growth since 2008 and the waste prevention measures undertaken since then.

In the area of food waste, the statistical surveys were improved. No clear trend can be deduced from this, however.

According to information provided by experts

- both the number and annual turnover of reuse enterprises
- and the quantity, number and turnover of the reuse products sold or utilised annually

have risen significantly in recent years. From 2011 to 2017, reuse networks were established in a further six federal provinces. In 2015, approximately 1,800 tonnes of waste electrical and electronic equipment were reused. Compared with 2009 (reference year of the Federal Waste Management Plan 2011), this corresponds to an increase of 85%.

Since the measures under the waste prevention programme in the construction sector largely have a long-term perspective, the effects cannot be anticipated immediately when the measures are implemented. Consequently, there was just the annual updating of the data pertaining to the quantity of waste generated from building activities and its whereabouts (cf. in this regard also Chapter 3.9. "Construction and demolition waste" of the Federal Waste Management Plan 2017).

As regards the level of knowledge of consumers, reference is made to the growing interest in terms of the number of visits made to the webpages of the Federal Ministry of Agriculture, Forestry, Environment and Water Management (e.g. www.bewusstkaufen.at with approximately 400,000 hits per year) and other institutions (e.g. the environmental consultancy). In 2016, approximately 200,000 visits to the waste pages of the Federal Ministry of Agriculture, Forestry, Environment and Water Management were registered.

5.7.2.1. SELECTED OTHER INITIATIVES IN AUSTRIA WHICH CONTRIBUTE TO WASTE PREVENTION

In addition to the Waste Prevention Programme 2011, at a Federal level, other strategic plans for waste prevention may also be important as they promote sustainable developments, resource-efficient products, services and production or needs-oriented consumption. Examples include:

- the Austrian Strategy for Sustainable Development,
- the Sustainability Strategy of the Federal Government,
- the Green Jobs Master Plan,
- the Incentive Programme for Sustainable Economies,
- the Action Plan for Corporate Social Responsibility,
- the Austrian Sustainable Public Procurement Action Plan.

To sum up, at provincial level, the following waste prevention measures must be emphasised:

- Regional programmes concerning corporate environmental protection assist in the introduction of efficient techniques, the creation of waste management concepts, the implementation of environmental audits and the introduction of environmental management systems;
- Green events are organised with the support of the federal provinces.
- Information and awareness-raising campaigns promote sustainable consumption, the prevention of food waste or the redistribution of surplus foodstuffs to social groups in need.
- The extended use of equipment is promoted through the publication of repair, rental and second-hand guides.
- The development of repair and reuse networks and repair cafés is supported.
- The expansion of the collection points for recoverables to include, inter alia, acceptance and storage of used products as a preparatory step for reuse is supported.

5.7.3. ASSESSING PROPOSALS FOR MEASURES UNDER ANNEX 1 TO WASTE MANAGEMENT ACT 2002 AND ANNEX 4 TO THE EU WASTE FRAMEWORK DIRECTIVE

The usefulness of the measures (that are highlighted in colour in the following subchapters) given by way of example in Annex 1 to the Waste Management Act 2002 and Annex 4 to the EU Waste Framework Directive must be assessed. Chapters 5.7.3.1. to 5.7.3.3. include this assessment for the incorporation of the measures listed in the Waste Prevention Programme 2017. Those measures adjudged to be suitable for implementation, and which have not been implemented hitherto in Austria, were incorporated into the Waste Prevention Programme 2017.

5.7.3.1. MEASURES POSSIBLY IMPACTING THE FRAMEWORK CONDITIONS IN CONNECTION WITH WASTE GENERATION

Use of planning measures and other economic instruments that promote the efficiency of resource utilisation

To this end, Austria has a wide range of planning measures and instruments at its disposal, from various topics of environmental and resource policy:

- Waste Prevention Programme 2011
- Austrian Strategy for Sustainable Development and the "Ressourcen.Effizienz.Technologie" (Resource. Efficiency.Technology) Initiative Reset2020
- Action Plan for Corporate Social Responsibility
- Green Jobs Master Plan
- Incentive Programme for Sustainable Economies
- Sustainable Public Procurement Action Plan

Further measures associated with the 2017 programme

Review of additional possibilities for a building material information system

The promotion of relevant research and development with the aim of achieving cleaner and less wasteful products and technologies and the dissemination and use of the results of such research and development

Austria has a system in place to promote research and development into more eco-efficient, energy-efficient and climate friendly products and environmental technologies:

- Promotion of research and development into energy/material-efficient and environmentally friendly technologies and services in the incentive programme for sustainable economies
- Support for the environment in Austria in the areas of "Prevention of hazardous waste" and "Resource management"
- Regional programmes for corporate environmental protection in the federal provinces concerning the advice-supported identification and realisation of waste prevention potential in enterprises
- Promotion of the collection and recovery schemes from the point of view of waste prevention
- Accolades such as the Daphne, Phoenix or Viktualia awards..

Among other things, the distribution and use of low-waste products and technologies are promoted within the framework of research and development programmes, cleaner production initiatives and guidelines for public procurement:

- Green Jobs Master Plan
- Incentive Programme for Sustainable Economies,
- The use of efficient technologies is supported within the framework of environmental funding in Austria through the promotion of projects to prevent hazardous waste.
- Regional programmes for corporate environmental protection in the federal provinces
- Events such as envietech, Re-source.

Further measures associated with the 2017 programme

Preparation of teaching materials and learning aids on the principles, planning techniques, techniques and technologies:

- or "low-waste construction" and
- concerning the extraction and reuse of entire building components arising from the demolition of buildings
- for the training of specialists in vocational schools and schools of higher education. These teaching materials and learning aids are increasingly involved in the educational and vocational further training of specialists.

The inclusion of design measures concerned with waste prevention and reuse in professional and university education.

The development of waste prevention documentation for technical schools and educational institutions on concrete issues.

The development of effective and meaningful indicators of the environmental pressures associated with the generation of waste aimed at contributing to the prevention of waste generation at all levels

The following benchmarks are used in connection with the waste prevention programme measures:

- volume of waste in the Federal Waste Management Plan or in status reports
- residual waste analyses in the federal provinces
- various studies on the occurrence of avoidable food waste
- material flow indicators in the indicator reports regarding Austria‘s sustainability strategy.

Further measures associated with the 2017 programme

Surveys on the potential of avoidable food waste in the processing industry

Standardising compilation methods, e.g. in the case of sorting analyses

5.7.3.2. MEASURES POSSIBLY IMPACTING THE CONCEPTUAL DESIGN, PRODUCTION AND DISTRIBUTION PHASE

Promotion of ecological design (systematic inclusion of environmental aspects in product design with the aim of improving the environmental balance of the product over its entire life cycle) and of reusable packaging

The reusable proportion of drinks packaging was able to be stabilised at the 2011 level:

- Additional agreement regarding the Sustainability Agenda 2008-2017 of the Austrian beverage packaging industry
- Awareness-raising measures, e.g. the initiative "Sag's am Mehrweg" [Use reusables]

Figure 95: Logo of the initiative "Sag's am Mehrweg"

Further measures associated with the 2017 programme

Developing standards concerning waste prevention design, the avoidance of harmful substances and the reparability, separability and reusability of product parts

Extension of the Ecodesign Directive in the context of the package of measures concerning the circular economy

Working in the EU towards the information obligation concerning

- the period of availability of replacement parts
- the average service life of the products

Repair, reuse and recycling design are to be increasingly incorporated in design curricula.

Provision of information on industrial techniques for waste prevention with a view to facilitating implementation of the state of the art

Several initiatives have already been launched:

- Environmental technology clusters
- COIN (COncrete INnovation) funding programme
- "Waste management" working group within ECR Austria (Efficient Consumer Response Austria)
- Examples of best practice from EMAS enterprises

Further measures associated with the 2017 programme

Other examples of best practice on techniques and technologies that prevent waste, accompanied by an intensive information campaign

Training measures for the competent authorities as regards the inclusion of waste prevention requirements in permits for treatment plants and IPPC installations

Pursuant to the Waste Management Act 2002 and the Industrial Code, an operational waste management concept must be drawn up by all plants with more than 20 employees and when applying for an operating licence. This waste management concept should outline all waste-relevant processes, material flows and waste streams, as well as all current and planned waste prevention measures. Waste prevention measures are initially proposed by planners during plant approval procedures as part of the waste management concept and then reviewed by the authorities.

Waste prevention potential and measures must be identified by the enterprise itself or the planner commissioned by it. In the first instance therefore, the enterprises and planners must be supported in identifying waste prevention potential and techniques.

Further measures associated with the 2017 programme

Supplementing sector-related blueprints with good examples of waste prevention

The inclusion of measures to prevent waste production at installations not falling under Directive 2008/1/EC; such measures could include waste prevention assessments or plans

The use of awareness campaigns or the provision of financial, decision-making or other support to businesses, in particular measures which are aimed at small and medium-sized enterprises and work through established business networks

Small and medium-sized enterprises shall receive support in identifying and implementing their waste prevention potential:

- waste management concept
- regional programmes for corporate environmental protection
- domestic environmental support in accordance with the Environmental Aid Act
- support of environmental management systems such as EMAS training programmes
- information booklets, e.g. regarding EMAS.

In enterprises with more than 100 employees, a waste officer shall be appointed and the local authority notified.

Further measures associated with the 2017 programme

Other examples of best practice on techniques and technologies that prevent waste, accompanied by an intensive information campaign

Continuation of the regional programmes for corporate environmental protection in the federal provinces concerning the advice-supported identification and realisation of waste prevention potential in enterprises

The use of voluntary agreements, consumer/producer panels or sectoral negotiations in order that the relevant businesses or industrial sectors set their own waste prevention plans or objectives or correct wasteful products or packaging

Voluntary agreements are increasingly used in the area of waste prevention:

- Sustainability Agenda 2008-2017 of the Austrian beverage packaging industry
- agreement covering the period 2016 to 2025 concerning a reduction in carrier bags
- cooperation partnership within the framework of the initiative "Food items are precious!"

Further measures associated with the 2017 programme

- Enhanced prevention of food waste during production, processing, in trade and consumption away from home
- Continuation of the Sustainability Agenda
- Canvassing further enterprises regarding the agreement covering the period 2016 to 2025 concerning a reduction in carrier bags

Promotion of environmental management systems including EMAS and ISO 14001

Environmental management systems expedite waste prevention measures:

- regional programmes for corporate environmental protection in the federal provinces promote the implementation of environmental management systems
- EMAS-certified enterprises receive concessions on the certification of products for the Austrian Ecolabel and extra points in the case of public calls for tender in accordance with the Sustainable Public Procurement Action Plan.

Further measures associated with the 2017 programme

Further support for environmental management systems, including EMAS, ISO 14001 and Responsible Care

5.7.3.3. MEASURES POSSIBLY IMPACTING THE CONSUMPTION AND UTILISATION PHASE

Economic instruments such as incentives for clean purchases or the institution of an obligatory payment by consumers for a given article or element of packaging that would otherwise be provided free of charge

- Pursuant to the Packaging Ordinance 2014, the collection and recovery of packaging waste is financed through participation fees in a collection and recovery scheme. The participation fees are calculated according to the specific material used in the packaging distributed and the weight thereof
- Charging final customers for disposable carrier bags in accordance with the voluntary agreement covering the period 2016 to 2025 concerning a reduction in carrier bags
- Promotions and competitions in the context of the "Being aware of what you buy" and "Use reusables" initiatives
- Passing on foodstuffs at a reduced rate shortly before expiry of the best-before date

Awareness-raising measures and information for the general public or specific consumer segments

This may be the most important and central measure for promoting waste prevention on the consumer side. Raising awareness involves making people take note of their own consumption behaviour, the values lost through inefficient consumption and the barriers to efficient consumption behaviour:

- the "Being aware of what you buy", "Food items are precious!" and "Use reusables" initiatives
- prevention programmes in the federal provinces
- public relations work on the collection and recovery schemes
- Forum for Environmental Education (www.umweltbildung.at)
- RedUSE project to raise awareness amongst schoolchildren

Further measures associated with the 2017 programme

- The continuation of information campaigns on
  - waste prevention opportunities in households,
  - waste prevention through consumption behaviour that emphasises quality of life
- Campaigns targeting households: Creating awareness on the topic of "Prevention of food waste" and showing how people can do things differently
- Integration of the topic of food waste prevention in continuing education and training programmes for teachers
- Campaigns concerning reuse

Promotion of ecolabels

Important initiatives already exist on the promotion of the ecolabel:

- Austrian Ecolabel
- Sustainability seal for long-life electrical equipment that is easy to repair

Further measures associated with the 2017 programme

Extension or updating of the guidelines concerning the awarding of the Austrian Ecolabel

Agreements with industry, such as the use of product panels such as those being carried out within the framework of integrated product policies or with retailers on the availability of waste prevention information and products with a lower environmental impact

The "Being aware of what you buy" initiative already includes a platform for the provision of information regarding waste prevention and environmentally sound products:

- "Being aware of what you buy" initiative
- "Food items are precious!" and "Use reusables" initiatives
- Agreement covering the period 2016 to 2025 concerning a reduction in carrier bags

In the context of public and corporate procurement, the integration of environmental and waste prevention criteria into calls for tenders and contracts, in line with the Handbook on Environmental Public Procurement published by the Commission on 29 October 2004

The public sector in Austria plays an important pioneering role in the development of a sustainable national economy and waste prevention. The following implementation measures must be cited:

- Federal Public Procurement Act
- "Ecological Guidelines" of the Federal Government
- "EcoBuy Vienna" criteria
- "Green Events Austria" Initiative
- Austrian Sustainable Public Procurement Action Plan

Further measures associated with the 2017 programme

- Promoting extension of the useful life of public buildings and material assets
- Promoting the use of recycled building materials in public procurement
- The introduction of procurement criteria concerning products which have been drawn up in accordance with the principles of waste-reducing design as well as concerning durability and reparability
- Review and further development of the public procurement criteria with a view to preventing food waste
- Continued use of usable material assets within the public sector
- Increased communication of the public procurement criteria

Promotion of the reuse or repair of suitable waste, notably through the use of educational, economic, logistic or other measures such as support to, or establishment of, accredited repair and reuse centres and networks, especially in densely populated regions. Consideration must be given to the creation of "green jobs" in this regard.

The topic of reuse and repair has received increasing attention over recent years:

Various initiatives in the federal provinces promote the development of repair networks, reuse initiatives and repair cafés at a local level.

AND MEASURES

6

REQUIREMENTS AND MEASURES

6. REQUIREMENTS AND MEASURES

6.1. AUSTRIAN WASTE MANAGEMENT STRATEGY

THE AUSTRIAN WASTE MANAGEMENT STRATEGY is aligned with precautionary principles and sustainability. The various Austrian waste management objectives (Article 1 of the Waste Management Act 2002) should be achieved based on the waste hierarchy with the best possible combination of waste prevention, reuse, recovery and disposal. Every principle and instrument must be measured against the principles and objectives and must not be an end in itself. On the basis of the precautionary principle, final sinks are needed in waste management. The landfilling of pre-treated waste will therefore continue to constitute an indispensable component.

The extent to which the waste management aims are currently met was the subject of a research contract which lasted several years. The high level of Austrian waste management was clearly documented, although optimisation potential was identified. Details on this research work are included in Chapter 6.7.1.

Promotion of recycling

The Europe-wide comparison of the development of municipal waste recycling rates is ample proof of the advanced waste management system in Austria.

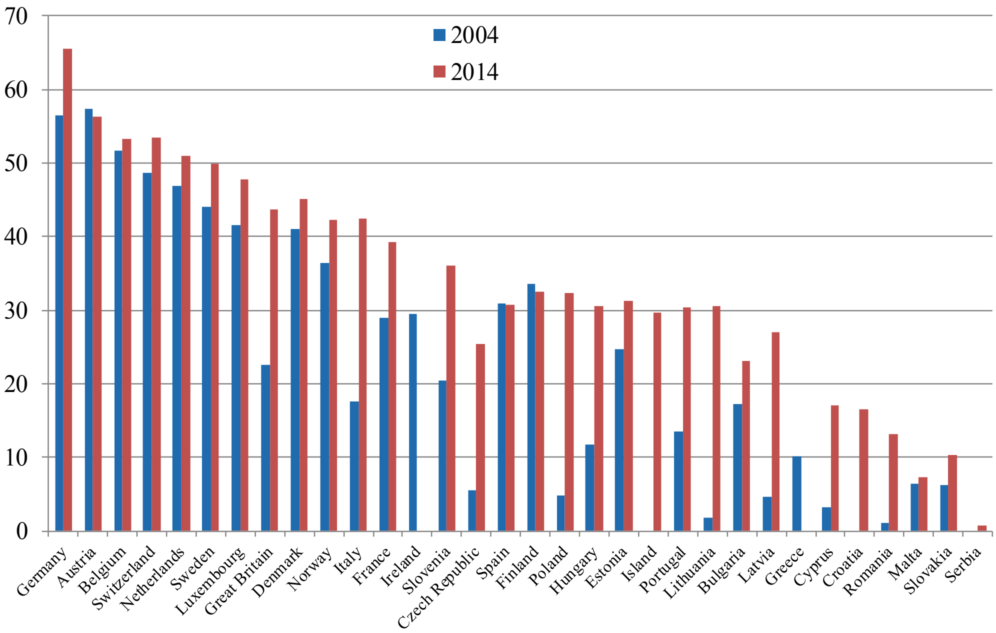

Figure 96: Municipal waste recycling rates in Europe (source: Eurostat)

Due to the national transposition of the amended EC directives in the course of the EU Circular Economy Package that will take place in the foreseeable future, rising recycling rates are primarily expected in the areas of packaging waste, end-of-life vehicles and waste electrical and electronic equipment.

Moreover, more remains to be done in the realm of the sustainable phosphorus recycling of sewage sludges and animal meal. Phosphorus is a substance that is indispensable for agriculture, and the occurence of raw phosphate is regionally concentrated and characterised by deteriorating quality (especially with regard to cadmium and uranium). Rock phosphate has already been put on the EU list of critical raw materials.

Similarly, the resource-efficient use of materially recoverable waste wood could still be enhanced and should – although in this context renewable raw materials are involved – be pursued further.

Challenge – recycling society – circular economy

International studies show the economic advantages of redirecting traditional management methods towards the circular economy. Economic growth, job creation, lower consumption of primary materials and reduced environmental impact such as CO_2 emissions are cited in this context. Guidelines on implementing the circular economy, such as those of the Ellen MacArthur Foundation, clearly show that changes at various levels are necessary.

Social barriers

Both society and businesses need to be involved in converting to a resource-efficient recycling society and move further towards a circular economy – as the terminology implies. Established waste management located at the end of the conventional linear economy cannot achieve this alone.

As already noted by the European Environment Agency in a report on resource efficiency in Europe, measures to close loops should be intensified in areas upstream of waste management. Ecodesign, new business models (such as service systems and shared use) and reuse and repair initiatives are considered appropriate in this context. A paradigm shift is required in production and consumption; networking between companies active in the waste sector with the manufacturing industry needs to be intensified.

Product design significantly influences the options for and extent of material use at the end of the life cycle. To establish the circular economy on a broader basis, appropriate design and selection of materials are needed at the production stage. Reparability, disassembly and recyclability are rarely taken into account at the design phase.

Technical barriers

A circular economy in the narrow sense of the term or multiple recirculation require high-quality waste. Single-origin fractions are comparatively easy to recycle. Lower grades can, however, be fed at best into downcycling, although the number of useful recycling loops will inevitably be fewer.

Ever more complex products and new composite materials make recycling increasingly difficult. For instance, in communications technology, the motor industry and the building sector, there is wider diversity and less concentration in individual substance groups. Technological developments are expected to intensify this trend. From a logistical and technical perspective, this results in huge challenges when it comes to recovering materials. The need for further research will grow.

Economic barriers

The price structure for primary raw materials in many cases runs contrary to increased use of substitutes recovered from waste and certain reconditioning processes are often not economically viable. In addition to taxing primary materials that cannot be carried out by countries acting alone due to competitiveness reasons either financial incentives or other intervention measures remain available to promote the desired developments.

Ecological barriers

The waste industry needs to identify further resource potential and promote its use. The aim is to close high-quality material cycles. If raw materials are to be used in several cycles, significant quantities of pollutants will have to be removed. Preventing contamination due to excessive recovery initiatives is a central concern. The challenge lies in determining the degree of acceptable impurities with no higher environmental impact (compared to the primary raw materials). The precautionary principle ranks above the conservation of resources. Improving waste quality is also the key to improving acceptance of secondary materials and an intensified circular economy.

Priority fields of action for prevention

There are particular leverage effects in the building and food sectors. This is confirmed by the strategy to step up waste prevention pursued by the Federal Waste Management Plan 2011 waste prevention programme for construction and demolition waste and food waste. These focal points also form central fields of action over the coming years in the updated waste prevention programme (Chapter 5). Even if, initially, conversions entail expenditure, affected companies can expect long-term competitive advantages.

Incineration as part of the strategy

Not all waste streams can or should be subjected to repeated recycling. This does not mean, however, that their resource potential should remain unexploited. As well as waste incineration, many Austrian industrial plants already use significant amounts of reconditioned waste materials as a fuel substitute. In addition to the environmental advantages, such as the destruction of organic pollutants, the separation or build-up of inorganic pollutants and the reduction of climate-relevant emissions, this entails cost savings and reduces Austria's dependency on imports of primary energy resources. Besides the ecological advantages gained from the use of substitute fuels, this also harbours an additional ecological benefit, if the incineration residues are materially recovered in the same process.

Landfill as a final sink or a stockpile

The landfilling of waste will always be an integral part of sustainable waste management and is unavoidable to ensure clean cycles. Not all output from a waste treatment plant is suitable for recirculation in the production cycle and therefore needs to be properly deposited.

Furthermore, the use of landfill in specific stages for potential subsequent processing is appropriate for waste streams occurring only in limited volumes or for which no suitable technologies for further processing are currently available.

Challenge – international networking

International interdependencies are also increasing in the waste management sector. The transboundary shipment of waste is becoming increasingly important in this regard. Apart from illegal shipments, which are increasingly being tackled nationally and internationally, valuable resources are migrating abroad via the second-hand market. This partially extends the useful life or reuse of used goods that are not in demand on the Austrian market. However, the material and the added value of waste treatment are lost to the domestic economy. The options of waste prevention or reuse versus recycling are in competition. A further aggravating circumstance in this context is the different national terminology and the differentiation between waste and non-waste. Given the high standards of Austrian treatment plants, the aim should be to utilize these on economic and ecological grounds and thereby help ensure that waste generated domestically is primarily treated domestically.

6.2. OPTIONS AND INSTRUMENTS

In accordance with Article 8(3) of the Waste Management Act 2002, the Federal measures intended to fulfil the various provisions derived from the objectives and principles of the Waste Management Act 2002 shall be outlined in the Federal Waste Management Plan.

This relates to

- provisions for the reduction in volume, pollutant content, and adverse environmental and health impact of waste,
- provisions for the promotion of preparatory activities for reuse, recycling, and other waste
- recovery methods,
- provisions for the environmentally-friendly and economically purposeful recovery of waste,
- provisions for the disposal of unavoidable or non-recoverable waste and
- provisions for the shipment of waste either to or from Austria for recovery or disposal.

The various options and means that are in place to fulfil the provisions are broken down as follows:

- logistical and organisational measures and the preparation and creation of the necessary technical basis,
- publicity and provision of information, along with advice and training,
- the public sector acting as a role model,
- international cooperation (especially within the EU),
- market-based instruments and financial incentives,
- voluntary agreements.

The **Waste Management Act 2002** forms the main basis for implementing the various provisions. It regulates not only the handling of waste produced but also contains provisions to help prevent the generation of waste. The overall configuration is done more specifically via ordinances. The powers to issue statutory instruments that are most significant in practice can be found in Article 14, Article 23 and Article 65 of the Waste Management Act 2002.

Article 14 of the Waste Management Act 2002 makes provision for the power to issue statutory instruments for the adoption of **measures for waste prevention and recovery**, in particular for reducing waste volumes and pollution levels and for promoting the circular economy. Efforts must be made to ensure the lowest possible amount of waste generated in the design, manufacture, sale and use of goods.

This not only includes measures such as the obligation to label goods with disposal instructions or pollutant contents, but also includes measures which encroach more into economic life, such as the take-back obligation, the collection of deposit contributions, and eventually banning the placing of certain products on the market (such as those containing heavy metals). The measures assigned through the various ordinances can be applied at an early point in the life cycle of products (e.g. product design) and may therefore relate to items that are not considered to be waste (e.g. Packaging Ordinance).

In accordance with Article 23 of the Waste Management Act 2002, there is the option to specify **general obligations for waste holders** by means of regulation. Within the framework of Article 23(1) of the Waste Management Act 2002, the Federal Minister for Agriculture and Forestry, Environment and Water Management shall come to an agreement in consultation with the Federal Minister for Science, Research and Industry as to which types of waste are to be collected separately and for which type of treatment the waste shall be supplied, along with requirements for collection, storage and transportation, and specifications for the treatment of waste in accordance with the state of the art (e.g. End-of-Life Vehicles Ordinance, Ordinance on Waste Treatment Obligations).

As a result of the power to issue statutory instruments stated in Article 23(2) and (3) of the Waste Management Act 2002, a number of special measures may be assigned for **biogenic waste**. This type of waste has major potential for the realisation of a functioning circular economy. The Federal Minister for Agriculture and Forestry, Environment and Water Management may make provision for a number of quality requirements for compost or soils from waste and other accompanying measures such as the labelling of compost to be placed on the market. Compost or soils from waste may only be placed onto the market if they comply with the various quality requirements specified by means of regulation (e.g. Compost Ordinance).

For **waste treatment plants**, the Federal Minister for Agriculture and Forestry, Environment and Water Management may, in consultation with the Federal Minister for Science, Research and Industry, and on the basis of Article 65 of the Waste Management Act 2002, stipulate a number of more specific requirements by means of regulation regarding the equipment and mode of operation in line with the state of the art. Article 65 of the Waste Management Act 2002 contains comprehensive regulatory powers within the field of (stationary and mobile) treatment plants. The type and quality of waste to be treated, the criteria and limit values for the allocation of waste to specific facilities, the applicable measurement procedures, the monitoring during operation and after-care, and the emission limits to be observed by the plants in accordance with the state of the art (e.g. Landfill Ordinance, Waste Incineration Ordinance) may all be stipulated.

The **Chemicals Act** (see also Chapter 6.3.9 "Provisions in chemicals legislation with waste management relevance") also provides a basis for the stipulation of measures that may bring about an improvement in the situation, particularly within the field of qualitative waste prevention. Technical guidelines and standards shall also contribute to the provision and/or introduction of the state of the art for plants and modes of operation.

Also available for implementing necessary measures are the instruments of **voluntary declaration, voluntary commitment, agreement or cooperation**, which have proven effective (e.g. sustainability agenda for beverage packaging, 2016-2025 agreement on avoiding carrier bags).

In order to ensure that sustainable waste management is also taken into account in normal operational practice, the Waste Management Act 2002 specifically makes provision in Article 10 and Article 11 for the use of two effective instruments: The **waste management concept** (see also Chapter 6.6.1. "Waste management concepts") and **waste officer** (see also Chapter 6.6.2. "Waste officer").

Public relations work and information (see also Chapter 6.7.5 "Public relations work") and **advice and training** (see also Chapter 6.7.4 "Training and further education") should also be seen as further key instruments for environmental policy and hence also as waste management measures. The awareness and understanding for selected objectives and for the execution of measures that are necessary for implementation must be communicated on the one hand; on the other hand, any sustained changes may only be achieved through the training and knowledge enhancement of those affected.

Thanks to the sustained pursuit of the objectives and principles of the Waste Management Act 2002, the possibility of a decisive role model function has emerged for the **public sector** as an important client for commercial services, especially within the **procurement and construction sector** which can decisively influence the development, market entry and competitiveness of environmentally friendly products or processes.

Figure 97: Building activities cause considerable waste quantities.

The Austrian and European **Ecolabels** (see also Chapter 6.7.8. "Austrian and EU Ecolabels") provide reliable, independently reviewed information on the environmental aspects of products and services. They thus offer an incentive for manufacturers as well as a simple decision-making aid for consumers and for procurement. These national Ecolabels stand for higher living and environmental quality levels, clear and transparent information and a high degree of informative value, as well as for the environmental policy that companies are responsible for themselves.

International cooperation on environmental policy has a particularly strategic and thus decisive role to play, not least because of cross-border environmental pollution and shipment of waste. This particular area presents an additional and significant challenge not only for the European Union, but also from a waste management perspective.

6.3. REGULATORY MEASURES

The Federal Constitution Act (B-VG) understands the term "waste management" to refer to the sum of all measures for the prevention, reduction, recovery, and safe treatment and disposal of waste (all types). In terms of constitutional law, the Federal Government has the authority to adopt and enforce regulations relating to hazardous waste (see Article 10(1)(12) of the Federal Constitution Act); it shall be entitled to do this for other waste if there is a need for uniform legislation to be enacted. With the enactment of the Waste Management Act 2002, Federal Law Gazette I No 102/2002 (Waste Management Act 2002), the Federal Government made extensive use of its "authority in case of need" and issued a number of nationwide uniform regulations on hazardous and non-hazardous waste. The states hold jurisdiction over the removal of municipal waste and the planning of disposal sites for non-hazardous waste.

There are other waste management provisions in other relevant laws, e.g. in the Industrial Code 1994 and the Mineral Raw Materials Act.

6.3.1. WASTE MANAGEMENT ACT OF THE FEDERAL GOVERNMENT 2002 (AWG 2002)

6.3.1.1. OBJECTIVES AND PRINCIPLES OF WASTE MANAGEMENT

The Waste Management Act 2002 is based on precautionary principles and on the principle of sustainability and is aligned in accordance with the following objectives (Article 1(1) of the Waste Management Act 2002):

- Protecting humans, animals, plants, their livelihoods and their natural environments
- minimising emissions from air pollutants and climate-relevant gases
- conserving resources (raw materials, water, energy, countryside, land, landfill volumes)
- no higher risk potential resulting from the recovery of primary raw materials
- landfill of waste arising from treatment without risk to future generations.

The following five-stage hierarchy is taken as the basis for the Act and for ordinances based thereon (Article 1(2) of the Waste Management Act 2002):

- Waste prevention (qualitative and quantitative)
- preparation for reuse
- recycling
- other recovery, e.g. energy recovery
- disposal.

The objectives and principles of waste management in the Waste Management Act 2002 are finally completed by the definition of "public interests" which must not be negatively affected under any circumstances when dealing with waste (in particular the collection, transportation, storage and treatment of waste (see Article 1(3) of the Waste Management Act 2002)). The avoidance of any negative effects on these public interests is also relevant for

- the classification of an item as waste in the objective sense,
- general treatment requirements for waste holders,
- the collection or treatment of waste,
- the approval of collection and recovery systems,
- the approval of treatment plants,
- waste treatment orders.

6.3.1.2. OBLIGATED PARTIES UNDER THE WASTE MANAGEMENT ACT 2002 – WASTE HOLDERS, WASTE PRODUCERS, WASTE COLLECTORS AND WASTE PROCESSORS

Waste holders – Article 2(6) subparagraph 1 of the Waste Management Act 2002

A waste holder is defined as the generator of waste or the person in possession of waste. The term "holder" is used in the Act for any such person who holds physical control of the item. The prerequisite for the possession (physical control) and ownership of waste by a person is that the waste is located within their domain, whereby the custody is determined according to the prevailing opinion. It is not under any circumstances a question of the permanent physical availability of the goods to the owner, but rather it is simply down to the fact that objects located in a specific area belonging to a person have traditionally been recognised by others as being foreign goods. The individual in question whose instructions or ideas must be followed when carrying out the work and who determines what work must be carried out, shall in effect exert their influence and shall have custody of the materials and the resulting waste according to the prevailing opinion. This complies with the case law of the Supreme Court and Administrative Court (see Supreme Court 23 February 1993, 1Ob516/93; 4 September 1998, 6Ob211/98t; 18 September 1991, 1Ob22/91; Administrative Court 20 February 1990, 90/01/0010).

The term "waste holder" is understood to be an umbrella term for waste producers, waste collectors and waste processors.

Waste producers – Article 2(6)(2) of the Waste Management Act 2002

A waste producer shall mean any such person whose activities produce waste ("original waste producer") and/or anyone who carries out pre-processing, mixing or other treatment types resulting in a change in the nature or composition of this waste.

The aforementioned criteria (i.e. physical control, general prevailing opinion, power of disposal) shall also be used for assessing the attributes of waste producers.

Waste collectors – Article 2(6) subparagraph 3 of the Waste Management Act 2002

A waste collector is any such person who picks up waste produced by others either by himself or through others, accepts the waste or is legally entitled to pick up or accept the waste.

The Waste Management Act 2002 accordingly makes a distinction with respect to the two different versions of the term "waste collector":

- waste collectors who have the waste in their physical custody given that they (or their own staff) pick it up or accept it;
- waste collectors who are only legally entitled to pick up or accept the waste.

With respect to this second version, the waste does not actually have to be physically acquired or physically transferred. The decisive point here is whether a person is authorised or not to make decisions himself (in accordance with civil law) on the acquisition, transfer or retention of waste.

The contractor who picks up the accumulated waste shall either be regarded as a waste collector or transporter according to the agreement in place. The person who brought the waste to the waste collector or waste processors in accordance with the contract shall be decisive for assessment purposes. If the contractor is free to choose which waste processors he will bring the waste to, then he shall qualify as a waste collector within the meaning of Article 2(6) subparagraph 3 of the Waste Management Act 2002.

Waste processors – Article 2(6)(4) of the Waste Management Act 2002

A "waste processor" is any such person that either recovers or disposes of waste.

Figure 98: Waste separation bins used at railway stations

6.3.1.3. OBLIGATIONS OF WASTE HOLDERS

The general obligations of waste holders are compiled in Article 15 to Article 23 of the Waste Management Act 2002. It shall in particular be standardised that the objectives and principles of Article 1 of the Waste Management Act 2002 must be observed with respect to the collection, transport, storage and treatment of waste and the handling of waste within the meaning of sustainable waste management, and any negative effects on the various public interests must be avoided. In addition to general and specific treatment requirements, obligations on keeping records, obligations in connection with the transfer and transportation of hazardous waste (consignment note) and notification and registration obligations, a number of special conditions are also specified for the treatment of waste (PCB-containing waste, waste oils, hazardous houshold waste, fats and oils and demolition waste).

The **obligations** of the waste holder include:

- General treatment requirements for the waste holder (Article 15 of the Waste Management Act 2002)
- Specific treatment requirements for the waste holder (Article 16 of the Waste Management Act 2002)
- Obligation for waste holders to keep records (Article 17 of the Waste Management Act 2002)
- Declaration of the transfer of hazardous waste by means of consignment note (Article 18 of the Waste Management Act 2002)
- Attachment of the consignment note for the transportation of hazardous waste (Article 19 of the Waste Management Act 2002)
- Notification and registration obligation for the original waste producer of hazardous waste (Article 20 of the Waste Management Act 2002)
- Registration obligations and maintenance of data in the electronic master data register for specific waste holders (Article 20 and Article 21(3) of the Waste Management Act 2002).

The specific obligations of the waste collector and processor include:

- Obligation to report a consignment note (Article 18 of the Waste Management Act 2002)
- Obligation to keep electronic records on the type, quantity, origin and whereabouts of waste (Article 17 in conjunction with the Ordinance on Waste Balance Sheets)
- Obligation to prepare and provide electronic notification of annual waste balance sheet (Article 21(3) of the Waste Management Act 2002 in conjunction with the Ordinance on Waste Balance Sheets)
- Obligation for landfill holders to prepare and provide electronic notification of waste input/output (Article 21(4) of the Waste Management Act 2002)
- Appointment of an executive manager in accordance with waste laws (only under certain conditions; Article 26 of the Waste Management Act 2002) or a responsible person.

6.3.1.4. LAWS GOVERNING THE PROFESSION OF WASTE COLLECTORS AND PROCESSORS

Anyone who collects or treats waste shall require a permit from the Head of the Provincial Government in accordance with Article 24a of the Waste Management Act 2002. This permit shall be issued upon the fulfilment of a number of specific conditions contained in the Act. The essential criteria include:

- Suitability of collection or treatment for each type of waste,
- evidence that public interests are not negatively affected in accordance with Article 1(3) of the Waste Management Act 2002,
- evidence of professional knowledge and skills,
- reliability and
- conformity with the objectives and principles of the Waste Management Act 2002.

Authorised parties pursuant to Article 24a(2) of the 2002 Waste Management Act are not subject to this obligation to obtain authorisation.

The Head of the Provincial Government may issue a number of requirements, conditions or time limits, and may withdraw granted permits under certain conditions (see Article 25a(5) and (6) of the Waste Management Act 2002).

Prior to the commencement of duties, waste collectors and processors must register in the electronic plant and personal data register (Article 21 of the Waste Management Act 2002).

If the various activities surrounding the collection and treatment of hazardous waste are not to be performed by a individual (e.g. in the case of a limited company/GmbH), or if the permit applicant cannot demonstrate himself that he has the necessary technical knowledge and skills in relation to the activity that is to be performed, then a full-time person must be appointed as an executive manager in accordance with waste laws (Article 26(1) of the Waste Management Act 2002). By way of derogation from this, municipalities must name a competent person in accordance with Article 26(4) of the Waste Management Act 2002. If the various activities surrounding the collection and treatment of non-hazardous waste (or asbestos cement) are to be carried out by a legal entity, then a responsible person must also be named (Article 26(6) of the Waste Management Act 2002). A responsible person shall, for example, be a person who is authorised to represent the entity externally, such as the commercial director or a responsible person in accordance with Article 9 of the Administrative Penalty Act.

6.3.1.5. WASTE MANAGEMENT IN ENTERPRISES

The use of proven instruments for promoting corporate waste reduction and recovery in practice is compulsory for enterprises above a certain size.

Waste officer (Article 11 of the Waste Management Act 2002)

A professionally qualified waste officer must be appointed in businesses with more than 100 employees. The appointment or dismissal of the waste officer shall be notified immediately to the district commissioner's office or to the municipal authorities in cities with their own by-laws.

The waste officer has a number of duties to provide information and advice related to any corporate waste management issues, including any waste management issues with respect to procurement. The business owner shall support the waste officer in the exercising of his duties.

Further information is contained in Chapter 6.6.2. "Waste officer".

Waste management concept (Article 10 of the Waste Management Act 2002)

A waste management concept (WMC) shall be created for plants whose operations generate waste and where more than 20 workers are employed. A WMC provides information on the type, quantity, origin and location of all waste generated during the operation of the plant, as well as on measures that are in place for the prevention and treatment of waste.

Further information is contained in Chapter 6.6.1. "Waste management concepts".

6.3.1.6. LAWS GOVERNING WASTE MANAGEMENT PLANTS

With the exception of plants listed in Article 37(2) of the Waste Management Act 2002, all waste treatment plants are subject to the Waste Management Act 2002. In general, the construction, operation and significant modifications to a treatment plant require the approval of the Head of the Provincial Government (with an option to delegate to the district administrative authority for specific plants). A distinction must in principle be made between stationary and mobile treatment plants.

For stationary waste treatment plants, the Waste Management Act 2002 makes provision in Article 38 for a concentrated approval process for any matters listed there. The concentration includes not only Federal but also provincial provisions as well, along with the structural provisions of the respective province.

In addition to the general approval process, there is also a simplified approval process and a notification procedure. The various treatment plants that are subject to approval in the simplified approval process (Article 50) and changes to a treatment plant are listed in Article 37(3) of the Waste Management Act 2002. For specific measures (Article 37(4) of the Waste Management Act 2002), the notification procedure is governed in Article 51 of the Waste Management Act 2002.

Provision is made for special standards regarding public participation in the approval process for IPPC treatment plants and incineration and co-incineration plants. There are also other special provisions in particular regarding landfills and the control of major accidents ("Seveso regime").

Provisions for mobile treatment plants, whose installation and operation shall in principle be limited to a maximum of six months, can be found in the Waste Management Act 2002 in Article 52 et seq. Certain mobile plants that are identified in a regulation in accordance with Article 65(3) of the Waste Management Act 2002 shall require approval. Any such mobile treatment plants that have similar effects on humans or the environment as stationary treatment plants are listed in this regulation. These include, for example, certain crushing and grinding plants for waste and hazardous waste treatment plants. These do not include, for example, waste disposal units, tank cleaning vehicles or disinfection devices.

The Head of the Provincial Government in whose province the permit applicant has its registered office shall be responsible for the approval of these plants. In the event that the various interests to be safeguarded via the permit are not sufficiently protected in a specific location, the authority within whose local jurisdiction the mobile plant is constructed and operated may impose additional restrictions or prohibit the operation of the mobile plant in this particular location (Article 53(2) of the Waste Management Act 2002).

6.3.1.7. TRANSBOUNDARY SHIPMENT

The transboundary shipment of waste shall in principle be governed by Regulation (EC) No 1013/2006 of the European Parliament and the Council on shipments of waste (EC Waste Shipment Regulation). In certain sub-areas, a number of implementing provisions were adopted in Article 66 to Article 72 of the Waste Management Act 2002 in accordance with this directly applicable EC regulation. This relates in particular to the national authority responsibilities, the notification, the guarantee, the reimporting obligations (provided the waste is not accepted or taken illegally) and the supervisory powers of customs agencies. Further details can be found in Chapter 6.3.6. "Transboundary shipment" and Chapter 9 "Guidelines on the shipment of waste".

Figure 99: Waste shipment on the road!

6.3.1.8. TREATMENT CONTRACTS

The administrative enforcement of waste management obligations is governed in two categories in Article 73 of the Waste Management Act 2002.

When issuing a treatment order, a decision needs to be made on whether there is a breach of duty (Article 73(1)(1) of the Waste Management Act 2002) or whether there could be negative effects on public interests within the meaning of Article 1(3) of the Waste Management Act 2002 (Article 73(1)(2) of the Waste Management Act 2002). An obligated party or a party to be obligated in accordance with Clause 1 typically refers to a party that collects, stores, transports or treats waste in an illegal manner, or is responsible for causing this illegal procedure. It does not have to be the owner of the waste. In the event that Clause 2 applies, parties to whom the waste and/or risk is attributed, i.e. the perpetrator (even if innocent) or the owner of the waste, shall be obligated.

In addition, under Article 15(5b) any party that as the obligated party as per Article 73(1) of the Waste Management Act 2002 does not hand over waste as per Article 15(5a) to an authorised waste collector or processor or does not specifically commission environmentally sound recovery or removal of the waste until the complete environmentally sound recovery or removal of the waste may be tasked with a treatment order.

In the event that the obligated person in accordance with Article 73 of the Waste Management Act 2002 cannot be identified, then provision shall be made for the subsidiary liability of the owner of the property on which the waste is located in accordance with Article 74 of the Waste Management Act 2002. If the property owner cannot be called upon either, then the municipality shall be responsible for removing any municipal waste that is illegally stored or deposited within its domain at its own cost and supplying it for environmentally sound treatment. This regulation shall not apply to disused or closed landfills. In all other cases, provision shall be made for a subsidiary liability of the Federal Government which is linked to the approval of the Federal Minister for Agriculture and Forestry, the Environment and Water Management, or for the implementation of the measures required with the costs payable by the Federal Government.

6.3.1.9. REGULATORY POWERS UNDER THE WASTE MANAGEMENT ACT 2002

The Waste Management Act 2002 sets out the basic framework for waste management legislation. The detailed configuration and implementation is typically reserved for the Federal Minister for Agriculture and Forestry, Environment and Water Management, along with partial consultation with the Federal Minister for Science, Research and Industry, by means of regulation.

6.3.2. ORDINANCES RELATING TO THE WASTE MANAGEMENT ACT 2002

- Ordinance on a List of Waste (List of Waste Ordinance), Federal Law Gazette II No 570/2003, as amended by Federal Law Gazette II 498/2008
- Ordinance on Record-Keeping Obligations for Waste (Waste Record-Keeping Ordinance), Federal Law Gazette II No 341/2012
- Ordinance on the Definition of Hazardous Waste and Hazardous Houshold Waste, Federal Law Gazette II No 227/1997, as amended by Federal Law Gazette II No 178/2000
- Ordinance on Annual Waste Balance Sheets (Ordinance on Waste Balance Sheets), Federal Law Gazette II No 497/2008
- Ordinance on the Prevention and Recovery of Packaging Waste and Specific Waste Products (Packaging Ordinance 2014) Federal Law Gazette II No 184/2014
- Ordinance on Determining Quotas for Delimiting Household Packaging and Commercial Packaging (Packaging Definitions Regulation), Federal Law Gazette II No 10/2015, as amended by Federal Law Gazette II No 29/2016
- Ordinance on Determining Total Collection Quotas for Household Packaging (Compensation Order Household Packaging) Federal Law Gazette II No 275/2015
- Ordinance Appointing the Non-Profit Packaging Coordination Body (VKS) as the Coordinating Authority, Federal Law Gazette II No 38/2015
- Ordinance on the Return and Levying of Deposits on Refillable Drinks Packaging made of Plastic, Federal Law Gazette II No 513/1990, as amended by Federal Law Gazette II No 440/2001
- Ordinance on Waste Prevention, Collection and Treatment of End-of-Life Vehicles (End-of-Life Vehicle Ordinance), Federal Law Gazette II No 407/2002, as amended by Federal Law Gazette II No 179/2010
- 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 No II No 71/2016
- Ordinance Appointing the WEEE Coordination Body (Elektroaltgeräte Koordinierungsstelle Austria GmbH) as the Coordinating Authority, Federal Law Gazette II No 206/2015
- Ordinance on Waste Prevention, Collection and Treatment of Waste Batteries and Waste Accumulators (Batteries Ordinance), Federal Law Gazette II No 159/2008, as amended by Federal Law Gazette II No 109/2015
- Ordinance on Waste Treatment Obligations (Waste Treatment Obligations Ordinance), Federal Law Gazette II No 459/2004, as amended by Federal Law Gazette II No 102/2017
- Ordinance on Quality Requirements for Compost from Waste (Compost Ordinance), Federal Law Gazette II No 292/2001
- Ordinance on Waste Oil (Ordinance on Waste Oil 2002), Federal Law Gazette II No 389/2002
- Ordinance on the Prohibition of Certain Lubricant Additives and Use of Chainsaw Oils, Federal Law Gazette No 647/1990
- Ordinance on the Recycling of Waste Wood in the Wood Material Industry (Recycled Wood Ordinance) Federal Law Gazette II No 160/2012

- Ordinance on the Obligations to be Observed in the Course of Construction and Demolition Works, the Separation and Treatment of Waste Generated in the Course of Construction and Demolition Works, and the Manufacture and End-of-Waste of Recycled Construction Materials (Recycled Construction Materials Ordinance), Federal Law Gazette II No 181/2015, as amended by Federal Law Gazette No 290/2016
- Ordinance on Landfills (Landfill Ordinance 2008), Federal Law Gazette II No 39/2008, as amended by Federal Law Gazette II No 291/2016
- Ordinance on the Separate Collection of Biogenic Waste, Federal Law Gazette II No 68/1992, as amended by Federal Law Gazette II No 456/1994
- Ordinance on the Incineration of Waste (Waste Incineration Ordinance), Federal Law Gazette II No 389/2002, as amended by Federal Law Gazette I No 127/2013
- Ordinance on Mobile Plants for the Treatment of Waste, Federal Law Gazette II No 472/2002
- Ordinance on Cost Compensation for the Operation and Maintenance of the Register Set up Pursuant to Article 22 of the Waste Management Act 2002 (Ordinance on the Reimbursement of Expenses of EDM), Federal Law Gazette II No 404/2011

6.3.3. HAZARDOUS WASTE

In accordance with Article 4(2) of the Waste Management Act 2002, the Federal Minister for Agriculture and Forestry, Environment and Water Management shall be authorised by means of regulation to determine all waste types that are hazardous. The inclusion of a substance in the list does not necessarily mean that this substance is waste under all circumstances. Determining whether a substance is waste comes down to whether it meets the subjective or objective definition of waste.

To do this, the hazardous properties listed in Annex III of Waste Framework Directive 2008/98/EC, as amended by Regulation (EU) 1357/2014 (e.g. "explosive", "oxidising" "flammable", "irritating to skin and eyes", "specific target organ toxicity (STOT)/aspiration hazard", etc.) should be used. Furthermore, all waste types that are deemed to be hazardous at Union level must be included.

Annex III of Waste Framework Directive 2008/98/EC was last amended by Commission Regulation (EU) No 1357/2014 of 18 December 2014 and the hazardous properties were adjusted to EU CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation). Due to the amendment of the List of Waste Ordinance, the hazardous properties of wastes that have been harmonised by virtue of EU Regulation No 1357/2014 shall be fed into the List of Waste Ordinance and/or hazardous properties that have not been harmonised as of yet shall be specified more precisely at a national level. Furthermore, the provisions on the assessment of hazardous properties considering Commission Decision No 2014/955/EU as well as the criteria relevant for the assigment to the individual waste types shall be adapted accordingly.

In Austria, hazardous waste is determined by the List of Waste Ordinance, Federal Law Gazette II No 570/2003. The current waste catalogue can be found on the EDM portal (www.edm.gv.at).

The following are deemed to be hazardous waste in accordance with Article 4 of the List of Waste Ordinance:

1. Waste that is explicitly described as hazardous in more detailed catalogues. The decisive part is the appendix "List of wastes" to the List of Waste Ordinance, which the ÖNORM S 2100 "List of wastes", issued on 1 October 2005, declares as binding along with the changes to the List of Waste Ordinance.
2. Waste which contains hazardous substances to a certain extent, or which is mixed with such substances, meaning that, even with a basic assessment such as an evaluation of the relevant mass fraction, a hazardous property in accordance with the List of Waste Ordinance cannot be excluded.
3. Specific types of excavated material:
   - Excavated material from sites where, as a result of handling substances which are hazardous for soil or water, there is reason to suspect a hazardous property as per Appendix 3 (e.g. metal or mineral oil processing plants, petrol stations, dry cleaners, factories within the chemical industry, gas works or contaminated sites); this shall apply to all areas of the site in which these substances were handled;
   - Excavated material from sites if contamination becomes apparent in the course of excavation or clearing activities and there is reason to suspect a hazardous property as per the List of Waste Ordinance;
   - Excavated material from sites if there is reason to suspect a hazardous property as per the List of Waste Ordinance as a result of contamination due to a breakdown or an accident;

- Excavated material that does not fall into one of the above points, but which is determined by chemical analysis as being contaminated in such a way that it has at least one hazardous property as per the List of Waste Ordinance.

4. Waste that was classified as being hazardous and subsequently solidified (stabilised), i.e. tightly embedded in a matrix, shall be deemed to be hazardous even after solidification (stabilisation).

The List of Waste Ordinance definitively governs which types of waste are hazardous. It is inevitable that, for certain hazardous waste types in marginal areas, non-hazardous waste that does not have any hazardous properties is also included. In order to take this fact into account and to help production processes move towards "cleaner production", evidence may be provided in individual cases to prove that waste listed as being hazardous has no hazardous properties (declassification).

The declassification in Article 7(3) of the Waste Framework Directive and Article 3 of Decision 2000/532/EC establishing a list of wastes, last amended by the Commission Decision of 18 December 2014 applies across the EU. Member States have the option of issuing provisions that require the waste holder to provide sufficient evidence in exceptional cases that certain types of waste contained in the catalogue do not have any hazardous properties.

This option and a declassification procedure is implemented in Article 4(3) and (7) of the Waste Management Act 2002.

The declassification can be introduced by

- the waste holder or landfill holder for a certain amount of a specific waste (single-batch declassification),
- the waste producer and landfill holder for specific waste from a defined energy generation, production or waste treatment process with consistent quality in relation to the limit values to be complied with for the respective treatment (waste stream declassification) or
- the waste producer and landfill holder for specific waste from a defined energy generation, production or waste treatment process with consistent quality in relation to the limit values to be complied with for the respective treatment (recurring waste declassification)

by means of notification. The competent authority is the Federal Minister for Agriculture and Forestry, Environment and Water Management. Notifications can be sent by post to the address Department V/6, Stubenbastei 5, 1010 Vienna, and via email to Abt.56@bmlfuw.gv.at.

In accordance with Article 16(1) of the Waste Management Act 2002, since 16 July 2001 it has been prohibited to deposit hazardous waste on above-ground landfills, i.e. the waste must either be declassified (if permitted) prior to any above-ground landfilling or subjected to alternative treatment processes. The sole exception is asbestos waste, which may be landfilled above ground under certain conditions for non- hazardous waste (see Article 10 of the Landfill Ordinance 2008).

6.3.4. WASTE DATA COLLECTION – ELECTRONIC NOTIFICATION OF WASTE BALANCE SHEETS

The Ordinance on annual waste balance sheets (Ordinance on Waste Balance Sheets) was promulgated in Federal Law Gazette II No 497/2008 on 23 December 2008 with the aim of collecting basic data in order to fulfil EU reporting requirements, improving data resources for waste management planning and the traceability of waste streams. The main content of the regulation is the annual obligation for waste collectors and processors subject to record-keeping requirements to submit annual waste balance sheets to the responsible Head of the Provincial Government; this is already provided for in Article 21(3) of the Waste Management Act 2002.

A comprehensive balance sheet notification must be compiled each year and must in particular include details on acquisitions of waste from other legal entities, transfers of waste to other legal entities, internal waste movements and storage information.

Furthermore, the Ordinance on Waste Balance Sheets contains provisions relating to the registration of waste collectors and processors (i.e. supplements to the master data) in the electronic register in accordance with Article 22 of the Waste Management Act 2002, the electronic keeping of records on the type, quantity, origin and destination of waste and the electronic transmission of records and summaries if required by the authorities.

By introducing the concept of waste balance sheets and electronic record-keeping requirements, this should help improve the traceability of waste streams as well as improve transparency in the proper collection and treatment of waste.

The introduction of Electronic Data Management in this area will enable a reduction in the necessary administrative costs for data collection and monitoring, especially when compared to paper- based operating procedures.

With respect to the keeping of records, the existing provisions for data collection contained in the Ordinance on the recording obligation for waste 2003 (Waste Record-Keeping Ordinance 2003) for waste collectors and processors shall be replaced by the Ordinance on Waste Balance Sheets. The recording requirements contained in Article 1 to Article 4 of the Waste Record-Keeping Ordinance 2003 are only directed de facto to waste producers and to those particular waste collectors and processors who are excluded from the scope of the Ordinance on Waste Balance Sheets.

6.3.4.1. ELECTRONIC DATA MANAGEMENT ENVIRONMENT (EDM)

Description and objectives

The e-government programme Electronic Data Management Environment (EDM) has long been a central strategic area for the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW). EDM includes a composite system of internet applications and databanks to support authorities and companies in complying with their legally prescribed environmental documentation, notification and reporting obligations.

The primary legal basis for the e-government initiative of the Federal Ministry of Agriculture, Forestry, Environment and Water Management is the Waste Management Act 2002. The Federal Minister for Agriculture, Forestry, Environment and Water Management is empowered to also use the EDM system for spheres of responsibility other than waste management to perform his tasks. The same applies to the Federal Minister for Research and Industry, the Federal Minister for Health and Women's Affairs, the Federal Minister for Finance and the provincial governments, which may use the EDM system in consultation with the Federal Ministry of Agriculture, Forestry, Environment and Water Management to perform specific tasks. In recent years, EDM has put 23 internet-based e-gov applications into operation, ranging from end- of-life vehicles to the central Radiation Protection Register. Despite the differences in these topics, EDM, with its central master data management (ZAReg), offers a common base for all applications.

EDM means:

- Environmental protection: Early detection of environmental problems, if possible before damage occurs
- Legal compliance: Supporting compliance with (environmental protection) provisions
- Reducing administrative costs by increasing efficiency: up to €5 million a year
- Data analysis: a decision-making tool for policy and administration.

Previous achievements

The project to build a database system to collect waste management data (e.g. waste data network, plant database, waste allocation database, Landfill Ordinance database) started back in the 1990s. The first EDM application, supporting notification and reporting obligations for end-of-life vehicles, was put into operation.

in late 2003, along with an initial version of central in-house master data management. Due to the obvious increased efficiency from the conversion from reporting via hard copy or fax to digital preparation and transmission, further waste management and environmental applications progressively followed. EDM rapidly supported notifications on such items as the European Pollutant Release and Transfer Register (PRTR), emissions from incineration plants, the return and recycling of waste electrical and electronic equipment and packaging, the recording of plants involved in emissions trading (emission allowances) and notifications on the marketing of fluorinated industrial gases (HFCs).

Since the EDM was put into operation, there has been a continuous increase in the number of registered companies and of digitally recorded locations and plants.

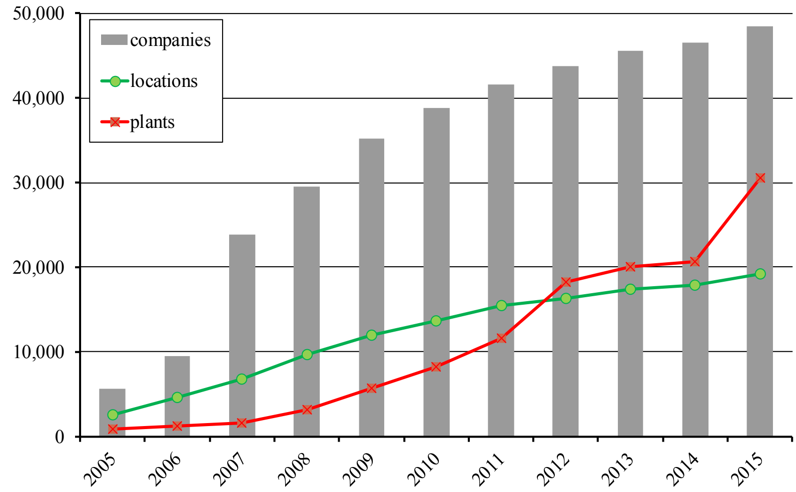

Figure 100: Development of EDM data stock

At the end of 2015, EDM included the data of about 50,000 registered companies, 20,000 locations and 35,000 plants. Annually, more than 850,000 notifications are handled via EDM (from various legal areas ranging from waste management, air and water purification to radiation protection).

More than 1,300 authority employees of all administrative levels work with EDM, persons and companies subject to reporting requirements (e.g. waste collectors and processors, generators of hazardous waste, authorised personnel, technical institutions, experts) and plant operators and holders subject to reporting requirements (e.g. operators of incineration plants, large industrial and business facilities and wastewater treatment plants).

Electronic data management by the Federal Ministry of Agriculture, Forestry, Environment and Water Management is a unique e-government programme in Europe. This has also been reflected in international prizes and awards. As well as winning the Eurocloud Awards in Luxembourg, the EDM was awarded a "Best Practise Certificate" at the European public administration awards in Maastricht

Current implementation status

New master data register ZAReg

Milestones in EDM developments included the commissioning of a completely redesigned, modern version of the central plant register ZAReg in October 2015.

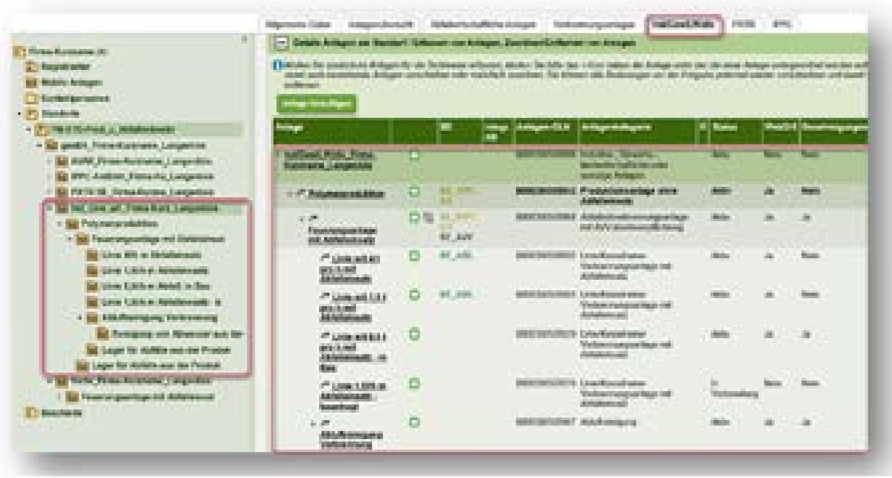

Figure 101: ZAReg plant register

ZAReg 1.0 supports not only the efficient information and reporting system of the EDM but is also consistently developing knowledge management in the environmental area. Environmental information (particularly regarding plants, air and water emissions and waste) is in many cases structured into specific areas. Comprehensive evaluations also offer significant support to authorities in ensuring the efficient implementation of environmental law. The knowledge already contained in the system, which is regularly improved through comprehensive evaluations, not only brings about improved user interfacing with background testing rules – thereby helping to present applicable regulations for users in a simpler and more comprehensible manner – but also supports compliance with obligations. With the central plant register connected to EBB, the EDM user area, those subject to reporting requirements can for example be reminded when notification periods are approaching expiry.

EDM as a register of approvals

To illustrate structured personnel and plant-related approval content in the waste area (approved waste types, input, air and water limit values), automatic consolidation of contents during input, i.e. for successive decisions. has been implemented, meaning that the content of any specific concrete approval and the resulting "consolidated" approval scope is visible at all times. With the implementation of the EU Directive on industrial emissions which entails an obligation to publish the approval content for IPPC plants and an environmental inspection to be conducted regularly (every one to three years) in these plants to check for compliance with the environmental approval content, the IT-supported consolidation/summary has now been extended to include less structured areas.

If the EDM correctly applies the rules for recording approvals, this enables automated adaptation of approval content in the EDM to specific amendments to legal provisions – e.g. the current adaptation of permits for the collection and treatment of waste to the provisions of the Recycled Construction Materials Ordinance.

EDM and expert reports

The EDM application, eExpert opinions 1.0, was successfully put into operation at the end of May 2016. By using this EDM application for landfills, the landfill holder can access information, before waste is delivered, on which delivery it relates to and can conduct a plausibility test in advance. The EDM provides support with a traffic light system and control messages. All of this is documented in the EDM. Upon actual delivery, all that needs to be checked now is whether the waste actually corresponds to the expert report, i.e. through visual inspection or spot checks. Ultimately it makes it easier to run a landfill properly. The cost of checking whether legal provisions have been complied with is thus reduced by up to 90% through the implemented and scalable test regulations, through automated calculations and through the displaying of the results of limit value comparison per application.

Alongside the eGutachten application, the EDM user area, EBB, was also put into operation. The EDM user area will in future be the central entry point to the EDM from whence all its information can be accessed. It is thus an integral part of all EDM specialist applications. With the introduction of the EBB the procedures and underlying processes have been harmonised. The EDM user area enables the direct exchange of information and news between businesses and authorities in a secure, comprehensible environment.

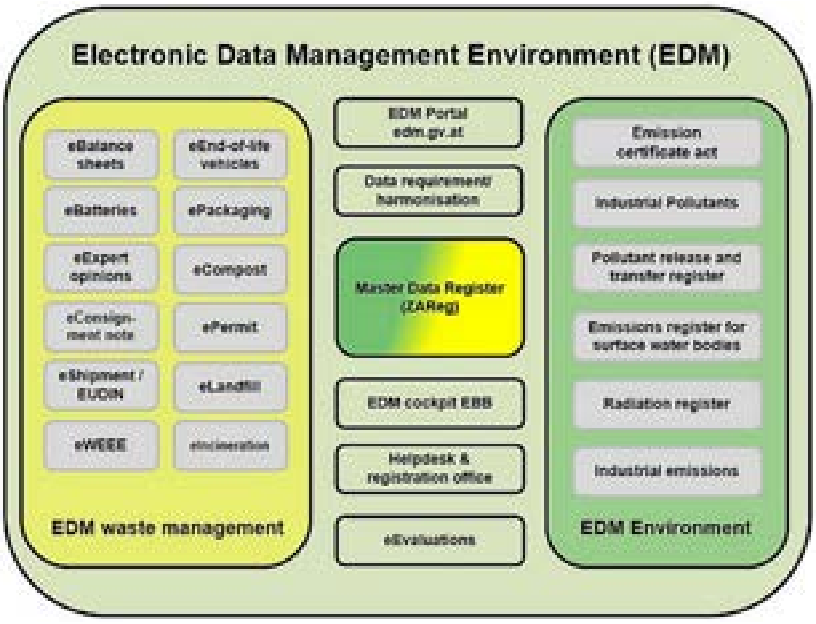

Figure 102: Graphical representation of applications in the EDM

EDM and standardised check-lists during implementation

For many tasks such as monitoring tasks or those of public administration in the environmental area, standardised check-lists were and are drawn up jointly with experts from business, the legislative sphere and execution (Federal Government and provinces) and mapped and implemented in the EDM. The following areas are already supported or will be in the near future:

- electronic templates for environmental inspection reports
- check-lists for verification by the landfill supervisory body
- structural templates for uniform, standardised project applications for plant approval.

All check-lists support those involved to fulfil their tasks.

Outlook

The EDM is increasingly becoming a "single point of information" in the environmental area. With its comprehensive and integrative approach, it pursues the aim whereby information is only recorded electronically at the location where the data is first generated. This data is then made available to all authorised persons/authorities to perform their tasks without having to switch media. As well as efficiently processing notifications, IT support is increasingly featuring in the entire processing chain for administrative procedures. From a pure information and notification system, this will give rise to an increasingly task-oriented, knowledge-based IT system that supports users in performing their tasks and duties through the application of modern IT technology and the use of explicit knowledge (recorded master and transaction data) and implicit knowledge (testing rules, wizards) simplifies matters for companies and authorities and increases administrative efficiency and the effectiveness of laws and regulations. With the recorded data and comprehensive analysis possibilities, the EDM is an important tool for outcome-oriented administration in the environmental area.

6.3.5. EU 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 suitable for this purpose:

- Creation of a uniform set of working concepts
- data recording, analysis, and assessment
- creation of uniform, high-level standards
- introduction of suitable approval and inspection procedures
- restrictions and bans
- reporting requirements.

When the Single European Act entered into force on 1 July 1987, a special chapter on the environment was added to the EC Treaty (ECT, Article 100a of the EC Treaty, now Article 95 EC and Article 130 r et seq. of the EC Treaty, now Article 174 EC), which also forms the basis for waste legislative measures. When the Treaty of Lisbon entered into force in 2009, the Treaty establishing the European Community (EC) was renamed to the Treaty on the Functioning of the European Union (TFEU). The existing Article 95 EC became Article 114 TFEU and the existing Article 174 EC became Article 191 TFEU. The Articles did not however experience any substantive changes.

Like environmental measures in general, waste legislation may be based either on Article 191 TFEU or on Article 114 TFEU. The selection of the legal basis depends on whether the primary focus is on harmonisation measures related to the internal market or on environmental protection measures.

Article 114(4) TFEU 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. Article 114(5) TFEU provides for the option of introducing 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. These Regulations shall be assessed by the Commission and either approved or rejected.

For legislation that is based on Article 191 TFEU, Article 193 TFEU shall make it possible to maintain or adopt more stringent measures that are to be agreed within the Treaty.

The judgement of the European Court of Justice on Directive 75/442/EEC on waste (Waste Framework Directive: previous provision to Waste Directive 2008/98/EC) was decisive for selecting the legal basis for many national waste management laws. In this judgement, the Court of Justice confirmed that the Waste Framework Directive aims at efficient waste management and that Article 175 EC (formerly Article 130s of the EC Treaty) should therefore be used as the legal basis. Ever since, both the Waste Framework Directive as well as the EC Waste Shipment Regulation have been supported by Article 175 EC (formerly Article 130s of the EC Treaty). Directives concerning incineration plants, landfills, end-of-life vehicles and waste electrical and electronic equipment are also supported by Article 175 EC (now Article 192 TFEU).

Each Directive must be implemented within a certain deadline by the Member States. Each country must issue a law or regulation corresponding to its own legal system. EU regulations shall apply directly, i.e. they do not need to be adopted by the national parliaments or ministries. There are EU regulations for example on the transboundary shipment of waste (EC Waste Shipment Regulation) or on criteria to determine when specific types of waste are no longer to be considered waste.

6.3.5.1. EU DIRECTIVES, REGULATIONS AND OTHER LEGISLATION

The following EU directives and regulations provide the basis for European waste management. They are supplemented by 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

Waste Framework Directive 2008/98/EC replaced Waste Framework Directive 2006/12/EEC, Directive 91/689/EEC on hazardous waste and Waste Oil Directive 75/439/EEC and was transposed into the Waste Management Act in Austria by the amended Waste Management Act 2010.

This Waste Framework Directive encompasses the following key points:

- five-stage waste hierarchy (prevention, preparation for reuse, recycling, other recovery, disposal)
- waste prevention (waste prevention programme as an obligation for Member States, as well as a Commission mandate within the field of waste prevention)
- definitions of key waste-related concepts, such as waste, recovery and disposal
- clarification of the end-of-waste (early termination of waste status)
- clarification of by-products – distinction from waste
- extension of responsibility of the waste producer
- recycling and recovery aims (including preparation for reuse) for household waste and similar waste along with construction and demolition waste.

Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Directive 75/442/EEC on waste and Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, last amended by Decision 2014/955/EC amending Decision 2000/532/EC establishing a list of waste

This catalogue covers various waste types according to origin (generation) using a waste code and a description, and determines which waste is deemed to be hazardous waste, but this is not an exhaustive list.

The use of national catalogues is compatible with the objectives and principles of Community waste management law. The European Waste Catalogue shall be binding with respect to the definition of waste as being hazardous. However, individual Member States can deviate from this definition taking hazardous properties into account and must notify this immediately to the Commission.

Council Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture, last amended by Council Regulation (EC) No 219/2009

The Directive lays down limit values for concentrations of heavy metals in soils onto which sewage sludge will be applied and for sewage sludge intended for use in agriculture. Implementation is the responsibility of the individual provinces

Council Directive 96/59/EC on the disposal of polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs), last amended by Regulation (EC) No 596/2009

This Directive imposes inventory and labelling obligations and prohibits filling transformers with PCB; moreover, it imposes the obligation to decontaminate transformers.

This Directive is transposed by the Austrian Ordinance banning halogenated substances, Federal Law Gazette No 210/1993 (Halogen Ordinance) and the Waste Management Act 2002 (AWG 2002), Federal Law Gazette I No 102/2002.

Plan and principles for decontamination and/or disposal of PCB-containing devices pursuant to Article 11 of Directive 96/59/EC on the disposal of polychlorinated biphenyls and terphenyls

With the Ordinance banning certain halogenated substances, Federal Law Gazette No 210/1993 (Halogen Ordinance) and the Waste Management Act 2002, Federal Law Gazette I No 102/2002 (AWG 2002), the Austrian legal system has a plan for decontaminating and disposing of PCB-containing devices.

The time line for this plan entailed as of 24 March 1993

- a ban on the distribution of devices that contain PCBs[6],
- a ban on the manufacture and distribution of PCBs and preparations containing PCBs,
- a ban on the manufacture and distribution of finished goods containing PCBs,
- a ban on the use of hydraulic systems that contain hydraulic liquids with more than 30 ppm PCB.

Electrical equipment with more than 1 litre of liquid in operation as at 24 March 1993, or groups of electrical equipment that are spatially connected and contain more than 2 litres of liquid, and having an apparent PCB concentration of more than 30 ppm, had to be labelled in accordance with Article 4(1) and (2) of the Halogen Ordinance and reported to the Federal Minister for Agriculture and Forestry, Environment and Water Management by 24 March 1994.

Electrical equipment having a content of more than 1 litre of liquid, if PCB contamination is suspected, had to be analysed when taken out of service, at the latest by 31 December 1996, and had to be labelled and reported to the Federal Minister for Agriculture and Forestry, Environment and Water Management at the latest by 31 December 1996 if a PCB content greater than 30 ppm was found.

In line with the PCB concentrations determined, the following periods had to be complied with for taking the electrical equipment out of service (Article 8 Halogen Ordinance):

- The use of electrical equipment subject to labelling requirements – with the exception of transformers – having more than one litre of liquid was permitted until the equipment was taken out of service, which was to be done no later than 31 December 1996.
- The use of transformers subject to labelling requirements and having a PCB concentration greater than 500 ppm was permitted until they were taken out of service, which was to be done no later than 31 December 1999.
- The use of PCB-contaminated transformers with a concentration of less than 500 ppm is permitted until they are taken out of service.

The Waste Management Act 2002 (Article 16(2)) includes the obligation to hand over waste containing PCBs (with total content of over 30 ppm) immediately to an authorised waste collector or processor and to dispose of it in plants approved for that purpose. Alternative procedures are permitted to the extent that they meet the same environmental protection specifications as incineration and correspond to the state-of-the-art. Furthermore, the separating out of other substances for the purpose of reusing is not permitted in accordance with the Waste Management Act 2002. If the PCB-containing devices are components of other devices, they should be removed and collected separately if this can be done at reasonable expense.

The treatment requirements for waste containing PCBs are specified in Article 27 et seq. of the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004. In particular, metals recovered from devices containing PCBs must be decontaminated in line with the state of the art.

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[6] PCBs include all congeners of polychlorinated or halogenated biphenyls, polychlorinated or halogenated terphenyls, halogenated naphthalenes, mono-methyl-dichloro-diphenyl methane (Ugilec 141), monomethyl-dichloro-diphenyl methane (Ugilec 121 or Ugilec 21), monomethyl-dibromo-diphenyl methane (DBBT) and other halogenated diphenylmethanes.

As part of the Basel Convention, two new guidelines were issued in 2015 (Decision 12/3 of the Conference of the Parties[7]) for the environmentally sound management (including the use of alternative treatment processes) of POPs or PCBs:

- Updated General Technical Guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants;
- Updated Technical Guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with polychlorinated biphenyls, polychlorinated terphenyls or polybrominated biphenyls including hexabromobiphenyl.

Regulation (EC) No 850/2004 on persistent organic pollutants and amending Directive 79/117/EEC, as last amended by Regulation (EU) No 2016/293

The aim of this directly applicable Regulation is to protect human health and the environment from persistent organic pollutants – POPs by

- banning or phasing out as early as possible or placing restrictions on the manufacture, distribution and use of substances that come under the Stockholm Convention on persistent organic pollutants or the 1998 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants, and
- restricting releases of such substances to a minimum with the aim of phasing such releases out as soon as possible as far as practicable and
- laying down provisions on waste consisting of, containing or contaminated with such substances.

For waste consisting of, containing or contaminated with the substances listed in Annex IV of the POPs Regulation, Article 7 of the POPs Regulation specifies a destruction requirement as a treatment principle.

This means that persistent organic pollutants contained in this waste must be destroyed or irreversibly transformed into substances that do not exhibit similar characteristics. To do this, POPs waste must be thermally or chemically treated in a plant approved for this purpose (D9, D10 and R1). For specific waste containing metals and metal compounds as mentioned in Annex V of the EC POPs Regulation, recycling/recovery of metals and metal compounds (R4) is permissible under certain conditions. Furthermore, the Waste Management Act 2002 (Article 16) in accordance with the POPs Regulation provides the option of long-term underground depositing of the POPs waste mentioned in Annex V Part 2 of the POPs Regulation in safe, deep, underground, hard rock formations, salt mines or landfills for hazardous waste, in accordance with Annex V Part 2 of the EC POPs Regulation up to the limit values mentioned in that Annex. The owner of the POPs waste must demonstrate that this different treatment is in accordance with best environmental practice.

Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)

The Directive on industrial emissions entered into force on 6 January 2011 and replaced Directives 78/176/EEC (Directive on waste from the titanium dioxide industry), 82/883/EEC (Directive on procedures for the surveillance and monitoring of environments concerned by waste from the titanium dioxide industry), 92/112/EEC (Directive on procedures for harmonizing the programmes for the reduction and eventual elimination of pollution caused by waste from the titanium dioxide industry), 1999/13/EC (Directive on the limitation of emissions of volatile organic compounds (VOC)), 2000/76/EC (Waste Incineration Directive) and 2008/1/EC (IPPC Directive) on 7 January 2014 and Directive 2001/80/EC on 1 January 2016.

For IPPC (Integrated Pollution Prevention and Control) plants, an integrated plant approval, i.e. approval extending to all environmental media (air, water, waste, soil, energy), is required.

Compared with the IPPC Directive, the provisions of the Industrial Emissions Directive for waste treatment plants are extended and relate in particular to

- the publication of approvals
- where applicable, the preparation of a report on the baseline condition of soil and groundwater on the site of the treatment plant
- the return of the terrain to baseline condition after the treatment plant stops operations
- the application of BAT conclusions
- the tightening up of provisions regarding inspections

[7] http://www.basel.int/Implementation/POPsWastes/TechnicalGuidelines/tabid/5052/Default.aspx

The Industrial Emissions Directive has been transposed into waste legislation via the Waste Management Act 2002 (Federal Law Gazette I No 2013/103) and the Waste Incineration Ordinance.

Regulation (EU) No 333/2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC

This EU Regulation entered into force on 28 April 2011, has been applicable since 9 October 2011 and regulates the end-of-waste criteria for iron, steel and aluminium uniformly across the EU.

Regulation (EU) No 1179/2012 establishing criteria determining when glass cullet ceases to be waste under Directive 2008/98/EC

This EU Regulation, which has been applicable since 11 June 2013, regulates the end-of-waste criteria for glass cullet recovered from used glass uniformly across the EU.

Regulation (EU) No 715/2013 establishing criteria determining when copper scrap ceases to be waste under Directive 2008/98/EC

This EU Regulation, which has been applicable since 1 January 2014, regulates the end-of-waste criteria for copper scrap uniformly across the EU.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Directive 96/82/EC (Seveso III Directive)

Like its predecessor, the SEVESO II Directive, the SEVESO III Directive aims to prevent major accident hazards involving dangerous substances and to limit their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community in a consistent and effective manner.

The Directive is applicable to all plants in which hazardous substances are present in certain amounts or at which an accident might occur, provided that they contain the same or greater amounts as those specified in the Annex. Establishments must be classified as either "lower-tier establishments" or "upper-tier establishments".

The Directive contains operator obligations in relation to the transmission of specific notifications and information to the competent authority, the development and implementation of a plan by operators to prevent major accidents, and the preparation of safety reports and emergency plans. The Directive regulates requirements relating to regional planning and contains provisions for inspection and public disclosure.

Directive 2011/92/EU on the assessment of the impact of certain public and private projects on the environment

The EIA Directive provides for a comprehensive, integrated assessment of the possible environmental impact of a project on people, flora, fauna, soil, water, air, the climate, and countryside, material goods and cultural heritage, as well as possible interactions among these areas, with broad public participation before a decision is made regarding the application for authorisation.

The scope of this Directive also includes specific waste treatment plants.

Directive 2000/53/EC on end-of-life vehicles, as last amended by Directive 2013/28/EU

See Chapter 6.4.2 "End-of-life vehicles".

Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC, as last amended by Directive 2008/12/EC

See Chapter 6.4.5 "Batteries and accumulators".

Directive 2012/19/EU on Waste Electrical and Electronic Equipment

See Chapter 6.4.4 "Electrical and Electronic Equipment"

Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, as last amended by Delegated Directive 2015/863/EC

See Chapter 6.4.4 "Electrical and Electronic Equipment".

Directive 94/62/EC on packaging and packaging waste, as last amended by Directive 2015/720/EU

See Chapter 6.4.3 "Packaging".

Directive 1999/31/EC on the landfill of waste, as last amended by Directive 2011/97/EU

See Chapter 6.5.3 "Landfill".

Council Decision 2003/33/EC establishing criteria and procedures for acceptance of waste at landfills pursuant to Article 16 and Annex II to Directive 1999/31/EC

See Chapter 6.5.3 "Landfill".

Regulation (EC) No 1013/2006 on shipments of waste, as last amended by Regulation (EU) No 2015/2002

Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste amends Regulation (EEC) No 259/93 on the supervision and control of shipments of waste within, into and out of the European Community (EC Waste Shipment Regulation). As an EC Regulation, it is directly applicable law in the Member States. Further information can be found in Chapter 6.3.6 "Waste shipment" and Chapter 9 "Guidelines on the shipment of waste".

Regulation (EC) No 2150/2002 on waste statistics, as last amended by Regulation (EU) No 849/2010

This Waste Statistics Regulation stipulates that statistics on waste accumulation and waste recovery and disposal must be compiled and reported.

Data collection in Austria is based on the EDM system.

Decision No 1386/2013/EU on a General Union Environment Action Programme to 2020 "Living well, within the limits of our planet"

The EU Environment Action Programme was presented by the European Commission in late 2013 and sets out the aims of European environmental policy for the coming years. The 6th Environmental Action Programme (EAP) ended in 2012.

The 7th EAP has the following priority objectives for the Union up to 2020:

- to protect, conserve and enhance the Union's natural capital;
- to turn the Union into a resource-efficient, green and competitive low-carbon economy;
- to safeguard the Union's citizens from environment-related pressures and risks to health and well-being;
- to maximise the benefits of Union environment legislation;
- to improve the knowledge and evidence base for Union environment policy;
- to secure investment for environment and climate policy and address environmental externalities;
- to improve environmental integration and policy coherence;
- to enhance the sustainability of the Union's cities;
- to increase the Union's effectiveness in addressing regional and global environmental and climate-related challenges

Under the thematic priority (objective 2: to turn the Union into a resource-efficient, green, and competitive low-carbon economy) of the 7th EAP, in December 2015, the European Commission presented, inter alia, **the Communication "Closing the loop – an EU Action Plan for the Circular Economy" and a proposal to revise six Waste Directives**.

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 contains an export ban for mercury as well as disposal requirements for specific mercury.

6.3.5.2. EU COMMISSION PROPOSALS

The following proposals are currently being discussed:

Under the circular economy package:

- Proposal for a directive to amend Directive 2000/53/EC on end-of-life vehicles, Directive 2006/66/EC on batteries and accumulators and Directive 2012/19/EU on waste electrical and electronic equipment (COM(2015) 593 final)
- Proposal for a directive to amend Directive 1999/31/EC on the landfilling of waste (COM(2015) 594 final)
- Proposal for a directive to amend Directive 2008/98/EC on waste and repeal specific directives (COM(2015) 595 final)
- Proposal for a directive to amend Directive 94/62/EC on packaging and packaging waste (COM(2015) 596 final).

Other proposals:

- Proposal for a regulation on mercury and for the repeal of Regulation (EC) No 1102/2008 (COM(2016) 39 final)
- Proposal for a regulation with provisions on the making available on the market of CE-marked fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 (COM(2016) 157 final).

6.3.5.3. WASTE REPORTING REQUIREMENTS IN THE EUROPEAN UNION

General

Most reports relate to the implementation of specific directives in the Member States, which are only binding in terms of content. Most ready-made questionnaires inquire as to the transposition of each article of a directive into national law. These reports must be regularly submitted every three years but a simplification is planned.

Furthermore, certain provisions require the creation of national programmes (e.g. Packaging Directive) that must also be submitted to the European Commission and reviewed periodically.

Measures relating to manufacturer responsibility have been introduced by a range of EU directives. Data is required to effectively monitor whether Member States are meeting the objectives set out in the Directives. These include the Directives on packaging waste, end-of-life vehicles, batteries and waste electrical and electronic equipment. These Directives contain collection and recovery objectives, compliance with which must be effectively checked through regular queries relating to the products distributed and the waste collected (collection quotas) in the Member States and to the reused and recovered waste including any material recovery quotas and other recovery quotas in the Member States.

In addition, documents which must contain a description of the used data as well as the data evaluation method are also requested.

To monitor the implementation of waste policy in the European Union, the European Commission regularly requires statistical data on the generation and treatment of hazardous and non-hazardous waste. This data is collected in EU countries on the basis of the Regulation on Waste Statistics (2150/2002/EC) and published by Eurostat, the statistical office of the European Commission, every two years in accordance with the joint recommendations on methodology. Eurostat also collects data on the generation and management of municipal waste and the transboundary shipment of waste.

Reporting obligations in the directives/regulations

The following list indicates the various reporting requirements as well as the various obligations and programmes that are to be created and updated on a regular basis.

Table 68: EU reporting requirements

Regulation	Reporting requirements
Directive 2008/98/EC on waste	Report on the implementation, every three years Report on progress on recycling/recovery objectives (Article 11), every three years
EU Sustainable Development Strategy (2006)	The sustainable development indicator (SDI) for municipal waste is updated every year. The questionnaire collects data on the volume and treatment of municipal waste. Recycling and composting are shown separately.
Regulation (EC) No 2150/2002 on Waste Statistics	Data on the volume and disposal of waste, every two years
Directive 2006/66/EC on batteries and accumulators and Regulation (EU) No 493/2012 on waste batteries and accumulators with implementing provisions for calculating the efficiency of recycling processes for waste batteries and accumulators in accordance with Directive 2006/66/EC	Report on the implementation, every three years Report on measures to promote developments that affect the environmental impact of batteries and accumulators (reduction in volumes of heavy metals and other hazardous materials, new recycling and treatment technologies, etc.), every three years Report on used batteries collected and the recycling efficiency of treatment plants, annually
Directive 94/62/EC on packaging and packaging waste Decision 2005/270/EC establishing the formats relating to the database system	Report on the implementation, every three years Data on the extent, characteristics, and development of packaging and packaging waste volumes, recycling materials, and materials that are disposed of, to be done annually
Directive 2000/53/EC on end-of-life vehicles	Report on the implementation, every three years
Decision 2005/293/EC on compliance with targets	Data on the reuse, recovery, and disposal of materials, to be done annually
Decision 2005/369/EC laying down rules for monitoring compliance of Member States and establishing data formats for the purposes of Directive 2002/96/EC on waste electrical and electronic equipment (notified under document number C(2005) 1355) Directive 2012/19/EU on Waste Electrical and Electronic Equipment	Number and weight of devices distributed, collected and recovered, annually Report on the implementation, every three years
Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture	Report on the implementation, every three years
Directive 1999/31/EC on the landfill of waste	Report on the implementation, every three years
Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)	Report on the implementation of this Directive, on representative emissions data and other types of environmental pollution, on emission limit values, on the application of the best available techniques and on progress made in developing and applying emerging techniques, every three years
Regulation (EC) No 1013/2006 on shipments of waste	Report on waste shipments, to be done annually In accordance with the Basel Convention, an annual report on exported and imported waste must be submitted to the Basel Secretariat and a copy of the report must be submitted to the Commission in accordance with the Waste Shipment Regulation.
Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances	Report on the implementation and notification of SEVESO III plants, every four years Report on major accidents occurring
Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive) and Directive 2006/66/EC on batteries and accumulators and/or Regulation (EC) 765/2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products	Compliance with the RoHS provisions and with the limit values set out in the Battery Directive: The Member States regularly review and assess the functioning of their surveillance activities. These reviews and assessments are carried out at least every four years and their results are communicated to the other Member States and to the European Commission.

6.3.6. WASTE SHIPMENT

6.3.6.1. TRANSBOUNDARY SHIPMENT

Regulation (EC) No 1013/2006, Regulation (EC) No 660/2014

The shipment of waste is uniformly regulated at EU level through the implementation of the Basel Convention and of the OECD decisions on the control of transboundary movements of waste for recovery by Regulation (EC) No 1013/2006 on the shipment of waste (hereafter EC Waste Shipment Regulation), as amended by Regulation (EU) No 660/2014.

The EC Waste Shipment Regulation stipulates the supervisory procedure that must be applied for transboundary shipments. The question of which process applies depends on

1. the intended treatment process (recovery or disposal),
2. the type of waste for the recovery of specific waste and
3. the country of destination (inside/outside the EU).

The shipment of waste to third countries (excluding the EFTA states Iceland, Norway, Switzerland and Liechtenstein) for disposal is generally prohibited.

The export of non-hazardous waste as per Annex III or IIIA of the EC Waste Shipment Regulation for recovery in third countries that have not fully implemented OECD Decision C(2001) 107 is regulated in Regulation (EC) No 1418/2007, as amended by Regulation (EU) No 733/2014.

The EC Waste Shipment Regulation shall apply directly and does not require any implementing measures under national law. A number of implementing provisions can however be found in the Waste Management Act 2002 (directions for application of the EC Waste Shipment Regulation can be found in Chapter 9 "Guidelines on the shipment of waste").

Where there is a requirement to notify the shipment of waste out of Austria/ export out of the EU, the complete notification documentation must be forwarded to the Federal Minister for Agriculture, Forestry, Environment and Water Management (Department V/1).

The forms to be used for the notification can be downloaded from the EDM portal and filled in, as can the form for waste shipment as per Article 18 of the EC Waste Shipment Regulation (for details on the notification procedure and related formal requirements as per Article 18, please refer to Chapter 9.2 "Information on Annexes III to V of the EC Waste Shipment Regulation").

Shipment of waste between Member States

- The transboundary shipment of waste between EU Member States for disposal is at all times subject to the written notification and consent procedure (except for national import bans in individual Member States).
- The transboundary shipment of waste as per Annex IV and IVA of the EC Waste Shipment Regulation and the shipment of waste not listed in the Annexes to the EC Waste Shipment Regulation between Member States for recovery is also subject to the written notification and consent procedure without exception.
- For transboundary shipments between Member States of waste listed in Annexes III, IIIA or IIIB for recovery, only the information as per Article 18 of the EC Waste Shipment Regulation (Annex VII form) need be carried, and the recovery contract must be forwarded to the competent authority on request. Reference is made to existing storage requirements.

Export out of the EU

At Union level, the export of waste from the EU for disposal shall only be possible in EFTA Member States (Iceland, Norway, Switzerland and Liechtenstein) according to the principle of self-sufficiency in disposal (Article 4(2) of the Basel Convention). Such exports are subject to notification and consent at all times.

When exporting waste that is intended for recovery, the following cases must be distinguished:

1. Waste that is cited in Annex III or IIIa to the EC Waste Shipment Regulation, and which is shipped to third countries that have not implemented the OECD Decision shall be subject to the respective control procedures of Regulation (EC) No 1418/2007, as amended. When exporting to a country to which the OECD Decision applies – as with shipments between Member States – only the documentation as per Article 18 of the EC Waste Shipment Regulation need be carried (with the exception of mixtures of wastes destined for an interim operation: Article 38(2)(a) of the EC Waste Shipment Regulation).
2. Hazardous waste that is to be classified under Annex V of the EC Waste Shipment Regulation and waste listed in Annex V Part 3 is subject to a general export ban to third countries that have not implemented the OECD Decision (the export of such waste to states that have implemented the OECD Decision is subject to notification and consent at all times).
3. Waste not listed in Annexes III, IIIA, IIIB, IV or IVA of the EC Waste Shipment Regulation is subject on export to the written notification and consent procedure at all times. The export of unlisted waste to third countries that have not implemented the OECD Decision is prohibited if the waste is hazardous.

Import into the EU

The import of waste into the EU for disposal is subject to notification and consent at all times. It shall only be permitted if the country of dispatch is a Party to the Basel Convention or has entered into an agreement with Austria within the meaning of Article 11 of the Basel Convention.

When importing waste that is intended for recovery, the following cases must be distinguished:

- The waste is listed in Annex III, IIIa or IIIb of the EC Waste Shipment Regulation. In such cases there shall be no need for notification if it is intended to recover the waste in an authorised recovery plant. However, the documentation as per Article 18 of the EC Waste Shipment Regulation (i.e. the form in Annex VII) must be carried during transportation. The recovery contract as per Article 18(2) of the EC Waste Shipment Regulation must be forwarded to the competent authority on request.
- All other types of waste (waste listed or not listed in Annex IV) shall be subject to notification.

The shipment of waste that is subject to notification through third countries (e.g. via the "Deutsches Eck" region where Germany, Austria and Switzerland meet) shall also require notification and consent. Various relaxations are provided based on the border agreement with Germany (Federal Law Gazette III No 72/2009).

Transit

Tacit consent shall in principle apply for shipments within the Community that involve transit through Austria. This means that the approval for transit shall be deemed to have been issued 30 days after the submission of the acknowledgement of receipt by the competent authority at the place of destination.

Exemptions from tacit consent

The Federal Minister for Agriculture, Forestry, Environment and Water Management shall enact an official order:

- for exports out of the EU or imports into the EU involving transit through Austria
- to safeguard public interests prior to expiry
- shipment to recovery plants with prior consent.[8]

Reporting requirements

The shipment of waste that is subject to notification requirements must comply with a series of reporting obligations. The notifying party as per the EC Waste Shipment Regulation must notify the competent authority of the date the waste is to be shipped and provide – where possible – the completed transmission form at least three working days before transportation. The plant must inform the notifying party and competent authorities within three days of receipt of the waste, within a period of no more than 30 days after the completion of the non-interim recovery or disposal, and within no more than a year following receipt of the waste, regarding the completion of the non-interim recovery or disposal and confirm this by forwarding the completed transmission form for certification/confirmation.

[8] Tacit consents pursuant to Article 9(5) of the EC Waste Shipment Regulation shall only be applicable for one calendar year. This is why the granting of a written consent is required for shipments to recovery plants (with pre-consent required) if waste is shipped through Austria.

Electronic submission of notifications and messages

A database was installed at the Federal Ministry of Agriculture, Forestry, Environment and Water Management to manage the ongoing records concerning transboundary shipments of waste.

New notification applications for shipments out of Austria (export, shipments through the "Deutsches Eck") can be completed online since 30 November 2010 and transmitted electronically to the Federal Minister of Agriculture, Forestry, Environment and Water Management (the original signed notification forms must be sent in later).

Furthermore there is also the (restricted) option to submit messages within the meaning of Articles 15 and 16 of the EC Waste Shipment Regulation in electronic format to the Federal Minister of Agriculture, Forestry, Environment and Water Management using the eShipment application.

Statistics

Table 69: Number of notifications (2010 – 2015)

	2010	2011	2012	2013	2014	2015
Shipments out of Austria/Exports	542	498	474	479	447	329
Shipments into Austria/Imports	347	405	397	393	411	349
Transit	1.138	1.047	890	797	668	523

Table 70: Export, Import and Transit volumes of notified shipment [t]

	2010	2011	2012	2013	2014	2015
Exports	983,836	811,013	729,483	749,095	796,101	822,126
Imports	335,453	369,523	436,510	597,579	645,076	659,245
Transit	980,654	1,055,190	724,994	633,911	579,234	528,280
Exports (excluding excavated soil)	720,938	722,734	660,770	698,703	744,007	758,083

6.3.6.2. IMPEL-TFS

Under the IMPEL network (European Network for the Implementation and Enforcement of Environmental Law), the practical implementation and transposition of international and European provisions for the transboundary shipment of waste is undertaken by the TFS (Transfrontier Shipment of Waste) network.

As a result of the EC Waste Shipment Regulation, international cooperation between the responsible authorities has become particularly important with respect to the monitoring and control of transboundary shipments of waste.

The primary objective of promoting compliance with the EC Waste Shipment Regulation is pursued through the following measures:

- Setting up and improving communication and cooperation between competent authorities (TFS enforcement authorities, police, customs)
- raising awareness and exploiting the necessary capacities
- exchanging enforcement information and experience
- transnational exchange of control persons
- preparation of manuals, guidelines, and regulations for enforcement
- common European waste inspections on the roads, railways and water.

Current projects in the TFS network relate in particular to landfill controls, enhanced networking of state prosecutors, drawing up waste inspection plans and organising a TFS conference.

Further information is available on the IMPEL website.

Figure 103: IMPEL-Logo

6.3.6.3. BASEL CONVENTION

The Basel Convention (BC) on the control of transboundary movements of hazardous wastes and their disposal that was developed in 1989 within the framework of the United Nations Environment Programme (UNEP) forms the international legal basis for the export and import restrictions of the Shipment Regulation. Both the EU as a Community as well as Austria are Parties to the Convention.

The aim of the Convention is to protect the uncontrolled shipment of hazardous waste, to reduce the generation of hazardous waste and to treat this waste in an environmentally sound manner.

At the 3rd Conference of the Parties (COP) in 1995, an amendment to the Convention was passed to the effect that exports from States included in the newly created Annex VII (OECD, EU and Liechtenstein) would generally be prohibited in non-Annex VII States. (This amendment has not yet entered into force). For the practical implementation of this decision on the ban, two new annexes with sample waste lists were decided at the 4th COP. Annex VIII (List A) lists waste that is subject to the ban, Annex IX (List B) lists waste that is not subject to the ban.

The OECD has adopted these Lists A and B in the "green" and "red" waste list system.

The provisions of the Basel Convention are implemented in the Waste Management Act 2002. Where these relate to transboundary shipments of waste, they are transposed by the directly applicable EC Waste Shipment Regulation.

To improve cooperation and avail of synergies between the Basel Convention, the Rotterdam Convention (control of the trade in hazardous chemicals) and the Stockholm Convention (Convention on the prevention and disposal of persistent organic pollutants – POPs) the Basel Convention currently deals in particular with the development of technical guidelines for treating POP waste (the subject of the Stockholm Convention). Waste electrical and electronic equipment and the delimitation between used goods and waste are other priorities.

A range of technical regional centres provides support to developing countries and those in transition to a market economy to help them draw up technical and legal framework conditions for regulating waste management.

6.3.7. OECD – WORKING PARTY ON RESOURCE PRODUCTIVITY AND WASTE (WPRPW)

The Working Party on Resource Productivity and Waste was set up in 2011 and is responsible for organising and coordinating the work programme of the Environment Policy Committee (EPOC) to improve resource productivity and reduce the environmental impact of waste processing.

Waste prevention

Waste prevention is a key aspect of sustainable materials management and the circular economy. A review of the current waste prevention strategies in OECD countries is in preparation. Previously, only a few OECD countries had plans to carry out economic assessments of waste prevention strategies. There is also a lack of methodological guidelines in this area. The use of waste prevention indicators and economic assessment of waste prevention should, however, be a target task of the OECD WPRPW. The WPRPW is to develop guidelines that will also contain "good practice" examples of waste prevention strategies. Synergies with the Working Party on Environmental Information and with the EU Environment Agency are envisaged.

Figure 104: OECD Headquarters (OECD/Michael Dean)

Resource productivity and material efficiency

It shall in principle be possible to achieve the objective of decoupling economic growth from resource use by using low-carbon technologies, increasing the use of renewable energies, modernising transport and promoting energy efficiency.

A survey and assessment of activities and initiatives to measure and analyse substance flows, resource productivity and their environmental effects as well as the related environmental policy (sustainable materials management, 3R (reduce, reuse, recycle) and circular economy approaches, sustainable production, etc.) is envisaged at OECD level.

The question of whether it is necessary to update or develop new legal instruments to promote resource productivity will also be examined. Previous assessments have shown that the provisions of the relevant OECD Recommendation have not yet been fully implemented

Extended Producer Responsibility

As part of the OECD's efforts on Extended Producer Responsibility (EPR), reports on efficient and effective EPR schemes and appropriate policy instruments for the implementation of the EPR principle were produced and linked to the "Economics of Waste" subject area. An OECD study also examined the effect of EPR on product design.

Macroeconomic effects of the circular economy and resource productivity as well as financial effects of the transition to a low-carbon economy

A range of OECD studies have shown that a circular economy can entail economic benefits in terms of savings in material costs, economic growth and employment. Based on the "CIRCLE" project (Cost of Inaction and Resource Scarcity – Consequences for Long-term Economic Growth) the economic consequences of improved resource productivity and material recovery as well as the macroeconomic and structural effects of the transition to a circular economy and a low-carbon economy will be considered.

Large-scale use of renewable energies and energy-efficient technologies will be necessary. These technologies put a strain on soil, minerals, chemicals and water. At OECD level, the resource "footprints" of various renewable and energy-efficient technologies and their macroeconomic effects will be investigated to improve the alignment of policy with a low-carbon economy and promote resource efficiency.

A range of new business models such as sharing models and service-based models have been developed and expanded. Various types of business models will be identified that are important for the circular economy, resource productivity and the environment. Appropriate political measures will be examined to increase resource productivity.

Plastics and their environmental effects

The proportion of plastics in various waste streams is rapidly increasing. On the other hand, plastic waste presents an opportunity for material and energy recovery. It is therefore important that recycled plastics have as few hazardous or prohibited substances as possible to minimise risks and make them usable for the widest range of applications.

The OECD therefore aims to identify political measures to bring chemical and waste management strategies more closely into line to ensure safer products and strengthen the markets for recycled plastics. While some markets for specific plastic recyclates (PET and HDPE) are well established, the plastics industry tends to react very sensitively to price changes for new plastics and oil. In cooperation with the Chemical Committee, an OECD report is to be drawn up outlining the interfaces between chemical and waste management strategies in OECD countries and examining in more detail the economic and ecological problems and the effects from the perspective of the circular economy.

Nanowaste

Nanowaste has been identified as a key issue at OECD level. The increasing number of nano-technology applications means that volumes of waste with synthetic nanomaterials are rising. Disposing of this waste (thermal treatment, recovery, landfill for specific waste) should not endanger people or the environment through exposure to hazardous substances (in particular aspects of employee protection).

Recycling should also not be affected by the use of synthetic nanomaterials in plastics or metals. Industrial nanowaste containing nanomaterials which may be released to the environment can accrue as production waste, reject batches or residues from research and development. In a workshop in late 2016, new insights into the current state of waste management strategies and the infrastructure for handling nanowaste were evaluated to help decide whether the guidelines and infrastructure need to be adapted to adequately protect human health and the environment. Cooperation with the Working Party on Manufactured Nanomaterials (WPMN) is envisaged.

Transboundary shipment - OECD Interactive Database

OECD Council Decision C(2001)107/Final (two-list system of recyclable waste – green and yellow list) was implemented at EU level through the EC Waste Shipment Regulation. An interactive database containing information on competent authorities, methods of calculating security deposits and pre-authorised plants in the OECD area will in future be discontinued in its previous interactive form at OECD level, not least on account of budgetary considerations. Other more efficient solutions to meet the requirements of the OECD Council Decision are currently being reviewed at OECD level and the information will be updated on an annual basis.

OECD Environmental Country Review

The environmental efforts of all OECD member countries and their implementation in the operational area (Group on Environmental Performance Programme, GEP) shall be examined on a legal basis at OECD level. The primary objective of this Country Review Programme is the promotion of sustainable development in all OECD member countries through the mutual exchange of information. Austria's environmental policy and performance was last reviewed in 2013. By publishing the country-specific test report, this provides an additional incentive for increasing the efficiency of all activities in this area. Non-OECD countries are making more and more attempts alongside their OECD counterparts to review their environmental efforts and submit recommendations for future waste policy developments. The OECD environmental reports are available on the OECD website.

6.3.8. UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

Already in the European area there is a considerable gap in the environmental relevance of waste management. The standards within Member States of the United Nations differ by several orders of magnitude. For the UNEP, therefore, know-how transfer regarding sustainable waste management is a priority, with the use of environmentally-friendly technologies acknowledged as a key factor

Sustainable Development Goals

In Autumn 2015 the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs) set out therein. The Agenda entered into force on 1 January 2016. The Member States have agreed to take action at local and global level for peace, and against poverty, inequality, ecosystem destruction and climate change inter alia and to promote increased social, environmental and economic sustainability. The 2030 Agenda is the new guiding framework for global development and environmental policy. In a connected world, local and global problems must be tackled jointly to achieve significant improvements.

The Federal Ministries were tasked by virtue of submission to the Council of Ministers to include these sustainability goals in relevant strategies and programmes and to draw up action plans and measures, if need be. Based on a progress report listing the Ministry activities that have already been carried out and that, already now, contribute to the implementation of the global goals, an action plan was elaborated in the course of an interdiscplinary and inclusive process within the Federal Ministry of Agriculture, Forestry, Environment and Water Management. This plan sets out the measures that the Federal Ministry of Agriculture, Forestry, Environment and Water Management will kick off or implement more intensively in the coming years to support the achievement of the SDGs.

The waste management industry is particularly addressed in Goal 12 Ensure sustainable consumption and production patterns. In concrete terms, waste volumes must be significantly reduced and waste directed towards recovery by 2030 through prevention and reuse. Although Austria's level is comparatively high, the goals set are quite ambitious. Moreover, waste management measures play a supportive role in achieving Goals No 6 "Clean water and sanitation", No 11 "Sustainable cities and communities", and No 13 "Climate action". The Federal Ministries have been tasked with integrating these sustainability goals in relevant strategies and programmes and preparing action plans and measures where appropriate. The Federal Ministry of Agriculture, Forestry, Environment and Water Management already started work on this

Figure 105: UN Sustainable Development Goals (Source: UN)

Global Waste Management Outlook (GWMO)

The GWMO was published in 2015 in cooperation with the International Solid Waste Association (ISWA). This report comprehensively outlines the challenges, trends and policies in waste prevention, waste reduction and waste management and is intended to be used as a handbook for national waste policies.

6.3.9. PROVISIONS IN CHEMICALS LEGISLATION WITH WASTE MANAGEMENT RELEVANCE

6.3.9.1. DIRECTLY APPLICABLE EU CHEMICAL LEGISLATION

The following directly applicable EC regulations are of particular importance with respect to chemicals legislation:

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer

The Regulation replaces Regulation (EC) No 2037/2000 on substances that deplete the ozone layer and regulates the production, import, export, distribution, use, recovery, recycling, reclamation, and destruction of ozone-depleting substances, the submission of information regarding these substances, and the import and export, distribution and use of products and equipment that contain or require such substances.

The production, distribution and use of regulated substances shall in principle be prohibited.

Regulation (EU) No 649/2012 concerning the export and import of hazardous chemicals

Regulation (EU) No 649/2012 defines prior informed consent (PIC). This Regulation regulates the import and export of specific hazardous chemicals and imposes obligations upon companies wishing to export these chemicals to countries outside the EU. Its purpose is to transpose the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade into European law.

Regulation (EC) No 1272/2008 on the classification, labelling, and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC and amending Regulation (EC) No 1907/2006

This Regulation ("CLP Regulation") is of central importance for chemicals legislation as it governs the classification, labelling and packaging of chemicals in detail.

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Regulation (EEC) No 793/93 and Regulation (EC) No 1488/94 as well as Directive 76/769/EEC and Directives 91/155/EEC, 93/67/EEC, 93/105/EC, and 2000/21/EC

This Regulation ("REACH Regulation") is at the centre of EU chemicals legislation (together with the CLP Regulation). It includes detailed provisions on the registration, evaluation, authorisation and restriction of chemicals and on the establishment of the European Chemicals Agency (ECHA) and various bodies dealing with the implementation of the REACH Regulation.

Regulation (EC) No 648/2004 on detergents

This Regulation aims to harmonise the free circulation of detergents (washing and cleaning agents) and to achieve environmental improvements. The latter will be achieved through provisions on biodegradability, bans and restrictions, additional labelling provisions (in addition to general chemicals legislation), information transfer to authorities and medical personnel and restrictions on phosphate content and the content of other phosphorous compounds in washing and dishwasher agents.

Regulation (EC) No 850/2004 on persistent organic pollutants

This Regulation aims to protect human health and the environment from persistent organic pollutants (also known as "POPs" – i.e. pollutants that can accumulate in environmental media and living organisms due to their extremely long life span). This will be achieved through strict restrictions on the manufacture, distribution and use of substances that come under the Stockholm Convention on persistent organic pollutants or the 1998 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants. The release of such substances must be minimised as much as possible through strict regulations. In addition, it aims to contain releases by laying down provisions on waste consisting of, containing or contaminated with such substances.

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

The provisions of this Regulation aim to reduce exposure to mercury for humans and the environment. This Regulation will shortly be replaced by a new Regulation on the implementation of the Minamata Convention on minimum levels of mercury.

Regulation (EU) No 98/2013 on the marketing and use of explosives precursors

This Regulation lays down uniform provisions on the provision, shipment, possession and use of substances or mixtures that could be misused to illegally manufacture explosives. The availability of such precursors to the "general public" (private consumers) is restricted and a system for reporting suspicious transactions has been set up. The marketing restrictions and bans currently relate to seven chemicals, listed in Annex I to this Regulation.

Regulation (EC) No 517/2014 on fluorinated greenhouse gases

The objective of this Regulation is to contain, prevent and thereby reduce emissions of the fluorinated greenhouse gases covered by the Kyoto Protocol. It applies to the fluorinated greenhouse gases listed in Annex A to this Protocol. Annex I of this Regulation contains a list of fluorinated greenhouse gases that currently come under this Regulation with information on their global warming potential ("GWP"). This Regulation regulates the reduction of emissions, the use, recovery and destruction of the fluorinated greenhouse gases listed in Annex I, labelling and disposal of products and equipment containing these gases, reporting on these gases, monitoring of the uses mentioned in Article 8 and the ban on distributing products and equipment under Article 9 and Annex II as well as the training and certification of personnel and companies involved in the activities provided for in this Regulation. The Regulation also stipulates that installations such air-conditioning systems, refrigeration appliances and fire-fighting equipment with specific gases must be checked at regular intervals for airtightness and that the results of these checks must be logged. The qualification and certification of companies and employees were regulated in the four supplementary ordinances.

6.3.9.2. ORDINANCES UNDER THE CHEMICALS ACT

The ordinances set out below were enacted on the basis of the Chemicals Act (mainly Article 14 of the Chemicals Act, Federal Law Gazette No 326/1987 and Article 17 of the 1996 Chemicals Act (Chemicals Act 1996), Federal Law Gazette No 53/1997).

These Ordinances also improve the situation with respect to qualitative waste prevention and contribute to reducing pollution from waste.

Ordinance banning 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 chlorofluorocarbons as a propellant. As a result, multi-packs with a pump or atomisation mechanism were brought onto the market which facilitated much simpler recovery in terms of the technical processes involved.

Formaldehyde Ordinance, Federal Law Gazette No 194/1990

With regard to qualitative waste prevention, this Ordinance, which entered into force on 1 March 1990, eliminated formaldehyde, a dangerous chemical substance, from wood materials and derived products as well as detergents, cleaning agents, and hygienic products.

Ordinance restricting and prohibiting the use, production and distribution 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-scale equipment from 1 January 1992 onwards and in smaller devices 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 affects the disposal of waste refrigerators as chlorofluorocarbons 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 distribution and use of certain partially hydrogenated chlorofluorohydrocarbons and certain hydrobromofluorocarbons as well as methyl bromide. In particular, the distribution and use of methyl bromide and HCFCs and HBFCs is prohibited, with precisely specified exceptions. These substances were used mainly as solvents as well as for manufacturing foams and coolants, and they have a harmful effect on the stratospheric ozone layer.

Ordinance banning halogenated hydrocarbons, Federal Law Gazette No 576/1990

This Ordinance bans the manufacture, distribution and use of brominated fully halogenated hydrocarbons. Halogenated hydrocarbons were used mainly in fire extinguishers and fire-fighting systems. They contribute significantly to the destruction of the ozone layer.

Ordinance banning certain hazardous substances in plant protection products, Federal Law Gazette No 97/1992

For the purposes of the protection of organisms and qualitative waste prevention, the manufacture and use of certain substances and preparations as pesticides 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 as well as the mandatory determination of the PCB content of insulating oils facilitate the identification of potential sources of danger. Even small amounts of PCBs are dangerous as they are hazardous 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). This means that the Ordinance also has an impact on waste quality within this field.

2005 Solvents Ordinance, Federal Law Gazette No 398/2005

The Ordinance covers the general prohibition of benzene and chlorinated hydrocarbons in paints, varnishes, and coatings (wood preservatives), and stipulates a number of restrictions for organic solvents in paints, varnishes, coatings, and pharmaceuticals. This Ordinance brings about qualitative waste prevention thanks to the compulsory replacement of these solvents with water, alcohol, etc., but also brings about quantitative waste prevention through the transition to alternative, low-waste, and low-emission technologies.

Ordinance on the establishment of a halon bank (Halon Bank Ordinance), Federal Law Gazette II No 77/2000

The purpose of this Regulation is to define applications in which halons can continue to be used after 1 January 2000 (critical applications), to ensure that the use of halons is restricted to critical applications, to record existing halon stocks in Austria as at 1 January 2000, to secure the establishment of a national halon bank for these stocks of halon available for critical applications and to monitor and reduce emissions into the environment

2000 Poisons Ordinance, Federal Law Gazette II No 24/2001, as amended by Federal Law Gazette II No 229/2016

This Ordinance applies to substances and mixtures classed as poisons under Article 35 of the 1996 Chemicals Act and lays down specific protection and due diligence obligations for handling poisons.

Ordinance banning and restricting partially fluorinated and fully fluorinated hydrocarbons, and sulphur hexafluoride (PHFC-HFC-SF6 Ordinance), Federal Law Gazette II No 447/2002, as amended by Federal Law Gazette II No 139/2007

This Ordinance is intended to contribute to climate protection, 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 certain substances listed in the Kyoto Protocol (fluorinated greenhouse gases). This Ordinance is intended to reduce the use of fluorinated greenhouse gases subject to the Protocol (PHFCs, HFCs, SF6) to the extent that substitutes or alternative procedures are available, and restrict them to the applications for which they are still necessary in line with the state of the art.

This Ordinance regulates the distribution and use of partially fluorinated and fully fluorinated hydrocarbons as well as sulphur hexafluoride in devices, plants and products. The areas regulated by this Ordinance include refrigerating and cooling, foams, use in aerosols and certain solvents, the electronics industry and electrical applications, as well as in certain specific areas (such as sports shoes).

2003 Prohibited Chemicals Ordinance, Federal Law Gazette II No 477/2003, as amended by Federal Law Gazette II No 361/2008

Alongside the implementation of the relevant EC legal requirements of Council Directive 76/769/EEC, this Ordinance is also an umbrella regulation that serves as a compilation of the Prohibition Ordinances issued on the basis of Article 14 of the Chemicals Act 1987. Among other things, it regulates asbestos, benzene, CMR substances, certain chlorinated hydrocarbons, pentachlorophenols, antifouling, azo dyes, creosote, nonylphenol, arsenic compounds, mercury compounds, and cement (containing soluble chromium VI), most of which are now covered by Annex XVII of the European REACH Regulation.

1999 Poisons Information Ordinance, Federal Law Gazette No 137/1999

A reporting requirement to the Federal Environment Agency exists in accordance with this Ordinance for certain preparations which are classified as very toxic, toxic or corrosive, and which were distributed firstly in Austria and are available from retailers. Furthermore, there is a disclosure requirement for doctors providing treatment in hospitals and occupational physicians with respect to poisoning.

Ordinance on the provision of specific hazardous substances and mixtures to private end users (Self- Service Ordinance), Federal Law Gazette II No 251/2015

This Ordinance bans or restricts the self-service provision of substances and mixtures belonging to specific hazard categories to private individuals. The Self-Service Ordinance originated from a very similar previous ordinance that had been in force since 1995.

Ordinance on safety standards and protective measures in the use of highly poisonous and poisonous fumigants (Fumigant Safety Ordinance), Federal Law Gazette II No 287/2005, as amended by Federal Law Gazette II No 200/2016

As extreme caution is required when using hydrogen phosphide and other fumigants and there is an acute risk of endangering adjoining areas or buildings if improperly handled, this Ordinance regulates the qualifications that must be held by those using such substances as well as details on use and reporting requirements.

6.3.10. WASTE INSPECTIONS

Waste shipment checks

Environmental crime is a serious problem that is often associated with cross-border effects, meaning that preventing illegal waste shipments is of primary importance.

The UNEP experts also stated that the growing number of environmental crimes can only be addressed through increased international cooperation. They added that cooperation with Interpol and the various international customs authorities would need to be strengthened with respect to illegal waste shipments.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management has maintained its existing contacts at international level with the various authorities responsible for transboundary shipments of waste (especially in neighbouring States) and is committed to developing these further.

The exchange of experiences and the implementation of joint waste control actions are both at the forefront of this. Within the EU itself, there are regular expert round tables whose objectives include uniform EU-wide enforcement and the strengthening of joint collaboration in the field of international waste inspections through discussions and the practical exchange of information.

Close cooperation within the IMPEL/TFS network (see Chapter 6.3.6.2 "IMPEL-TFS") will ensure a coordinated procedure on transboundary waste shipments for the competent authorities. Conferences and coordinated inspections take place throughout Europe on a regular basis within this context.

In 2008, a practical guide for dealing with illegal shipments of waste was developed by the IMPEL/TFS working group.

It is however agreed within the EU that environmental crime must not only be fought individually but must also be fought jointly, especially with respect to the IMPEL-TFS inspection report from 2009.

Illegal exports of used cars to Africa, of electronic waste to Asia and Africa, and of waste to East European countries have in particular highlighted the need for the competent authorities of the States in question to work closely together in order to solve these problems.

In accordance with Article 50 of the EC Waste Shipment Regulation, all EU Member States are obliged to carry out inspections on shipments of waste for recovery or disposal. The objective is to ensure the proper handling of waste in appropriate and approved plants so as to ensure the environmentally sound recovery and disposal of waste and to prevent eco-dumping.

In conjunction with the provisions of national and European waste legislation (EC Waste Shipment Regulation), it is incumbent upon the Federal Minister for Agriculture, Forestry, Environment and Water Management to inspect transboundary shipments of waste. To carry out such inspections, EU Member States have been under obligation since 1 January 2017 to draw up inspection plans. These inspection plans must be based on a risk assessment for specific waste streams and the origins of illegal shipments and must also describe the aims and priorities of inspections and provide details of cooperation with the authorities involved in inspections. The inspection plan drawn up by the Federal Ministry of Agriculture, Forestry, Environment and Water Management must be examined at least every three years to review the implementation of the aims set out therein and update these if necessary.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management publishes the results of the inspections carried out and the measures taken annually on its website.

In conjunction with the Environment Agency Austria (UBA), the coordination and management of inspections is done in close cooperation with the following bodies:

Federal Ministry of the Interior

- Interpol
- Environmental groups in criminal investigation departments, support in the conducting of investigations on suspicion of breaches of criminal law
- Transport departments

Since 2007 the Federal Police has conducted transportation checks itself.

Federal Ministry of Finance

- Central body: Department IV/27 (bans and restrictions)
- Customs agencies, in particular operational control units (Economic Area Risk Management (RMW))

Federal Ministry of Transport, Innovation and Technology

- Federal Office for Transport – cooperation in the field of hazardous material classification in the context of notification procedures
- Supreme Shipping Authority

To keep the level of information of the control bodies of customs and police up-to-date, ongoing training sessions shall be provided by the Federal Ministry of Agriculture and Forestry, the Environment and Water Management.

In addition to customs and police authorities, the control bodies of the individual provinces shall also be given access to the EDM application "eShipment" (notification database) so that it is possible to quickly check whether transboundary waste shipments were approved.

Inspection of waste shipments

Inspections of waste shipments shall be carried out at busy border crossing points and internal control areas that are closest to borders by customs agencies and the police, along with the expert involvement of the Federal Ministry of Agriculture and Forestry, the Environment and Water Management and the Federal Environment Agency (for any sampling and analysis). If possible, the competent authorities from neighbouring states will also participate. Waste inspections of ships on the Danube are organised in cooperation with representatives from the Bavarian authorities.

Any accompanying transport documents shall be inspected, along with their compliance with the cargo itself. The customs agencies and public supervisory authorities that are primarily appointed for the inspection of waste shipments shall also carry out ongoing waste shipment inspections.

Despite limited staff resources, good results are ensured thanks to the many years of inspection experience, as well as the excellent cooperation with BMI and BMF representatives..

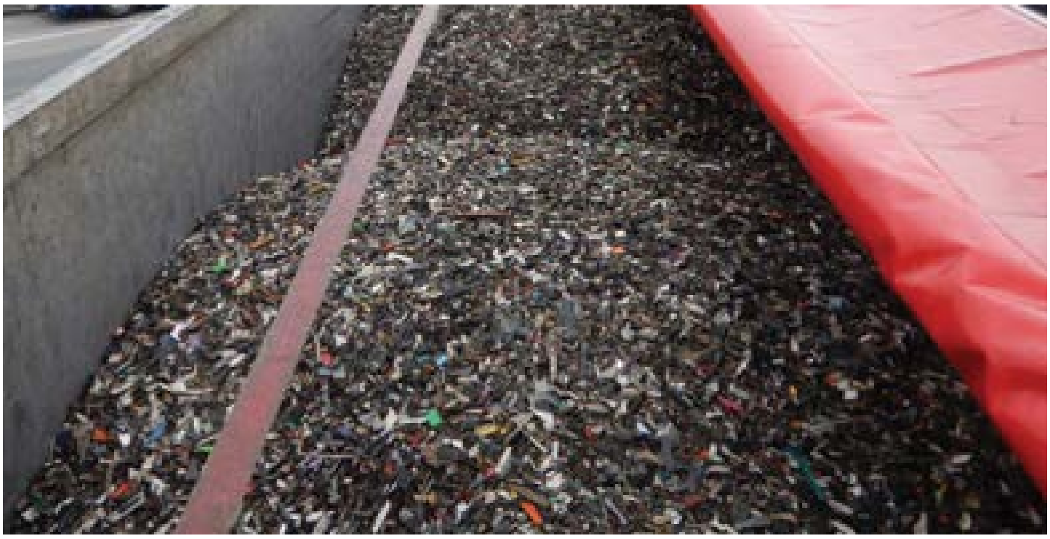

Figure 106: Shipment of substitute fuels

Harmonisation of inspection activities (national)

In order to bring the inspection activities to be carried out by the provincial authorities to a consistent level, a working group was established along with the control bodies of the individual provinces. A check-list to facilitate the implementation of waste inspections was developed together with the provincial authorities.

If illegal shipments are suspected, the district administrative authority shall take appropriate action. Meetings between representatives from the Federal Ministry of Agriculture and Forestry, the Environment and Water Management and these control bodies take place several times a year for the purpose of exchanging experiences.

Seizure according to the 2002 Waste Management Act

To boost the efficiency of inspections, in particular in the area of the transboundary shipment of waste, the Amendment of the Waste Management Act, Seveso III, Federal Law Gazette I No 70/2017, stipulated the introduction of the seizure instrument. This is to guarantee that it is possible to intervene directly in the fight against the illegal shipment of waste, such as of end-of-life vehicles, waste electronic equipment and also in the area of the informal collection of used equipment that is to be deemed as waste, by depriving the persons involved of the basis for their illegal business dealings.

Operational inspections relating to waste shipments

In addition to the various national transport inspections on roads, railways and water, event-based operational inspections are also carried out. On the basis of information received by the Federal Ministry of Agriculture, Forestry, Environment and Water Management from the populace and the waste treatment sector, findings from transport inspections, repatriations in the event of illegal shipments or suspicions, (unannounced) inspections of companies shall be carried out. These inspections include a comprehensive review of the statutory waste records, shipping documents, and an on-site inspection of the premises in most cases.

Most of the inspections are done in close cooperation with the provincial authorities (offices of the provincial governments or district administrative authorities). In some cases, the Federal Environment Agency takes standardised samples from waste, and cross samples are then handed over and analysed.

Furthermore, in its position as a supervisory or higher authority, the Federal Ministry of Agriculture, Forestry, Environment and Water Management may arrange inspections to be carried out by the head of the provincial government in accordance with Article 75 of the Waste Management Act 2002 in justified cases.

Between 20 and 30 operational inspections, at least two large-scale transport inspections, and 5 to 10 smaller scale transport inspections shall be carried out annually by the Federal Ministry of Agriculture, Forestry, Environment and Water Management near to various border crossings or at checkpoints on motorways, some of which shall be done in cooperation with foreign environmental authorities.

In connection with the operational inspections, comprehensive details regarding illegal shipments shall be submitted where appropriate to the public prosecutor or the responsible head of the provincial government for appropriate action; the foreign authorities in question shall also be informed.

If relevant criminal offences are suspected, details shall be submitted to the public prosecutor.

Inspections for the landfill ordinance

In cooperation with the various customs offices, inspections of the waste volumes deposited in landfills with respect to the contaminated land remediation contribution payment shall be carried out. Inspections of the compliance of plants with the provisions of the Waste Management Act 2002 and the Landfill Ordinance shall be carried out independently by the various authorities responsible for monitoring.

Inspections for the packaging ordinance

Since late 1996, the Federal Minister for Agriculture, Forestry, Environment and Water Management has been responsible for inspections to check compliance with the obligations of the Packaging Ordinance. Since then, companies (manufacturers, importers, retailers) in all sectors have been inspected annually by technical experts from the Federal Environment Agency and external financial experts. Between 1997 and 2015, approximately 2,100 inspections were carried out, with the emphasis being on those companies that are not or only partially taking part in a system. In more than half of these inspections, notifications had to be submitted to the competent district administrative authorities. This resulted in approximately 620 administrative penalties and cautions.

Inspections relating to the end-of-life vehicle ordinance

The End-of-Life Vehicle Ordinance entered into force in November 2002. The head of the provincial government is responsible for checking compliance with the obligations on the part of manufacturers, importers, vehicle dealers, repair shops, dismantlers and shredders in respect of the storage and handling of end-of-life vehicles. The Federal Minister for Agriculture, Forestry, Environment and Water Management is responsible for checking compliance with obligations in respect of prevention, labelling, take-back and related information, reuse or recovery and associated recording, evidence and reporting requirements.

As a result of the shared inspection responsibilities to ensure an efficient approach, the control activities shall be coordinated by the Federal Ministry of Agriculture, Forestry, Environment and Water Management in order to carry out a joint inspection of all obligations with respect to the various businesses to be inspected.

240 inspections have been conducted by the Federal Ministry of Agriculture, Forestry, Environment and Water Management since 2015. In more than half of these inspections, notifications had to be submitted to the competent district administrative authorities. This resulted in approximately 90 administrative penalties and cautions.

Inspections for the WEEE ordinance

Given that the retailers of electrical and electronic equipment generally use packaging as well, since 2006 obligated manufacturers have been inspected alongside reviewing compliance with the requirements of the Packaging Ordinance. Between 2006 and 2015, approximately 290 inspections were carried out. The emphasis of inspections was on manufacturers (this term also includes importers) of electrical and electronic equipment for private households, as this particular area is typically required to participate in collection and recovery systems. In approximately half of these inspections, notifications had to be submitted to the competent district administrative authorities. This resulted in approximately 40 administrative penalties and cautions.

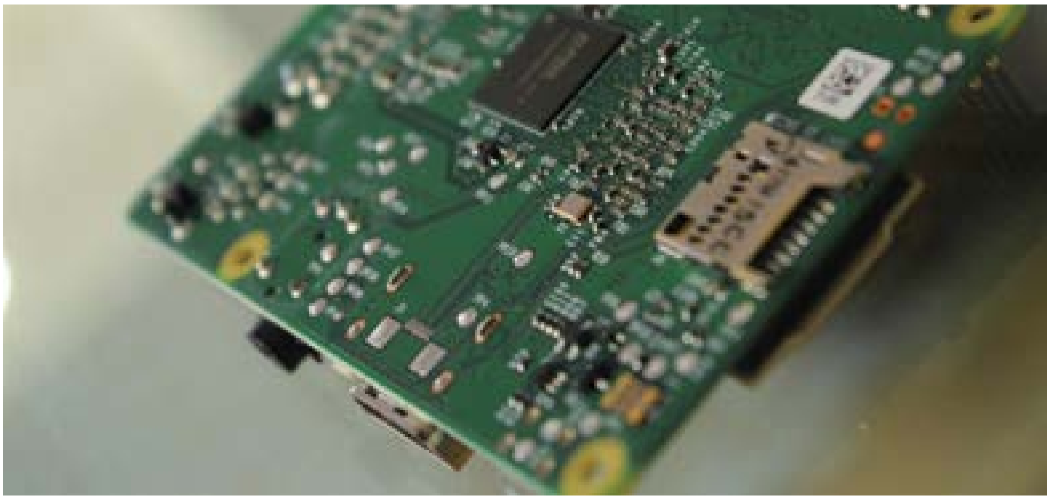

Figure 107: Populated circuit board

During the inspections, random testing is carried out to check compliance with the substance prohibitions under Article 4(1) WEEE Ordinance (cadmium, mercury, lead, hexavalent chromium and specific polybrominated flame retardants). These inspections focused on power tools, budget toys, computer hardware and household appliances. Up to 2015, approximately 75 electrical appliances were analysed, and violations were detected in around half of the samples (limit values for cadmium, lead, polybrominated flame retardants exceeded). In addition, close to 20 companies self-reported transgressions of the substance ban under Article 4 of the WEEE Ordinance to the Federal Ministry of Agriculture, Forestry, Environment and Water Management in relation to their electrical appliances distributed in Austria, while simultaneously providing information on corrective measures.

In 2013-2014 the mercury content of 100 energy-saving lamps was tested. Only two energy-saving lamps exceeded the limit value.

Inspections for the Batteries Ordinance

The manufacturers and importers of batteries and accumulators who are obligated in accordance with the Batteries Directive are also inspected within the framework of inspections of obligated parties under the Packaging Ordinance and the WEEE Ordinance. Between 2010 and 2015, approximately 30 inspections were carried out. The emphasis of these inspections is on equipment batteries. In approximately one third of these inspections, notifications had to be submitted to the competent district administrative authorities. This resulted in eight administrative penalties and cautions.

During the inspections, random testing is carried out to check compliance with the substance prohibitions under Article 4(1) of the Batteries Ordinance (cadmium and mercury). Up to 2015, 20 batteries were analysed. One sample exceeded the limit value for cadmium.

6.4. PRODUCT- AND WASTE-RELATED MEASURES

6.4.1. CONSTRUCTION AND DEMOLITION WASTE

Waste from construction and demolition activities is a priority waste stream due to its volume and related resource-conservation potential.

The purpose of the Ordinance on obligations during construction and demolition activities, the separation and processing of waste arising from construction and demolition activities, the production and classification as non-waste of recycled construction materials (Recycled Construction Materials Ordinance), Federal Law Gazette II No 181/2015, as amended by Federal Law Gazette II No 290/2016, is to promote the recycling of waste from construction and demolition activities and thus ensure that the recycled construction materials produced are of high quality. It also aims to achieve the following:

- the highest possible recovery rate of high-quality recycled construction materials as a replacement for primary building materials in structural engineering applications
- conservation of natural primary materials (protecting the landscape by removing less material and improving groundwater protection)
- legal certainty in the use of recycled construction materials or recycled construction material products
- reduction of the remaining substances sent to landfill and hence reduced usage of landfill volumes and cost minimisation due to lower quantities of waste ultimately sent to landfill.

In this regard, the Ordinance lays down requirements that must be met when demolishing structures, such as the investigation of pollutants and impurities, the ordered and recovery-oriented dismantling of structures and the proper separation of waste on site. These measures make construction and demolition waste more suitable for producing recycled construction materials. The Ordinance also contains quality specifications for recycled construction materials and prescribes the ranges of applications for recycled construction materials. This will help ensure that recycled construction materials are of high environmental quality, increasing trust and confidence in the use of these construction materials. The Ordinance also prescribes the highest quality for recycled construction materials so that they are no longer classified as waste, subject to compliance with specific requirements.

Upon the entry into force of the Recycled Construction Materials Ordinance, the Ordinance on the separation of materials due to construction activities, Federal Law Gazette No 259/1991, ceased to be in force.

Figure 108: Mineral construction waste generated in the course of the demolition of a building

Recycling of gypsum and areated concrete

Approximately 200,000 tonnes/year of gypsum products and approximately 75,000 tonnes/year of aerated-concrete products have been installed in Austria since the 1970s, which could arise as waste in the coming years. Gypsum and aerated concrete can be used as a construction material in a closed recycling loop at the same material and technical level. From the perspective of construction waste recycling to produce recycled aggregates, however, gypsum and aerated concrete are impurities and lead to problems because they break down into hydrogen sulphide in landfills.

For the recycling of gypsum and aerated concrete, the first step is to intensify the collection of scrap plasterboard and building components made from aerated concrete generated on building sites. According to estimates, 10,000 - 20,000 tonnes of gypsum per year and 2,000 tonnes of aerated concrete per year could be collected and recovered. This potential is, however, nowhere near exhausted because only 10 % of gypsum are recorded. Gypsum could be collected for a fee from building sites, for example in special big bags, and scrap plasterboard could be handed in at many waste collection centres, at a comparatively low cost for landfill but with a higher collection quota.

When buildings are dismantled and materials sorted properly, plasterboard and building components made from aerated concrete, can be processed in existing production plants. A study by the European gypsum industry showed that up to 30% of recycling could be achieved with only minor adjustments. Since 01/01/2016, under the Recycled Construction Materials Ordinance, structures must be demolished in line with ÖNORM B 3151. The impurities to be removed and dismantled include in particular "gypsum-based construction materials (e.g. plasterboard, gypsum planks, gypsum-based screed), excluding gypsum-based wall and ceiling plaster, gypsum-based compound screed and partition walls made from aerated concrete". This will also require the separate collection of plasterboard and building components made from aerated concrete, when demolishing larger buildings.

6.4.2. END-OF-LIFE VEHICLES

The End-of-Life Vehicle Ordinance, Federal Law Gazette II No 407/2002, as amended, implements Directive 2000/53/EC on end-of-life vehicles and essentially regulates the take-back, reuse and treatment of end-of-life vehicles and their components and further legal details on collection and recovery systems in this area.

If an end-of-life vehicle needs to be disposed of, the owner can as a minimum return the vehicle to a collection facility set up by the manufacturer or importer of the particular brand or to an initial collection centre. The collection facilities for various brands are published on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and brand importers.

Manufacturers and importers must take back end-of-life vehicles and to this end must set up collection facilities according to their distribution structure (usually vehicle dealers) and comply with the recovery quotas. The Ordinance also specifies the initial collection centres that must also comply with these recovery quotas. These centres are recovery or dismantling operations whose activities require a permit. Initial collection centres are not required to take back end-of-life vehicles. They do this out of economic interest, to earn revenue from recovery.

The decree issued by the Federal Ministry of Agriculture, Forestry, Environment and Water Management in April 2015 pursuant to the End-of-Life Vehicle Ordinance (BMLFUW-U.W.2.1.6/0033-V/2/2015) clarifies the concept of waste by distinguishing between used vehicles and end-of-life vehicles and also clarifies the requirements and obligations of owners and users of end-of-life vehicles and companies handling end-of-life vehicles, as well as collectors and processors. It must be ensured in any case that used car dealers that can also take back end-of-life vehicles without a permit must have the appropriate storage facilities for these end-of- life vehicles as set out in the End-of-Life Vehicle Ordinance.

The European Commission requires regular reports on the implementation of the EU Directive as well as on compliance with recovery rates. As a result, operations involved in the collection and recovery of vehicles must keep specific records and submit electronic reports to the Federal Ministry of Agriculture, Forestry, Environment, and Water Management. This can be done as part of the reporting requirements via www.altauto.at. The records and notifications contain data relating to the receipt of end-of-life vehicles (vehicle identification number, brand, model, details of the person returning the vehicle, etc.), the treatment and transfer of the end-of-life vehicle and the waste produced during treatment per calendar year.

It also lays down obligations for vehicle dealers. End-of-life vehicles must be taken back free of charge and a recovery certificate must be issued. They must also ensure that any end-of-life vehicles that are accepted must be forwarded to a shredder operator for treatment. Please refer to Chapter 9.2.2.4 (sub-section D) for information on transboundary shipments.

Collection and recovery systems for end-of-life vehicles

The approved collection and recovery systems for end-of-life vehicles are published on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

6.4.3. PACKAGING

Directive 94/62/EC of 20 December 1994 on packaging and packaging waste was enacted to ensure harmonised provisions in the management of packaging waste. The main content of this Directive is the determination of recovery quotas:

- at least 60 per cent by weight of all packaging waste must be recovered or incinerated in incinerator plants with energy recovery,
- at least 55 and at most 80 per cent by weight of all packaging waste must be recovered.

The following material recovery quotas for individual packaging must be achieved:

- 60 per cent by weight for glass,
- 60 per cent by weight for paper and cardboard,
- 50 per cent by weight for metals,
- 22.5 per cent by weight for plastics, taking into account only material that can be recovered into plastic, and
- 15 per cent by weight for wood.

A package on strengthening the circular economy presented by the European Commission in late 2015 proposed partially amending the Directive to significantly raise the quotas that would have to be achieved in the future.

The Directive sets a limit on the concentration of heavy metals in packaging, basic requirements for the composition, recoverability, and usability of packaging, and the establishment of packaging and reporting requirement databases. In a supplement to the Packaging Directive, Member States were also allowed to set up measures to avoid or limit the number of plastic carrier bags, such as prohibiting their distribution free of charge.

Programme for the implementation of Directive 94/62/EC on packaging and packaging waste

In accordance with Article 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 reuse programmes, is to be included in waste disposal plans. The following measures and targets are to be taken and fulfilled accordingly:

- Waste prevention measures
- promotion of reuse
- targets for the recovery of packaging waste
- development of return, collection, and recovery systems
- maintenance or introduction of labelling and identification systems
- maintenance of quality requirements for packaging
- setting up databases
- mandatory submission of data on packaging in compliance with Appendix III to Directive 94/62/EC (manufactured packaging, imported or exported packaging, packaging consumption, reuse rate, recovery rate, etc.).

The measures taken to date in Austria to implement the Directive shall be described in the following sections. Austria has achieved, and in some cases exceeded, all targets through these measures.

Further duties (e.g. labelling, databases) shall be implemented in accordance with the various provisions set for the Directive (decisions).

Austrian packaging regulations

The Packaging Directive was transposed in Austria by the Waste Management Act 2002, which contains key provisions on obligated parties, the distinction between household and commercial packaging and the requirements for approving collection and recovery systems. The Packaging Ordinance 2014 also extends the definitions and provisions for obligated parties and provides details on collection and recovery systems.

Waste Management Act – Packaging Amendment

The packaging amendment to the Waste Management Act (Federal Law Gazette I No 193/2013) sets out the principles for creating fair competition in the management of household packaging waste, while maintaining the existing quality of separate collection and recovery and extensively implementing producer responsibility in this area.

There are joint comprehensive collection and recovery systems for household packaging, for which corresponding contracts with operationally active municipalities or associations of local authorities or private disposal companies must be entered into. In principle, collection and recovery systems may also enter into a co-use contract with an existing collection and recovery system.

Collected packaging waste is divided into individual collection and recovery systems according to market shares. To calculate market shares, the collection and recovery systems report the packaging volumes dispensed from obligations by them on a monthly basis. The market shares are publicly accessible on the EDM portal.

Extended producer responsibility also creates the basis for compensating packaging recorded with residual municipal waste to local authorities to a greater extent. (This was regulated in a separate "Compensation Ordinance", which contains specific provisions on total collection and cost allocation.)

The Waste Management Act 2002 also contains the definitions and the delimitation of household packaging and commercial packaging.

The packaging coordination body was founded to carry out specific tasks for all collection and recovery systems. Its tasks include in particular:

- coordinating information to end users,
- conducting the necessary analyses relating to collection,
- monitoring participants in all collection and recovery systems in a coordinated fashion,
- keeping a register of sources of generation of commercial packaging waste.

The packaging coordination body has also been tasked with processing waste prevention projects. Financing is through the packaging collection and recovery systems, which must contribute 0.5 % of their fee income for this task.

Packaging Ordinance 2014

The Packaging Ordinance 2014, Federal Law Gazette II No 184/2014, contains the necessary adjustments to the Waste Management Act packaging amendment, in particular as regards classification as "household packaging" and "commercial packaging", and determines corresponding collection and tariff categories. It also stipulates minimum quotas for the separate collection of household packaging.

The definitions and provisions of Directive 94/62/EC on packaging and packaging waste, amended by Directive 2004/12/EC (EU Packaging Directive) were taken over unchanged from the previous regulation, the Packaging Ordinance 1996. The basic requirements for packaging and the heavy metal ban under the Packaging Directive remain in place. Disposable tableware and cutlery shall, as previously, be regulated in the same way as household packaging.

The regulations on commercial packaging remain largely unchanged compared to the Packaging Ordinance 1996 (primarily the take-back obligation free of charge and the obligation to recover returned commercial packaging – particularly for recycling). The provisions relating to major accumulation points also remain in place.

Under this Ordinance, the registration and reporting requirements for commercial packaging are handled via the EDM (ePackaging subproject).

Packaging Definitions Regulation

The Waste Management Act amendment with respect to packaging (Federal Law Gazette I No 193/2013) was established to provide a basic framework for the definition of household packaging and commercial packaging in Article 13h of the Waste Management Act 2002. The site where the packaging is usually generated and the size of the packaging play a central role here. Various special provisions also apply to selected packaging and packaging substances. Clarification of these general definitions and the establishment of a collective justice are made possible through a power to issue statutory instruments.

The Packaging Definitions Regulation, Federal Law Gazette II No 10/2015, lays down a delimitation between household packaging and commercial packaging in detail and uniformly for all obligated parties.

After classifying packaging into one of 47 product groups, proportions of packaging in each product group are determined per packaging material as household packaging or commercial packaging.

The collection and recovery systems and all obligated parties as per Article 13g of the Waste Management Act 2002 and the upstream or downstream distribution stages, regardless of the distribution channels of individual companies, must comply with the proportions determined. These proportions shall also be taken as a basis during inspections of obligated parties by the authority or the packaging coordination body.

The classifications made apply to the end of 2020, because the Waste Management Act 2002 limits the scope of application to five years. After 2021, the Ordinance shall be amended on the basis of current empirical data.

Compensation Order Houshold Packaging

The basis for the Compensation Order Houshold Packaging, Federal Law Gazette II No 275/2015, is Article 29b(5) of the Waste Management Act 2002, which contains a power to issue statutory instruments in relation to determining reference values, including total collection quotas. In addition, a calculation model for distributing finances to recipients can be determined.

Under the Compensation Order Houshold Packaging, the compensation for packaging collected together with mixed municipal waste is increased for the years 2016 to 2018 in order to extend producer responsibility.

The national minimum collection volumes from separate collection are derived from the respective quotas laid down in the Packaging Ordinance 2014.

Waste investigations carried out country-wide are used to assist in determining the volume of packaging collected together with mixed municipal waste.

For the collection and recycling systems, contracts must be negotiated with the municipalities or waste management associations for packaging collected together with mixed municipal waste concerning the compensation of appropriate costs of collection and treatment in accordance with Article 29b(2) of the Waste Management Act 2002. For the years after 2019, the Ordinance shall be evaluated and if necessary adjusted.

Sustainability agenda for drinks packaging

In the past, there was a decline in the return of reusable packaging. Reasons for this include the convenience of disposable packaging (low weight, resilience, dense collection schemes), non-domestic consumption, and retailer promotion and pricing. Voluntary arrangements within the beverage industry contributed to a slowdown in the trend towards disposable drinks packaging. From 2010, this trend was halted and the reuse quotas stabilised at roughly the same level.

To compensate for the environmental impact of a decline in reusable packaging, the sustainability agenda for the Austrian economy requires the drinks sector and/or trade to put in place measures to reduce greenhouse gases over the period 2008-2017. These measures should ensure that a net reduction in emissions of at least 10% is achieved when compared to the starting point (2007).

In 2011, an additional agreement with the following priorities was signed, based on the recommendations of the social partners on reusable drinks packaging:

- Stabilisation of the reuse quotas at 22.1 % (2010 basis) by making reuse more attractive (in-store placement, reduced prices, testing weight reduction, reusable offering for 0.33 l bottles of beer, etc.)
- promotion of the recovery of drinks packaging through bottle-to-bottle recycling of PET containers and increasing the recycling of drinks cans
- stemming littering.

The implementation reports on the sustainability agenda which document the measures put in place can be found on the website of the Austrian Economic Chamber. It is planned to evaluate and further develop the sustainability agenda.

Waste prevention based on the example of plastic carrier bags

In Austria, between 5,000 and 7,000 tonnes of plastic carrier bags accrue as waste, i.e. about 0.01% of total waste produced. Due to the high level of environmental awareness among the population and the comprehensive, well-established collection scheme, almost all plastic carrier bags are recovered or recycled. Nevertheless, there is further potential to increase resource efficiency and sustainability. The use of shopping bags, baskets, cloth bags or other reusable carrying aids has the highest priority in terms of waste prevention.

The political aim for Austria is to reduce the existing number of plastic carrier bags by 50% by 2019. The use of all single-use carrier bags shall also be reduced. A voluntary agreement has been signed with specific Austrian trading companies from all sectors and with NGOs. In particular a charge for single-use plastic carrier bags (according to the definition of Article 3 figure 1b til 1d of Directive 94/62/EC on packaging and packaging waste) and on single-use carrier bags of any material (including paper and bioplastics) was implemented, except for food storage bags for fresh produce. Furthermore, no food storage bags shall be made available for free at checkout areas, for example and the numbers of carrier bags distributed must be reported.

Participating companies report the number of single-use carrier bags annually. These reports form the basis of a progress report on reducing single-use carrier bags, which is published annually by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. With this agreement, also the objective stipulated in Directive 2015/720 as regards reducing the consumption of lightweight plastic carrier bags is reached.

Figure 109: The agreement on the reduction of single-use carrier bags is starting to bear fruit!

2013 review of goals relating to residual volumes under the Packaging Ordinance 1996 and waste analyses in relation to packaging

The Packaging Ordinance 1996 laid down maximum volumes for landfilled glass and metal packaging at 40,000 tonnes for glass and 17,000 tonnes for metal. The residual volumes specified referred to the actual net packaging material mass deposited when dry without adhesions or residual content. These goals relating to residual volumes are reviewed every three years (the last time was in 2013).

As shown in an inspection of residual volume goals commissioned by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the residual volume goals established in accordance with Article 10a of the Packaging Ordinance for landfilled glass or metal packaging were fallen short of in 2013 by approximately 26 % for glass packaging and by approximately 64 % for metal packaging. The residual volume goals were replaced by the provisions on packaging-material collection quotas for collection and recovery systems in the Packaging Ordinance 2014.

Extensive waste analysis (residual, bulky and industrial waste) was carried out during the course of inspections. In addition to glass and metal packaging, net volumes of paper, plastic and composite material packaging contained in residual, bulky, and industrial waste were calculated separately for drinks packaging and other packaging.

The results show that the proportion of residual contents and pollution per packaging material account for between 1 % for glass drinks packaging and 35 % for plastic packaging.

The volumes of packaging in residual, commercial and bulky waste show the following development (the net volumes collected before any treatment which therefore do not correspond to landfilled packaging volumes):

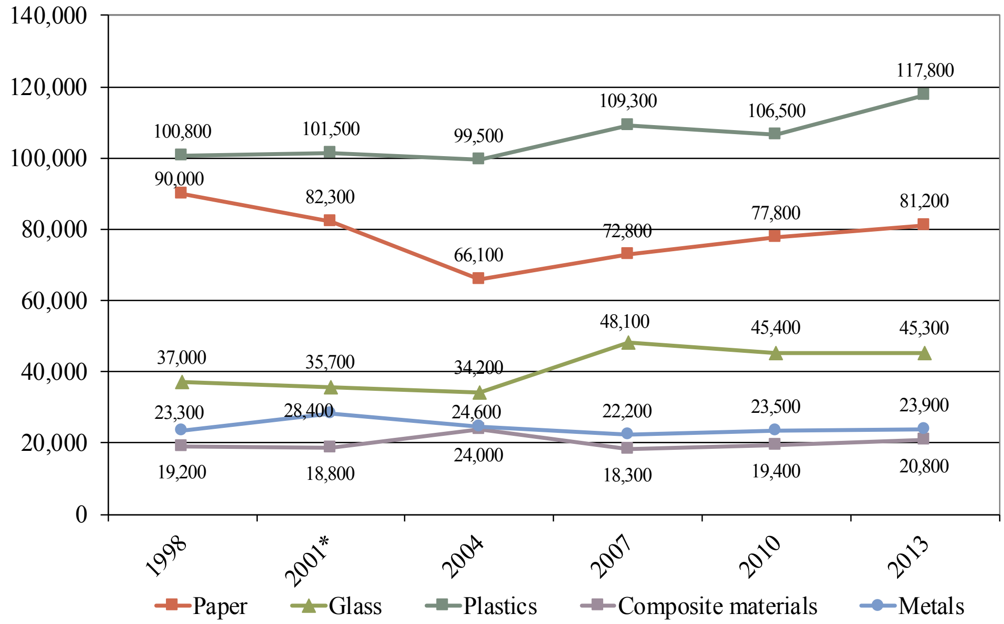

*Figure 110: Total packaging in residual, commercial and bulky waste [t] (net) (*different analysis in 2001)*

Stakeholder dialogue on the future of packaging collection in Austria

The period of December 2013 to November 2015 saw a dialogue at Federal level on the future orientation of packaging collection upon the initiative of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. This dialogue brought together representatives of the Federal Provinces, the municipalities, the social partners, the business world, the packaging collection and recovery schemes, the packaging coordination centre, of NGOs, of the Federal Ministry of Economy, Research and Science and of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. The stakeholders of the Austrian waste industry think that the overarching goal of the separate collection of packagings is the collection of as much material as possible for the purpose of high-quality recycling.

The stakeholder dialogue is to be continued from autumn 2017 onwards.

6.4.4. WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

Electrical and electronic equipment consists of a complex mix of materials and components. It differs from municipal waste in terms of the disproportional increase in the waste stream, the level of hazardous content and environmental impact ("ecological backpack") during production.

Electrical or electronic equipment requires electricity in order to function. Basic components of electrical or electronic equipment include printed/soldered circuit boards, cables, connectors and wires, fire resistant plastic, 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, capacitors, resistors and relays, sensors, and plug-in connectors. The environmentally harmful substances in these components can be heavy metals such as mercury, lead, cadmium and chromium, halogen materials such as chlorofluorocarbons (CFC), PCB, PVC, and brominated flame retardants, as well as asbestos and arsenic.

EU Directives

At European level, the need for harmonisation led to a European solution in 2002, on the one hand to the Directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE Directive), as well as the Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in waste electrical and electronic equipment on the other hand (RoHS Directive). Both these Directives were revamped in 2011 and 2012 by Directives 2011/65/EU and 2012/19/EU.

The main points in the Directives are as follows:

- Regulating the scope of application, with a number of categories, initially limited to ten, transferred to an open scope with defined exceptions. In principle, a distinction is made between waste equipment from private households and waste equipment from the commercial sector. Appliances that are generally used in both the commercial and private sector, such as mobile telephones, are classified as private.
- Free return option for waste equipment from private households;
- The obligation for retail to take back waste equipment of the same type (function) free of charge when selling new equipment (1:1 rule);
- For the collection and treatment of commercial appliances, manufacturers and/or importers must cooperate with the users of the appliances.
- Promoting the reuse of suitable waste equipment and criteria for reuse businesses;
- Specifying collection quotas according to the equipment volumes distributed or the volumes of waste equipment;
- Manufacturers and importers are responsible for the environmentally-friendly recovery and treatment of collected waste equipment. Environmentally harmful components must be subjected to special treatment. A number of recovery rates were set for waste equipment and these will be gradually increased by 2019.
- The cost of transporting household waste equipment from collection points and their recovery and environmentally-friendly treatment should be borne by the manufacturers or importers ("producer responsibility").
- Minimum requirements for the shipment of used electrical equipment;
- Preconditions for the appointment of an authorised representative by foreign manufacturers and distributors;
- These points are supplemented by provisions on the labelling of electrical and electronic equipment as well as certain information and reporting obligations.
- A ban on specific environmentally hazardous substances (heavy metals, flame retardants, plasticisers) in the production and distribution of electrical and electronic equipment, accompanied by corresponding market monitoring instruments and CE labelling.

Implementation of EU Directives in Austria

Key implementation provisions were included in the amendment to the Waste Management Act 2002.

The provisions of the Directive were laid down in the treatment principles for waste electrical and electronic equipment in the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004, as amended. The Ordinance contains requirements on the collection, storage, transport and treatment of waste electrical and electronic equipment. The Federal Ministry of Agriculture, Forestry, Environment and Water Management has published "Guidelines on handling waste electrical and electronic equipment" to help identify pollutants and remove polluting components.

The key provisions on the collection, treatment, financing, registration, reporting, labelling and transboundary shipment of used equipment are stipulated in the WEEE Ordinance, Federal Law Gazette II No 121/2005, as amended.

The aim was to set up a system with a division of responsibilities between municipal collection and manufacturer responsibility for reasons of practicability, controllability, cost reflectiveness and cost efficiency, as well as fairness of the system. At the same time, attention was directed towards the possibility of keeping the flow of goods and finance in tandem.

The WEEE coordination body (Elektroaltgeräte Koordinierungsstelle Austria GmbH) was again appointed as the coordinating authority in 2015 by way of an official decision. Its duties include in particular coordinating the collection of waste electrical and electronic equipment from collection points through collection and recovery systems, promotional activities, the payment of lump-sum infrastructure costs, as well as preparing reports for the European Commission.

The implementation of both EU Directives in a manner that is designed specifically for Austria has given rise to a system that is widely accepted and is functional and practical in many areas. Comparisons with other implementation models within the European Union have shown that the Austrian system was implemented in a cost-effective manner for manufacturers and was also consumer-friendly.

From the entry into force of the WEEE Ordinance until the end of 2015, around 700,000 tonnes of waste appliances were collected and forwarded to treatment plants in Austria within the framework of household collection activities alone. As a result, a total of approximately 240,000 tonnes of iron, approximately 80,000 tonnes of copper and approximately 35,000 tonnes of aluminium were fed back into the economic cycle. In addition to major resource savings, this converts to a reduction of about 750,000 tonnes of CO2. Alongside the elimination of pollutants from waste electrical equipment (e.g. heavy metals), this is the best evidence of the usefulness of the separate collection of waste electrical equipment.

Future challenges are expected in the following areas in particular:

- New applications and technologies in electrical and electronic equipment, e.g. monitors, lighting technology, refrigeration technology and power supply and storage technologies, which require creative solutions for the collection and financing of future waste equipment as well as new treatment methods.
- To promote reuse of old equipment that is still serviceable, reuse businesses must be afforded increased opportunities to receive suitable old equipment at collection centres based on an agreement with collection centre operators. This will increase the life cycle of this equipment and reduce consumption of resources.
- Since 2016, evidence of collection targets must be provided to the European Commission using a new methodology. Austria has reached previous collection targets very satisfactorily and is in the leading group in Europe. To demonstrate the required collection quotas from 2019 onwards, however, alongside annual reports under the WEEE Ordinance, further aspects of the collection of waste electrical equipment will also have to be considered.
- The distribution of goods, particularly that of electrical equipment over the internet, is steadily increasing and is having considerable impact on the logistics and financial viability of collection and treatment. Foreign distributors must therefore transfer the obligations under the WEEE Ordinance to an authorised representative. The Ordinance also sets out the prerequisites for the appointment and activities of this authorised representative. The obligation to appoint an authorised representative in the recipient country to meet the producer responsibilities is expected to improve the financing of appliances sold over the internet.

6.4.5. BATTERIES AND ACCUMULATORS

Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (hereinafter referred to as the Battery Directive) regulates the collection, treatment and related financing of used batteries and accumulators in particular.

The main points in the Directive are as follows:

- The use of hazardous substances in batteries or accumulators (hereafter "batteries") shall be restricted.
- All batteries should be collected and recycled at the end of their useful life. There shall no longer be provision for disposal in incineration plants or in waste landfills. There are a number of exceptions under certain circumstances.
- A distinction shall be made between portable batteries, vehicle batteries and industrial batteries. A number of specific provisions shall be arranged for their collection.
- Retailers are required to take back used batteries free of charge.
- The equipment shall be designed in such a way that the batteries can be removed and that the battery capacity is specified on the equipment itself or on the label.
- By 2016, the collection target for portable batteries of at least 45 % of average sales over the last three years must be achieved.
- Collected batteries must be recycled. A number of recycling efficiencies shall be stipulated: 50 % for batteries that do not contain cadmium or lead, and 75 % or 65 % for batteries containing cadmium or lead respectively.
- The manufacturers shall be responsible for the costs related to the waste management of batteries.

The European Commission plans to conduct an evaluation of Directive 2006/66/EC, which is to be completed by the 4th quarter of 2017. This will represent the first step in a review of the Batteries Directive.

The aforementioned Directive in Austria was implemented via three legal standards:

- The definition of a manufacturer (this includes importers), the duty to participate in a collection and recycling system, and the legal basis for the collection and transfer of certain duties to a coordinating authority are all stipulated in the Waste Management Act 2002. Article 75 gives the Federal Minister testing competence.
- A number of more specific provisions on the treatment of waste batteries are stipulated in the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004.
- The Batteries Ordinance transposes the provisions of the Directive on collection, recovery and financing.

The Ordinance of the Federal Minister for Agriculture and Forestry, the 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, implements the following requirements on the manufacture of batteries contained in the Directive:

- From September 26, 2008, manufacturers and equivalent importers may only distribute batteries at any level of trade within the EU that contain no more than 0.0005 percent by weight of mercury and waste batteries or accumulators that contain no more than 0.002 percent by weight of cadmium, including any such batteries that are installed within the equipment itself.
- The ban on mercury shall not apply to button cells with a mercury content not exceeding 2 percent by weight.
- The ban on cadmium shall not apply to portable batteries and accumulators that are intended for use in emergency and alarm systems (including emergency lighting), in medical equipment or in cordless power tools.
- The equipment shall be designed in such a way that the batteries can be removed and that the battery capacity is specified on the equipment itself or on the labe.

The collection of waste batteries (portable batteries and car batteries) shall be done via municipal collection points as well as by retailers who remain obliged to accept such items back free of charge. Retailers and municipalities shall have the option to forward waste batteries to the collection points of manufacturers.

The recast of the Waste Treatment Obligation Ordinance, Federal Law Gazette II No 102/2017, set forth requirements for the collection and storage of lithium batteries and waste electrical and electronic equipment containing litihium batteries, as well as for treatment plants for these batteries. This was to take account of the growing importance of lithium batteries (in particular, lithium-ion batteries) that are used, inter alia, in the area of electromobility, in cordless electrical and electronic equipment (e.g. gardening tools and power tools), in small electrical devices (such as mobile phones, tablets, cameras, toothbrushes, razors) and in model making.

Producer obligations

Producer must be registered on the electronic register (ZAReg) and must set up at least one collection point per political ward from which waste batteries can be handed over by end distributors. Waste batteries shall be accepted at collection points free of charge.

Transportation from collection points and treatment shall be funded. Batteries must be marked with the "crossed-out waste bin" symbol along with the chemical symbol of any heavy metals that they contain.

Figure 111: Pictogram of crossed-out waste bin for safeguarding separate collection (Source: Batteries Ordinance)

Manufacturers of equipment and vehicle batteries must fulfil their obligations (transport, establishment of collection points for batteries taken back by retailers, treatment of waste batteries, reporting requirements) by participating in a collection and recovery system.

There is a pro-rata collection obligation for all batteries collected at the collection points. All collected waste batteries shall be supplied to an approved treatment plant by the manufacturer (collection and recovery systems). The waste batteries must be treated in accordance with the provisions of the Waste Treatment Obligations Ordinance, whereby the specified recycling efficiencies are to be ensured through the selection of a suitable waste recovery plant and documented as well.

Collection and recovery systems must conclude a contract with the coordinating authority. This agreement shall include the collection of waste to be acquired from collection points (handover points), the approval of alternative implementation for cost reimbursement, the minimum equipment for the collection infrastructure, the provision of information to end users, and the establishment of a dispute resolution service, including the financing of the collection infrastructure and the provision of information to end-users.

Industrial batteries, i.e. those which are mainly used within industry, as well as batteries for electric cars must be taken back by manufacturers. The costs for collection and recovery can be governed in individual agreements.

6.4.6. BIOGENIC WASTE

Most biowaste originates from separate household collection, from the green area sector, from trade and industry (e.g. catering, food industry) and wastewater treatment (sewage sludge). Further information is contained in Chapter 3.1.5 "Biogenic waste collected separately from households and similar establishments" and in Chapter 3.3.1 "Biogenic waste from green areas".

Ordinance on the separate collection of biogenic waste (Biogenic Waste Ordinance), Federal Law Gazette II No 68/1992

This Ordinance sets forth which biodegradable waste products can be collected separately provided they cannot be recovered at home or at the industrial premises (composted).

Leftover food can only be collected together with other biowaste if it is brought to a suitable plant for recovery. Otherwise, leftover food must be disposed of with the general waste. The scope of separate collections therefore varies from region to region.

Reference is made to diverse regulations based on provincial Waste Management Acts on the separate collection of biogenic waste.

A key precondition for recovering and achieving the target grades of recovery products is that biogenic waste is collected carefully and separately. It must be accompanied by intensive educational and promotional activities.

Recovery methods

Biogenic waste for biological recovery (composting and fermentation) is to be classified under code group 92 under the List of Waste Ordinance, Federal Law Gazette II No 570/2003, as amended.

The recovery methods listed are permissible if the relevant waste is harmless and appropriate for the intended purpose and no protected resources as per the Waste Management Act 2002 could be affected by such use, and provided that these measures do not infringe other legal provisions (e.g. water protection legislation, ordinances for the Waste Management Act 2002, provincial soil protection legislation):

- aerobic biologically (composting)
- anaerobic biologically (fermentation)
- thermally (incineration)
- directly spreading on land
- using biotechnology (e.g. biodiesel, lactic acid)
- combinations of these processes.

The prefered recovery channel depends on the condition of the biogenic waste:

- solid structured biowaste (e.g. biogenic municipal waste) shall preferably be treated in composting plants
- liquid, paste-like biowaste (e.g. kitchen and food waste) shall preferably be treated in biogas plants
- high-calorific, biogenic woody waste (e.g. rootstocks) can be supplied for thermal recovery
- energy-rich biowaste (e.g. used cooking oils and fats) can be supplied for biotechnological recovery (e.g. biofuel production)

Recommendations on biological recovery methods are set out by code numbers in ÖNORM S 2201 "Biogenic waste – Quality requirements" (2009).

The recovery methods for biogenic waste should supplement each other, not compete with each other. For example, an anaerobic treatment stage before composting may also provide an opportunity to use part of the energy content as well as the nutrient content of biowaste. On the other hand, the composting of fermentation residues provides sanitation and humification. Sieve residue from composting can be supplied for thermal recovery.

Figure 112: Quality compost generated from biogenic waste

6.4.7. RECYCLED WOOD

The recycling of waste wood in the wood material industry is regulated in the Recycling Wood Ordinance, Federal Law Gazette II No 160/2012, as amended. The Ordinance aims to ensure the recycling of suitable waste wood in a manner that does not harm humans or the environment and to prevent the accumulation of pollutants in the product cycle.

The Recycling Wood Ordinance lays down limit values for harmful substances and an obligation to carry out testing. These limit values are variable and depend on the proportion of wood recycled compared to the total wood input required to make timber materials. This means that the cleaner the recycled wood is, the more recycled wood can be used to make timber materials. Therefore, an incentive will be created to separate waste wood into contaminated and less contaminated waste wood fractions or to carry out extensive preparation of waste wood at the point where it is generated.

If the waste wood is of similar quality to natural wood, it can be classified as non-waste.

Currently, a detailed source analysis is carried out in the course of a research project for the parameters of PAH and chlorine, and their suitability as leading parameters for the presence of treated waste wood is being tested. As soon as results will be available, the provisions of the Recycled Wood Ordinance will be evaluated and an adaptation regarding these parameters will be carried out, if need be.

Figure 113: Sorting of waste wood

6.4.8. ANIMAL BY-PRODUCTS

Regulation (EC) No 1069/2009 laying down health rules as regards animal by-products and derived products not intended for human consumption (hereinafter: ABP Regulation), last amended by Regulation (EU) No 1385/2013, contains health rules and animal health provisions for animal by-products and their derived by-products.

Under the ABP Regulation, animal by-products are whole animal bodies, animal body parts, products of animal origin or other products derived from animals that are not intended for human consumption.

Animal by-products are classified into three categories according to the degree of danger they pose to human and animal health, with ABPs with the highest risk falling into Category 1, e.g. those suspected of containing specific risk material and TSE (transmissible spongiform encephalopathies). Category 2 includes dead animals and liquid manure, for example. Category 3 covers material such as body parts from slaughtered animals that are not intended for human consumption such as blood, skin, hoofs, etc.

The ABP Regulation contains restrictions and prohibitions on the use and disposal of animal by-products. These provisions regarding treatment differ depending on the category in question.

Kitchen and food waste fall under Category 1 of the ABP Regulation if it originates from international transport. Otherwise, kitchen and food waste shall only fall under the ABP Regulation if it is intended for pressure sterilisation or for a type of processing pursuant to Article 18(1) of the ABP Regulation or for conversion in a biogas or composting plant.

All other kitchen and food waste shall be assigned to Category 3 and shall be processed or composted or converted into biogas by way of pressure sterilisation or by way of methods pursuant to Article 15 Para 1 Subpara 1 lit b of the ABP Regulation. To the extent that the competent authority has granted a permit, kitchen and food waste falling under Category 3 may also be used for feeding.

Waste in accordance with the Waste Management Act 2002

Animal by-products can also be waste. Waste shall only be subject to the Waste Management Act 2002 if it does not relate to the carcasses of animals that have not been slaughtered, including carcasses of animals killed to eradicate epizootic diseases and which were disposed of in accordance with the ABP Regulation. Furthermore, other animal by-products, including processed products, are excluded from the Waste Management Act 2002 if they come under the ABP Regulation, with the exception of those that are intended for specific waste treatment plants, such as incineration in an incineration plant or co-incineration plant, or treatment in a biogas or composting plant (Article 3(1)(5)(a) and (b) of the Waste Management Act 2002).

Similarly, the collection, storage, transport and treatment of manure, silage, liquid manure and organically compostable material as waste is not necessary as a matter of public interest if it occurs on an agricultural or forestry holding and is supplied for an approved use in the immediate vicinity of an agricultural or forestry holding (Article 2(3) of the Waste Management Act 2002).

Composting and fermentation

Companies producing, transporting, handling, storing, distributing, selling, using or disposing of animal by-products must inform the various authorities prior to commencing operations. Plants and businesses carrying out these activities must be approved (Animal Materials Act, Federal Law Gazette II No 141/2003, as amended). This also includes composting or processing in a biogas plant.

The ABP Regulation makes provision for a number of general hygiene requirements for plants and businesses carrying out these activities in accordance with Article 25. Additional requirements can be found in the annexes to the ABP Regulation and can be stipulated by way of a number of implementing measures.

Detailed provisions on the distribution and use of organic fertilisers and soil conditioners, including the fermentation residues from biogas plants and compost, can be found in Article 32 of the ABP Regulation.

If kitchen and food waste is processed in a composting or fermentation plant, it shall also be subject to the ABP Regulation. In accordance with Article 14(k) of the ABP Regulation, if this material is in Category 3, then it may be processed through pressure sterilisation or other methods that were identified in accordance with Article 15(1)(1)(b), or converted into biogas. Furthermore, the parameters for the processing of animal by-products, including kitchen and food waste, into biogas or compost can be set on a Europe-wide basis. Any existing national provisions may be retained until such provisions are adopted.

In accordance with Article 21(4) of the ABP Regulation, the collection, transport and disposal of Category 3 kitchen waste shall be done in accordance with the national measures pursuant to Article 13 (Protection of human health and the environment) of the Waste Framework Directive, 2008/98/EC. Labelling provisions may however be laid down within the framework of regulations on animal by-products.

The ABP Regulation defines specific requirements for facilities and operations for the recovery of animal by-products which are divided into three different categories, as well as end products (digestate) from biogas and compost plants. The treatment of Category 1 animal by-products in biogas or composting plants shall not be permitted in principle.

With the exception of manure, stomach and intestinal contents (separated from stomach and intestine), milk and colostrum (approved without pre-treatment if there is no risk of the spreading of serious diseases), all Category 2 animal by-products must be subjected to steam pressure sterilisation at ≥ 133°C, ≥ 3 bar, with a particle size < 50 mm for at least 20 minutes (after the core temperature of 133°C is reached) in an approved establishment before processing in a biogas or composting plant. This does not include kitchen and food waste or processed former foodstuffs of animal origin, whose storage, collection and biological treatment are regulated nationally by the Animal Materials Regulation (Federal Law Gazette, II No 141/2010).

The following shall apply to the treatment of other Category 3 animal by-products: Thermal pasteurisation must be done at 70°C for a period of 60 minutes for a particle size <12 mm in a suitable facility that cannot be avoided. Alternatively, there is also the option of a validation system for the recognition of other processes in accordance with Commission Regulation (EC) No 208/2006.

Spreading animal by-products

In accordance with the ABP Regulation, the feeding of farm animals with green fodder from fields on which organic fertilisers or soil conditioners (from animal by-products) were applied, with the exception of manure, is prohibited unless the cutting or grazing occurs after a waiting period of at least 21 days.These conditions, especially the waiting period, may be amended in the committee procedure.

6.4.9. NANOWASTE

Due to their specific chemical and physical properties, nanomaterials are used in many products, can be released along the entire product life cycle and are therefore increasingly accruing as waste. They are found for example in building materials, paints and varnishes, cosmetics, textiles, sports equipment and electronic equipment. Nanomaterials are also used in cosmetics and can be enriched in sewage sludges already during their utilisation, e.g. by elution, via waste-water collection systems as well as waste-water purification plants.

There is as yet no certain knowledge about the behaviour of these materials in recycling processes. It is quite conceivable that nanomaterials could be released, for example in the form of dust caused by abrasion during transportation, crushing or filling procedures. Furthermore, quality reductions in recyclates cannot be excluded. In the biological treatment of waste, a study has shown that biological activity is affected whereas no effects on the formation of biogas were identified in the substances evaluated (silver, various metal oxides and multi-wall carbon nanotubes). Moreover, there is currently only scarce knowledge on the long-term environmental impact in the course of biological processes (in particular, on the genotoxic impact of nanowaste).

In respect of thermal waste treatment, previous results have shown that thermally stable nanomaterials are primarily concentrated in solid residues. Swiss material flow modelling has shown that in future the largest quantities will be found in landfills as these materials are also deposited as residue from thermal treatment. Little is known about the reactions of this nanowaste in landfills. A French study has pointed to the fact that nanomaterials are being discharged from landfills. The mobility behaviour of colloidally stable nanomaterials under landfill conditions was investigated in an Austrian study, and diffusion experiments are also the subject of an EU-funded project to examine the permeability of the base sealing of landfills for nanoparticles.

In general, however, the data from scientific studies is currently insufficient to fully estimate the effects of the treatment of nanowaste. There are information gaps in terms of both quantitative relevance and the potential mechanisms. An OECD study suggests that modern waste treatment plants can hold back or destroy nanomaterials. Even though Austrian treatment plants undoubtedly meet this standard, further research is necessary. Due to the large number of different nanomaterials and the knowledge deficit regarding their effects during waste treatment, estimating potential hazards poses a challenge. The Austrian Nanotechnology Action Plan focuses on closing knowledge gaps in the area of nanotechnology and on the increased provision of information as well as on the enhanced utilisation of potential opportunities (www.nanoinformation.at).

6.4.10. MICROPLASTIC

According to the Roadmap on the European Commission Strategy on Plastics, that will presumably be submitted in late 2017, the prevention of the release of plastics into the environment is one of the main concerns, with a need for action having been identified in the area of microplastics. It can be assumed that the presence of plastics and microplastics in the oceans can be traced back to various sources and that they are, inter alia, being released from the land or from big rivers.

With regard to their original use, microplastics are subdivided into primary and secondary microplastics. Primary microplastics are deliberately used as a product (blast-cleaning abrasives) or for certain products (e.g. cosmetics, detergents, colours). Secondary microplastics are, however, generated by the decomposition and fragmentation of bigger plastic components (e.g. tyre wear or fibres accrued during the cleaning of textiles).

As regards plastics and microplastics, the Federal Ministry of Agriculture, Forestry, Environment and Water Management has been active for many years. In cooperation with other relevant stakeholders, a number of initiatives regarding the reduction of the release of plastics and microplastics into environmental media and, ultimately, into the oceans, has been launched (e.g. Initiative for a Europe-wide abandoning of the use of microplastics in cosmetics, the Federal Ministry of Agriculture, Forestry, Environment and Water Management initiative "Zero Pellets Loss" in cooperation with the Association of the Austrian Chemical Industry, campaign for the reduction of single-use carrier bags, etc.). In addition, mention must be made of the fact that the key for the reduction of pollution at the source frequently lies in responsible product design. Last but not least, also informed consumer behaviour makes a contribution to tackling the problem.

Especially when it comes to retrieving microplastics, a lot of methodical groundwork must be provided. This is why one focus of activities is on the area of the preparation of standardised methods to create a comparable data record as well as on the closing of knowledge gaps.

Surveys indicate that sewage sludge constitutes a sink for microplastics and that the further handling of sewage sludge is key for potential spreading.

Figure 114: Waste water purification plant

6.5. PLANT-RELATED MEASURES

6.5.1. BIOLOGICAL WASTE TREATMENT

6.5.1.1. AEROBIC TREATMENT (COMPOSTING)

Composting makes a positive contribution to climate protection as it reduces humified organic substances and nutrients in the natural cycle (conservation of resources). Humification sequesters and/or concentrates carbon in the soil over the long term.

State-of-the-art rotting processes help significantly reduce greenhouse gases through open windrow composting. The national contribution of composting to the greenhouse effect amounts to 0.03-0.06% of total national emissions of climate-changing CO2 equivalents regardless of the method used.

To achieve product status for the production of compost from waste, the provisions of the Compost Ordinance must be observed.

Figure 115: Collection vehicle

Ordinance on quality requirements for compost from waste (Compost Ordinance), Federal Law Gazette II No 292/2001

The Compost Ordinance contains a number of uniform and binding requirements nationally for the manufacture, distribution and labelling of compost from waste. The quality requirements for the end products as well as the nature and origin of the raw materials are all in the foreground. The technical foundations for an amendment are currently being developed.

The basic technological and operational requirements for composting plants are contained in the "Guideline on the state of the art in composting (2006)", in the ÖWAV fact sheet 518 "Requirements for the operation of composting plants (2009)" and in ÖNORM S 2205 "Technical requirements for composting plants (2008)".

The veterinary requirements under the Animal Materials Ordinance, Federal Law Gazette II No 484/2008, as amended by Federal Law Gazette II No 141/2010 (Annex IV), must also be observed for the composting of kitchen and food waste and spoiled food. The lawful handling of kitchen and food waste (storage, collection and biological treatment) is set out in the ÖWAV Guideline "Kitchen and food waste and former foodstuffs of animal origin" (2013).

Waste types of code group 92 under the List of Waste Ordinance are permitted as raw materials for composting, taking into account the quality requirements for raw materials under ÖNORM S 2201 "Biogenic waste – Quality requirements" (2009). Furthermore, to optimise the rotting process and the quality of end products, aggregates (e.g. ash from biomass combustion, rock dust, excavated soil material) may be used in accordance with the Compost Ordinance.

6.5.1.2. ANAEROBIC TREATMENT (FERMENTATION)

By substituting fossil fuels, fermentation in state-of-the-art biogas plants makes a valuable contribution to climate protection. Returning organic substances and nutrients to the natural cycle preserves resources through the utilisation of digestates, e.g. in agriculture.

Under the Waste Treatment Obligations Ordinance, fermentation residue must be stored in a gastight manner (under cover) to minimise climate-relevant gases.

The "Technical specifications for assessing biogas plants" (2012) by the Federal Ministry of Science, Research and Economy summarises the state of the art and gives an overview of any dangers, emissions or adverse effects that may occur.

The operational requirements for biogas plants are set out in "ÖWAV"- Fact Sheet 515 "Anaerobic waste treatment – Requirements for the operation of biogas plants" (2nd edition, 2013). ÖNORM S 2207-1 "Biogas plants, Part 1: Definitions and Principles" (2011) and ÖNORM S 2207-2 "Biogas plants, Part 2: Technical specifications for process engineering" (2011) contain definitions, principles and technical requirements for biogas plants.

The veterinary requirements under the Animal Materials Ordinance, Federal Law Gazette II No 141/2010 (Annex IV) must also be observed for the fermentation of Category 3 animal by-products as per Regulation (EC) No 1069/2009.

Waste types of code group 92 under the List of Waste Ordinance are permitted as raw materials for fermentation, taking into account the quality requirements for raw materials under ÖNORM S 2201.

Figure 116: Biogas plant

6.5.1.3. MECHANICAL-BIOLOGICAL WASTE TREATMENT

The treatment of waste prior to landfilling is necessary as a result of the ban on the landfilling of waste with an organic carbon content in the solid material of more than five percent by mass (see Article 7(7) of the Landfill Ordinance 2008). These mainly involve thermal or mechanical-biological treatments (with the use of the exception stated in Article 7(7)(f) of the Landfill Ordinance 2008 for the latter). The Waste Incineration Ordinance (Federal Law Gazette II No 389/2002, as amended by Federal Law Gazette II No 135/2013), sets out the state-of-the-art requirements as regards the incineration of waste. The state of the art was published by the Federal Ministry of Agriculture, Forestry, Environment and Water Management as the "Guideline for the mechanical-biological treatment of waste" (March 2002) for mechanical-biological waste treatment.

This Guideline, which was also reported to the European Commission, constituted a decisive step for the orientation of all stakeholders, especially planners and prospective plant operators. Authorities are recommended to use this Guideline as a reference in the plant approval process. The stability parameters of the MBT Directive have been established as mandatory landfill criteria for waste from mechanical-biological treatment (see Annex 1, Table 9 of the Landfill Ordinance 2008).

New mechanical-biological treatment plants were set up (see Chapter 4.3. "Mechanical-biological treatment plants") and existing plants were adapted to implement the ban on landfilling. Surveys conducted jointly with the Environment Agency Austria on the progress of implementation of the MBT guideline indicated that there was a need for state-of-the-art adjustments to both existing systems and some newly built plants, especially with respect to the delimitation of open and closed plant areas, air management including air extraction and purification, as well as the binding emission limit values that must be observed.

For MBT plants classified as IPPC treatment plants under the criteria in Annex 5(3) of the Waste Management Act 2002, the 2006 explanatory leaflet on the best available techniques for waste treatment plants (BAT waste treatment) must be taken into account along with the MBT guideline when adapting plants to the state of the art.

In November 2013 a review process based on the latest data was initiated to update, supplement and adapt this explanatory leaflet to the requirements of European Directive 2010/75/EU on industrial emissions. The resulting BAT conclusions adopted in committee as per Article 75 of the Industrial Emissions Directive are being published as a stand-alone legal document by the European Commission containing binding requirements for plant approvals, which must be implemented by Member States or approval authorities within four years of publication. Against this background – and taking into account the declining numbers of MBT plants – a planned ordinance for the mechanical-biological treatment of waste based on Article 65(1) of the Waste Management Act 2002 has been abandoned for the time being.

The installation of anaerobic treatment stages is seen as a sensible development. The 2008 Environmental Report of the German Advisory Council on the Environment showed that purely aerobic processes have a number of shortcomings regarding the energy efficiency of different MBT concepts; this is because the energy content of organic substances is not fully converted into usable heat. In contrast, the various combination methods with partial or full flow anaerobic processes make it possible for energy to be extracted based on the level of anaerobically treated organic constituents. Plants used for the mechanical-biological treatment of waste with combined anaerobic and subsequent aerobic biological treatment have not yet been implemented in Austria.

6.5.2. THERMAL WASTE TREATMENT

In Austria, the incineration of waste is comprehensively regulated by the Waste Incineration Ordinance (Federal Law Gazette II No 389/2002, as amended by Federal Law Gazette II No 135/2013). The Waste Incineration Ordinance covers hazardous and non-hazardous waste incinerated in incineration plants (plants for the thermal treatment of waste with or without recovery of the combustion heat generated) or in co- incineration plants (plants whose purpose is the generation of energy or the production of material products).

The Waste Incineration Ordinance contains limit values for air emissions (Appendixes 1 and 2) as well as provisions on the operating conditions to be complied with.

The Waste Incineration Ordinance also lays down limit values for the pollutant content of waste that can be incinerated in co-incineration plants (cement plants, power plants and other co-incineration plants), as well as detailed guidelines on planning sampling, taking samples and carrying out analyses on this waste.

The Waste Incineration Ordinance also defines a number of requirements for end-of-waste of replacement fuels. A distinction is made between replacement fuel products from wood waste and other replacement fuel products, whereby the limit values are based on the composition of comparable conventional fuels.

In addition to the requirements of the Waste Incineration Ordinance, IPPC treatment plants must be regularly adapted in line with the state of the art; the state of the art used as the basis for waste incineration plants is defined in the "Reference Document on the Best Available Techniques for Waste Incineration".

In terms of the conservation of resources, the use of substitute raw materials in plants for cement production is a key component of the Austrian waste management industry as it involves the direct replacement of primary raw materials.

To avoid an increase in the environmental impact and environmental risk due to the use of substitute raw materials for preventive environmental protection reasons, the Federal Ministry of Agriculture, Forestry, Environment and Water Management has drawn up and published "Technical specifications for the use of waste as substitute raw materials in cement manufacturing plants". These technical specifications must be taken into account when adapting plants for cement production to the state of the art.

6.5.3. LANDFILLS

In line with the aims and principles of the Waste Management Act 2002, non-recoverable waste must be treated in such a way that its landfilling does not pose a danger to subsequent generations, solid residues must be deposited in a non-reactive manner and landfill volumes must be restricted (see Article 1(1) and 2 of the Waste Management Act 2002). To achieve these aims, the first ordinance on the state-of- the-art layout and mode of operation of landfills was enacted in April 1996 (Landfill Ordinance, Federal Law Gazette No 164/1996). Key points included quality requirements for waste sent to landfill through the limitation of pollutant content, the soluble portion and total organically bound carbon (TOC). The TOC restriction excludes biodegradable and high-calorific waste from landfill to prevent the formation of greenhouse gases and preserve energy resources.

The gradual adaptation of existing landfills was to be completed by 1 January 2004 at the latest. Individual exceptions to the TOC ban were only possible up until 31 December 2008. The effect of these periods is clearly shown in Figure 24 "Recovery and disposal of municipal waste" (Chapter 3.1), which illustrates the decline in the landfilling of untreated municipal waste.

Directive 1999/31/EC on the landfilling of waste was transposed into national law by the Landfill Ordinance 1996 and the Waste Management Act 2002. A comprehensive redrafting of the Landfill Ordinance was necessary to implement the Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2003/33/EC).

The 2008 Landfill Ordinance, Federal Law Gazette II No 39/2008, last amended by Federal Law Gazette II No 291/2016, entered into force on 1 March 2008.

The new provisions relate above all to the waste acceptance procedure and to adaptations concerning the financial security of landfills. Through the Federal Government's e-Government and administration campaign, the necessary notification and reporting procedures are being gradually integrated into the electronic data management system (EDM) of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

A ban on surface landfilling of hazardous waste has been in effect since 16 July 2001. Exceptions include waste containing asbestos and contaminated road rubble, for which specific provisions on non-hazardous waste have been created for long-term storage in landfills in line with the provisions of the Council Decision.

Specific hazardous waste can be treated using chemical-physical, biological or thermal procedures to the extent that classification as non-hazardous waste, and hence landfilling, is possible. Furthermore, potentially hazardous waste can be declassified if it is demonstrated in individual cases that it has no hazardous properties (where applicable taking landfill conditions into account). The competent authority for declassification is the Federal Minister for Agriculture and Forestry, Environment and Water Management.

The depositing of hazardous waste is only permitted in underground landfills for hazardous waste (Article 16(1) of the Waste Management Act 2002). Austria does not have any such plants. The shipment of such waste that cannot be further treated appears secure for the long term, however.

Landfilling for the medium-term storage of recoverable waste

If recoverable waste arises in volumes such that it cannot be recovered within three years, it may be appropriate to deposit this waste in specifically designed single compartments or compartment sections.

6.5.3.1. IMPLEMENTATION OF THE AUSTRIAN STRATEGY TO REDUCE BIODEGRADABLE WASTE SENT TO LANDFILL (2003)

Under Article 5(1) of Directive 1999/31/EC on the landfilling of waste (Landfill Directive), the Member States must draw up a strategy to reduce biodegradable waste sent to landfill and report to the Commission on this. The measures set out in the strategy should enable the achievement of the aims set out in Article 5(2), with specific measures on recycling, composting, biogas production or material/energy recovery.

The Austrian strategy to reduce landfill volumes of biodegradable waste and the harmful effects of the landfilling of waste is based on the following:

- the separate collection of biodegradable waste (in particular, separately collected fractions of municipal waste are to be composted and used in biogas plants or else thermally recovered) and
- the determination of requirements pertaining to the quality of landfilled waste through 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 entered into force in 1995. This Ordinance sets forth which biodegradable waste from households or businesses is to be supplied for separate collection, unless this waste is recovered in the immediate vicinity.

The Compost Ordinance, Federal Law Gazette II No 292/2001, which entered into force in 2001, regulates quality requirements for compost from waste, the type and origin of raw materials and the conditions for placing these on the market.

Other ordinances that ensure the separate collection and recovery of considerable quantities of waste include the Packaging Ordinance (Ordinance on avoiding and recycling packaging waste and certain waste goods and the establishment of collection and recovery systems, Federal Law Gazette No 648/1996, as amended by the Packaging Ordinance 2014, Federal Law Gazette II No 184/2014) and the Ordinance on the separation of materials due to construction activities, Federal Law Gazette No 259/1991, replaced by the Recycled Construction Materials Ordinance, Federal Law Gazette II No 181/2015, as amended.

The organic proportion in waste that can be landfilled was drastically restricted by the Landfill Ordinance (Landfill Ordinance 1996, Federal Law Gazette No 164/1996, as amended by the Landfill Ordinance 2008, Federal Law Gazette II No 39/2008, as amended by Federal Law Gazette II No 104/2014). Since 31 December 2008, no waste containing more than 5% TOC (total organic carbon) may be sent to landfill. This relates not only to municipal waste but also to all waste sent to landfill. The only exceptions are for mechanically and biologically pretreated waste below a specific calorific value and some other waste that is not subject to relevant biodegradation.

In addition to specifying the contents of the measures to be put in place, Article 5(2) of the Landfill Directive stipulates the extent of the reduction in volumes of biodegradable municipal waste to be sent to landfill with regard to specific percentages by weight of the total volume of biodegradable municipal waste produced in the reference year 1995. The volume of biodegradable municipal waste sent to landfill had to be reduced to 75 % by 16 July 2006, to 50 % by 16 July 2009 and to 35 % by 16 July 2016, each time with respect to the volume produced in the reference year 1995.

The volume of biodegradable municipal waste produced in Austria in 1995 was 2,675,300 tonnes overall, calculated in particular from the biodegradable portion of residual waste, bulky waste, waste paper, biogenic waste and green waste (see the "Austrian strategy to reduce biodegradable waste sent to landfill", a report to the Commission in line with Article 5(1) of the Landfill Directive (1991/31/EC), Decree No 62 5530/115- VI/2/03 of 26 November 2003), published on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

In accordance with the reduction targets under Article 5(2) of the Landfill Directive the volume of biodegradable municipal waste sent to landfill in Austria was/is to be reduced as follows:

- to 2,006,475 tonnes by 16 July 2006 (-25 %)
- to 1,337,650 tonnes by 16 July 2009 (-50 %)
- to 936,355 tonnes by 16 July 2016 (-65 %).

In fact, the volume of biodegradable municipal waste actually sent to landfill in Austria in 2006 was only 69,860 tonnes. Since 2009, no biodegradable waste has been sent to landfill because of the landfill ban.

These developments show that the Austrian strategy to reduce biodegradable waste sent to landfill not only met and achieved the targets set out in Article 5(2) of the Landfill Directive several years ago but also that the landfilling of biodegradable waste is now completely outlawed.

The trend in volume flows in the collection and treatment of municipal waste since 1989 is set out in Chapter 3.1. "Municipal waste from households and similar establishments" and clearly shows the implementation of measures taken in Austria regarding the separate collection and recovery (recycling) of biogenic waste and municipal waste and thermal recovery of the residual volumes discharged from the waste collection scheme. By 2009, more than 50% of municipal waste was recycled and a further approximately 36% was thermally recovered.

6.5.4. PLANTS AND SITES

Chapter 4 "Treatment plants" contains a comprehensive list of major waste recovery and treatment plants along with their regional distribution. Thanks to the existing treatment plants and capacities in Austria, there is in principle a very high degree of "self-sufficiency" within the meaning of Article 16 of Directive 2008/98/EC (Waste Framework Directive).

Following the expiry of the transitional periods (end of 2008) regarding the ban on the depositing of waste with high amounts of organic carbon in accordance with the Landfill Ordinances 1996 and/or 2008, sufficient treatment capacity for municipal waste has been made available. As regards commercial waste, and for special waste fractions such as sewage sludge, capacity must be provided as this waste is increasingly being sent for mono-incineration (see Chapter 7.5 "Sewage sludge from municipal sewage plants") and because shipment abroad is no longer done to the same extent (commercial waste).

There are 11 plants for the thermal treatment of municipal waste in operation with total capacity of around 2.6 million tonnes/year. Compared to the number of plants under the Waste Management Plan 2011, additional capacity of approximately 200,000 tonnes/year was provided. There are also 54 thermal treatment plants in operation, particularly co-incineration plants, with total capacity of around 2.7 million tonnes/year. There are even sufficient capacities for plants used for the thermal treatment of hazardous waste, with the exception of some possible short-term bottlenecks as a result of larger contaminated site remediation projects.

Generally speaking, if appropriate technologies are used and there is a high energy efficiency level, thermal waste treatment is seen to be a particularly suitable method which significantly outweighs any environmental impacts compared to alternative methods. With respect to plants with high energy efficiency (waste incineration plants as well as waste co-incineration plants), primary energy sources can also be saved and an essential contribution to climate protection can therefore be made. In this respect, the shipment of waste to such plants to Austria must be assessed positively both from an environmental as well as an energy policy perspective (based on the assumption of low transport distances and particularly, lower standards in foreign plants). Directive 2010/75/EU (Directive on industrial emissions) and the related revision to the BAT explanatory leaflets "Waste treatment" and "Waste incineration" should further align the environmental standards for waste treatment plants in EU Member States, with the trans-boundary shipment of waste also requiring assessment from this aspect.

The approved capacity of mechanical-biological treatment plants is approximately 660,000 tonnes/year. Due to the necessary adaptation of a significant proportion of these plants in line with the state of the art, it is therefore to be expected that plant capacity in this particular area will decline in the medium term and there will be a shift towards thermal treatment.

There is sufficient capacity over the medium term in above-ground landfills for non-hazardous waste. Regional bottlenecks, particularly for the depositing of mineral waste, may arise over the short term, causing longer journeys. The depositing of hazardous waste that cannot be further treated is only permitted in underground landfills for hazardous waste (Article 16(1) of the Waste Management Act 2002). Austria does not have any such plants. The shipment of such waste that cannot be further treated appears secure for the long term, however.

The observations contained in Chapter 4 "Treatment plants" also show that there is sufficient treatment capacity for handling special waste (e.g chemical-physical treatment plants, shredders, construction waste processing plants, sorting and recovery plants for separately collected recoverables and waste electrical and electronic equipment). The same applies to the treatment of biogenic waste (collected separately).

6.5.5. CLIMATE IMPACT OF THE WASTE MANAGEMENT INDUSTRY

The demands on sustainable waste management go far beyond the standards for the traditional waste management industry and also depend on other environmental media and environmental factors within the framework of waste management strategies. The weakening of the anthropogenic greenhouse effect represents a major global challenge over the next few decades in terms of environmental protection.

Climate Protection Act

The Federal Act adopted in 2011 on compliance with maximum volumes of greenhouse gas emissions and on the preparation of effective climate protection measures (Climate Protection Act, Federal Law Gazette I No 106/2011, as amended by Federal Law Gazette I No 128/2015), sets maximum emission volumes outside the EU emissions trading scheme for six sectors between 2013 and 2020 (Federal Law Gazette I No 94/2013) and regulates the preparation and implementation of effective climate protection measures. It forms an essential pillar of Austrian climate policy up to 2020.

The six sectors are waste management, energy and industry (non-emissions trading), fluorinated gases, buildings, agriculture and transport.

The Climate Protection Act contains a reduction scenario (target scenario) for maximum annual volumes of greenhouse gas (GHG) emissions which is binding on Austria by virtue of the "Effort-Sharing Decision" (No 406/2009/EC) (reduction from 52.6 million tonnes of CO2 equivalent in 2013 to 48.8 million tonnes of CO2 equivalent in 2020).

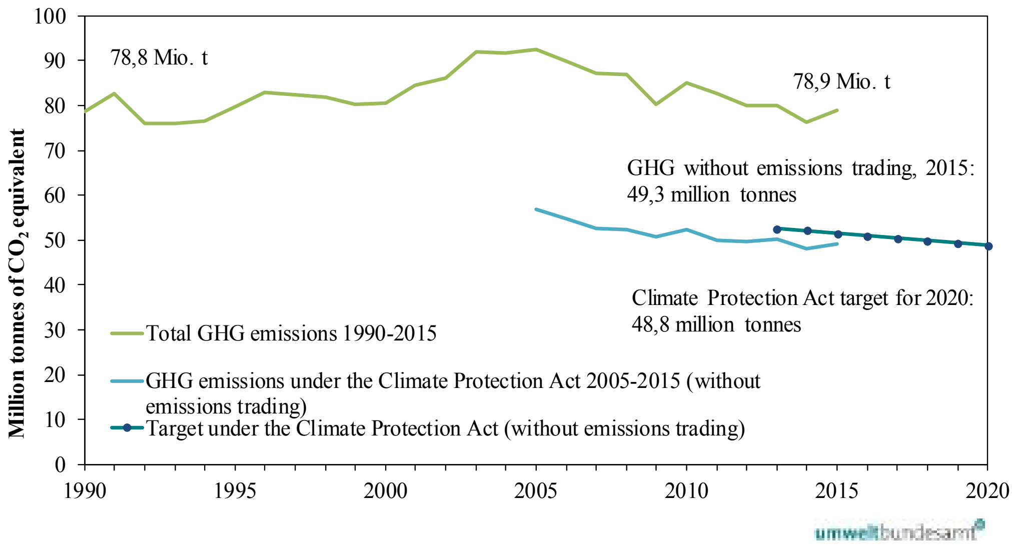

Figure 117: Development of Austrian GHG emissions, 1990 to 2015 and Climate Protection Act target

To support the process of achieving the greenhouse gas target by 2020, a package of measures in line with the Climate Protection Act was determined by the Federal Government and the provinces, which was updated in 2015 for the second implementation stage (for 2015-2018).

The maximum annual volumes were distributed among the six sectors in Climate Protection Act plants, with the GHG emissions from waste incineration no longer attributed to the energy and industry sector but to the waste management sector from 2013 to 2020.

Waste management sector

After the fluorinated gas sector, the waste management sector is the second smallest, with approximately 4 % in total GHG emissions in 2015 (including GHG emissions under emissions trading in the energy and industry sector).

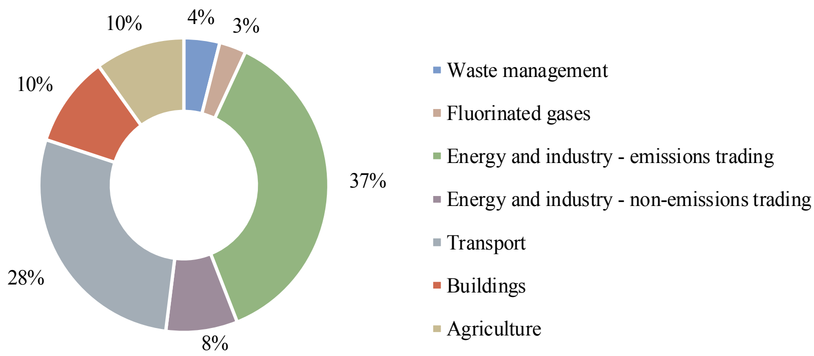

Figure 118: Share of sectors in total GHG emissions in 2015

Waste management was one of the largest sources of methane emissions in Austria. As a consequence of the steady growth in waste volumes, emissions steadily increased up until 1990. Since 1991, the sector has seen a significant decrease in emissions despite a continuous increase in waste volumes.

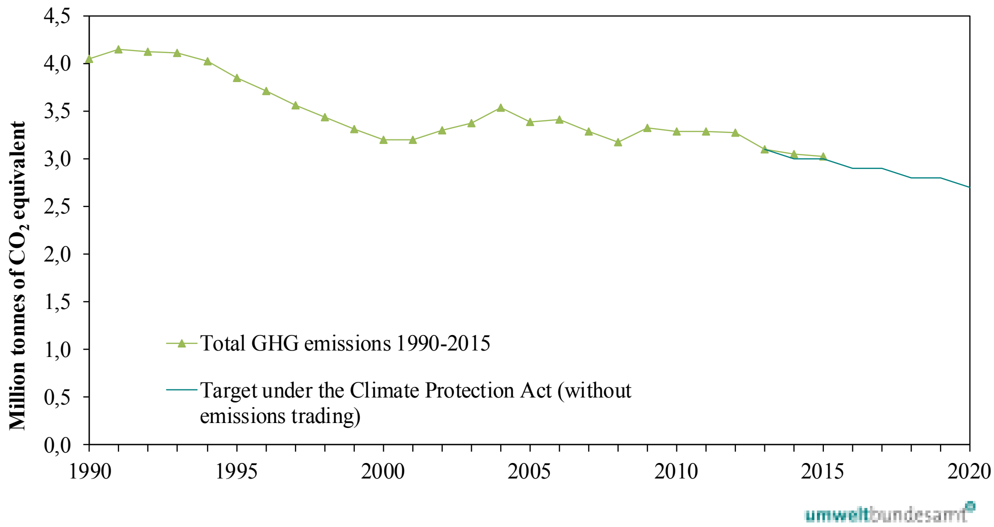

Figure 119: Greenhouse gas emissions from the waste management sector, 1990–2015 and Climate Protection Act target

Emissions from the waste management sector decreased slightly in 2015 by 0.8 % compared to 2014 (24,000 t of CO_2 equivalent). In relation to 1990, they are 25.2 % lower (1.0 million tonnes of CO_2 equivalent).

This data shows that a significant level of importance must be attributed to waste management in implementing the National Climate Strategy. To complete this task, the waste management industry set up corresponding framework conditions with the Waste Management Act 2002 and the Landfill Ordinances 1996 and 2008. Landfills in particular are the main sources of methane emissions in Austria. The impact of methane on the climate is significantly greater than CO_2 (25 times according to 4th Assessment Report of IPCC). The implementation of the separate collection (e.g. biogenic waste, waste paper) and the Landfill Ordinance already led to a reduction in emissions between 1990 and 2015 of 2.35 million tonnes of CO_2 equivalent (-64.5 %) from landfills alone. It is expected that the continued consistent application of the Landfill Ordinance 2008 will facilitate additional reductions.

In 2015, landfills accounted for 43 % of GHG emissions in the waste management sector and waste incineration accounted for 45 %. Biological waste treatment (mainly composting) and wastewater treatment and disposal each accounted for 6 % of the greenhouse gases in this sector. While methane emissions from landfills have continued to decline, GHG emissions from waste incineration with subsequent energy generation are on an upward trend.

Since the 2006 Federal waste management plan, volumes of incinerated waste in both mono-incineration and co-incineration have risen significantly, which is having a positive impact on the Austrian GHG balance overall. In addition to reducing methane emissions, no amounts of carbon dioxide are to be released during the incineration of biowaste and waste from biogenic raw materials which could affect the climate.

Waste incineration also leads to a lower use of fossil fuels, their reduction of CO_2 emissions enter in the emissions balances as reductions cannot be credited to waste management, but rather to the energy and industry sector. Waste incineration measures such as the increasing removal of district heating and district cooling or the increase in energy efficiency can therefore have a positive impact, not in the waste management sector but rather in the energy and industry sector only. The increasing energy recovery of waste in this analysis necessarily leads to an increasingly deteriorating climate balance in the waste management sector. Hence, the performance of the waste management industry in the reduction of GHG emissions cannot be assessed merely in terms of the GHG emissions in the waste management sector alone.

Through enhanced measures in the waste management sector, which are also laid down in the federal and provincial package of measures under the Climate Protection Act, efforts will be made to improve the emissions balance.

Figure 120: : Austrian waste management contributes to climate protection

6.6. OPERATIONAL MEASURES

6.6.1. WASTE MANAGEMENT CONCEPTS

A large proportion of waste arising in Austria is caused by operational activities. As a result, the detailed examination of material flows at operational level is essential to promote sustainable development. This should be ensured with the mandatory creation and updating of a waste management concept (WMC).

In accordance with Article 10 of the Waste Management Act 2002, a WMC must be created for plants whose operations generate waste and where more than 20 workers are employed. This obligation concerns every operator of such plants and also applies to all locally integrated establishments, including office buildings and schools, for example. Furthermore, when building and commissioning waste treatment plants, or if a number of major changes are planned for waste treatment plants (regardless of the number of employees), the application for approval must be accompanied by a waste management concept. There are similar regulations for industrial plants in the Austrian Industrial Code and for mining facilities in the Mineral Raw Materials Act.

A waste management concept is used to elucidate the operational waste situation along with any weaknesses, to identify measures for sensible waste prevention and recovery, and to highlight opportunities for optimisation. It provides information on the type, quantity, origin and location of all waste generated and on measures taken or to be taken to meet the waste management targets. The establishment of a waste management concept should also foster and anchor awareness of sustainable waste management.

However, the Waste Management Act 2002 only prescribes the minimum content to be taken into account in a waste management concept (information about the industry, purpose of the facility and list of plant components, process-related and waste relevant presentation of the operation, organizational precaustions to comply with waste management regulations, estimation of future developments). Plant operators and owners must also regularly review and update the waste management concept. The waste management concept can be used as a supervision and control instrument for the company and thus provide support as follows,

- integration of ecological principles in the business
- improvement of production planning
- organisation of more efficient materials procurement and management
- prevention of waste at source
- conservation of resources and
- actual reduction of the share of emissions.

The waste management concept as per Article 10 of the Waste Management Act 2002

- must be submitted to the authority on request, the authority may decide that improvements are necessary;
- must be updated in the event of significant modifications and at least every seven years.

The environmental statement is deemed to be a waste management concept in accordance with the EMAS Regulation, and the obligation to create an in-house operational waste management concept no longer applies if there is a valid environmental statement. The update of a valid environmental statement is also considered as an update to the waste management concept.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management website contains guidelines on drawing up a waste management concept, which also describes the prescribed contents in greater detail.

A waste management concept tool commissioned by the Federal Ministry of Agriculture, Forestry, Environment and Water Management is also available for schools. This tool is provided to schools free of charge. Details are available on the Federal Ministry of Agriculture, Forestry, Environment and Water Management website.

6.6.2. WASTE OFFICER

It is mandatory for all businesses in Austria with 100 or more employees to appoint a professionally qualified waste officer in writing. The order or dismissal is to be reported to the district administrative authority, or in cities with its own statute, to municipal authorities without delay. The term "operation" within the meaning of Article 11 of the Waste Management Act 2002, refers to production (including processing companies), commercial and service companies (including public institutions). The operational term of employment law is used for the interpretation.

The duties of the waste officer under Article 11 of the Waste Management Act 2002 include monitoring compliance with the Waste Management Act 2002 and related administrative acts as well as informing the plant owner of his or her findings, in particular with regard to any defects that are identified. Furthermore the waste officer is in charge of developing proposals to eradicate any defects. The waste officer must 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 that affect operations. In the course of creating or updating the waste management concept, the waste officer must report the costs of waste treatment and proceeds from recoverables to the plant owner. By performing these duties, the waste officer can make an essential contribution towards optimising the organisation of waste management in companies, thereby saving subsequent acquisition, storage and disposal costs. The waste management concept is also an important contribution to the development of a recognised environmental management system and increases legal compliance as well.

In order to help the waste officer cover this wide range of duties, the waste officer must be given appropriate training by the plant owner and be granted sufficient leeway to take care of their duties. Furthermore, the necessary resources and materials should also be made available. A minimum requirement profile is set out in a Federal Ministry of Agriculture, Forestry, Environment and Water Management explanatory leaflet. A number of courses and events are currently offered in certain institutions and education centres in order to provide the necessary training for waste officers.

6.6.3. ENVIRONMENTAL MANAGEMENT – EMAS

For the last twenty years, the Federal Ministry of Agriculture, Forestry, Environment and Water Management has relied on EMAS, the European Union environmental management system, which has also incorporated the requirements of ISO 14001 and is now applicable worldwide. Against the background of rising energy costs, scarcer resources, sustainable markets and business partners and an increasingly critical public, environmental management is a key factor for the success of companies and the administration. The Federal Ministry of Agriculture, Forestry, Environment and Water Management is also a role model and since 2000 has participated in the EMAS system. All locations had been certified by 2012 and extension to other Federal Ministry of Agriculture, Forestry, Environment and Water Management agencies is envisaged. The legal possibilities for greater consideration of environmental management systems in the framework of tenders are already in place today

As a high-quality, mature and effective management and audit system, EMAS helps companies improve their ability to innovate, reduce their environmental impact and costs, conserve resources and strengthen their credibility, and hence increase their competitiveness. EMAS provides a range of advantages for companies and organisations, the most important of which are:

- Seamless recording of all raw materials and supplies and of the amount of waste generated provides a sound basis for systematically and permanently reducing the demand for operational resources.
- Continuous improvement of energy efficiency will provide savings in terms of both financial resources and emissions.
- Green procurement is gaining in importance. Evidence of comprehensive environmental management increases the opportunities for suppliers with EMAS and not just in the case of public tenders.
- Sustainable corporate development must take social and business aspects into account, alongside the ecological aspects. EMAS environmental management also provides a sound basis for comprehensive sustainability management and transparency.
- Creation of a high degree of legal certainty in the environmental sector through regular systematic internal and external verification of compliance with environmental legislation.

A study commissioned by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and conducted by the Environment Agency Austria on "Impact analysis of environmental performance using core indicators in selected sectors" clearly shows the ecological effectiveness of EMAS, both in terms of the key indicator, waste, and generally in the waste sector. The following sectors were analysed: beverage production, energy supply, paper, chemicals, metal, waste, cleaning, public administration and education.

The investigation focused on the following core indicators: water, direct CO_2 emissions and CO_2 equivalents, energy (overall, heating energy, electrical energy and the proportion of renewable energy), waste (overall, hazardous and non-hazardous) and sector-specific core indicators (detergent consumption, fuel consumption). Overall, between

2009 and 2013 the environmental statements of 90 organisations were examined. Eighty-five organisations were found to have improved in at least one core indicator. This mostly related to the core indicators energy and waste. In addition, the measures used to improve environmental performance were also described. This analysis clearly showed the effectiveness of EMAS in relation to improving environmental performance.

In terms of the practical implementation of EMAS, a range of activities were set up, e.g. exchange of information and experience for EMAS businesses, the workshop series "Implementing EMAS together", the annual EMAS conference and the awarding of EMAS certificates by the Federal Minister.

Overall, there are 287 organisations or companies across Austria with a total of 1,100 locations which are EMAS-certified (as at December 2016).

Further information on EMAS can be found on the Federal Ministry of Agriculture, Forestry, Environment and Water Management website and the Environment Agency Austria website.

Figure 121: EMAS logo

6.6.4. REGIONAL ADVISORY PROGRAMMES FOR CORPORATE ENVIRONMENTAL PROTECTION

At the instigation of the Federal Ministry of Agriculture, Forestry, Environment and Water Management, a programme for sustainable corporate environmental protection has been developed and established in recent years, in cooperation with the provinces. With the involvement of regional offices of the Austrian Economic Chamber (WKÖ), an optimal advisory service with a wide range of modules and the very broad theme "Environmental protection for businesses" was set up and existing offerings expanded. The best-known regional programmes are EcoBusinessPlan Vienna, the Economic Initiative for Styria, Eco-management for Lower Austria and the Salzburg Environment Service.

The programme was designed in consultation with programme management for each province and Federal Ministry of Agriculture, Forestry, Environment and Water Management experts. The co-financing of the regional programmes by the Federal Government as part of environmental funding was combined with the incorporation of various instruments and modules developed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, such as advice on setting up waste management concepts, waste prevention, waste management, etc.. Advice on material efficiency has also been strengthened.

An evaluation is currently underway on regional programs for corporate environmental protection. The results of the evaluation are then a basis for the discussion of a common external appearance of the regional programs

6.6.5. SUSTAINABILITY REPORTING

A sustainability report provides information on economic, ecological and social performance. Increasing numbers of companies are trying to make their business activities more sustainable and to establish a procedure for sustainability reporting. This is used to measure performance, set goals and carry out strategic changes. If the environmental statement is not already a part of the sustainability report (as is the case in many EMAS businesses), measures relating to waste prevention are found consistently in the sustainability programmes of the reports.

EU Directive 2014/95 as regards disclosure of non-financial and diversity information requires Member States to standardise the sustainability reporting of specific large companies. Public-interest entities (listed companies, banks and insurance companies) with more than 500 employees must in future issue sustainability reports. This Directive was transposed into national law in Austria by the Act on Improving Sustainability and Diversity. Companies will issue reports on the past financial year for the first time in 2018.

6.6.6. THE SPECIALISED WASTE DISPOSAL OPERATION

The voluntary certification as a specialised waste disposal operation (EFB) imposes specific requirements on organisations operating in waste management and thus establishes a uniform quality standard in this sector. The sector-specific regulation serves to demonstrate best practice in the collection, recovery or disposal of waste. In addition to EFB certification there is also an option for expanded EFB+ certification, which is associated with entry in the national register and/or equivalence with EMAS. The system offers legal conformity and the opportunity to optimise operational procedures and gain competitive advantages. For instance, the EFB+ certificate is important for obtaining pre-authorisation in the case of transboundary waste shipments.

Currently, over 110 companies with more than 220 locations in Austria have a valid waste disposal certificate and nine businesses have an EFB+ certificate (as at March 2017). EFB demonstrates a high degree of reliability, not least because it is tested by external, independent environmental experts.

Figure 122: "The specialised waste disposal operation" logo

6.6.7. DOMESTIC ENVIRONMENTAL SUPPORT IN ACCORDANCE WITH THE ENVIRONMENTAL SUPPORT ACT

The objective of Federal environmental support is to improve the Austrian environmental situation. Its purpose is to provide an incentive to influence voluntary investment decisions to be more environmentally-friendly and preserve resources while increasing the rate of economic and technical innovation. The legal framework for these objectives was created by the Environmental Support Act 1993. Measures for using renewable energy sources, increasing energy efficiency, mobility measures and also projects to avoid and reduce air pollutants, noise and hazardous waste are all funded.

Since 1993, Kommunalkredit Austria AG and, from 2003, Kommunalkredit Public Consulting GmbH, have developed environmental support schemes.

The reform of funding guidelines in 2009 introduced "raw materials management" as a funding priority, and this was further developed in the 2015 amended guidelines. Support is given to the reduction of raw material consumption by at least 10% in the course of existing production while maintaining the functionality of the product, along with investments in innovative service concepts to increase material resource efficiency. The replacement of raw materials by renewable materials is also subsidised.

The primary aim of the "hazardous waste" funding area is to support preventive measures, followed by material recovery. Thermal recovery and other treatments are then included. This set of priorities is also expressed through staggered funding intensity. High-quality use of hazardous waste compared to previous treatment is eligible for funding – in-house as well as via disposal companies. However, the mere sorting, interim and final disposal of hazardous waste is not eligible for funding. Increased operational capacity is deducted proportionately.

Overall, between 1993 and 2015, 106 projects with investment costs of about € 187,136,000 were funded in the waste and resources sector. The cash value of funding was € 20,651,000, an average funding intensity in the region of 11 %. Fifty-three waste prevention projects have been funded (investments: € 18,479,000; cash value of funding: € 3,836,000; average funding intensity: approximately 21 %). Twelve waste recovery projects have been funded (investments: € 18,333,000; cash value of funding: €1,679,000; average funding intensity: approximately 11%). Twenty-four raw material management projects have been funded since 2011 (investments: € 34,263,000; cash value of funding: € 5,385,000; average funding intensity: approximately 16 %).

The areas of hazardous waste and raw materials are comparatively minor funding areas in domestic environmental support compared to the prominent energy themes and are also subject to the effects of the current weak economic climate. Nevertheless, considerable investments have been made in this area.

Although the number of projects submitted is comparatively low, the medium-term trend is rising and shows that these topics are gaining in importance. As with energy, the trend to a decoupling of production and use is also starting in the case of resources.

Table 71: Funded waste-related projects 2006 – 2015

Total

Year	Number	Environment-related investment costs [€]	Total funding [€]
2006-2010	15	109,718,065.00	10,189,496.00
2011-2013	67	50,250,701.00	6,152,645.00
2014	17	20,525,782.00	3,108,039.00
2015	7	6,641,410.00	1,200,950.00
Total	106	187,135,958.00	20,651,130.00

Prevention of hazardous waste

Year	Number	Environment-related investment costs	Total funding
2006-2013	42	10,297,299.00	2,489,274.00
2014	9	6,035,594.00	852,913.00
2015	2	2,146,460.00	494,266.00
Total	53	18,479,353.00	3,836,453.00

Recovery and treatment of hazardous waste

Year	Number	Environment-related investment costs	Total funding
2006-2013	10	16,204,895.00	1,473,508.00
2014	1	1,953,000.00	179,566.00
2015	1	175,521.00	26,328.00
Total	12	18,333,416.00	1,679,402.00

Resource management

Year	Number	Environment-related investment costs	Total funding
2011	4	2,087,327.00	369,495.00
2012	3	4,691,340.00	705,910.00
2013	6	10,627,715.00	1,553,186.00
2014	7	12,537,188.00	2,075,560.00
2015	4	4,319,429.00	680,356.00
Total	24	34,262,999.00	5,384,507.00

6.7. GENERAL MEASURES

In addition to regulatory, product/waste flow-related and operational measures, all kinds of comprehensive initiatives, described in the following chapter, have given the impetus to drive the change to a recycling society.

6.7.1. RESEARCH CONTRACT "BENCHMARKING FOR AUSTRIAN WASTE MANAGEMENT"

The objective of this research project consists of determining the status quo of Austrian waste management and of assessing the achievement of goals (resource conservation, environmental protection and sustainability) and their economic viability. The project was led by Vienna University of Technology with the involvement of the University of Natural Resources and Life Sciences, Innsbruck University and Montanuni Leoben on behalf of the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the provincial governments of Lower Austria, Upper Austria, Vienna, Burgenland, Styria, Carinthia and Salzburg, Altstoff Recycling Austria AG and the Association of Austrian Disposal Companies.

During this two-year project, a methodical basis for assessment was set up. It was a partial success, as it was easier to present and assess some waste management areas than others. Established assessment methods were used for the methodology, and it became apparent that these were not sufficient to assess the entire waste management sector. Many of these need further development (e.g. avoiding adverse and detrimental effects on humans) and others are still in development (e.g. pollutants in product loops, final sinks).

To assess whether the goals have been achieved, sub-goals and indicators were classified under five waste management goals (Article 1 of the Waste Management Act 2002), and corresponding assessment criteria determined. Economic viability was assessed with a modified cost-effectiveness analysis; this involved comparing goal achievement to related costs. The basis for assessment forms a balanced summary of materials used in the Austrian waste management industry. The status quo was calculated for each indicator using material flow analysis or ecological balancing. In addition to material summaries, summaries of selected reusable substances and pollutants were also drawn up. Environmental impact was calculated using an ecological balance method.

The results underline the high standard of the Austrian waste management industry. The aims of the Waste Management Act 2002 have been largely attained. The findings also showed that there is still potential for optimisation. In terms of the conservation of raw materials, there is potential for higher collection and recovery quotas, especially in wood and plastic recovery, but these are restricted by the issue of pollutants. The conflict between resource conservation and avoiding contamination means that not all aims can be fully achieved.

Further information on this research contract is available on the Federal Ministry of Agriculture, Forestry, Environment and Water Management website.

6.7.2. RESOURCE RELEVANCE OF WASTE MANAGEMENT

The conservation of natural resources and sustainable handling of renewable and non-renewable raw materials are the challenges of our time. The efficient and environmentally friendly use of materials from extraction to waste management is a fundamental prerequisite for this. In past decades, waste management has developed from a sector focused on the disposal of waste to one dealing with the highly technical recovery of raw materials. Substituting primary raw materials with high-quality and virtually equivalent secondary raw materials is now one of the core tasks. At the same time, for resource conservation purposes, material turnover per person (currently at about 22 tonnes per person per year) must be reduced. Overall, 186 million tonnes of materials were consumed across Austria in 2014. With annual material turnover of about 60 million tonnes, waste management can therefore definitely meet part of the demand for resources.

Recycling society – present and future

Not including excavation materials, over 60 % of all waste is recycled and only 9 % is sent to landfill. The volume of used glass (about 320,000 tonnes) makes up over half of glass production in Austria. In 2015, over 257,000 tonnes of primary raw materials were saved in the glass industry through the use of used glass. The volume of used paper was around 2.4 million tonnes in 2015, giving a waste paper utilisation rate in Austrian paper production of some 48 %. In 2014, over 2.5 million tonnes of used metal was used in iron and steel production (total Austrian production of about 7.9 million tonnes). In aluminium production, 75 to 80 % of input materials are replaced by scrap metal.

As approximately 90 million tonnes of non-metal minerals are used annually as construction raw materials (primarily for building purposes), recycled construction materials make a significant contribution to covering Austria's needs.

The competitiveness of materials recovered from waste is determined by economic viability and recycling quality. However, increasingly complex products make recycling more difficult: for instance, in communications technology, the motor industry and the building sector, there is wider diversity and the concentration of individual substance groups is decreasing. From a logistical and technical perspective, this results in huge challenges when it comes to recovering materials.

Metal recycling

In 2014 around 6.3 million tonnes[9] of metal were consumed across Austria. The recycling of bulk metals such as aluminium, iron, steel and copper has been established for many years. The potential for achieving separate collection of packaging is classified as low. The recovery of metals from industrial residues[10] could make a much greater contribution. In particular, increased recycling of metals from incineration residue and the development of procedures to enable automated separation and sorting of grades of aluminium and high-grade steels with different alloy components will open up opportunities to increase metal recycling.

The recycling potential of critical metals, i.e. those used in low quantities, has been rarely harnessed up to now. This is only partly due to the low collection volumes. Inadequate information on the composition of products, dismantling-unfriendly design and recycling processes focused on bulk metals are preventing the increased achievement of recycling potential. The short innovation cycles of many ranges of applications for these metals and the volatility of commodity prices compound the difficulties.

There is also a need for further research into all these aspects. Meanwhile, the targeted storage of currently non-recoverable waste flows with potential raw material content for subsequent recovery would be worth considering, particularly in the area of strategic metals (essential for many technical applications and for developing cutting-edge technologies).

Mineral construction waste

Non-metallic minerals make up more than half of Austrian material consumption and over 80 % are used for construction purposes. From a waste perspective, construction and demolition waste constitutes the most voluminous material streams, at over 10 million tonnes.

The investigation of pollutants and impurities and recovery-oriented dismantling, as set out in the Recycled Construction Materials Ordinance, are the basic requirements for increasing the grades and acceptance or marketability of secondary mineral materials.

The previously moderate demand for recycled construction materials can be boosted by setting quotas for the use of recycling materials in public procurement tenders. The procurement guidelines for public developers should be adapted to take this into account.

Future challenges will be the increasing use of composite materials in the building sector and the difficulty of separating glued compounds. The design of construction materials will need to be developed to increase their reusability or recyclability in order to secure the economic recovery of construction waste into the future.

Wood recycling

The importance of the cascading use, i.e. the sequential use of biomass for material and thermal treatment of biomass, is referred to in the report "Resource use in Austria" drawn up by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Federal Ministry of Science, Research and Economy. This is particularly relevant for wood. Forty percent of domestic biomass consumption involves wood and wood products. Much of this demand is covered by imports. With repeated use of materials before thermal recovery, the additional extraction of biomass and dependency on imports can be reduced.

The legal framework for waste management prescribes the cascading use of waste wood of appropriate quality. The provisions in ordinances such as the Recycled Construction Materials Ordinance, the Packaging Ordinance and the

[9] DMC (Domestic material Consumption): Domestic extraction + imports – exports (excluding secondary raw materials).

[10] There are plans to draw up an ÖWAV auxiliary document regarding the collection and recovery of metal chips, sludges and dusts from mechanical processing for the purpose of recording them in a structured way and for promoting material recovery.

Recycled Wood Ordinance reflect the superior ranking of material recovery. In particular, the recycling quota in the wood material industry can be positively influenced by providing a recycling offering for specific waste wood grades.

Even with these waste streams, pollution, in particular caused by wood protection treatment and mostly imperceptible to the naked eye, is a limiting factor. The opportunities to substantially increase material use are seen mostly in preventative avoidance of loads by using pollution-free substances in wood treatment and improved separate collection of low-pollution waste wood through increased separation at the place of waste generation.

Figure 123: Sparing use of resources by the cascading use of renewable raw materials

Plastics recycling

Scarcely any other material is so custom-manufactured for a defined range of uses, which opens up a wide range of applications for a variety of plastics. However, these specific configurations also explain the comparatively tight economic limitations to recycling. Sorting accuracy is an essential criterion for high- quality recycling. Currently, around a quarter of plastic waste is recovered. The heterogeneity and various, sometimes harmful, additives and aggregates make recycling difficult or even impossible. The conflict between resource conservation and avoiding contamination is particularly pronounced in this waste stream.

Examples include the use of HBCD (hexabromocyclododecane) as a flame retardant in expanded polystyrene (EPS; Styropor) in the construction sector, which is a (legally prescribed) reason for exclusion from recycling. The EU POPs Regulation on persistent organic pollutants applies a general ban on destruction or conversion, with a limit value of 1,000 mg/kg set for HBCD. This waste can only be recovered as ordinary waste if the prescribed limit values are not reached. Dilution with uncontaminated materials to ensure the limit value is not reached is not permitted. As regards EPS waste from the construction industry (e.g. insulation panels), this means that material recovery is only possible if these contain no HBCD (e.g. waste from new insulation panels).

Glass fibre- and carbon fibre-reinforced plastic (CFRP) have an ever-increasing range of applications due to their high specific strengths, CFRP in particular. Between 2012 and 2020, global demand for CFRP is predicted to increase fourfold. The current high functional and material integration in lightweight building applications requires intensive composite materials and complex superstructures, which makes waste recycling much more difficult. With CFRP recycling, the difficulties reside in the exposure and preparation of fibres, in the repeated heating of the plastics contained therein and in the preservation of fibre length. The safety of thermal treatment for this type of waste is also still unclear (formation of respirable particles). Currently there is no procedure to enable the material recovery of glass fibre. The recycling of glass fibre is also less attractive as it is very cheap to produce glass fibre from primary materials.

The higher recovery quotas envisaged at EU level will offer an increased incentive for plastic recycling, and quality is a decisive factor for recycling.

There is a need for research to increase the knowledge base on the national plastics cycle and to improve sorting and recycling technologies.

6.7.2.1. URBAN MINING

Urban mining – the city as a mine

The dimensions of anthropogenic deposits (around 400 tonnes per person) suggest that the waste industry should also look to mining and proactively to raw material reserves. There is hardly any prospecting or exploration for secondary materials. Major anthropogenic deposits are found predominantly in infrastructure (especially construction, roads and sealed surfaces). There are large quantities of mineral building materials, but also metals, wood and plastics, in this area. Urban mining seeks primarily to identify recyclables in infrastructures in order to feed these back into the economic cycle after use in a targeted fashion. For instance, metals consumed in Austria are mainly located in anthropogenic deposits. The use of these deposits when infrastructure is demolished can reduce the dependency on metal imports and accelerate regional added value. The Recycled Construction Materials Ordinance and the measures described in the waste prevention programme (Chapter 5) are a key building block in this context. Urban mining goes far beyond recycling, however, as it also includes prospecting, i.e. the search for and investigation of anthropogenic deposits and keeping records of information on where materials were processed. The vision would be to only use buildings for the "interim storage" of raw materials and subsequently to recover or recycle them. Scientifically, this topic has been the focus of increased attention for years.

Urban mining cadaster

The UMKAT pilot project developed the first Austrian urban mining cadaster for a district of Graz, identifying and visualising anthropogenic deposits. This cadaster seeks to systematically map which materials have been used in infrastructures and buildings. A system was developed to record urban mining potentials and hence create the basis for identifying, categorising, quantifying and assessing anthropogenic deposits in regions, from a scientific, technical, ecological and economic perspective. The potential identified was visualised as an example for the test area Graz-Eggenberg using a geographic information system (GIS). It is planned to extend this cadaster.

Landfill mining and landfill deconstruction

There is considerable recovery potential in the waste deposited in landfills, particularly as regards the metals copper, iron and aluminium as well as high-calorific waste (waste wood, lightweight fraction). Several studies have looked at the opportunities for using this potential, including the Environment Agency Austria study "Landfill deconstruction – resource potential, climate impact and economic viability" (2011). This study estimated the resource potential of materials deposited in 1990-2009 in Austria, with a focus on municipal waste. The study concluded that from a business standpoint, landfill deconstruction was only economical if several parameters were favourable, if landfill volume is required or if land recycling is to take place. The economic viability of landfill deconstruction depends mainly on the costs of handling the high-calorific fraction and on the scrap content in landfill materials. It remains to be examined which other metals apart from iron, aluminium and copper from landfill can be economically recycled. For company-owned landfills, e.g. in the metalworking industry, the ratios for economical recovery could be much more favourable.

Previously, landfills were deconstructed mainly to create landfill volume, rehabilitate landfill or for land recycling, i.e. the waste was completely removed or transferred. The recovery of recyclables contained therein was of secondary importance.

With landfill mining, on the other hand, landfills that are particularly rich in recyclables or partial areas of landfills are investigated. Relevant waste is excavated and prepared, recyclables removed and the non- recoverable remainder is returned to landfill, provided the provisions of the Landfill Ordinance are met. A pilot landfill mining project is currently being carried out in Styria.

The possibilities for using resources deposited in landfills are highly dependent on the conditions of individual landfills. From a professional perspective, the quality of the residual waste handled that is to be returned to landfill needs closer investigation. The aim should be to carry out landfill mining in both an economically and ecologically sustainable manner.

6.7.2.2. RESOURCE EFFICIENCY

Re-source symposium

The Re-source symposium is a joint conference organised by Germany, Switzerland and Austria, which has taken place regularly since 2009 to increase public awareness of resources and waste themes. The event is also the occasion for a professional dialogue on the themes of sustainable use of resources, the development of concepts relating to resource conservation with a focus on waste management and increasing networking between stakeholders. Re-source shows the current state of development, possible constraints and the potential to increase resource efficiency and in particular material efficiency.

After successful symposia in Berlin (2009), St. Gallen (2011) and Vienna (2014), "Re-source 2016" was held in Munich on the future challenges of plastic recycling, material flow bundling and metal recycling and the current findings from obsolescence research were presented. Due to the positive response, this event series is being continued and the next conference is planned for Switzerland in 2019.

Figure 124: 2014 Re-source symposium in Vienna

Resource-efficient-technologies – RESET2020

As the efficient and sustainable use of resources is necessary and given that this poses one of the major challenges facing the economy and society, the Federal Ministry of Agriculture, Forestry, Environment and Water Management is taking steps through the new initiative RESET2020 – resource-efficient-technologies – to bring about more sustainability in the Austrian economy and society.

RESET2020 deals with issues relating to resource efficiency and the circular economy in innovative environmental technologies, sustainable raw materials management, renewable raw materials, sustainable production and consumption and sustainable procurement. Through RESET2020, new measures are taken and existing national programmes (e.g. resource efficiency action plan, environmental technology master plan) and European strategies (Europa 2020, new circular economy strategy) will be put into operation by 2020.

The initiative will ensure cascading use and optimised utilisation of material resources, high-quality recycling, the use and reuse of products manufactured with low environmental impacts and will stimulate marketable, smart environmental technologies and services and promote their widespread use in businesses. One of the main topics of the initiative is dedicated to the area of material efficiency in operational production. In addition to the production sector, consumer themes will also be taken into account in RESET2020. To ensure resource efficiency in the product and services society, we need consumers to be well informed and act consciously. Other goals include accelerating qualifications, reinforcing networking and improving cooperation in the economy and in society. The RESET programme will also involve factoring in future waste at the concept and design stage of product development, so that waste does not arise at all, if possible, or is reduced. Raw materials will also be consistently used in line with resource efficiency. These should be supplied mainly from renewable sources.

Figure 125: RESET2020-logo

6.7.3. SUSTAINABLE PUBLIC PROCUREMENT

One of the key challenges for the future is to shift existing consumer and production patterns to sustainability, particularly resource conservation and higher resource and energy efficiency and environmental compatibility. The public authorities in Austria will make a major contribution to this through the implementation of the sustainable procurement action plan (naBe), set up in 2010 by the Council of Ministers. A key aim of the sustainable procurement action plan is to redirect the considerable purchasing power of public authorities as much as possible to demand for sustainable resource-efficient products and services and to motivate supplier companies to increase their range of more sustainable solutions and environmentally compatible, innovative products and services. As far as possible under public procurement law, regional business cycles will be taken into account and attention will increasingly focus on ensuring that social standards are met (particularly in the global supply chain) during manufacture or in the provision of public procurement services.

Sustainable procurement is a process and is not possible without further development and innovations. Products and services that are seen nowadays as sustainable when compared to conventional products and services, lose this feature after a few years due to technical developments and innovation.

To respond effectively to developments in the European Union and to technical developments and innovations on the market, the existing ecological criteria were updated in 2015 and other procurement groups were included in the sustainable procurement action plan. The updated criteria were sent to all relevant stakeholders for their opinions.

To respond effectively to the requirements of environmentally friendly as well as sustainable procurement, the work of an expert group (consisting of representatives of federal ministries, provinces, municipalities, social partners, NGOs and other experts) was developed and "social core criteria for public procurement" were agreed with the social partners. A Ministerial Council submission was agreed with the Federal Chancellery and the documents to be issued (sustainable procurement action plan evaluation report and updated ecological criteria) were agreed and prepared for political decision. Embedding the best bidder principle in the Federal Procurement Act is an important starting point for promoting sustainability in public procurement.

With regular activities such as the sustainable procurement action days and the announcement of a sustainable procurement award, the Federal Ministry of Agriculture, Forestry, Environment and Water Management aims to raise awareness of sustainable procurement and help set up a sustainable network for the exchange of information and experience by procurement personnel in all regional authorities, NGOs and tendering companies. The information platform www.nachhaltigebeschaffung.at and a help desk for individual issues complete the offering.

With an estimated volume of turnover of 16 % of the GDP, public procurement offers a key economic-policy lever. Thus, it is important, from a national-economy perspective, to optimally use this potential by prompting an efficient and effective linking-up of sustainability and innovation in public procurement. Together with the purchasing service provider of the public sector, BundesbeschaffungsGmbH, the Federal Ministry of Agriculture and Forestry, Environment and Water Management will, from 2017 onwards, support public administration institutions in a one-year pilot phase to find environmentally-sound and innovative products and services for their concrete issues. For this endeavour, the www.innovationspartnerschaft.at platform offers the marketplace where public institutions and offering companies meet. The sustainability aspects to be focused on in this context are the topics of circular economy, resource efficiency, energy efficiency, and a changed user behaviour

Figure 126: Sustainable procurement in public administration

6.7.4. TRAINING AND FURTHER EDUCATION

Some 40,000 people are currently working in the Austrian waste management industry. This has given rise to a specific training sector. The theme of waste management has been long established in both secondary and tertiary education, as well as in vocational training, to meet the increasing demand for qualified experts. There is also a wide-ranging training programme to transfer the necessary specialist expertise for ranges of tasks anchored in legal standards, such as managing input control in landfills by waste officers, etc. Various initial and in-service training modules with a focus on waste management are also offered.

Properly trained "recycling and disposal specialist" are primarily employed in waste collection and treatment companies and make a valuable contribution to ensuring correct waste management.

Waste producers also need expert consultants to help them implement waste prevention measures. Properly trained personnel in businesses (waste officers) and at municipal level (environmental and waste consultants) will help raise awareness among their target groups and encourage them to change their behaviour. Specific education, vocational and further training courses are regularly offered for these experts.

For landfill personnel, especially input control managers, the Landfill Ordinance prescribes specific educational and further training requirements depending on the landfill category. In conjunction with the Landfill Ordinance, courses for input control managers on excavated soil, inert waste and construction waste landfills, training courses for operators of mass waste and residual waste landfills and special training courses regarding input control for mass waste and residual waste landfills should all be mentioned.

The requirements and training content for mangers under waste law, under Article 26 of the Waste Management Act 2002 and applicants for authorisations were published in ÖWAV Fact Sheet 512. The training course for mangers under waste law is used primarily for the standardisation and quality assurance of knowledge.

In the event non-hazardous waste is collected or treated by legal entities, a responsible person must be named for this. This person must have the necessary professional skills and knowledge for this task. Evidence may be provided by way of five years' worth of professional experience or through relevant training or completion of relevant courses (e.g. environmental engineering schools) or studies. In contrast to the training for mangers under waste law, an examination is not absolutely necessary.

A variety of training and education schemes are provided by diverse public and private suppliers, as listed below.

In waste collection, a training course is provided for operators of waste material collection and recycling centres. A course on metal and scrap recycling is also provided.

In order to meet the training requirements within the field of biological waste treatment, there are basic courses for operators of MBT and composting plants and training courses for operators of biogas plants. There are also courses on the mechanical processing and thermal treatment of waste as well as on the basics of the laws concerning industrial plants and the environment.

To implement the Recycled Construction Materials Ordinance, courses and educational courses on investigating pollutants and impurities and on the dismantling of structures are particularly relevant. These courses are generally designed to transmit the necessary expertise for skilled dismantling personnel in line with the Recycled Construction Materials Ordinance and successful completion of these is evidence of expert knowledge.

Energy-efficiency measures and waste prevention often go hand in hand. In the framework of klimaaktiv – the Environment Ministry climate-protection initiative – there is a comprehensive training programme for energy officers in companies. Further information is available on the klimaaktiv website.

6.7.5. PUBLIC RELATIONS

Measures are only really effective if they are supported by an informed population. Public relations work is therefore a central element in waste management.

To keep Austrian waste management at a high level, the population is kept continuously informed about waste prevention, reuse, proper waste separation and collection and on how to handle waste. However, the information goes well beyond implementing regulatory measures, for it must also instil an understanding of the complex correlations between the environment and waste management based on the principles of sustainability.

Public relations work on waste management is done via print and electronic media, through media cooperation and in particular via the Federal Ministry of Agriculture, Forestry, Environment and Water Management homepage, which contains many publications on waste management. As part of its public duty under the Federal Ministries Act, the Federal Ministry of Agriculture, Forestry, Environment and Water Management cooperates with provinces, municipalities/waste associations and businesses and supports them in their publicity activities.

Public relations work in the waste management sector must be aligned with the various objectives and principles in accordance with Article 1 of the Waste Management Act 2002. The information is quality- oriented and tailored to target groups.

Effective public relations work does not only support people in their efforts to achieve genuinely sustainable environmental behaviour. Correct and sustainable environmental behaviour generally also leads to savings, both for individuals and organisations and for the Austrian economy. There must be provision for appropriate and legal funding of public relations work, and this must ensure shared responsibility between the Federal Government, provinces, communities (community associations), and businesses through appropriate measures.

An essential element of public relations work is the activity of municipal environmental and waste consultants which is organised throughout Austria. The Federal Ministry of Agriculture, Forestry, Environment and Water Management has supported this since 1997 through the "Communication Network with Waste Consultants" project. Approximately 400 waste consultants throughout the whole of Austria belong to the network. It has proven to be a very effective platform and communication hub for waste management matters at regional and municipal level.

At the annual "Networking Days", any current issues are discussed and waste consultants are informed of any developments or changes. Their commitment and creativity are appropriately acknowledged at the annual awards ceremony for the waste consultant of the year.

The Austrian Association of Waste Consultants magazine "VABÖ-Blatt", which is funded by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, communicates the latest and most important news. The "VABÖ-Blatt" is published four times a year. Since 2005, the VABÖ has also published an electronic newsletter (VABÖ-Newsletter), which is also financially supported by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and which is able to reach an even wider audience quickly and without any bureaucracy.

The "Richtig sammeln. Ist doch logisch!" website ("Collecting the right way. How logical!")

In cooperation with the individual provinces and waste management experts, the Federal Ministry of Agriculture, Forestry, Environment and Water Management offers a great deal of useful information about the proper collection and separation of waste through the communications platform that has been launched. There are points of contact for any questions regarding regional waste management and the "Expert-Net" is available to all multipliers of the waste management sector. The website www.richtigsammeln.at contains comprehensive basic information and working documents on the most important waste types and information on drawing up a waste management concept.

The website includes multilingual collection tips which can be downloaded from "ExpertenNet". This means therefore that there are tips available in Hungarian, Czech, Slovakian, Slovenian, Turkish, Croatian, Serbian, Polish, Russian, Arabic and Chinese, along with appropriate instructions as to how the modular collection instructions can be handled in the easiest manner possible.

The "Rund geht's" image campaign ("What goes around")

The Austrian Water and Waste Management Association, ÖWAV, developed the idea for the "Rund geht's" campaign. The aim of this agreed information and media work, in which municipalities, associations and private disposal companies as well as industry, commerce and trade have been invited to cooperate, is to raise awareness among the population of the importance of the circular economy and secondary materials. It aims to enhance the image of waste as a substitute for primary raw materials and increase the willingness to ensure more waste separation.

Umpädicus

The correct collection and separation of waste are key elements of environmentally-friendly behaviour and should therefore be taught as early as possible. The Federal Ministry of Agriculture, Forestry, Environment and Water Management has therefore provided funding for the development of a training course which is aimed at environmental education for young children.

The key aim of the "Umpädicus" educational programme is to enable waste and environmental consultants to pass on their expert knowledge to children in an age-appropriate manner and in line with the children's personal development. After passing a test, participants receive a certificate stating that they have acquired expertise and knowledge in pedagogy, didactics and business administration.

To facilitate participation in Umpädicus, the Federal Ministry of Agriculture, Forestry, Environment and Water Management pays 25 % of the training costs of waste and environmental consultants.

Figure 127: Environmental education in Austria starts from an early age.

The waste management award "PHÖNIX – Einfall statt Abfall" ("PHÖNIX - ideas instead of waste")

The PHÖNIX Prize is awarded to innovative projects or ideas related to sustainable materials and resource management. The "PHÖNIX" Prize is symbolic of waste management. Named after the mythological phoenix that rises once again from its ashes, PHÖNIX epitomises renewal along with the two main strategic elements of waste management: the material and energy recovery of waste. The PHÖNIX Prize is therefore a symbol of innovation and sustainability in waste management.

The sponsors of the PHÖNIX Prize are the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Austrian Water and Waste Management Association (ÖWAV). The PHÖNIX Prize has been awarded since 1999; since 2012 it has been awarded every two years.

The "Smart Packaging" state prize

The "Smart Packaging" state prize is also awarded every two years. The purpose of this packaging competition is to respond effectively to the increasing importance of integrated, comprehensive solutions in the packaging sector and to honour the exemplary integral packaging developments of individual firms. It is also aimed at highlighting the multiple functions of packaging, its impact on the environment (e.g. waste prevention) and at raising awareness of its economic importance.

The state prize is awarded by the Federal Ministry of Science, Research and Industry in cooperation with the Federal Ministry of Science, Research and Industry.

"Sag's am Mehrweg" ("Let's talk reusable")

With the awareness initiative "Sag's am Mehrweg", the Federal Ministry of Agriculture, Forestry, Environment and Water Management offers environmentally aware consumers guidance on opting for reusable drinks packaging. Publicity campaigns such as the "Mehrweg-Spruch" ("reusable-slogan") and "Mehrweg-Foto" ("reusable-photo") aim to increase awareness of reusable bottles. The work has already borne fruit as the proportion of reusable packaging has stabilised.

The initiative www.am-mehrweg.at is supported by multiple partners from the drinks industry and trade.

"Lebensmittel sind kostbar!" ("Food is precious!")

The Federal Ministry of Agriculture, Forestry, Environment and Water Management launched the initiative "Lebensmittel sind kostbar!" to counteract the negative trend in food waste. An action programme was agreed with the social partners in 2012 to reduce food waste along the entire value chain. By 2016, over 60 organisations/businesses from all sectors had become cooperation partners in the initiative and had committed to improving how food is handled.

These notably include:

- Stakeholder dialogue on networking between various sectors;
- Information and awareness campaigns (diverse publications on the topic of food waste and food waste prevention);
- Organisation of the VIKTUALIA awards – the first Austrian anti-food-waste prize to bring positive examples into the limelight and set role models through media reporting. The prize has been awarded since 2012.
- Supporting the passing on of foodstuffs to social institutions and building "food-sharing", the first online private-sector exchange platform for food in Austria;
- "Restl-Koch" competition, the Austria-wide competition on using up leftovers;
- Drawing and painting competition for primary schools to raise awareness of the topic among children;
- Preparing class materials for primary and secondary schools;
- Studies on information bases;
- Co-financing the "United Against Waste" project in the catering industry;
- Launching a Facebook page on the theme of "food is precious";
- Preparing the theme on the homepage of the Federal Ministry of Agriculture, Forestry, Environment and Water Management with many concrete tips on avoiding food waste;
- Media cooperation to achieve wide-ranging impact.

"Bewusst kaufen" ("Buy better")

The "Bewusst kaufen" initiative of the Federal Ministry of Agriculture, Forestry, Environment and Water Management offers a platform with comprehensive information on "sustainable consumption", shopping guides, opportunities for dialogue in the form of blogs for experts and events where current themes such as obsolescence are addressed and discussed.

The web portal for sustainable consumption, www.bewusstkaufen.at, also includes a comprehensive label and product database and has over 370,000 visits per year from interested citizens. Focused actions are also held several times a year with the retail trade, which has become a key partner in fostering awareness of sustainable products and identifying courses of action. The aim here is to bring each company that has opted for an integrated sustainable product policy into the limelight. For manufacturers and retailers, cooperation in "Bewusst kaufen" honours their commitment to the eco-social segment.

topprodukte.at

The neutral and manufacturer-independent information platform "topprodukte.at" is a service provided by klimaaktiv, the climate-protection initiative of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. "topprodukte.at" informs consumers as well as professional procurement agents of the best energy-efficient equipment and products currently available in Austria, inter alia, under the following categories:

- Lamps, washing machines, laundry dryers, dishwashers, refrigerators, chest freezers, heaters, boilers, AC equipment, cars, TV sets, screens, printers, mobile phones, coffee makers, vaccuum cleaners, etc.. Every year, more than 750,000 persons visit the platform to seek information. Also on this platform, the topic of durability and repairability plays a key role.

6.7.6. LITTERING

Thoughtless littering or dumping of waste such as packaging, cigarette butts, chewing gum and also discarded car tyres and household appliances in public places and in the natural environment is to be condemned – and not just on aesthetic grounds. In addition to the visual nuisance or impairment to environmental quality, ecological and economic consequences are associated with this type of careless behaviour. Every year, this type of behaviour leads to high cleaning costs to recover these materials and send them for waste treatment or return them to the economic cycle.

Effective action requires various measures that must be taken together. Programmes according to the principle "clear up – clean up – take action" are seen as particularly promising. According to this formula, multiple information campaigns and actions have been taken at provincial, regional and municipal level and also in cooperation with businesses, waste management associations, clubs and schools. In Lower Austria, for example, a joint initiative entitled "We keep Lower Austria clean – drive against litter" was launched at the instigation of the Office of the Provincial Government of Lower Austria in cooperation with the Lower Austrian Economic Chamber, driving schools and Lower Austrian environmental associations. In this context, the focus was on raising awareness amoung adolescents for the topics of road safety and the issue of waste dumped on the roadside via a short movie.

Figure 128: Littering is far more than a visual nuisance.

Clean-up operations involving the population have been organised for years and are becoming increasingly popular. In 2015, some 130,000 people took part in about 1,700 operations. Approximately 860 tonnes of waste were collected. More than 75 waste prevention and anti-littering projects were promoted nationwide. One of these is the "Saubere Alpen – Saubere Gewässer" ("Clean Alps – Clean Water") initiative of the Austrian association for the protection of the Alps. The clearance operations conducted by the association for years in medium and high altitude mountain areas in Austria have seen thousands of cubic meters of waste (including hazardous houshold waste) collected and disposed of in an environmentally-friendly manner.

Figure 129: Examples of anti-littering campaigns (ARA AG, ATM GmbH, Province of Styria)

6.7.7. INNOVATIVE ENVIRONMENTAL TECHNOLOGIES AND SERVICES

To successfully develop sustainable growth, the cross-sectoral industries of environmental technology and resource efficiency play a decisive role because environmental technology companies contribute to resolving ecological challenges and avoiding ecological risks with their products, procedures and services. They can be a key factor in ensuring that waste does not arise or is avoided and, where waste does arise, in ensuring that it can be reused as resources. This shows that innovative environmental technology and services can significantly stimulate a "green and sustainable" transition to other economic activities and thus close material and economic cycles.

One very topical challenge is rapid technological change in "digitisation & networking in business and society". Compared to conventional technologies and products, the functions are becoming smarter. With their smart properties, they go beyond conventional sectoral boundaries and product limitations. Fast-changing technology and products are revolutionising supply and distribution chains and forcing companies to rethink almost all their activities: from the design of their products and services through manufacturing, operation and maintenance to building and securing the IT infrastructure.

The question is what effects the developments connected with the digitisation and networking innovation trend will have on a resource-efficient and sustainable economy and whether the associated smart networking of production units and the use of new production systems will make production more resource-efficient and environmentally friendly overall.

Developing the environmental technology industry

For a long time, Austria has established itself internationally as a location for a highly competitive and strongly growing environmental technology industry – a sector that already contributes to environmental and climate protection on a global scale, creates jobs and fosters Europe's position in international competition. Especially in the areas of the energy use of renewable sources, green building, but also in conventional environmental technology sectors, such as water and waste management, Austria has taken a leading position internationally.

With € 35.4 billion, the environmental sector in Austria generated a considerable share in domestic value-added in 2014, yet thus marginally missed its peak value from the previous year (€ 36.4 billion).

With a marked plus in terms of turnover, export and employment, the environmental technology industry has made a considerable contribution to a livable Austria and contributes to better conditions of living on a global scale. Especially against the backdrop of the abandoning of fossile energy sources that was agreed in Paris by the global community, this sector is gaining in importance. The fact that such investment in environmental, climate and resource-protection technologies actually pays off for society, the environment and the business world alongside the implementation of measures for the protection of the environment and the climate is corroborated by the following figures:

- In 2015, the Austrian environmental technology industry (producing sector) generated a turnover of € 9.7 billion with approx. 31,000 employees.
- Each new employee working in a producing company in the environmental technology industry creates approximately two additional jobs in other areas of the Austrian economy.
- € 1.00 of direct gross value-added generated in the environmental technology industry (producing sector) triggers € 0.65 in indirect and € 0.50 in induced gross value-added.

In the years to come, company representatives reckon with continued dynamic growth of the global environmental technology market. This will prompt eminent investment opportunities and possibilities for the Austrian environmental technology sector.

Green innovations in environmental technology

Innovations and technological progress are major drivers in the interactions between the economy, environmental protection and resource conservation. Environmental technologies offer companies the chance to tap into new economic potential, new products and procedures and new markets. Against this background, the Federal Ministry of Agriculture, Forestry, Environment and Water Management has carried out a technology screening of the Austrian economy using a patent analysis[11], which shows the relative strengths and tendencies. In the technology fields of waste (technologies for waste management, waste used for power generation, waste treatment and waste disposal), recycling (technologies for reuse, restoration and recycling) and soil & contaminated sites (technologies for the recultivation of contaminated soil, soil improvement) the following is the situation:

Waste: In the thematic field of waste Finland is the leader, just ahead of Liechtenstein, Norway, the Netherlands and Denmark. Austria is in 10th place, behind Switzerland and Germany. Inventor density in Austria is 84 % higher than the European average. There are particularly high numbers of inventors in Upper Austria, Styria and Lower Austria. Adsorption procedures & processes are the main focus.

Recycling: In recycling, Austria is ranked 8th, behind Germany and just ahead of Switzerland. Liechtenstein, Norway, Finland, Luxembourg, the Netherlands and Denmark lead the rankings. Inventor density in Austria is about 67 % higher than the European average. The most frequent responses are metal, processes, natural gas and carbon dioxide. Upper Austria and Styria rank highest.

Soil/contaminated sites: Slovenia is ahead of Norway, Denmark, Lithuania and Belgium in terms of inventor density in Europe. Austria is ranked 14th, slightly below the European average.

In patent analysis, the thematic interdependencies between materials/energy efficiency and waste/recycling/water/wastewater are considered. Austria is ranked 11th worldwide for inventors in material efficiency.

Export initiative

The focus of the "Export initiative for environmental technologies" supported by the Federal Ministry of Agriculture, Forestry, Environment and Water Management in conjunction with the Austrian Economic Chambers has been and will continue to be the BRICS states (Brazil, Russia, India, China and South Africa) and Member States that have joined the EU since 2004.

Figure 130: Austrian environmental technology

Figure 131: Export initiative logo

[11] Economica: Berrer, H, Dolle, B., Helmenstein, C., Kerschbaum, F., Krabb, P., Pohl, P., Stadlbauer, M. GreenTech Innovationsdynamik. Vienna, 2016.

Climate Technology Centre and Network (CTCN)

Already as early as in 2010, it was decided at the Cancun climate negotiations to set up the Technology Mechanism. On top of the "Technology Executive Committee – TEC", the CTCN was created as a result. It is the task of the Copenhagen-based CTCN to foster international cooperation in the area of environmental technology and in particular, also in the area of climate technology, with the aim of sustainably promoting the transfer of climate technologies and services to emerging and LDC countries. The national contact points (National Designated Entity - NDE) support the work of the CTCN at a national level. In this context, the Austrian NDE in the Federal Ministry of Agriculture, Forestry, Environment and Water Management serves as a point of contact to CTCN. Accordingly, e.g. the efficiency of Austrian environmental technologies and CTCN inquiries coming from LDC and emerging countries are made visible in several languages e.g. via the Internet portal: www.cleaner-production.eu.

State awards ceremony and envietech

Austria has long since established itself as a location for environmental technology, has developed an active start-up scene and national and its global sales of environmental, resource and climate technologies are steadily growing. The Austrian state prize for environmental and energy technologies is the arena for this and the highest award for personalities in the environmental and energy technology areas who have understood that, given the global challenges, they have to create a win-win situation for the environment, the climate and society and push their own organisations. The Austrian state prize has been regularly awarded since 2008 to acknowledge the outstanding ideas and services of Austrian businesses. Further information is available at www.ecolinx.at.

In the framework of the most recent envietech symposium that was held on 29 November 2016 on the topic of "Austrian environmental technology: Innovative in the country, successful in the world!", various studies were presented on the topic of Austrian environmental technology. Experts from the business world, science and politics discussed topics regarding market leadership and further development of the industry in the coming years, with the aim of jointly and sustainably promoting the development of start-up companies into successful Austrian environmental technology companies all the way to hidden champions. Similarly, the strategy process for the Environmental Technology Master Plan (MUT, Masterplan Umwelttechnik) was launched for the next ten years. The congress documents are available on the Internet at www.cleaner-production.eu

Qualification campaign for environmental and energy technologies

An "environmental qualification" portal has been set up for Austrian education and training providers which is available to learning providers as a service, information and communication portal for all relevant course offerings (www.kursfinder.at) and which also provides informal networking with sectors. The "environmental qualification" portal has also been enhanced. It is based on the need for Austria to develop its leading role in environmental technologies and to make the necessary bundled training opportunities visible to all those interested in education and training. The opportunity to exchange content and expertise across sectors in networking meetings or working groups, discuss current trends and developments and showcase bundled training opportunities on the internet was again very well received by Austrian training providers in 2016.

In late 2016, 726 active further training courses and 126 active training courses were registered on the www.kursfinder.at platform that can be respectively assigned to the five categories of "Waste", "Energy", "Air", "Water", and "Others". Overall, 3,082 courses have been registered on the environmental qualification platform so far.

The Federal Ministry of Agriculture, Forestry, Environment and Water Management initiated the pilot project on green vocational orientation (BOgrün) for grade 8 students in 2013 and this approach was successfully implemented in a number of pilot schools. The aim of this project is to create the basis and prerequisites for the Austrian introduction of green vocational orientation for grade 8 students and to develop and field test green vocational orientation involving the environment and sustainability and compiling information on green job descriptions. Further information can be downloaded from www.agrarumweltpaedagogik.ac.at.

2016 Environmental Technology Sector Guide

In cooperation with the Bohmann publishing house, a 2016 environmental technology sector guide was drawn up (available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management).

The environmental economy and green jobs

The "green jobs master plan" is a further development of the environmental technology master plan ("MUT") and was presented in 2010. It focuses on the following fields of action:

- Ensuring high levels of qualification
- Continuously improving & innovating
- Accelerating networking & cooperation
- Supporting and accelerating internationalisation
- Stimulating business investment in & private consumption of sustainable products and services
- Raising awareness.

The "green jobs master plan" aims to create a total of 200,000 green jobs by 2018. In 2008, 167,665 people were employed in the environmental economy. This number had risen to 181,820 by 2014 (i.e. 4.9 % of the total workforce). This means that one in 20 jobs in Austria is a green job. The environmental economy in Austria had sales of € 31.0 billion in 2008, rising to € 35.4 billion by 2014. This corresponds to 10.7 % of GDP in Austria.

In late 2012 an initial evaluation of the master plan measures was carried out based on the data and research of Federal Ministry of Agriculture, Forestry, Environment and Water Management experts. The evaluations were updated in the course of three more surveys of this data.

Since the first survey of this economic sector, a positive trend has emerged over all years. Both sales and employment have grown almost twice as much as the average for the Austrian economy since the beginning of the economic crisis in 2008. Encouragingly, this positive trend is reflected in all six fields of action.

In addition, through the acceleration of the environmental economy, a "triple win" scenario has been achieved, with the environment, the economy and employment all benefiting. The most important goal is to transform the Austrian economy over the long term to set up sustainable, resource-efficient and energy-efficient production methods so that domestic companies can benefit from an early competitive advantage and make economies of scale in the necessary adaptation to sustainable growth. This also entails implicit advantages for environmental protection and resource conservation. Lastly, statistical surveys show not only that environmental protection and economic and employment growth are no longer contradictory aims but also that the environmental sector is well on the way to becoming a resilient economic sector.

Figure 132: The Austrian environmental technology industry is gaining in importance.

6.7.8. AUSTRIAN AND EU ECOLABELS

Since 1990, the Austrian Ecolabel has been awarded to products, tourism businesses, educational facilities and "green meetings & events" and has successfully positioned itself as an instrument for environmentally aware and social business management with a high standard of quality in Austria. On the one hand, it helps consumers make environmentally-friendly purchasing decisions and, on the other hand, it motivates retailers, businesses and educational facilities to produce and offer environmentally-friendly and resource-efficient products and services. Products and services with the Austrian Ecolabel must meet a range of environmental criteria, and compliance must be demonstrated in an independent expert report.

The strategic development of the Austrian Ecolabel was driven by strengthening cooperation with the EU Ecolabel and the national German Ecolabel "Blue Angel".

A range of information events is also held with the awarding of the Ecolabel by the Minister for the Environment. Further information on the Ecolabel is available on the Ecolabel website.

Products

Products that are awarded the Austrian Ecolabel are tested according to criteria such as quality, suitability for use, durability, health and safety. The entire life cycle – from the extraction of raw materials to packaging and disposal – is a central element of certification. The offer includes products from building & housing, household and cleaning, gardening, office, paper & printing, green energy and sustainable financial products. Two new guidelines for the product groups shoes and textile rental services have been drawn up.

Tourism

Energy-saving measures, environmentally sound waste management, efficient use of resources and regional and seasonal cooking – all these criteria and more play a role in the awarding of the Austrian Ecolabel to tourism businesses.

Figure 133: Ecolabel logo for tourism businesses

Education

Today's children are the adults of tomorrow. Children must be given the opportunity to learn and explore a culture of sustainability in kindergartens and schools. On this basis, they can acquire knowledge, skills and an attitude that will enable them to contribute to shaping a sustainable society once they become adults.This is why, in addition to awareness-raising, the awarding of the Austrian Ecolabel for schools covers the quality of the learning culture, the assessment of the social climate in schools and health promotion for children and young people. Presumably from 1 July 2017, it will be possible for kindergartens to be awarded the Austrian Ecolabel. Out-of-school educational establishments living environmental awareness and sustainable development on a daily basis can be awarded the Austrian Ecolabel for Educational Institutions.

Green meetings and events

A typical conference visitor generates a whopping 3.5kg in residual waste, 5.5kg in paper waste, 151 liters of water and 204kg of CO_2 per day. To make conferences, meetings and events more efficient and environmentally friendly, the Federal Ministry of Agriculture, Forestry, Environment and Water Management, together with the conference and event sector and the Consumer Information Association, has developed a new standard for events: the Austrian Ecolabel for "green meetings & green events".

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Figure 134: Ecolabel logo for events

Ecolabel data

Four hundred and fifteen companies are now generating annual product sales of € 945 million with 4,295 products. Three hundred and ninety-seven businesses with about 30,000 beds have been awarded the Austrian Ecolabel. Four tour operators have also been awarded the Ecolabel for their travel offerings. Sixty-five companies hold the Austrian Ecolabel for green meetings and green events. 1038 schools in Austria have the Austrian Ecolabel. A further 10 schools are on their way to being awarded the Ecolabel. Twenty-seven educational facilities are now certified. 95 companies generating turnover of € 1.2 billion, have been awarded the EU Ecolabel for 650 products. The EU Ecolabel for tourism businesses is currently used by 60 Austrian hotels and campsites.

7

PRINCIPLES FOR THE TREATMENT OF SPECIFIC WASTE AND MATERIAL STREAMS

7. PRINCIPLES FOR THE TREATMENT OF SPECIFIC WASTE AND MATERIAL STREAMS

FOR SELECTED WASTE STREAMS, guidelines have been put in place to ensure environmentally sound management. Specific arrangements are described per waste stream for all relevant phases of waste management, building on the five-step hierarchy set out in the Waste Management Act 2002 (prevention, preparation for reuse, recycling, other recovery, disposal) to assess the existing waste management processes available in respect of their overall environmental impact. In particular, the conflicting priorities of resource conservation and potential contamination are becoming increasingly important in this context.

The treatment principles are also taken into consideration when assessing treatment processes for waste as part of the notification and consent procedure.

7.1. TREATMENT PRINCIPLES ACCORDING TO THE WASTE TREATMENT OBLIGATIONS ORDINANCE

The Waste Treatment Obligations Ordinance establishes the minimum state-of-the-art requirements for the collection, storage and treatment of specific waste and thus aims to ensure the environmentally sound collection, storage and treatment of waste to realise the goals and principles of the waste management industry. The recasting of the Waste Treatment Obligations Ordinance served to update regulations that had been in place since 2004. New provisions on lithium batteries, flat screens, refrigerators with hydrocarbons as the coolant or propellent and photovoltaic modules were included.

The following types of waste are covered:

- Waste electrical and electronic equipment (with special provisions for refrigerators)
- transformers with operating voltage above 1,000 V
- batteries and accumulators (particularly lithium batteries)
- solvents, solvent-containing waste, paint and varnish waste
- medical waste that may cause injury
- amalgam residues
- waste containing PCBs
- digestates from biogas plants that use waste.

In principle, the standard is aimed at all waste holders (waste producers, waste collectors or processors) and such waste holders must hand over waste to a party authorised to conduct collection or treatment if they are not themselves authorised or able to perform such treatment. The waste must be handed over in good time as per Article 15(5) of the Waste Management Act 2002 so that public interests are not adversely affected (Article 1(3) of the Waste Management Act 2002). The waste holder is also responsible for ensuring that the environmentally sound recovery or disposal of waste is explicitly assigned (see Article 15(5a) and (5b) of the Waste Management Act 2002).

Figure 135: End-of-life photovoltaic plants are to be treated according to the Waste Treatment Obligations Ordinance.

7.2. ASBESTOS-CONTAINING FLOOR AND WALL COVERINGS

Large quantities of wall and floor coverings containing asbestos were produced predominantly in the 1960s and 1970s and came to be used extensively. Experts estimate that in Austria alone more than 15 million m^2 of these coverings were laid. In contrast to other products containing asbestos, such as storage heaters, product- specific data is rarely available for old floor and wall coverings. Thus, apart from a very few exceptions, coverings containing asbestos can only be identified by specialists using scanning electron microscope analysis.

When these coverings have been used normally (i.e. they are not extensively damaged) appreciable release of fibres can be largely excluded. However, when floor and wall coverings containing asbestos are removed, extremely varied amounts of fibres can be released, depending on how the asbestos is bound to the covering, on the bonding to the substrate and on the method of removal. Each situation therefore requires a unique approach, but the obligatory minimum standards are to be observed in each case.

Floor and wall coverings containing asbestos can be categorised into two types, cushion vinyl coverings and floor flex covering. The significant difference between them is in the use of the asbestos fibres, which are bound into a matrix (filler) in floor flex coverings and used as an asbestos board lamination (base) on cushion vinyl lining. As far as cushion vinyl linings are concerned, bonding of the asbestos fibres is weak, which essentially means that the potential for release is significantly higher than when they are an intrinsic part of the material as they are in floor flex lining.

Incorrect removal of floor and wall coverings containing asbestos by conventional means (manual, dry detachment without further preparation) inevitably puts the health of the people exposed at serious risk.

The provisions on the disposal of storage heaters containing asbestos (Chapter 7.3) are for the most part similar to those regarding the disposal of floor and wall coverings containing asbestos. Additional steps are required, however, as a result of the ubiquitous and usually strong bonding to the substrate.

Basically, when using/handling floor and wall coverings containing asbestos, any release of fibres is to be avoided and this applies in particular to the breaking of coverings or sanding of the substrate to remove remnants of coverings adhering to it. Floor and wall coverings containing asbestos may not be handled without additional special preparation (e.g. drilled into, detached from their substrate, broken up) or transported.

The following steps should be taken when removing floor and wall coverings containing asbestos:

- Set up a portioned-off, sealed and marked working area (contaminated area) with airlock
- generate sufficient, permanent negative air pressure in the working area during removal (low pressure appliance, air exchange 10, warning device)
- controlled ventilation of the working area via sensor-controlled filters into the atmosphere (visual and audio warning in case of failure)
- use of protective clothing, respiratory equipment, etc.
- use of binding agent to immediately trap loose fibres
- double packing of asbestos waste in PE sacks and labelling
- cleaning of protective equipment and tools
- transportation of packaged asbestos waste by authorised collectors/processors
- accompanying documentation in accordance with the Waste Record-Keeping Ordinance
- final treatment of the waste taken out (including contaminated equipment)
- after completing removal, cleaning of all surfaces and tools in the working area
- dismantling of the partitioning and low pressure appliances
- final clearance of the restoration area.

For more detailed guidelines on how to handle asbestos, please refer to the relevant set of standards, especially EN ISO 16000-7, VDI 3492:2013 and TRGS 519. Further information can be downloaded from the following competent authorities:

- Federal Minister for Labour, Social Affairs and Consumer Protection, Dept. III/2, Consumer Protection (www.sozialministerium.gv.at),
- labour inspectorates (www.arbeitsinspektion.gv.at),
- Federal Ministry of Science, Research and Industry.

7.3. ASBESTOS-CONTAINING STORAGE HEATERS

Storage heaters are to be classified as hazardous waste upon disposal. In accordance with Article 6(7) of the Waste Treatment Obligations Ordinance, Federal Law Gazette II No 459/2004, as amended, asbestos waste and components containing asbestos are to be removed from electrical and electronic equipment so as to avoid contaminating other components and the environment. According to information from the Association of German Electricity Plants (Vereinigung Deutscher Elektrizitätswerke – VDEW e.V.) most electric storage heaters manufactured before 1977 have components which contain asbestos, generally with weak bonding. A differentiation is to be made as to whether components containing asbestos are only located in the partitioned-off switch area – these are of secondary importance when assessing a possible health hazard from normal operation – or whether these components are exposed to the air current.

In the majority of appliances, the asbestos can be found in the heat insulation surrounding the storage core base and is partially exposed to the air current. Asbestos is also used for the sealing strip on the bypass flap in the air outlet. In some types of appliances, the plates at the side of and over the storage core are made of weakly bound asbestos. As a rule, these are not exposed to the air current. In the electrical switch area, elements containing asbestos – e.g. the insulation sleeves for the control cartridge of the charge regulator, in certain cases the insulating plates on the ventilator housing – were used in part up to 1984. Information on whether a specific electric storage heater contains asbestos can be obtained in the first instance from the manufacturer, from specialised electrical retail outlets or via Elektroaltgeräte Koordinierungsstelle Austria GmbH, the Austrian coordination centre for waste electrical equipment.

The following steps should be taken when removing components containing asbestos:

- If small parts containing asbestos are only located in the partitioned-off switch area, core stones may be removed where necessary to reduce weight – there are restrictions in the case of core stones containing chromium - confer below.
- If appliances are involved where the removal of the core stones would release asbestos fibres, these are not to be opened on any account at their location; they are to be removed intact and unopened from the building. In addition, all openings in the appliance must be sealed off using industrial adhesive tape to prevent dust escaping. Plate metal seams (front, cover, etc.) are also to be sealed off. Alternatively, the appliance may be packed dust-free in plastic. A label "Warning! Contains asbestos" is to be attached.
- If the removal of core stones involving a release of asbestos fibres is necessary, the following safety procedures are to be observed (see preferably VDI 3492:2013 and TRGS 519):
  - The working area is to be kept as small as possible.
  - The working area must be hermetically sealed and dustproof.
  - The working area must be continuously kept at an adequately effective level below atmospheric pressure during the removal process.
  - Once the removal work has been completed, all surfaces in the partitioned areas, including the partitioning materials, are to be cleaned and if necessary treated with fibre binding agent.

Prior to any further handling of the storage heater, all components containing asbestos must be removed. For this purpose, the appliances are to be competently dismantled and the components containing asbestos must be treated in such a manner that no asbestos fibres can be released (residual fibre binding agent and double wrapping).
A hermetically sealed working area (contamination area) is required for dismantling components containing weakly bonded asbestos. The disassembly of the components containing asbestos is to be carried out by an authorised processor. When transporting old appliances containing asbestos, an accompanying document complying with the Waste Record-Keeping Ordinance is to be carried.

Heat storage stones containing chromium

Storage heaters containing asbestos may contain core stones containing chromium which as a rule cannot be taken to a landfill site. Chromates are water-soluble and can also be absorbed through the skin. Therefore any dismantling as well as further treatment is to carried out by authorised processors in all cases. They should be classified as SN 31109g, Linings and refractories from non-metallurgical processes containing product-specific dangerous substances (EWC: 16 11 05).

7.4. PCB-CONTAINING WASTE

Waste containing PCBs comes within the scope of the Waste Treatment Obligations Ordinance. Reference is made to the provisions on the storage, transportation and treatment of waste containing PCBs.

Polychlorinated biphenyls (PCBs) are a substance class that includes 209 isomers and homologous compounds. Synthetic PCBs are always a mixture of different isomers.

With the 2004 Stockholm Convention on persistent organic pollutants, also known as POPs, a worldwide ban on the production and use of PCBs was introduced. At the same time, the Convention also demanded the removal of all remaining stocks and waste.

At EU level, the treatment of POPs waste is governed by Regulation 850/2004/EC (POPs Regulation). A limit value of 50 ppm applies to waste containing PCBs which is consistent with the recommendations made by the Stockholm Convention. Above 50 ppm PCB the waste is classified as POPs waste.

Electrical equipment containing PCBs

Due to their relatively low level of acute toxicity and their favourable material properties, PCBs have been widely used. The fields in which they were used were insulating oils and hydraulic oils, dielectric media in power capacitors, coolants in power transformers, plasticisers in plastics, sealants and colours, carrier substances in pesticides and others.

Depending on the PCB content of the equipment, electrical equipment containing PCBs is classified under the codes for electrical equipment containing PCBs and PCTs: SN 54110 12 (up to 50 ppm), SN 54110 13 (from 50 to 100 ppm), SN 54110 14 (from 100 to 500 ppm), SN 54110 15 (from 500 to 5,000 ppm) or SN 54110 16 (from 5,000 ppm). Underground cables with insulation containing PCBs should be classified according to the PCB content of the insulation under the codes for cables containing PCBs with designation of PCB content (SN 35341 12 (up to 50 ppm PCB), SN 35341 13 (from 50 to 100 ppm), SN 35341 14 (from 100 to 500 ppm), SN 35341 15 (from 500 to 5,000 ppm) and SN 34351 16 (from 5,000 ppm)).

If the PCB content cannot be determined, e.g. in the case of capacitors, designation 16 is to be selected (from 5,000 ppm PCB).

Capacitors and transformers containing PCBs were to be taken out of operation by 31 December 1999. Only capacitors with a liquid content of less than 1liter (and additionally for fields of multiple smaller capacitors with a liquid content of less than 2 liters for the complete field) and transformers containing < 500 ppm of PCB in oil may remain in operation until the end of their useful life.

Figure 136: Capacitors containing PCBs

Waste containing PCBs should preferably be subjected to thermal treatment, which must be performed in line with the Waste Incineration Ordinance. Under EU legislation, the thermal treatment of PCB waste is always to be classified as elimination D10.

Further approved destruction methods are summarised in the Basel Convention guideline "Updated general technical guidelines for the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants".

For fixed electrical and electronic equipment (transformers, capacitors), the taking apart and separation of the PCB fraction with subsequent destruction represents one alternative.

It should be ensured in the process that

- no PCBs find their way into the environment when draining PCB oils from electrical equipment. In particular, any PCB oils that leak during this kind of work must be collected in suitable oil and solvent-tight catchment wells. The draining of PCBs "on site" is prohibited unless this is necessary for technical reasons. Insofar as possible, electrical equipment containing PCBs (capacitors and transformers) is to be prepared for further treatment at suitable transfer stations.
- with respect to the treatment at transfer stations, all work is carried out in a separate, isolated zone. Appropriate measures must be taken to ensure that PCBs are not released into the environment via the exhaust air of the isolated zone (e.g. activated carbon filters or equivalent measures). The floor of the contaminated area must be configured in the form of a catchment well and be oil- and solvent-resistant.
- employees are to be protected against contamination with PCBs by means of suitable protective clothing and
- suitable measures must be taken (airlock, etc.) to ensure that PCBs are not carried out of the contaminated area.

If electrical equipment is to undergo a recovery process (metal recycling), 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 essential. Simple washing of electrical equipment containing PCBs with a solvent and subsequent treatment with a shredder is not permitted since experience from the retro-filling of transformers shows that substantial quantities of oil containing PCBs remain in the coil (transformer coil, transformer plates, capacitor plates) and in the insulation, which leads to dioxin formation during shredding and contamination of the shredded waste with PCBs. Due to the considerably higher toxicity of dioxins, even minimal PCB residues give rise to the risk of environmental contamination. Prior to the recovery of metal parts of electrical equipment containing PCBs, it is therefore necessary to completely dismantle (uncoiling copper wires, removing transformer plates, eliminating oil-soaked insulating paper, etc.) and decontaminate the metal parts. Just like the pre-treatment before disposal, this work must be carried out in a secure isolated area at a suitable plant. As a result of the far more complicated handling, special precautions need to be taken when disassembling for recovery purposes, particularly with regard to contamination with PCBs (airlock, treatment of exhaust air, etc.).

Contaminated materials such as paper, wood cores, etc. must undergo thermal treatment or, if the materials are inert they can also be placed in an underground landfill.

If the presence of PCBs cannot be ruled out in the case of small capacitors (capacitors with < 1 liter volume, e.g. start-up and compensation capacitors in washing machines, fluorescent lamps, etc.) because of the production date and/or labelling, these are to be regarded as potentially containing PCBs and must undergo thermal treatment in a suitable incineration plant.

Other waste containing PCBs

The accumulation of waste containing PCBs can be expected particularly in the construction trade and especially where restructuring and dismantling are concerned. PCBs were used as plasticisers until the mid- 1970s in open applications in the building trade, particularly in seals (e.g. window seals), permanent elastic joint sealants and emulsion paints. When removing PCB contaminated materials, it should be borne in mind that PCBs have a relatively high tendency to diffuse into concrete and plaster. Apart from removal of the actual source of contamination (sealant, coating), removal of the immediately adjacent parts of the wall will also be necessary. Cryogenic processes to remove sealants (embrittlement of the seals with liquid nitrogen) have proven useful in this respect.

Sealants and construction waste containing PCBs should be classified according to PCB content under the codes for other waste containing PCTs and PCBs (SN 54111 13 (from 50 to 100 ppm), SN 54111 14 (from 100 to 500 ppm), SN 54111 15 (from 500 to 5,000 ppm) or SN 54111 16 (from 5,000 ppm)) and disposed of. Inert fractions (PCB-contaminated concrete or plaster) can be landfilled underground in accordance with Annex V of Regulation 850/2004/EC. Organic fractions (seals, etc.) must be disposed of (e.g. high- temperature incineration).

Figure 137: Emulsion paints formerly contained PCBs.

As a result of the extensive distribution of seals containing PCBs (until around 1977/78) and micro-capacitors containing PCBs (until around 1985/86), light shredded fractions from the processing of white goods as well as the processing of scrap vehicles (capacitors, seals, cavity sealing and underseals from motor vehicles) may also contain significant amounts of PCBs. These kinds of fractions are to be subjected to a suitable means of elimination in accordance with Directive 850/2004/EC (e.g. high-temperature incineration). It should be noted that the PCB content of the waste is to be assessed in accordance with the EU Directive (content of seven congeners x 5).

7.5. SEWAGE SLUDGE FROM MUNICIPAL SEWAGE PLANTS

Spreading on land

Spreading contaminated sewage sludge onto the land is to be generally ruled out (risk of pollutant accumulation). It is also to be ensured that the long-term use of sewage sludge for agricultural purposes does not precipitate an inadmissible accumulation of pollutants in the soil. Framework conditions in this respect are set out in the varying soil protection legislation and regulations pertaining to sewage sludge in the provinces.

When using sewage sludge to fertilise and improve soil, recycling does not take place until the sewage sludge is actually used, i.e. spread onto the land. This type of waste treatment must be logged and reported in line with the provisions of the Ordinance on Waste Balance Sheets. These logging and reporting obligations relate to anyone applying sewage sludge, including agricultural and forestry operations.

The prerequisite for permitted application is in particular the benefit ensuing from the measure and the fulfilment of a specific objective. Sewage sludge must be spread for the purpose of fertilising, i.e. time and quantity must be adjusted to the growth of vegetation and the soil characteristics. For sewage sludge to be spread on soil for agricultural use or for the benefit of the ecology, it must contain sufficient bio-available nutrients to provide fertilisation while not exceeding the permissible spread amount and the use of the sewage sludge must be adjusted to the nutrient requirements of the plants.

Heavy metal limit values

The limit values for heavy metals (total content) set out in the Compost Ordinance (for non-agricultural recovery, the limit values for sludge as an input material for compost and for agricultural recovery, the limit values for sludge as an input material for high-grade sewage sludge compost) should be used together with other sources of information, to assess whether recovery is permissible.

Epidemiology

Sewage sludge may only be spread onto agricultural land if the sewage sludge has been subjected to a suitable sanitation procedure. This can be considered to be the case if no pathogens posing a danger to the environment or humans are contained in the sludge. Sewage sludge with a pH value of 12 or higher due to liming, which has been composted in line with the Guidelines for State-of-the-Art Composting or dried, is deemed sufficiently sanitised. Sewage sludge that has not been subjected to any treatment other than stabilisation is deemed sanitised if no salmonella can be detected.

Composting

Sewage sludge must be composted in accordance with the Compost Ordinance and the Guidelines on State-of-the-Art Composting (Federal Ministry of Agriculture, Forestry, Environment and Water Management, 2005). The specifications for spreading the sludge onto soil should be observed accordingly. Waste ceases to be waste when the composting process is complete in accordance with the Compost Ordinance.

Thermal treatment

For the thermal treatment of sewage sludge, the requirements of the Waste Incineration Ordinance are generally to be observed.

Landfill

With the phasing out of the exemptions in the Landfill Ordinance on 1 January 2009, the landfilling of sewage sludge is no longer permissible as a disposal option.

Mechanical-biological treatment of waste with subsequent landfilling

The suitability of mechanical-biological waste treatment plants (MBT plants) for the co-treatment of sewage sludge must be tested in individual cases based on specific investigations and preliminary tests. Where necessary, the plant-specific process and operating parameters must be adjusted to ensure optimal rotting conditions and the desired qualities of the output materials.

Sewage sludge must be stabilised before co-treatment and dewatered using appropriate measures. Taking into account the volume loss in the biological stage, the heavy metal content of the added sewage sludge must not be greater than the amount stipulated for landfilling or thermal treatment of the output material. In other words, the heavy metal content of the input materials for the biological stage is to be calculated on the basis of the reduced volume after rotting or drying.

To ensure that only suitable sewage sludge is accepted, visual input controls and quality monitoring in the form of regular analytical investigations must be conducted (e.g. by the sewage sludge producer or as part of input control). The frequency of analyses is to be scheduled depending on the range and variability of the relevant properties determined (e.g. heavy metal content).

During delivery, storage, movement and handling of sewage sludge, the possibility of additional (diffuse) emissions of odours and other gaseous substances (e.g. ammonia or nitrous oxide) must be taken into account, which may not only entail increased requirements for the protection of personnel but also for the collection and cleansing of waste gases. Where applicable, measures must be taken to counteract the additional formation of N-containing gaseous emissions (particularly ammonia and nitrous oxide), such as reducing the proportion of co-treated sewage sludge, optimising rotting processes (e.g. C:N ratio, windrow design, turning intervals, temperature level) and air management (e.g. acidic scrubber for separating ammonia). The effectiveness of the measures taken must be proven by accompanying exhaust air measurements (e.g. upstream and downstream measurement for ammonia and nitrous oxide).

Strategy for future sewage sludge management

Phosphorus is an essential and at the same time non-substitutable resource that is indispensable for guaranteeing food production at national and global level. Yet rock phosphate as a source material of phosphorus-based fertiliser production is a limited resource; its occurence is highly regionally concentrated and, in addition, there are multiple reports about the deteriorating quality of rock phosphates due to rising heavy-metal contents (cadmium and uranium). Municipal sewage sludge in Austria contains relatively high amounts of phosphorus that are currently used only to a minor extent. To reduce Austria's dependence on phosphorus imports and thus contribute to the guaranteed supply with phosphorus for the production of high-quality food, an extensive closed-phosphorus-cycle management is to be strived for. The reclamation of phosphorus from waste constitutes a key measure, also for achieving the United Nations Global Sustainability Goals (Agenda 2030, confer Chapter 6.3.8.).

The only type of utilisation of the phosphorus contained in sewage sludge that is currently practised in Austria is the application of sewage sludge or sewage-sludge compost on agricultural land. Due to the pollutants contained in sewage sludge, such as hormones and endocrine-disrupting substances, pathogenic germs, pharmaceutical residues, heavy metals, microplastics and nanomaterials, the agricultural recovery of sewage sludge is, however, not guaranteed for the future. More than 50 % of municipal sewage sludges are currently already incinerated (confer Chapter 3.2.).

Thus, it is the aim of future sewage-sludge management to recover phosphorus from municipal sewage sludge while largely destroying/creating reliable sinks for the pollutants contained in sewage sludge. As most promising technology in this regard shall be deemed the mono-incineration of sewage sludge and phosphorus recovery from incineration ash, with the provisions of the Waste Incineration Ordinance (AVV) having to be complied with in any event for incineration. During mono-incineration, additional firing is, in addition, only permissible with fuels or waste with either significant phosphorous content (e.g. animal meal) or low ash content (e.g. natural gas, waste oil) and that do not cause a relevant increase of pollutant concentrations in the ash. As an alternative aiming to consider the individual conditions of individual sewage treatment plants, also phosphorus recovery from wastewater, sludge water or sewage sludge can be carried out, with a phosphorus recovery rate of at least 45 % by weight, related to the sewage treatment plant intake, to be strived for.

By 2030, i.e. the target year specified in Agenda 2030 for achieving the United Nations Global Sustainability Goals, a phosphorus recovery rate of 65 to 85 % of the municipal sewage sludge accrued in Austria is strived for. To this end, a study that is to be conducted by the Federal Ministry of Agriculture, Forestry, Environment and Water Management is to verify, in particular, different scenarios regarding the design capacity of sewage treatment plants (20,000/50,000 P.E. $_{60}$[12]) and the structure of phosphorus recovery (centrally/decentrally). Here, the focus will, in a first step, be on sewage treatment plants with an influx load of, at minimum, 0.8 g of phosphorus per P.E. $_{60}$ and day and averaged over the past three years.

To guarantee the implementation of a strategy after having obtained the study results, it is especially the operators of larger sewage treatment plant (in any event, of treatment plants exceeding a design capacity of 50,000 P.E. $_{60}$) that are called upon to promptly initiate planning processes for their future phosphorus recovery action. In this context, the individual sewage sludge management strategy pursued so far and the plant investment made only recently shall, of course, be considered. There are plans to support necessary conversion measures by way of funding instruments.

The available strategy for future sewage sludge management shall be verified until the update of the Federal Waste Management Plan and shall be adapted, if need be.

Figure 138: Municipal sewage sludges are comparably rich in phosphorus.

[12] Load that is organically and biodegradable with a biochemical oxygen demand of 60 g of oxygen per day within five days (BOD5).

7.6. HYDROCARBON- OR PAH-CONTAMINATED SOILS OR MATERIALS SIMILAR TO SOIL (BIOLOGICAL TREATMENT IN EX-SITU PROCESSES)

The biological treatment of hydrocarbon- and/or PAH-contaminated soils or materials similar to soil can represent an ecologically and economically significant alternative to thermal treatment and/or be used as a substitute raw material in cement production plants according to Chapter 6.5.2..

In this case, biological treatment is carried out ex situ in ricks. As a basic principle, care should be taken to ensure that biological degradation of the pollutants (hydrocarbons or PAHs) actually takes place and not just a reduction of the pollutant concentration by dilution (e.g. mixing of soils of varying contamination) or through the volatility of certain pollutants (particularly hydrocarbons with a low boiling point).

Dilution is prohibited by the ban on mixing in the Waste Management Act 2002 and goes against the principles of sustainable waste management. It should be noted that for the purposes of the declassification procedure the authorised expert or agency must confirm that there are no indications of the waste having been mixed with other materials (see also Annex 3(II) of the Ordinance on the Definition of HazardousWaste and Hazardous Household Waste).

Excavated materials that are contaminated with (slightly) volatile pollutants (hydrocarbons) shall be stored and treated in such a way so as to prevent release of these pollutants into the environment. In the case of wet mechanical treatment procedures, the rinsing slurry and the exhaust air and, in the case of dry mechanical procedures, the exhaust air shall be collected and cleaned (e.g. cleaning of the rinsing slurry via a sand filter with a downstream activated-carbon filter/ cleaning of the exhaust air via dust-extraction devices with a downstream activated-carbon filter).

For biological treatment ex situ, ÖNORM S 2028 "Biological Treatment of Contaminated Soil or Similar Materials" of 1 May 2013 should be consulted and can be used to assess the quality of the treatment and that of the treated materials.

In accordance with the state of the art, analytical control and documentation of the input streams and the output streams from the process is essential. The analytical control of every material to be treated must at least include the pollutants that will be degraded in the course of the treatment.

Treatment success is verified using key parameters determined according to contamination via investigations of the output material and the input material. To check individual ricks, it may also be necessary to identify any retarding factors and other characteristics. In order to exclude the illicit reduction of pollutant concentration by dilution (e.g. mixing of soils with varying contamination), proof needs to be provided that only soils or materials similar to soil that are contaminated with degradable pollutants for which biological degradation under the basic conditions of the relevant treatment is fundamentally possible are being subjected to biological treatment. Only such materials as are contaminated with the same pollutants and in similar concentrations can be treated together. The reduction of pollutants is to be proven by measuring the difference in concentration before (input) and after (output) treatment.

With regard to the use of waste types (including the specific characteristics) for recovery (or disposal), see Appendix 5 of the List of Waste Ordinance.

Generally, what needs to be pointed out is that the biological treatment of hydrocarbon-contaminated or PAH-contaminated soils or materials similar to soil does not constitute mechanical-biological treatment as defined in the Landfill Ordinance.

7.7. COMPOST

Compost produced in line with the Compost Ordinance (Federal Law Gazette. II No 292/2001) loses its waste status upon declaration and can be marketed as a product.

State-of-the-art requirements for the application of compost are laid down in ÖNORM S 2202 "Application guidelines for compost" (2014) and in the "Guideline on the application of compost from biogenic waste in agriculture" (2010). Under the Fertiliser Ordinance 2004 (as amended in Federal Law Gazette II No 181/2014), compost of quality class A+ and A is permitted as an input material for producing fertiliser.

The principles on producing compost soil (mixtures of compost and excavated soil material) are summarised in ÖWAV Worksheet 44 "Producing compost soil - mixtures of compost and excavated soil material" (2014) and in ÖNORM S 2210 "Compost soil" (2015). Mixtures of compost as defined in the Compost Ordinance with waste (e.g. excavated soil material) remain waste until admissible recovery.

The principles on producing arable soil from compost (mixture of compost as per the Compost Ordinance and other mixing components) used to propagate and cultivate plants and to produce vegetation areas and that can be enriched with nutrients are regulated in ÖNORM S 2203 "Requirements for arable soil from compost" (2006). Arable soil from compost remains waste if waste is used as a mixing component until admissible recovery.

Figure 139: Rick composting

7.8. EXCAVATED MATERIALS

OVERVIEW OF EXCAVATED MATERIALS

Excavated material is material that is created when excavating or clearing soil or subsoil. The following provisions define the requirements for possible recovery methods. Excavation materials as defined in this Chapter include in particular excavated soil material, soil components, technical fill material and track excavation material as per the following definitions:

Excavated soil material

Excavated soil material is material that is generated by the excavation or removal of mainly naturally produced soil or subsoil – including after relocation. The proportion of mineral non-soil components, e.g. mineral construction waste, may not make up more than 5 % by volume and the organic non-soil components, e.g. plastics, wood, paper, etc. must not make up more than 1 % by volume overall. These non- soil constituents must be present in the soil or subsoil before its excavation and removal. Excavated soil material can originate from one or more locations as long as the mixing ban in the Waste Management Act 2002 is complied with.

The limitations for organic non-soil components do not apply to natural plant matter (plant residues, humus and wood debris in torrent sediments):

- sediment excavated from water (stream and river sediment, sediment from bodies of standing water)
- material from natural land movements, e.g. material from debris, rock slide material, mudflow debris
- tunnel excavation material.

Uncontaminated excavated soil material

Uncontaminated excavated soil material is excavated soil material that

- can obviously be assumed based on information to hand not to entail any relevant stress or pollution and that arises at a location where there are no pollution-related events or commercial (prior) use that could lead to possible contamination of the material or
- after analytical investigation as per Annex 4 of the Landfill Ordinance 2008, complies with the limit values for excavated soil landfills as in Annex 1 Tables 1 and 2 of the Landfill Ordinance 2008 and does not show any increased pollutant content, even after additional (unlimited) parameters have been investigated in case of suspicion.

Soil components

Soil components are components of soil or substrate either generated or emerged by the excavation or removal of not-naturally-produced soil or subsoil or by the treatment (e.g. sifting) of excavation material. The share of other materials e.g. mineral construction waste, clinker etc. may not make up more than 5 % by volume. The proportion of organic materials (plastics, timber) must not make up more than 1% by volume overall; this does not apply to natural plant matter (e.g. plant residues, humus, woody debris in torrent sediments).

Soil components include the following:

- fractions of uncontaminated excavated soil material (e.g. after sifting)
- fractions from mechanical, physical, biological or chemical treatment of contaminated excavated material
- track excavation material as well as fractions from the treatment of track excavation material
- verge trimming material from road maintenance
- clay suspensions
- gravel wash sludge
- technical fill material under Code Number 31411 34

Uncontaminated soil components

Uncontaminated soil components are

- fractions of uncontaminated excavated soil material (e.g. after sifting) separated from one another without adding other waste or other materials

- soil components that after analytical investigation as per Annex 4 of the Landfill Ordinance 2008 comply with the limit values for excavated soil landfills of Annex 1 Tables 1 and 2 of the Landfill Ordinance 2008. In case of suspicion, uncontaminated soil components must also not show any increased pollutant content, even after additional (unlimited) parameters have been investigated.

Technical fill material

Technical fill material is non-hazardous excavation material from structural layers such as gravel layers, antifrost layers and drainage layers produced in line with technical requirements such as a particular grading curve.

Technical fill material is to be differentiated as follows

- technical fill material under code number 31411 34; technical fill material containing less than 5 % by volume of mineral non-soil components (e.g. construction waste) and less than 1 % by volume of organic non-soil components (e.g. plastic, wood).
- technical fill material under code number 31411 35; technical fill material containing 5 % or more by volume of mineral non-soil components (e.g. construction waste) and less than 1 % by volume of organic non-soil components (e.g. plastic, wood).

Track excavation material

Track excavation material accumulates on rail work sites and consists of the following fractions (or mixtures thereof):

- track ballast material: ballast (natural, crushed, unbound aggregates from mineral sources) including abraded and fine material with undefined micro-aggregate;
- base layer material: a layer produced from technical fill material, bounded at the top by the superstructure and at the bottom by the substructure;
- subsoil material: natural in-situ soil or excavated material even after it has been shifted (e.g. in dam construction) that is below the substructure.

OVERVIEW OF RECOVERY METHODS FOR EXCAVATED MATERIAL

Provided it complies with the relevant quality criteria and is technically suitable, excavated material may, in particular, be recovered as

- raw material for industrial applications,
- underground backfilling or soil recultivation,
- recycled construction material for structural recovery,
- input materials for the production of synthetic soil, as a structural material for composting or for the production of compost soil

as specified in this Chapter. For each recovery, waste must serve a useful purpose in an environmentally sound manner by replacing other materials that would else have been used for fulfilling a certain function. If there is no useful purpose or if the requirements stipulated in this chapter are not complied with, a removal measure is to be assumed.

Raw material for industrial applications

Industrial recovery involves substituting primary raw materials in industrial manufacturing processes, e.g. in the construction materials industry (e.g. cement raw materials), iron and steel industry (e.g. flux), glass industry (e.g. stabiliser) or in the chemical industry (e.g. filler). This recovery channel is, among other things, suitable for tunnel excavation material, as large volumes can arise continuously in a location. The type of specific recovery is based on the (environmental-) technological properties of the material as well as on the type of possible industrial processes; confer e.g. for tunnel excavation material the guideline "Utilisation of tunnel excavation material" by the Austrian Society for Construction Technology– ÖBV (www.bautechnik.pro).

Underground backfilling or soil recultivation

The provisions of Chapter 7.8.1 apply to the direct recovery of excavated soil material and soil components as underground backfilling or for soil recultivation.

Figure 140: Soil recultivation

Recycled construction material for structural recovery

A recycled construction material is a natural, industrially-manufactured or recycled aggregate produced from waste that can be used as construction material in line with the EU Construction Products Regulation.

For the manufacturing of recycled construction materials from excavation materials listed in Annex 1 Table 1 of the Recycled Construction Materials Ordinance (e.g. technical fill material, track excavation material, excavated soil material in lesser quantities), the provisions of the Recycled Construction Materials Ordinance shall apply.

For the manufacturing of recycled construction materials that are exclusively produced from excavated soil material or soil components, the provisions of Chapter 7.8.2. shall apply. In addition, this chapter governs the admixture of mineral construction and demolition waste.

Input materials for the production of synthetic soil, as a structural material for composting or for the production of compost soil

The provisions of Chapter 7.9. apply to the recovery of input materials for production of synthetic soil; the provisions of the Compost Ordinance apply to the recovery of structural materials for composting (up to max. 15 % as an aggregate). ÖNORM S 2210 "Compost soil: quality requirements and investigation methods", issued on 1 September 2015, applies to the production of compost soil.

7.8.1. RECOVERY AS UNDERGROUND BACKFILLING OR FOR SOIL RECULTIVATION

Underground backfilling

Underground backfilling may be performed with the following materials, provided that they are technically suitable:

- uncontaminated excavated soil material or uncontaminated soil components derived from it (e.g. by sifting)
- uncontaminated soil components from the treatment of contaminated excavated material according to Chapter 7.8.4.
- small quantities of excavated soil material according to the provisions of Chapter 7.8.3.

The material must be basically characterised for underground backfilling according to Chapter 7.8.5. and – in the event of all limit values being complied with – have been assigned to quality classes A1, A2, A2-G or BA. For small quantities of excavated soil material, the provisions of Chapter 7.8.3. shall apply in deviation from this.

For underground backfilling in and directly above groundwater, only material in quality class A2-G is admissible. Assignment to quality classes A2-G and A1 must not be made for material derived from the treatment of contaminated excavated material.

Material of quality class A1 may only be used for underground backfilling if the limit value for overall TOC and TOC in eluate of quality class A2 is observed; this must be assessed in the course of the basic characterisation of this material and documented in the assessment report. Topsoil rich in humus is not suitable for underground backfilling under any circumstances. If uncontaminated excavated soil material containing an increased share of natural plant ingredients (e.g. woody debris in torrent sediments) is to be used for underground backfilling, the plant ingredients and/or the woody debris must be separated in advance or removed.

Generally a suitable recultivation layer should be applied on all underground backfilling, except below another building installation (e.g. roads, buildings or pathways).

Soil recultivation

Soil recultivation measures may be performed with the following materials, provided that these are technically suitable:

- uncontaminated excavated soil material or uncontaminated soil components derived from it (e.g. by sifting)
- uncontaminated soil components from the treatment of contaminated excavated material according to Chapter 7.8.4. (only for non-agricultural soil recultivation)
- verge trimming material from roads, provided that the verges do not feature proportions of asphalt, clinker or other materials that are not to be deemed as soil components
- small quantities of uncontaminated excavated soil material or verge trimmings from roads featuring low volumes of traffic according to the provisions of Chapter 7.8.3.

The material must be basically characterised for underground backfilling according to Chapter 7.8.5. and – in the event of all limit values being complied with – have been assigned to quality classes A1, A2, A2-G or BA. For small quantities of excavated soil material or verge trimming material from roads, the provisions of Chapter 7.8.3. shall apply in deviation from this.

For the production of recultivation layers (root-penetrable layers of, at minimum, 0.3 m or, at minimum, 0.5 m in the case of landfills and up to a maximum depth of 2 m) layer by layer construction, geared towards the building up of a natural soil layer, must be ensured taking account in particular of the graduated content of organic matter and nutrients. Topsoil rich in humus that has been collected separately must be used as top soil material in a recultivation layer.

The guidelines for the proper recultivation of soil used in agriculture and forestry as published by the Soil Recultivation Working Group of the Expert Committee for Soil Fertility and Protection (Fachbeirat für Bodenfruchtbarkeit und Bodenschutz, Arbeitsgruppe Bodenrekultivierung) should be observed for any agricultural or non-agricultural recultivation measure. A deviation from the requirements of the guideline is only permitted if technically justified.

Material of quality class A1 must be used (or quality class BA in consultation with the locally responsible waste authority) for an agricultural soil recultivation (i.e. for areas on which food and animal feed are produced or whose vegetation cover is to be fed to animals). Quality class A2 or A2-G material can be used for a non-agricultural soil recultivation (i.e. for areas on which the use of the plant cover as feed for animals can be excluded with a high degree of certainty (e.g. road embankments, green verges in traffic areas, cloverleaf junctions). Verge trimmings from roads featuring a daily traffic volume of more than 10,000 may – provided that the respective limit values are complied with – only be used for non-agricultural soil recultivation. In this context, the respective provisions on basic characterisation according to Chapter 7.8.5. shall apply.

Use of quality class BA (excavated soil material or soil components with background contamination)

Material of quality class BA for underground backfilling or agricultural or non-agricultural soil recultivation may only be used in areas with a similar pollution profile.

The planned implementation of a specific recovery application, using material of quality class BA, must be coordinated with the competent waste authority prior to installation by the responsible developer.

Table 78: Areas of applications and necessary quality classes for underground backfilling and soil recultivation

Quality class	Agricultural soil recultivation	Non-agricultural soil recultivation	Underground backfilling	Underground backfilling in and directly above groundwater
A1[3]	YES	YES	YES[1]	NO
A2	NO	YES	YES	NO
A2-G[3]	NO	YES	YES	YES
BA	YES[2, 4]	YES[2]	YES[2]	NO

[1] *Only in the event of compliance with the limit values as well for total TOC as for TOC in eluate from quality class A2.*
[2] *Only in areas with comparable contamination in consultation with the locally competent authority.*
[3] *For waste fractions from the treatment of contaminated excavated materials, an assignment to A1 or A2-G is not permitted.*
[4] *Agricultural soil recultivation with waste fractions from the treatment of contaminated excavated material is not permitted.*

Documentation

A recovery measure involving underground backfilling or soil recultivation with a total installation volume of more than 2,000 tonnes must be documented by builders commissioning the installation in an installation information document, which must contain the following information:

- place of installation
- purpose of installation/description of the benefits achieved by the operation
- nature of use (e.g. building a recultivation layer)
- mass of the installed material
- drawing of the installation with standard section (layers)
- reference number of the assessment report used for basic characterisation of the installed material
- certification by developer or builder that no impurities were detected during Installation by the person performing the installation.

A form is available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management for this installation information document.

The installation information document must be kept together with the relevant assessment report(s) by builders commissioning the installation for a period of at least seven years.

7.8.2. PRODUCTION OF RECYCLED CONSTRUCTION MATERIALS

This chapter applies to the manufacture of recycled construction materials from the following excavated materials, provided that these are technically suitable:

- Uncontaminated excavated soil material or uncontaminated soil components derived from it (e.g. by sifting)
- Uncontaminated soil components from the treatment of contaminated excavated material according to Chapter 7.8.4.
- Excavated material (also after treatment) of basically naturally grown soil or subsoil with, at maximum, 30 percent by volume of mineral construction and demolition waste or technical fill material
- Excavated material from tunnel construction projects containing not more than ten percent by volume of shotcrete and not more than one percent by volume of organic ingredients
- Small quantities of uncontaminated excavated soil material according to the provisions of chapter 7.8.3.

If the material was basically characterised according to Chapters 7.8.3. or 7.8.5. before the production of the recycled construction material, the finished recycled construction material can be assigned to the same quality class as the input material, provided that a pollutant concentration in a sub-fraction is not to be expected and no other materials are admixed. Else, quality assurance is to be performed on the finished recycled construction material, and the provisions of Chapter 7.8.5. shall apply.

The manufacture of recycled construction materials of quality classes A1 or A2-G may only be performed with uncontaminated excavated soil material or uncontaminated soil components derived from it (e.g. by sifting). Furthermore, the manufacture of recycled construction materials of quality class A1 may only be performed if the limit value for overall TOC as well as for TOC in the eluate of quality class A2 is observed.

The provisions of the Recycled Construction Materials Ordinance apply for the manufacture of recycled construction materials from technical fill material (waste type under code number 31411 34 and 31411 35), track excavation material and for the use of excavated soil material or soil components as a blending component for the technical improvement in lesser quantities.

A recycled construction material shall comply with the structural properties according to the state of the art of technology and shall be designated accordingly. The designation shall include the respective quality class (A1, A2, A2-G, BA or IN (confer Chapter 7.8.5.)).

Figure 141: Recycled construction material from excavated soil material

Provisions on unbound recovery

Recycled construction materials of quality class A1, A2, A2-G and BA may be used unbound or to produce concrete under strength class C 12/15 or in the case of strength class C 8/10 under exposure class XC1 in accordance with ÖNORM B4710-1 "Concrete - Part 1: Specification, production, use and verification of conformity – Rules for the implementation of ÖNORM EN 206-1 for normal and heavy concrete", issued on 1 October 2007 for structural purposes with the following restrictions:

- use only for structural measures and in the scope that is absolutely required
- recycled construction materials of quality class A1, A2 and BA may not be used unbound in or directly above groundwater.
- recycled construction materials of quality class BA may only be recovered unbound in areas with similar pollution load and in agreement with the competent waste authority.

Provisions on bound recovery

Recycled construction materials of quality class A1, A2, A2-G, BA or IN (confer Chapter 7.8.5.) may only be used to produce concrete from strength class C 12/15 (inclusive) or in the case of strength class C 8/10 (inclusive) from exposure class XC1 and to produce asphalt aggregate. There are no application restrictions for the concrete produced or the asphalt aggregate.

Provisions on the production of recycled construction materials by the admixture of less than 50 % of mineral construction and demolition waste or primary raw materials

If, in the course of the manufacture of recycled construction materials, construction and demolition waste is to be admixed in lesser quantities (< 50 %) for the purpose of technical improvement (e.g. improvement of grain size distribution), such shall only be admissible with material that has been subject to quality assurance beforehand according to the Recycled Construction Materials Ordinance (quality classes U-A, U-B or U-E). Also the excavated material provided for admixture must already have been subject to basic characterisation and must have been assigned to quality classes A1, A2, A2-G, BA or IN (confer Chapter 7.8.5.).

When admixing material of quality class U-A (or a primary raw material), the finished recycled construction material is assigned to the quality class of the excavated material that had been subject to basic characterisation before (A1, A2, A2-G, BA or IN).

When admixing material of quality classes U-B or U-E, the finished recycled construction product is assigned to quality class IN.

Also on the basis of a chemical analysis, an assignment to a quality class other than the quality classes set forth above is not admissible.

Table 79: Areas of application and necessary quality classes for recycled construction materials

Quality Class	Unbound use	Unbound use in and directly above groundwater	Bound use
A1[2, 3]	YES	NO	YES
A2	YES	NO	YES
A2-G[2]	YES	YES	YES
BA	YES[1]	NO	YES
IN	NO	NO	YES

[1] *Only in areas with comparable contamination in consultation with the waste authority responsible für installation.*
[2] *For fractions from the treatment of contaminated excavated materials, an assignment to A1 or A2-G is not admissible.*
[3] *Assignment to A1 only in the event of compliance with the limit value for TOC overall as well as for TOC in eluate of quality class A2.*

7.8.3. SPECIAL PROVISION FOR SMALL QUANTITIES OF UNCONTAMINATED EXCAVATED SOIL MATERIALS AS WELL OF VERGE TRIMMING MATERIAL FROM ROADS EXHIBITING LOW TRAFFIC VOLUMES

Under the following conditions, no chemical analysis is necessary for the basic characterisation of small quantities of excavated soil material (including waterbody sediments and material from natural land movements):

- On an excavation site or on a construction site, an overall maximum of 2,000 tonnes (corresponds to approximately 1,100 m^3) of excavated soil material is produced as waste.
- This is excavated soil material according to the definition of Chapter 7.8. at hand.
- No pollution-related events or commercial (prior) use on the site from which the small quantities are excavated are known of which could indicate possible soil contamination.
- During excavation, no visible impurities was noted.

The recovery of small quantities for recultivation measures or for underground backfillings (Chapter 7.8.1.) as well as for the manufacture of a recycled construction material (according to Chapter 7.8.2.) is restricted as follows as regards installation:

- Installation only for projects, in which up to a total of 2,000 tonnes of excavated soil material are used for underground backfilling or soil recultivation.
- Where local background pollution is known to exist, the material may only be recovered in the same area that exhibits this background pollution.
- Utilisation in or directly above groundwater is not permissible.

If one or several of the conditions for the removal, the material or installation defined herein is/are not fulfilled, the quantity is not deemed as a small quantity for the purposes of this chapter and basic characterisation on the basis of chemical analyses according to Chapter 7.8.5. is required.

For the purpose of documentation of recovery of a small quantity according to this chapter, a document on "Excavation information on small quantities of excavated soil material" is to be drawn up and signed by the waste producer (developer in the case of excavation). The company in charge of the excavation work is obliged to describe the excavated material and certify by signing that no contamination was evident from visual checks during excavation.

This excavation information report is to be submitted to the developer who has commissioned the recovery of the small quantity and is to be kept by the latter for seven years. For standardised excavation information a form is available on the website of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

A separate documentation of installation (installation information document) is not mandatory for small quantities.

Under the following conditions, no chemical analysis is necessary for the basic characterisation of verge trimming material from roads subject to low traffic volumes:

- The verge trimming material comes from road verges without any proportions of asphalt, clinker or other non-soil substances (excluding proportions of grit).
- In the case of recovery for agricultural soil recultivation as per Chapter 7.8.1. the verge trimming material comes from roads with an average daily traffic volume not exceeding 500 (assignment to quality class A1).
- In the case of recovery for non-agricultural soil recultivation as per Chapter 7.8.1. the verge trimming material comes from roads with an average daily traffic volume not exceeding 5,000 (assignment to quality class A2).
- No impurities (in particular with mineral oil, PAH or heavy metals) have been reported, can be assumed or have been perceived by the person trimming or milling the road verge.
- The proportion of littering is below 1 percent per volume.

Compliance with the conditions set out above must be documented accordingly by the waste producer and the documentation must be handed on to the person performing recovery.

7.8.4. CONTAMINATED EXCAVATED MATERIAL

Contaminated excavated material must either be sent directly to landfill (if long-term storage is permitted under the Landfill Ordinance 2008) or subjected to mechanical, physico-chemical or biological treatment.

Treatment can be carried out to improve the quality of the excavated material before landfilling (e.g. biological treatment of hazardous contaminated excavated material) or individual, appropriate fractions can be used to make a recycled construction material, for underground backfilling or non-agricultural soil recultivation.

The mixing ban must be complied with in the course of treatment, and, if need be, the individual input materials must be examined for the parameters respectively determining contamination (also e.g. by way of rapid tests).

The storage and treatment of excavated materials contaminated with (slightly) volatile pollutants must be performed in such a way so as to prevent the release of these pollutants into the environment (e.g. enclosure and exhaust air collection).

Figure 142: Contaminated excavated material

Provisions on biological treatment

Off-site biological treatment of contaminated excavated material must comply with the provisions of Chapter 7.6.

Materials derived from the biological treatment of contaminated excavated material are not permissible for underground backfilling or recultivation measures as per Chapter 7.8.1..

Recovery of fractions of treated excavated materials

The recovery of fractions from the treatment of contaminated excavated material (excluding from biological treatment) is permissible for underground backfilling or non-agricultural soil recultivation (respectively according to the provisions of Chapter 7.8.1.) or for the production of recycled construction materials as per Chapter 7.8.2. after the relevant impurities have been removed.

Material from biological treatment is only permissible for the production of recycled construction materials as per Chapter 7.8.2..

These materials must not be used for agricultural soil recultivation measures or underground backfilling (also as recycled construction material) in or directly above the groundwater.

The following conditions must be met for recovery:

- The selected treatment method as well as the technical equipment of the treatment plant must be verifiably suitable for removing most of the impurities or for separating most of the contaminated and uncontaminated fractions from one another.
- After treatment, the fractions to be recovered must be subject to basic characterisation as per Chapter 7.8.5 and be assigned to one of the quality classes A2, BA or IN, provided that all limit values have been complied with.

7.8.5. BASIC CHARACTERISATION OF EXCAVATED MATERIAL

If excavated material is to be recovered, it must be subjected to basic characterisation including chemical analysis by an external authorised expert or institute authorised for performing basic characterisations as per the 2008 Landfill Ordinance (excluding special provision for small quantities of uncontaminated excavated soil material and verge trimming material from roads exhibiting low traffic volumes as per Chapter 7.8.3.).

Basic characterisation of excavated material must be done in line with the provisions of the Landfill Ordinance 2008; while the relevant provisions of Annex 4 of the Landfill Ordinance 2008 apply to the analysis methods. The basic characterisation of verge trimming material from roads with a traffic volume exceeding an average daily traffic volume of 10,000 for non-agricultural recultivation as per Chapter 7.8.1. must be performed exclusively as other one-off waste (maximum assessment benchmark: 200 tonnes).

If uncontaminated excavated soil material that has already been subjected to basic characterisation is treated e.g. for technical reasons (e.g. sifting for the purpose of achieving certain grain fractions), the individual fractions can be assigned to the quality class of the input material, provided that a concentration of pollutants in a sub-fraction is not to be expected and no other waste or materials have been admixed.

If basic characterisation is only done on the finished recycled construction material as per Chapter 7.8.2., the standard quality assurance procedure for recycled construction materials as per Annex 3 of the Recycled Construction Materials Ordinance can be used with the parameters, limit values and quality classes set out in Chapter 7.8.6..

Technical fill material (with a layer thickness of 20 cm and above) and excavated soil material from a construction site are in principle to be characterised and assessed separately. With a layer thickness of less than 20 cm of technical fill material, this can be analysed and assessed with the excavated soil material.

Scope of parameters

For an initial investigation, an "Initial soil analysis" must be carried out, i.e. all the parameters in Tables 80 and 81 (see Chapter 7.8.6.) from the respective field samples must be tested. For recovery of recycled construction material as per chapter 7.8.2., for bound applications, all parameters for inert waste landfills can alternatively be analysed.

For classification under quality class A2-G the eluate parameters of Table 82 (Chapter 7.8.6) must also be analysed.

For assignment to quality class A1 (or BA) in the case of recovery as an agricultural recultivation layer, the total content of the parameters arsenic through zinc (see Table 80, Chapter 7.8.6.) in the fine fraction < 2 mm (plant-available) must be tested in each field sample taken during the initial investigation.

If pollution or increased contamination is suspected, which is not covered by the scope of parameters indicated here (e.g. PCBs, dioxins or pesticides), these parameters should also be examined and assessed with a view to the specific recovery. Further testing (e.g. ecotoxicological testing) may also be needed to assess the expediency of recovery.

Compliance with limit values or specific values and assignment to quality classes

According to the requirements of the respective examination system, compliance with all limit values of one of the following quality classes must be assessed, and the examined mass of waste must be assigned to the corresponding quality class, provided that all limit values have been complied with:

- Quality class A1 (agricultural soil recultivation) – Tables 80 and 81 of Chapter 7.8.6.
- Quality class A2 (underground backfilling) – Tables 80 and 81 of Chapter 7.8.6.
- Quality class A2-G (underground backfilling in and directly above groundwater) – Tables 80, 81 and 82 of Chapter 7.8.6.
- Quality class BA (excavated soil material with background contamination) – Tables 80 and 81 of Chapter 7.8.6.
- Quality class IN (inert waste quality for recycled construction materials for bound application) – Tables 3 and 4, Annex 1, Landfill Ordinance 2008

If increased limit values are to be taken into account due to geogenic background contamination, the authorised expert or agency must justify this and confirm that there is geogenic background contamination.

Specific values of Tables 80 and 81 under Chapter 7.8.6. must in principle be complied with to ensure the relevant soil functions. In the case of deviations from the specific values, the external authorised expert or institute – or an official expert for official procedures – must assess whether the relevant soil functions are still ensured as regards concrete recovery measures.

Documentation of basic characterisation

Basic characterisation must be documented in an assessment report. The relevant provisions on analysis models as per the Landfill Ordinance 2008 apply..

Backup samples

Backup samples (at least 1 kg) from all qualified samples taken must be kept for at least one year following the issue of the respective assessment report.

Basic characterisation of materials from natural land movements

For the basic characterisation of excavated groundwater sediment (stream and river sediment, sediment from bodies of standing water) and material from natural land movements (debris, rock slide material or mudflow debris), a confirmation by an external authorised expert or institute that anthropogenic contamination due to the origin of the material and visual assessment can be excluded or is unknown, is sufficient. In this case, the material should be classified under quality class BA or IN.

If the material is classified under another quality class (A1, A2 or A2-G), basic characterisation based on chemical analysis as per this chapter must be carried out and the examination model, the number of samples and the parameters to be examined can be individually determined in consulatation with the competent waste authority.

Basic characterisation of raw materials for industrial applications

For individual applications, the relevant technical requirements for the material or environmental requirements for possible pollutants in respect of concrete recovery must be determined. As the requirements of the consuming industry in raw materials for the same product can differ significantly from one operation to another, the framework conditions must generally be clarified with potential subsequent consumers in respect of the quality criteria to be imposed in advance of the recovery measure.

Additional provisions for basic characterisation of fractions from treatment of contaminated excavated material

Fractions from mechanical, physico-chemical or biological treatment of contaminated excavated material must be subjected to basic characterisation for recovery as other one-off or recurrent waste in line with the provisions of the Landfill Ordinance 2008.

The parameters for complete analysis as per the Landfill Ordinance 2008, qualify as the parameters for initial investigation. All input material parameters describing contamination must be determined as parameters relevant to limit values and chemically analysed in all partial amounts in line with the respective investigation model, regardless of the results of the first complete analysis. For parameters describing contamination that are not limited for inert waste landfills, recoverability must be assessed using other limit values.

If the contaminated excavated material has been exclusively contaminated with mineral construction and demolition waste before treatment and if the major part of such has been removed in the course of treatment, the parameter scope "Initial soil analysis" with an assessment benchmark of 500 tonnes is sufficient for the basic characterisation as other one-off waste.

Fractions from treatment of contaminated excavated material may only be classified in quality classes A2, BA or IN – provided the corresponding limit values are complied with.

7.8.6. PARAMETERS, LIMIT VALUES AND SPECIFIC VALUES FOR THE INDIVIDUAL QUALITY CLASSES

Table 80: Initial soil analysis – Total contents

Parameters [mg/kg DM]	Quality class A1	Quality class A2-G	Quality class A2	Quality class BA
Arsenic (as As)	20[5]	30	30	50/200[5,6]
Lead (as Pb)	100[5]	100	150	150/500[5,6]
Cadmium (as Cd)	0.5[1,5]	1.1	1.1	2/4[5,6]
Chromium, total (as Cr)	90[5]	90	90	300/500[5,6]
Cobalt (as Co)	50[5]	30	50	50[5]
Copper (as Cu)	60[5]	60	90	100/500[5,6]
Nickel (as Ni)	60[5]	55	60	100/500[5,6]
Mercury (as Hg)	0.5[5]	0.7	0.7	1/2[5,6]
Zinc (as Zn)	150[5]	300	450	500/1,000[5,6]
BTEX[8]	0.5	1	1	1
HC index	50/100/200[2,4]	20[7]	50/100/200[2]	50/100/200[2,4]
PAH (16 compounds)	2	2	4	4
PAH (Benz[a]pyrene)	0.2	0.2	0.2	0.4
PCB (7 compounds)[8]	0.1	0.1	0.1	1
TOC (as C)	-[3]	5,000[7]	10,000[3]	10,000[3,4]

[1] *1 mg/kg DM at a pH value ≥ 6; pH value according to ÖNORM L 1083*

[2] *50 mg/kg DM for excavated soil and material with TOC ≤ 5,000mg/kg DM*

100mg/kg DM for excavated soil and material with TOC > 5,000 mg/kg DM and ≤ 20,000mg/kg DM

200mg/kg DM for excavated soil and material with TOC > 20,000mg/kg DM

[3] *The specific values of the recultivation guidelines apply to the production of recultivation layers where these relate to installation.*

[4] *Exceptions may be permitted for excavated soil containing humus and peat in individual cases in consultation with the authorities.*

[5] *Each field sample must also be analysed for pollution in the fraction < 2mm if the material is to be recovered in the form of a recultivation layer for agricultural purposes (class A1) or as a recultivation layer for agricultural purposes in areas with a similar pollution profile (class BA).*

[6] *If the content of a pollutant in excavated soil material is due to geogenic factors, the limit value may be exceeded up to the higher indicated limit value.*

[7] *In individual cases, a total TOC content of up to 10,000 mg/kg DM may be determined in consultation with the authority. In this case, the limit value for the HC index is 100 mg/kg DM.*

[8] *Only investigat in the event of suspicion*

Table 81: Initial soil analysis – Contents in eluate

Parameters [mg/kg DM]	Quality class A1	Quality class A2-G	Quality class A2	Quality class BA
pH-value[5]	-[4]	6.5-9.5	Specific value: 4.5-9.5[4]	Specific value: 4.5-9.5[4]
Electrical conductivity [5] [mS/m]	50	50	50	150
Evaporation residue	-[1]	5,000	-[1]	-[1]
Aluminium (as Al)	-[1]	-[1]	-[1]	-[1]
Antimony (as Sb)	-[1]	0.06	-[1]	-[1]
Arsenic (as As)	0.3	0.1	0.3	0.5
Barium (as Ba)	10	5	10	10
Lead (as Pb)	0.3	0.1	0.3	0.5
Cadmium (as Cd)	0.03	0.03	0.03	0.05
Chromium, total (as Cr)	0.3	0.3	0.3	0.5
Cobalt (as Co)	1	0.1	1	1
Iron (as Fe)	-[1]	-[1]	-[1]	-[1]
Copper (as Cu)	0.6	0.6	0.6	2
Molybdenum (as Mo)	0.5	0.35	0.5	0.5
Nickel (as Ni)	0.4	0.2	0.4	0.4
Mercury (as Hg)	0.01	0.01	0.01	0.01
Selenium (as Se)	0.1	0.1	0.1	0.1
Silver (as Ag)	0.2	0.2	0.2	0.2
Zinc (as Zn)	4	4	4	4
Tin (as Sn)	2	0.5	2	2
Ammonium (as N)	8	3.5[6]	8	8[3]
Cyanide - easily releasable (as CN)	0.2	0.1	0.2	0.2
Fluoride (as F)	20	15	20	20
Nitrate (as N)	100	70	100	100
Nitrite (as N)	2	0.5[6]	2	2[3]
Phosphate (as P)	5	1[6]	5	5[3]
Sulphate (as SO_4)	2,500	1,500	2,500	2,500[7]
AOX (as Cl)	0.3[2]	0.3[2]	0.3[2]	0.3[2]
HC index	5	1	5	5
Phenol index	-[1]	0.05	-[1]	-[1]
aAnion-active tensides (as MBAS)[8]	1	1	1	1
TOC (as C)	-[1]	100	100[9]	100[9]

[1] The value must be determined and indicated in the analysis report.

[2] Is also deemed as compliant if the EOX parameter is no higher than 0.3 mg/kg DM.

[3] A threefold limit value can be determined in consultation with the authority.

[4] The relevant measurement methods and figures from the recultivation guidelines on the pH value apply.

[5] Where excavated material is landfilled, the limit values for the pH value and electrical conductivity, as published in Annex 1 of the Landfill Ordinance of 2008, apply.

[6] In consultation with the authority, a limit value of up to 8 mg/kg for ammonium, up to 2 mg/kg for nitrite and up to 5 mg/kg for phosphate may be determined in individual cases.

[7] Exceptions may be applied for excavated soil containing gypsum in individual cases in consultation with the authorities.

[8] Only investigate in the event of suspicion

[9] Limit value does not apply for soil recultvation material

Figure 143: Excavated materials

Table 82: Addendum for Class A2-G (recovery in and immediately above the ground water level) – Contens in eluate

Parameters [mg/kg DM]	Quality class A2-G
Beryllium (as Be)	0.05
Boron (as B)	5
Manganese (as Mn)	0.5
Thallium (as Tl)	0.1
Vanadium (as V)	0.5
Chromium VI (as Cr)	0.2
Chloride (as Cl)	1,000
Cyanide, total (as CN)	0.1

Figure 144: Excavation works

7.9. SOILS FROM WASTE

Synthetic soils are mixtures produced using specific formulations from specific waste or materials from which soil-like or mineral-organic materials are derived using the following biological processes ("humification") which correspond to naturally occurring soil or substrate in the key features and can take over relevant soil functions (in particular habitat, filter, buffer and transformer functions).

Quality requirements for input materials

Synthetic soils may only be produced from waste or materials according to Table 83.

Table 83: Input materials for producing synthetic soils

Classification/waste designation	Restrictions/scope of application
SN 31306 Wood ash, straw ash	Only quality class A or B material as per the plant ash guideline, no fine fly ash (SN 31306 74) or hazardous wood ash (SN 31306 77)
SN 31306 70 Wood ash, straw ash/grate ash	Only quality class A or B material as per the plant ash guideline, no fine fly ash (SN 31306 74) or hazardous wood ash (SN 31306 77)
SN 31306 72 Wood ash, straw ash/fly ash	Only quality class A or B material as per the plant ash guideline, no fine fly ash (SN 31306 74) or hazardous wood ash (SN 31306 77)
SN 31411 29 Excavated soil material with background load	Only permissible for the production of synthetic soils for recultivation on landfills in consultation with the waste authority responsible for the landfill
SN 31411 30 Excavated soil quality A1	Suitable for producing earth for soil recultivation of agricultural areas
SN 31411 31 Excavated soil quality A2	Suitable for producing earth for underground backfilling and for soil recultivation of non-agricultural areas
SN 31411 32 Excavated soil quality A2-G	Suitable for producing earth for underground backfilling and for soil recultivation of non-agricultural areas
SN 31411 33 Only verge trimming material from road maintenance	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 31418 Rock dust, polishing dust	Restricted to basalt, diabase and lava rock and meal thereof; permissible area of application dependent on quality (A1, A2, A2-G)
SN 31485 Garden and flower soil	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 31604 Clay suspensions	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 31625 Soil sludge, sand sludge, diaphragm wall excavation	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 31635 Soil from beet	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 94101 Sedimentation sludge	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 99102 Peat sludge and healing earth	Permissible area of application dependent on quality (A1, A2, A2-G)
SN 92303 Plant ash	Only quality class A or B material as per the plant ash guideline, no fine fly ash
SN 92303 71 Plant ash/grate ash	Only quality class A or B material as per the plant ash guideline, no fine fly ash
SN 92303 73 Plant ash/fly ash	Only quality class A or B material as per the plant ash guideline, no fine fly ash
Quality compost A+ as per Compost Ordinance	Suitable for producing earth for soil recultivation of agricultural areas
Quality compost A as per Compost Ordinance	Suitable for producing earth for soil recultivation of agricultural areas
Quality compost B as per Compost Ordinance	Suitable for producing earth for soil recultivation of non-agricultural areas

In addition to the materials defined above, organic materials as per Tables 1 and 2, Appendix 1 of the Compost Ordinance can be used with the quality requirements for input materials defined therein.

To prevent the dilution of pollutants by mixtures, only materials that have undergone quality assurance or have already been classified into a specific, suitable quality class may be used to produce synthetic soils. In this regard, the following shall apply:

- For excavated soil material or soil components, basic characterisation must be carried out as per Chapter 7.8.5. by an external authorised expert or institute and classification must be possible into quality class A1, A2 or A2-G as per Chapter 7.8.6..
- Quality compost must have been classified by quality assurance as per the Compost Ordinance into class A+, A or B.
- Plant ash must have been quality-assured in line with the "Guideline for proper use of plant ash for utilisation on agricultural and forestry areas" of the Expert Committee for Soil Fertility and Protection and must comply with quality A or B as per this guideline.

Requirements for the synthetic soil manufacturing process

Other input materials must undergo input control with at least all assessment reports relating to basic characterisation checked for completeness and plausibility and the materials delivered checked for compliance with the information in the corresponding assessment report and inspected visually for contamination.

Materials may also be accepted without an assessment report but only if subjected to basic characterisation by an external authorised expert or institute as per the provisions of Chapter 7.8.6. before the production process and where they comply with quality class A1, A2 or A2-G.

Synthetic soil must be produced according to approved formulae adapted to each individual area of application and in accordance with the latest technology. The relevant soil functions are to be given special attention in the process. The input of wood ash or plant ash may not exceed 2% of the volume.

The principles and requirements of a quality assurance system for the production of earth from waste are described in ÖNORM S 2122-4 "Earth from waste, Part 4: Requirements of a quality assurance system for the production of earth from waste", issued on 1 August 2013.

Depending on the quality of the input materials, the finished synthetic soil should be assigned according to Table 84.

Table 84: Classification to waste types for synthetic soils

Code numbers (SN)	Demonstrable quality of input materials
SN 31472 Arable earth, type E2, class A1	Excavated soil material and soil components: Quality class A1 Quality compost: Class A+ or A Plant ash: Quality class A as per the Plant Ash Guideline
SN 31473 Arable earth, type E2, class A2	Excavated soil material and soil components: Quality class A1, A2 or A2-G Quality compost: Class A+, A or B Plant ash: Quality class A or B as per the Plant Ash Guideline
SN 31474 Arable earth, type E3, class A1	Excavated soil material and soil components: Quality class A1 Quality compost: Class A+ or A Plant ash: Quality class A as per the plant ash guideline
SN 31475 Arable earth, type E3, class A2	Excavated soil material and soil components: Quality class A1, A2 or A2-G Quality compost: Class A+, A or B Plant ash: Quality class A or B as per the plant ash Guideline

Classification of the waste types under Code Numbers 31411 29-32 is not permissible as this is not naturally produced soil.

Areas of application for synthetic soils

Synthetic soils can be used for soil recultivation provided the provisions of Chapter 7.8.1. are complied with. Underground backfilling with synthetic soils is not permissible.

7.10. RESIDUES FROM WASTE INCINERATION PLANTS

Residues from waste incineration plants are understood for the purpose of this treatment principle to be grate[13], bottom and pre-separator ash[14] as well as combustion bed ash from fluidised-bed incineration plants.

Generally, these residues are sent to landfill, where iron and non-iron metals are separated for recovery in line with the state of the art. For the further recovery of recyclables, the separation of glass from residues discharged in dry state is strived for in addition.

Permissible use as base layer

Where the following specifications are met, residue from waste incineration plants may be used in unbound base layers or base layers stabilised with binders, both of which must feature a low-seepage capping (hydraulic or bituminous stabilisation).

A road base is defined as a pressure-distributing layer constructed in various ways, located between the substructure or subsoil and the road surface.

Grate ash from waste incineration plants and bed ash from fluidised-bed incineration plants which are subjected to a permissible use in unbound road base or road base stabilised with binders has to undergo a metal separation process; the upper limit for ferrous metal portions is 1 % DM (portion of the magnetisable metallic components in dry matter) and 0.8 % DM for non-ferrous metal (portion of the non-magnetisable metallic components in dry matter).

Moreover, the limit values in the table below must be observed when residues from waste incineration plants are used in unbound road base and road base stabilised with binders.

Table 85: Requirements for residues from waste incineration plants when used in base layers

Parameter	Unit	Limit valuet
Total content		
Pb	mg/kg DM	900
Cd	mg/kg DM	10
Cr	mg/kg DM	800
Ni	mg/kg DM	300
TOC	% DM	1
Content in eluate		
pH value		maximal 12.0
Sb	mg/kg DM	0.3
As	mg/kg DM	0.5
Pb	mg/kg DM	0.5
Cr_{total}	mg/kg DM	0.5
Cu	mg/kg DM	4
Mo	mg/kg DM	1
Ni	mg/kg DM	0.4
Chloride (as Cl)	mg/kg DM	3,000
Sulphate (as SO_4)	mg/kg DM	5,000

Electrical conductivity is to be determined and the result documented in the records.

13 This includes grate ash from both wet and dry discharge. In accordance with current parlance, slag from waste incineration plants (grate firing plants) is also included.

14 Pre-separators are, for example, cyclones and deflectors form fabric filters and electrostatic precipitators.

An analysis of the metal portions, total content and content in the eluate must be carried out in accordance with the specifications below.

Please refer to the following technical regulations concerning the technical eligibility of material for use in unbound roadbase and roadbase stabilised with binders:

- RVS 01.02.11 Civil Engineering
- RVS 08.15.01 Unbound Roadbases
- RVS 08.17.01 Roadbases stabilised with binders.

Use of residues from waste incineration plants is prohibited in the following areas:

- in conservation and protected areas as defined in Article 34, Article 35 and Article 37 of the Water Act of 1959
- below the highest groundwater level (HGL) plus 2.0 m
- within the bounds of discharge of a 30-year flood (Article 38 of the Water Act of 1959).

Where necessary, ecotoxicological testing should be carried out to determine whether the hazard-relevant property "ecotoxic" (criterion HP14) exists in accordance with Appendix 3 of the List of Waste Ordinance and e.g. CEN/TR 16110 "Characterization of waste – Guidance on the use of ecotoxicity tests applied to waste".

To serve as proof of compliance with the relevant provisions, the records must include sufficient information on the quantity, quality and technical suitability of the residues from waste incineration plants used. The site at which the material is used must also be recorded.

Please note the documenting and reporting duties – particularly where they apply to users as per the Ordinance on Waste Balance Sheets, Federal Law Gazette II No 497/2008, as amended.

Figure 145: Certain qualities of incineration residues can be recovered.

Specifications for sampling plans, the taking of samples and the implementation of inspections

Metal fractions are to be determined in accordance with Table 86.

Table 86: Determining metal portions

1 Production of a weekly composite sample from at least 10 random samples. The minimum sample size of the weekly composite sample is determined depending on the upper sieve size of the grain group:

Upper sieve size[1]	Minimum sample size
≤ 8 mm	10 kg as well as an additional 6 kg for water content
≤ 15 mm	25 kg as well as an additional 6 kg for water content
≤ 20 mm	40 kg
≤ 30 mm	70 kg
≤ 40 mm	140 kg
≤ 50 mm	230 kg
≤ 60 mm	380 kg
> 60 mm	To be determined in individual cases, at least 380 kg

[1] On this, see ÖNORM EN 13242, "Aggregates for unbound and hydraulically bound mixtures for engineering and road construction", issued on 15 February 2014

2 To analyse the water content, the sample must be dried at a temperature of 105 °C until constant weight in one sample equivalent is reached. The remainder of the weekly composite sample must be weighed.

3 Screening at 8 mm; for grain size groups with an upper screen size ≤ 10 mm, screening is not obligatory (in this case, go directly to step 6); for grain size groups with a lower screen size ≥ 8 mm, screening is optional (in this case, this should be documented on graph paper showing that there are only small amounts < 8 mm).

NB: A vibrating roller may be used before screening to separate mineral adhesions on the metal portions.

4 Coarse aggregate (> 8 mm) is weighed and metals sorted out by hand.

5 The metals are separated into one magnetic and one non-magnetic portion using a hand magnet and are subsequently weighed The permanent magnet should be placed at a distance of 1 to 1.5 cm from the sample.

6 The fines (< 8 mm) are reduced to approximately 10 kg using a sample splitter. The reduced sample is then weighed.

7 Screening at 4 mm.

8 The fines (< 4 mm) are discarded; metals without adhesions or organic portions are sorted out by hand from the coarse aggregate; residual material is left in the laboratory jaw crusher (2 – 3 mm clearance). Steps 7 and 8 must be repeated at least once.

NB: Optionally, the use of a laboratory jaw crusher may be dispensed with for bed ash from fluidised bed-incineration plants. In this case, it must be resorted using a permanent magnet (flux density = 1.35 Tesla (grade N45), minimum volume 70 cm³, distance from sample = 5 – 6 cm).

After this, go to step 11.

9 Screening at 4mm.

10 The fines (< 4 mm) are discarded; from the coarse aggregate, metals without adhesions are sorted out by hand.

11 The metals are separated into one magnetic and one non-magnetic portion using a hand magnet and are subsequently weighed The permanent magnet should be placed at a distance of 1 to 1.5 cm from the sample.

2 Calculation of ferrous metal fraction (magnetisable fraction) according to the following formula:

$$Share\ Fe\ in\ \%\ DM = \frac{M_{Fe>8} + \frac{M_{WMP,f} - M_{8/x}}{M_{0/8}} \cdot M_{Fe\,4/8}}{M_{WMP,tr}} \cdot 100$$

$M_{Fe>8}$ … Mass of ferrous metals from the coarse aggregate (> 8 mm), see step 5
$M_{WMP,f}$ … Mass of wet weekly composite sample, see step 2
$M_{8/x}$ … Mass of fraction > 8 mm after screening at 8mm, see step 3
$M_{0/8}$ … Mass of sample reduced using the sample splitter, see step 6
$M_{Fe\,4/8}$ … Mass of ferrous metals in the fraction 4/8, see step 11
$M_{WMP,tr}$ … Mass of dry weekly composite sample, see step 2

13 Calculation of non-ferrous metal fraction (non-magnetisable fraction) according to the following formula:

$$Share\ NE\ in\ \%\ DM = \frac{M_{NE>8} + \frac{M_{WMP,f} - M_{8/x}}{M_{0/8}} \cdot M_{NE\,4/8}}{M_{WMP,tr}} \cdot 100$$

$M_{NF>8}$ … Mass of non-ferrous metals from the coarse aggregate (> 8 mm), see step 5
$M_{WMP,f}$ … Mass of wet weekly composite sample, see step 2
$M_{8/x}$ … Mass of fraction > 8 mm after screening at 8 mm, see step 3
$M_{0/8}$ … Mass of sample reduced using the sample splitter, see step 6
$M_{NE\,4/8}$ … Mass of non-ferrous metals in the fraction 4/8, see step 11
$M_{WMP,tr}$ … Mass of dry weekly composite sample, see step 2

The following figure shows the individual steps for determining metal portions.

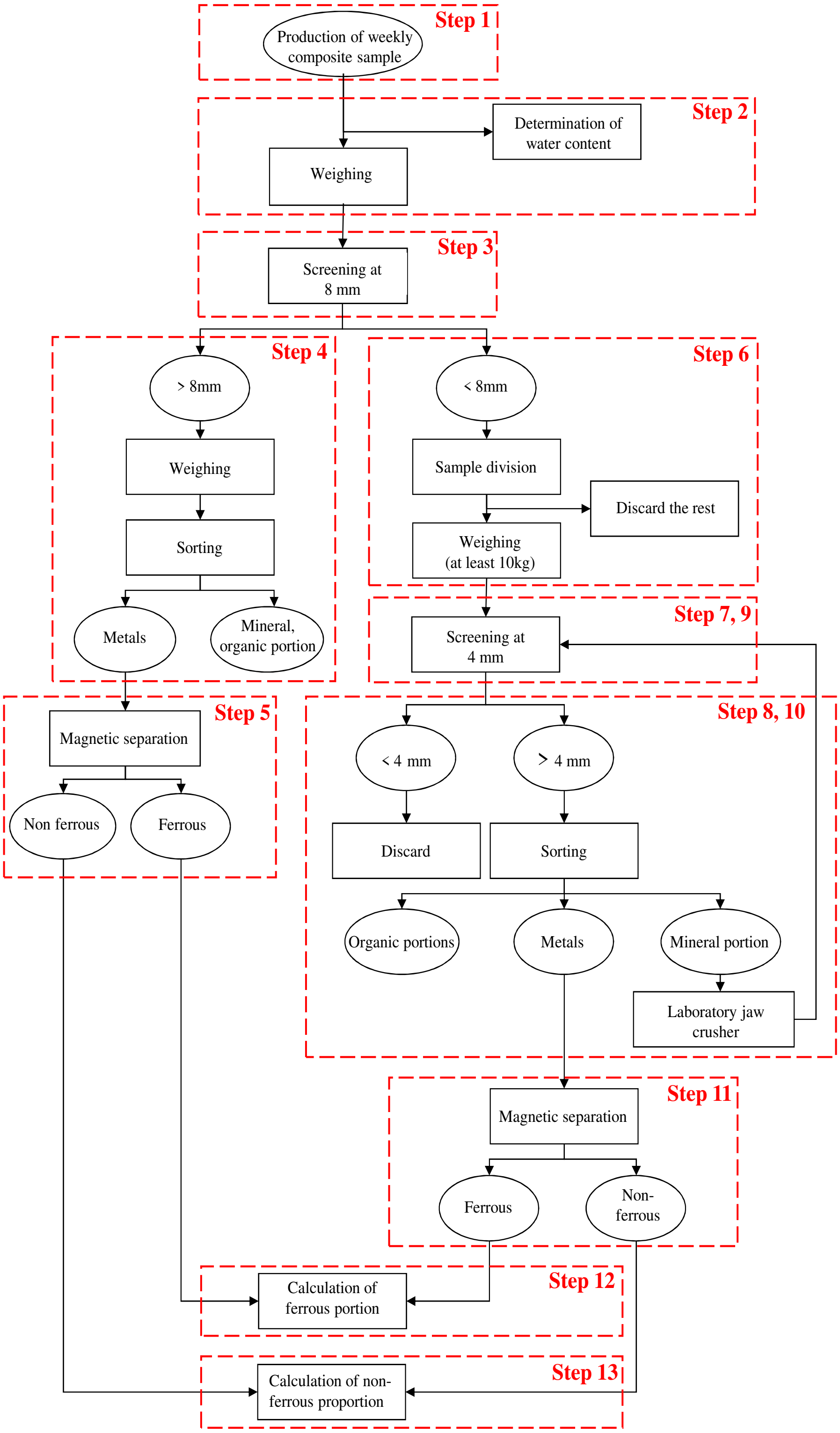

Figure 146: Graphical presentation of the individual steps for determining metal portions

Determination of the metal fractions is to be carried out at least once a quarter during normal treatment plant operations using two weekly composite samples produced in parallel.

During sorting, the sample grain must be singled out on the sorting table and in good lighting conditions. Mineral caking on metal parts can be removed with a hammer. Where necessary, metals can be identified by filing or with the help of cutting pliers. Depending on the water content in the residues, a dust mask must be worn while sorting. Sorting must be carried out in dry weather conditions or under cover.

Determination of total content and contents in eluate

Planning and sampling are to be carried out in accordance with the requirements of the Landfill Ordinance 2008.

Analysis samples (test quantities) are to be produced from the laboratory sample essentially in accordance with ÖNORM EN 15002 "Characterisation of waste – production of test quantities from laboratory samples", issued on 1 July 2015.

In order to determine the content in the solid material, acid hydrolysis is to be carried out in accordance with ÖNORM EN 13657 "Characterisation of waste – Hydrolysis for final determination of fractions of elements in waste that are soluble in aqua regia", issued on 1 December 2002.

Elution is to be conducted in accordance with

- ÖNORM EN 12457-4 "Characterisation of waste – Leaching – Compliance testing for the leaching of grainy waste and sludge – Part 4: Single-level vibration process with a fluid/solid ratio of 10 l/kg for materials with a grain size of less than 10 mm (with or without grain size reduction)", issued on 1 January 2003.

Crushing is to be carried out if this is necessary for sampling or carrying out an analysis or the grain size of the waste is over 10mm. The waste may not be ground. The fine grain accumulating during crushing is to be mixed into the sample.

The following determination methods are to be applied:

- ÖNORM EN 14346 "Characterisation of waste – Calculation of the dry mass by determining the dry residue and water content", issued on 1 March 2007,
- ÖNORM EN 16192 "Characterisation of waste – Analysis of eluate", issued on 1 February 2012 and
- ÖNORM EN 13137 "Characterisation of waste – Determination of total organic carbon (TOC) in waste, sludges and sediments", issued on 1 December 2001.

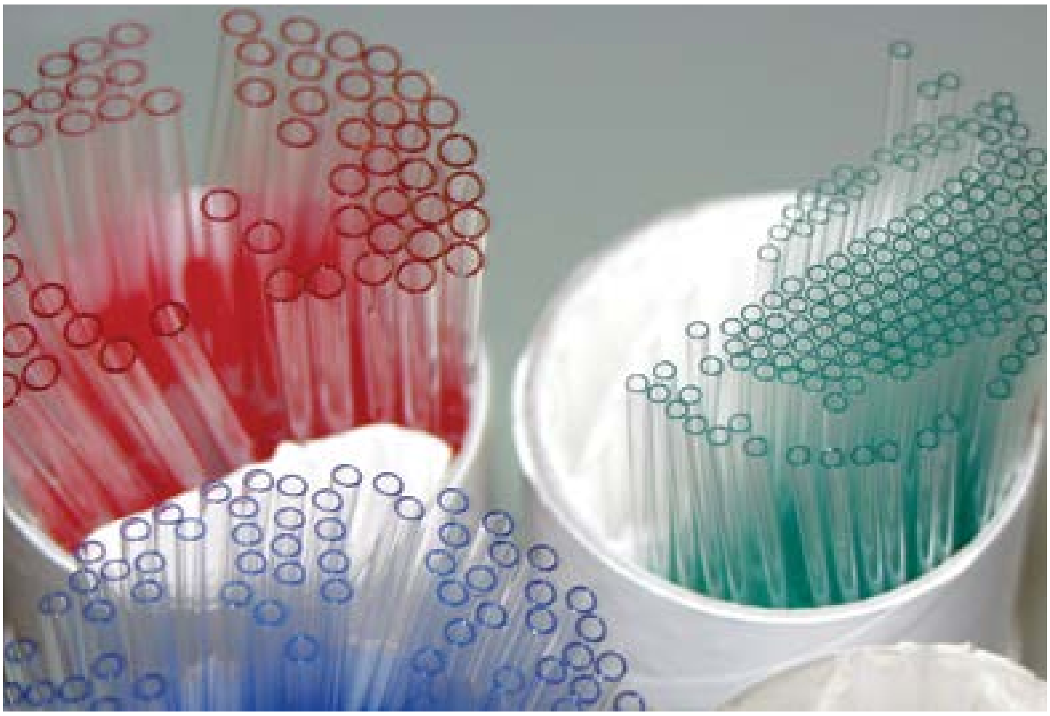

Figure 147: Examination of waste for determining adequate waste treatment

7.11. NON-MINING WASTE – RECOVERY IN UNDERGROUND BACKFILLING

This chapter contains a description of the latest recovery technology in non-mining waste in the backfilling of underground mines, i.e. waste that is not considered to be mining waste in accordance with Article 3(1)(3) of the Waste Management Act 2002. The latest technology is assumed to mean that adverse effects on protected resources (the public interest as per Article 1(3) of the Waste Management Act 2002) are prevented. The following conditions must be met for backfilling to be permitted (see Article 15(4a) of the Waste Management Act 2002):

- Backfilling measures need to be carried out and consequently waste is a substitute for other materials.
- The waste is suitable for the envisaged purpose and is environmentally compatible.
- The measure is line with the law.

This excludes waste that cannot be deposited in underground landfills in accordance with Annex 6 Point 2.1 of the Landfill Ordinance 2008.

Each of the criteria indicated below must be checked in individual cases and documented.

The main purpose of the backfill measure must relate to mining, in particular for example:

- stabilisation of mine workings
- prevention of subsidence damage above ground
- improvement in deposit recovery
- creation of a working platform in the mining chamber.

The backfilling system is to be planned by defining the specific aims, the action required in order to achieve these aims, the properties of the backfill material and selecting the backfilling method.

The backfilling materials are produced from input materials which can be non-mining or mining waste or mixtures of the two. Where non-mining waste or mixtures thereof are used, all properties of the individual input materials relevant to the backfilling of mines, including the ranges of variation occurring, must be known.

The backfilling material must satisfy the physical properties necessary for the purpose of backfilling (e.g. compressive strength, deformation characteristics) as well as the requirements for environmental compatibility. Environmental compatibility must be assessed on a case by case basis. Evidence of environmental compatibility requires in particular:

- Knowledge of the geogenic background in relation to the planned backfill measure
- Knowledge of the total pollutant content and eluate values of the waste and other backfill products, including the ranges of variation that occur.
- The pollutant content of the backfilling material must not exceed the geogenic background.
- Observance of the ban on diluting and mixing waste, whereby each individual waste from the geogenic background must be considered a reference value for pollutant content. Waste used as a binding agent or to improve substance properties (e.g. to increase fluidity) and that is only present in small proportions in the mixture can be determined separately.
- Assessment of the leachability of the backfilling material taking particular account of the local geochemical conditions.
- Assessment of the long-term behaviour of the backfilling material with regard to possible interactions of the individual source materials and the surrounding environment; e.g. in the case of hydraulic or latent hydraulic binders, tests similar to those in Annex 5 of the Landfill Ordinance 2008, if relevant in each individual case.
- The possible distribution pathways of pollutants into the environment, particularly into the groundwater and surface water, must be identified as far as possible.

A quality assurance system is to be developed taking particular account of the analytical control of non-mining waste, according to which backfilling activities are to be carried out.

7.12. WASTE WOOD

According to Article 3 Subpara 1 of the Recycled Wood Ordinance, waste wood is wood that qualifies as waste under Article 2 of the Waste Management Act 2002.

According to the List of Waste Ordinance, Federal Law Gazette II No 570/2003, as amended, wood waste shall be deemed as waste under code number group 17. Also Annex 9 Chapter 1.1. of the Waste Incineration Ordinance states that wood waste is waste under code number group 17 according to the List of Waste Ordinance, Federal Law Gazette II No 570/2003, as amended.

According to Article 3 Subpara 15 of the Recycled Wood Ordinance, recycled wood is waste wood that is to be used for recycling in the wood products industry and meets the requirements as per Annexes 1 and 2 of this Ordinance. Annex 1 exclusively lists waste types under code number group 17, yet does not list all of them. This means that recycled wood may exclusively encompass waste under code number group 17, and thus represents a partial amount of all types of wood waste.

The interconnection between the individual waste categories of waste wood, wood waste and recycled wood is again depicted in the following graph.

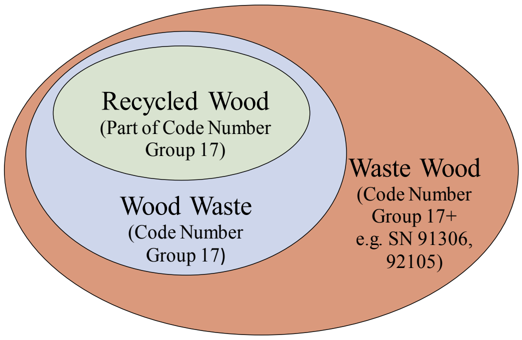

Figure 148: Representation of the interconnection between the terms of waste wood, recycled wood, wood waste

According to the EU law waste hierarchy, recycling plays a major role in waste management. This order of priority must form the basis for the legal provisions and political measures to be employed in the field of waste prevention and waste management. Consequently, waste wood must as a priority be sent for recycling.

The following waste wood fractions are excluded from this as they are not suitable for recycling:

- Windows,
- window frames,
- external doors,
- external door frames,
- waste wood with halogenated organic coatings (e.g. PVC),
- wood impregnated with creosote (e.g. sleepers, stakes, masts),
- impregnated wood (e.g. kyanized wood or wood impregnated with salt),
- other treated waste wood from external areas (e.g. fencing),
- laminate floors,
- wood-based façade (insulation) boards,
- ammunition boxes,
- solid wood cable reels,
- firewood and
- general waste wood that has hazardous properties due to chemical wood treatment as per the List of Waste Ordinance, Federal Law Gazette II No 570/2003, as amended, or treated with particularly hazardous substances or for which similar contamination is suspected due its original purpose.

These waste wood fractions must be separated from other waste, recorded, collected, stored and transported directly where the waste wood was produced.

To guarantee practical implementation that is as straighforward as possible, the drawing-up of a guideline on the sorting of waste wood fractions in waste collection centres and on construction sites is in the pipeline.

The recycling of waste wood in the wood material industry is regulated in the Recycled Wood Ordinance, Federal Law Gazette II No 160/2012.

8
REMEDIATION OF CONFIRMED CONTAMINATED SITES

8. REMEDIATION OF CONFIRMED CONTAMINATED SITES

AUSTRIAN ENVIRONMENTAL POLICY has dealt with the problem posed by contaminated sites from a very early stage and has set up major initiatives for managing this. The output over the last almost thirty years has been considerable and more than holds its own at international level.

The basis for this is the Act on the Remediation of Contaminated Sites (ALSAG), Federal Law Gazette No 299/1989, as amended, which entered into force in 1989. This Act forms the basis for the targeted identification of suspected and confirmed contaminated sites and lays down the framework for the awarding of contracts for securing and remediating contaminated sites and creates the financial basis for funding relevant measures.

The contaminated site model that has been in place in Austria for over 25 years is unique in international terms and well-respected across the world. There is no comparable funding model in the whole of the EU area which channels earmarked funds from waste management exclusively into the remediation of contaminated sites. This has ensured reliable protection for the population and the environment in Austria and mitigation of old environmental transgressions.

8.1. FROM SUSPECTED CONTAMINATED SITE TO CONFIRMED CONTAMINATED SITE

The process of identifying former disposal or industrial sites (suspected contaminated sites) requiring securing action or remediation starts with the Provincial Governor reporting a suspected contaminated site (after collecting the relevant data). This notification must contain certain minimum information. If initial appraisal results in the suspicion of substantial risk, the information is added to the Register of Suspected Contaminated Sites. However, sites are also identified as potentially contaminated if the preconditions set out in Article 2 (11) of the Act on the Remediation of Contaminated Sites apply.

The initial appraisal also determines whether there is need for additional investigations which can be financed through ALSAG funds (commissioned by the Federal Ministry of Agriculture, Forestry, Environment, and Water Management (BMLFUW) through the various federal provinces). If the investigations and the subsequent risk assessment indicate substantial risks to human health or the environment, the suspected contaminated site is registered as a contaminated site requiring securing action and remediation in the Register of Contaminated Sites. A (three-stage) classification of priorities is used to express the degree of risk and the resultant urgency (of funding) for the required remediation.

If the risk assessment indicates no substantial risks, the area is either deleted from the Register of Suspected Contaminated Sites (the data is retained) or remains in the Register as an area under observation (the existing pollutant potential requires observation that can be funded using ALSAG funds).

Remediated or secured suspected contaminated sites or confirmed contaminated sites are deleted from the Register of Suspected Contaminated Sites or listed as remediated or secured in the Register of Contaminated Sites.

Overall, it can be assumed that the level of detection of former disposal or industrial sites is very high (currently 68,588 areas have been detected), of which 1,973 areas are currently registered in the Register of Suspected Contaminated Sites. 2,280 areas were removed from the Register of Suspected Contaminated Sites after risk assessment (as at 1 January 2017).

288 areas have been identified as contaminated sites that need securing or remediation in the Register of Contaminated Sites on the basis of investigations and risk assessments conducted. 152 of these have already been secured or remediated. Securing or clean-up measures are already under way or at the planning stage for a further 65 contaminated sites (as at 1 January 2017).

In addition to the Ordinance on the Register of Contaminated Sites, further information on suspected and confirmed contaminated sites can be found in the Register of Contaminated Sites on the website of the Environment Agency Austria.

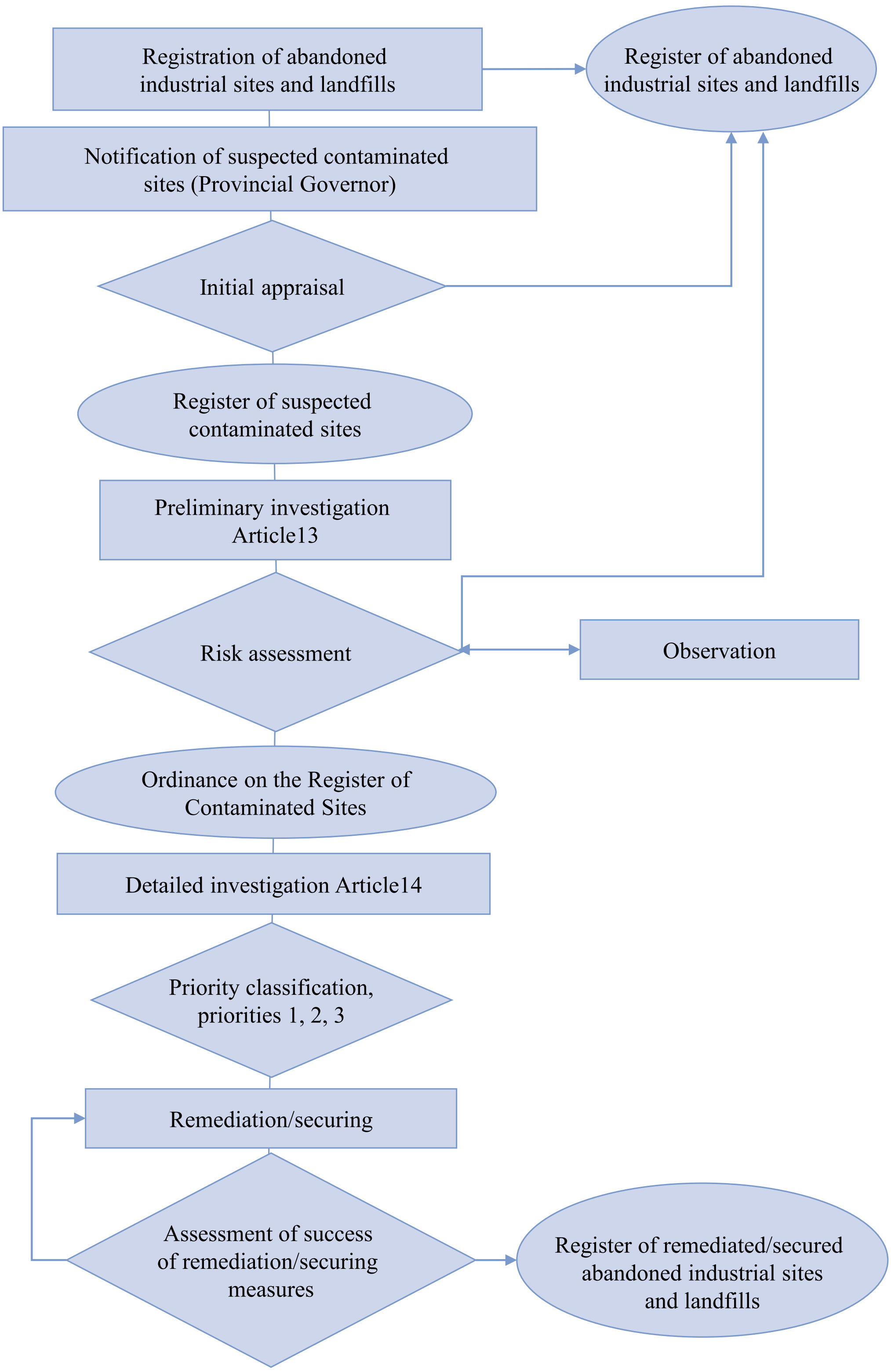

Figure 149: Flow chart for the handling of abandoned landfills and insustrial sites in the course of implementing the Act on the Remediation of Contaminated Sites (Source: EAA (UBA) report on the Register of Suspected Contaminated Sites and the Register of Contaminated Sites (1.1.2016))

8.2. REGISTER OF SUSPECTED CONTAMINATED SITES AND ORDINANCE ON THE ATLAS OF CONTAMINATED SITES

The environmental risk that is assumed or can be assumed in respect of abandoned landfills and industrial sites is assessed by the Environment Agency Austria in the context of enforcing the Act on the Remediation of Contaminated Sites.

Table 87: Austrian track record for the remediation of contaminated sites

Status (1.1.2017)	Sites
Sites registered[1] (project surveys)	33,965
Reports of suspected contaminated sites	34,593
Suspected contaminated sites (register)	1,973
Suspected contaminated sites – remediated	52
Suspected contaminated sites – removed (after risk assessment)	2,280
Observation areas	47
Atlas of Contaminated Sites (Ordinance)	288
Listed as remediated/secured	152
Remediation/securing under way	57
Remediation/securing at the planning stage	9
Deleted sites (no abandoned landfills and industrial sites under the Act on the Remediation of Contaminated Sites)	3,355

[1] *Sites whose relevance in terms of contamination is yet to be assessed*

The systematic registering of former industrial sites was carried out for the entire federal territory and is essentially completed. The systematic registering of former disposal sites can largely be completed over the next few years commensurate with the projects that are currently under way.

Based on previous experience, only a small number of the areas registered (abandoned landfills and industrial sites) will be assessed as suspected contaminated sites and subsequently as confirmed contaminated sites.

Remediation success

By 1 January 2017, a total of 288 sites had been registered as a source of substantial environmental hazard in accordance with the Ordinance on the Atlas of Contaminated Sites and were rated as contaminated sites requiring securing and/or remediation. Of these, 152 have already been secured or remediated. Remediation and clean-up measures are either already under way or at the planning stage for a further 65 contaminated sites.

The above-mentioned data is also published in the annual report of the Environment Agency Austria on "Keeping the Register of Suspected Contaminated Sites and the Register of Contaminated Sites" and can be downloaded from the website.

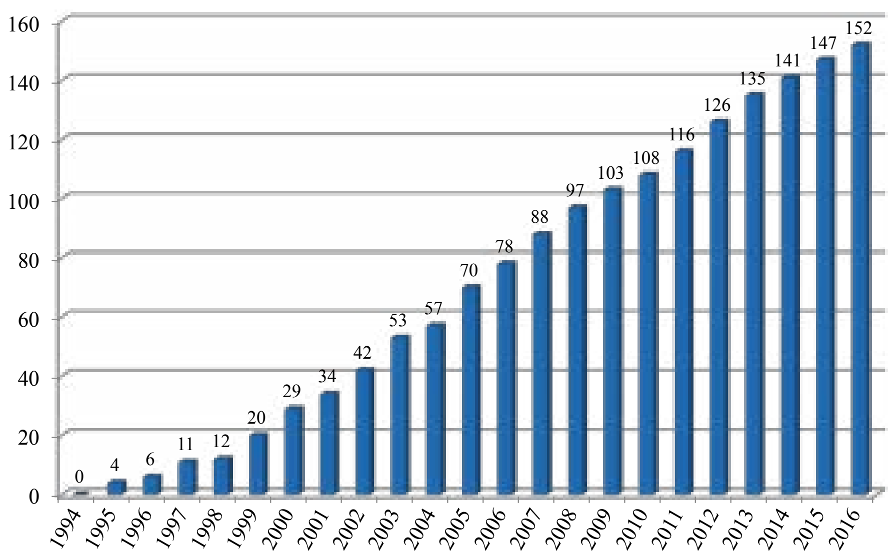

Figure 150: Remediated/secured contaminated sites between 1994 and 2016

8.2.1. CONTAMINATED SITE PORTAL

Content and aims

Since the implementation of the Act on the Remediation of Contaminated Sites (1 September 1989), a wide range of data has been available to the Federal Ministry of Agriculture, Forestry, Environment and Water Management and specialised institutions such as the funding bodies, Kommunalkredit Public Consulting GmbH, Bundesaltlasten-sanierungsgmbH and the Environment Agency Austria . Based on this data, the Federal Ministry of Agriculture, Forestry, Environment and Water Management developed a central information portal on contaminated sites as part of "Contaminated Site Management in Austria" and has made this available to various user groups.

The contaminated site portal is built on the following three core pillars:

- Contaminated Sites GIS
- Contaminated site databases
- Information and knowledge management ("contaminated site web").

With its complex and positive effects on the environment, the "Contaminated Site Management" programme will in future be made even more accessible to all via the contaminated site portal at www.altlasten.gv.at.

8.2.2. CONTAMINATED SITES-GIS

The "Contaminated Sites-GIS" application allows anyone to call up all the contaminated sites in Austria shown in the Ordinance on the Register of Contaminated Sites and identify their precise location using the Federal Ministry of Agriculture, Forestry, Environment and Water Management web map service. This will ensure that secured or remediated contaminated sites can be located. This geographical information system providing details of contaminated sites can be accessed from the Federal Ministry of Agriculture, Forestry, Environment and Water Management website.

Figure 151: Geographical information system providing details of contaminated sites (example)

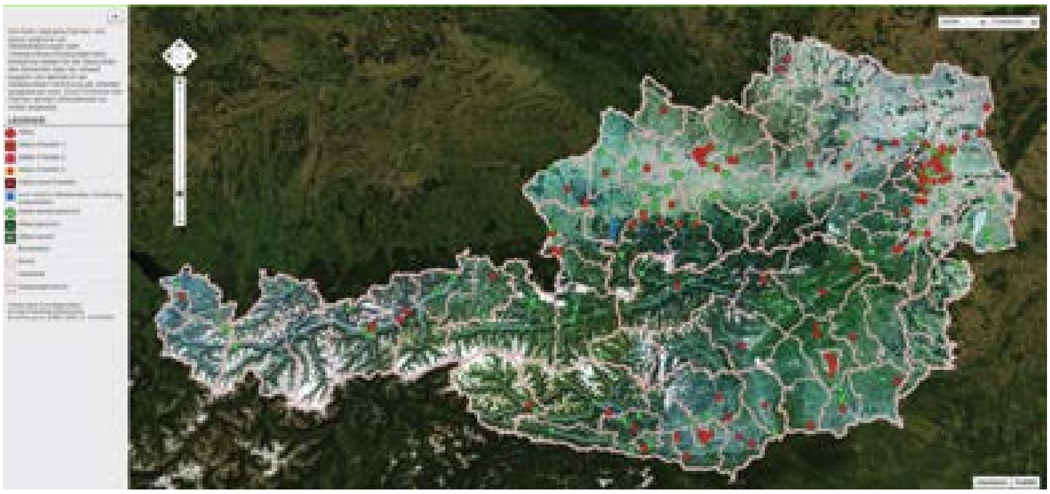

Figure 152: Geographical information system providing details of contaminated sites (screenshot)

8.3. SUPPLEMENTARY INVESTIGATIONS IN SUSPECTED AND CONFIRMED CONTAMINATED SITES

Since the Act on the Remediation of Contaminated Sites has been in force according to Article 13 and Article 14 of ALSAG, 684 supplementary investigations on risk assessment and priority classification have been commissioned.

Of these, currently 245 investigation projects on risk assessment and priority classification are under way (233 in respect of suspected contaminated sites and 12 in respect of confirmed contaminated sites). 439 of the projects commissioned to date have already been completed. The results of these investigations will be used to conduct a risk assessment (suspected contaminated sites) and to elaborate a priority classification (confirmed contaminated sites).

Approximately € 112.34 million has been allocated to date for investigations into suspected contaminated sites and confirmed contaminated sites as well as for studies, where approximately € 62.34 million has already been paid out and approximately € 50 million is tied up in on-going projects (1990–2016).

Table 88: Investigation projects for suspected and confirmed contaminated sites (as at 1.1.2017)

	Investigation projects for suspected contaminated sites		Investigation projects for confirmed contaminated sites	
Federal Province	currently underway	completed	currently underway	completed
Upper Austria	45	103	3	20
Lower Austria	75	128	4	13
Salzburg	23	34	0	0
Styria	24	33	2	8
Carinthia	18	20	0	13
Burgenland	4	14	0	1
Tyrol	9	12	0	6
Vienna	21	16	3	8
Vorarlberg	12	10	0	0
Total	233	370	12	69

Figure 153: Decontamination of underground sites

8.4. CONTAMINATED SITE CONTRIBUTION

Funding for the measures required in order to implement a comprehensive contaminated site management programme in Austria is based on the levying of contributions earmarked for contaminated sites (earmarked primarily for the registering, assessment and remediation of contaminated sites).

The contaminated site contribution introduced with ALSAG in 1989 and levied since 1990, is essentially based on a charge for the landfilling of waste and was developed into an effective steering instrument during the period of adjustment to the state of the art set out in the Austrian Landfill Ordinance (1996–2004 and 2009). (Accordingly, € 87/tonne was payable for the landfilling of untreated waste not compliant with the Landfill Ordinance until full implementation.)

From 2006, an additional contribution was introduced for the incineration of waste or the production of fuel products (retaining the exemption from contributions for incineration residues).

Under the current model, the following contribution rates are set forth:

Landfilling of waste

- € 9.20/tonne on excavated soil, inert waste and construction and demolition waste landfills
- € 20.60/tonne on residual waste landfills
- € 29.80/tonne on mass waste landfills

Incineration of waste, production of fuel products from waste, placing of waste in a furnace

- € 8/tonne

Storage of waste for disposal (> 1 year), for recovery (> 3 years) and backfilling with waste (including backfilling of mines)

- € 9.20/tonne for mineral waste (up to construction and demolition waste quality)
- € 87/tonne for all other waste

Export of waste for the above-mentioned activities.

Basic **exemptions** exist inter alia in the case of

- mining waste
- excavated material for backfilling
- quality-assured recycled construction materials for backfilling in conjunction with a building project
- waste with a high biogenic percentage in accordance with the Austrian Green Electricity Act and (non-hazardous) sewage sludge for incineration and the production of fuel products
- residues (waste) from waste incineration plants (landfill or backfilling of mines)
- steel mill slag (BOS slag, electric furnace slag) stored in landfill in single compartments for subsequent recovery
- recycled construction materials where these are manufactured and used in line with statutory provisions.

The contributions are paid by the respective party quarterly in accordance with a self-assessment.

With the expiry of the last transition periods for adaptation to the state of the art set out in the Landfill Ordinance (end of 2008), revenue from contaminated site contributions has fallen continuously in accordance with expectations (see following graph). If the current contribution system is retained, this would mean an annual revenue of approximately € 50 million (approximately € 97 million was generated in the "best" year, 2003).

There were no (index) adjustments to the contribution amount during the period 2012-2016.

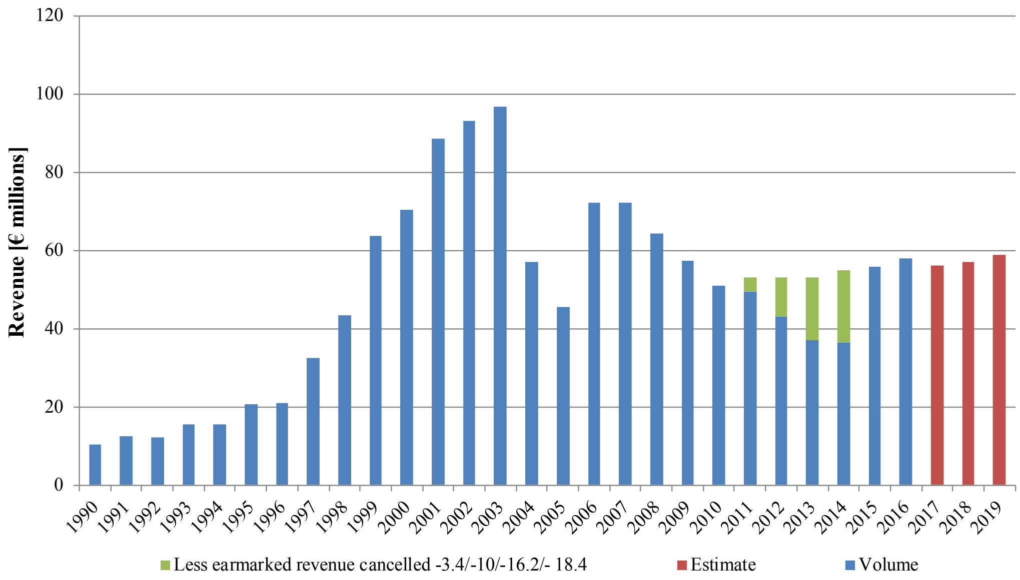

Figure 154: Trends in revenue from contaminated site contributions between 1990 and 2019

Total revenue from contaminated site contributions is approximately € 1.3 billion (1990-2016).

The general context

In order to continue the extremely successful handling over the past 25 years of the problems posed by contaminated sites compared with other countries and to achieve the targets in the "Management of Contaminated Sites" mission statement (registration of historically contaminated sites within a generation; implementation of measures on substantially contaminated sites = contaminated sites within two generations) it would require revenue of at least € 70–100 million per year according to unanimous expert estimates.

According to Environment Agency Austria estimates, the overall funding requirements for the remediation of contaminated sites comes to at least € 5 billion (for implementing measures on approximately 2,500 sites applying the "repair principle", i.e. retaining residual contamination in accordance with criteria specific to the respective site and its use; in the case of the remediation targets derived from the precautionary principle, the overall costs would be double). Approximately € 1 billion has already been invested from public funds.

With an annual overall investment of approximately € 100 million, the target set in the "Management of Contaminated Sites" mission statement of completing all necessary measures within two generations (by 2050) could be achieved.

In addition to the urgent securing of revenue, a clear steering effect for sustainable waste management, taking account of the hierarchy of the Waste Management Act 2002 or the new Waste Framework Directive, should be achieved by means of a new contribution model.

Use of revenue from contaminated site contributions

Of the funds available from contaminated site contributions,

85 % is used for

- funding securing and remediation projects,
- Federal Government securing and remediation in accordance with Article 18 of the Act on the Remediation of Contaminated Sites
- reimbursements (limited in terms of time and amount) and

15 % is used to

- conduct supplementary investigations into suspected contaminated sites and confirmed contaminated sites and also for studies and administrative costs.

The revenue of approximately € 1.3 billion mentioned is offset by payments received of approximately € 1.02 billion. For subsequent years, further guaranteed grants of approximately € 128.1 billion in prior charges have been identified. The use of the funds for individual areas is shown in the following table:

Table 89: Use of contaminated site contributions (as at 1.1.2017)

	Key activities	Payments [€ million]
85 %	**Grants and subsidies**	
	for securing/remediation	743.40
	for studies	14.97
	for urgent measures (contaminated site N1+N53)	23.60
	Total grants and subsidies	781.97
	Federal Government measures in accordance with Article 18 of the Act on the Remediation of Contaminated Sites	66.57
	Reimbursements/urgent measures	88.90
15 %	**Supplementary investigations into suspected contaminated sites and confirmed contaminated sites, studies** (including administrative costs for environmental support/remediation of contaminated sites through Kommunalkredit Public Consulting GmbH and additional funding from the Environment Agency Austria)	85.43
100 %	Total	1,022.87

Figure 155: Contaminated soil horizon

8.5. SUBSIDISING FOR SECURING AND REMEDIATION AT CONTAMINATED SITES

To date, 323 projects with an investment volume of approximately € 1,172 million have been approved by the Federal Minister for Agriculture and Forestry, Environment and Water Management and grants of approximately € 910 million have been pledged

Table 90: Total subsidies for contaminated sites

Investment volume	€ 1,172 Mio.
Pledged subsidies	€ 910 Mio.
Paid out subsidies	€ 782 Mio.

Pledged subsidies of approximately € 910 million are distributed among:

- 281 contaminated site projects (approximately € 870 million)
- 39 research projects (approximately € 16.5 million) and approximately
- € 23.5 million for 2 urgent measures.

The subsidies will be used primarily for set-up and implementation measures (investment costs) for on-going securing/remediation for five years (operating costs) as well as planning and building inspection measures.

The subsidies for securing and remediation of contaminated sites will be paid by Kommunalkredit Public Consulting GmbH (see www.public-consulting.at).

Figure 156: Vat rescue

8.6. MEASURES TAKEN BY THE FEDERAL GOVERNMENT

8.6.1. MEASURES IN ACCORDANCE WITH ARTICLE 18 OF THE ACT ON THE REMEDIATION OF CONTAMINATED SITES (ALSAG)

In accordance with Article 18 of the Act on the Remediation of Contaminated Sites, the Federal Government, as the institution upholding civil law, is obliged to carry out the required remediation on contaminated sites, in respect of which no one can be held responsible, in accordance with the priority classification whereby no financial charges over and above the revenue from contaminated site contributions may be incurred.

In total, 15 contaminated sites have been recognised as "cases under Article 18". Of these, the following nine contaminated sites have been secured or remediated:

- S 07 "Arsenikhalde Rotgülden"
- S 08 "Essenhalde Mitterberghütten"
- N 08 "St. Georgi Stollen"
- ST 7 "Gärtnerei Thianich"
- ST 1 "Teerfabrik Lederer-Mellitzer"
- N 55 "Betongrubenfelder Grube 1"
- N 56 "Betongrubenfelder Grube 2"
- N 16 "Tuttendorfer Breite"
- T 05 "Dachpappenfabrik Rum".

For the other six contaminated sites, remediation projects are already under way or in the planning stages:

- O 40 "Holzmüllerstraße"
- N 46 "Tanklager Mare"
- N 27 "Parkplatz Brevillier Urban"
- N 06 "Aluminiumschlackendeponie"
- ST 28 "Gaswerk Jakomini"
- O 43 "Putzerei Lengauer".

The cost of remediating these contaminated sites is estimated at approximately € 307 million.

The required remediation will be carried out by and at the expense of Bundesaltlastensanierungsges.m.b.H. (BALSA GmbH, as a 100 % subsidiary of Umweltbundesamt GmbH), which was established in 2004 with the main purpose of remediating contaminated sites in accordance with Article 18 of the Act on the Remediation of Contaminated Sites (see www.balsa-gmbh.at).

8.6.2. REIMBURSEMENT OF REQUIRED EXPENSES AND URGENT MEASURES

With the transfer of administrative enforcement competence from the Federal Ministry of the Interior as at 1.4.2000, the financial implementation of administrative enforcement is to be carried out by the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

Since 2000, approximately € 186 million has been disbursed for administrative enforcement for substitute performance by the Federal Ministry of Agriculture, Forestry, Environment and Water Management (approximately € 89 million from contaminated site contributions).

Figure 157: : Reimbursement, removal of an end-of-life vehicles

8.7. CONTAMINATED SITES MISSION STATEMENT

Mission statement for the management of contaminated sites in Austria

The mission statement presented in 2009 by the Federal Ministry of Agriculture, Forestry, Environment and Water Management consists of six leading principles, which are introduced and explained briefly below.

Detailed explanations are given in the identical publication of the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

Principle 1
Registration of historically contaminated sites within a generation

Contaminated sites are designated as those where more than a slight contamination of the subsoil is assumed. The addition of the word "historical" serves to delimit these from current accidents and relates to sites where contamination occurred prior to 1990. All these sites should be registered in Austria by 2025.

Principle 2
Implementation of measures (decontamination, securing, observation, restriction of use) on substantially contaminated sites ("confirmed contaminated sites") within two generations

Depending on the respective landfill volume, dispersion of pollutants in the environment and the specific use, different measures are possible in the case of substantially contaminated sites ('confirmed contaminated sites' in accordance with the mission statement), which may range from restrictions of use and monitoring to remediation (decontamination or securing). "Substantial contamination" in accordance with the mission statement is assumed to exist in Austria on approximately 5,000 former abandoned landfills where remediation needs to be carried out urgently on 2,500 of these sites (these 2,500 sites can be considered "confirmed contamination sites" in accordance with the current Act on the Remediation of Contaminated Sites). All the measures required on these sites should be completed by 2050.

Principle 3
Risk assessments must be carried out specifically in relation to the respective site and its use.

The potential repercussions of contaminated sites on human health and the ability of the environment to function depend, in addition to the nature and extent of contamination, also on factors specific to the respective site and its use. In the event of insufficient consideration of factors specific to the respective site and its use, the risk relating to the site may be misjudged and subsequently lead to measures being taken that go beyond the extent required to minimise the risk or, conversely, are not sufficient to eliminate existing risks. In accordance with an efficient use of resources, the risk in respect of each contaminated site should therefore be assessed taking account of specific factors in each individual case.

Principle 4
Measures can be selected in accordance with the specific site or its use where risks that are not tolerable to human health or the environment must be eliminated.

As a starting point for selecting measures, the aims to be achieved through the respective measures are defined in accordance with the specific site and its use based on a risk assessment. The measures can therefore be tailored to factors "specific to the individual case". Residual contamination to whatever extent can be tolerated, for example, as long as the site and use-specific functions of the soil, subsoil, and water in the ecosystem are guaranteed in the long term. However, it should be ensured as a prerequisite for the measures to be put in place that risks not tolerable to human health or the environment are eliminated.

Principle 5
Remediation (decontamination, securing) should be sustainable and permanently improve the state of the environment.

The premise is that the choice and implementation of remediation measures must satisfy the primary aim of the remediation of contaminated sites, i.e to improve the environment. This primary aim should in principle be strived for using suitable resources as well as in consideration of costs and benefits. In the context of managing contaminated sites, the positive environmental effects aimed for with remediation measures should be optimised through the gentlest possible use of economic resources and consideration of social aspects.

Principle 6

Creation of better framework conditions for the subsequent use and reintegration of contaminated sites into economic system

In order to effectively reintegrate remediated sites into general circulation in the sense of 'land recycling' and enable their subsequent use, the basic technical principles for minimising contamination risks and ensuring public safety need to be improved. Existing interfaces with other competent technical departments and authorities (e.g. regional planning and organisation, water board, building authority) can be extended or new ones established for this purpose. Alongside this, a financial incentive system (e.g. subsidies for "fallow land recycling") could precipitate the reuse and rehabilitation of contaminated sites.

Figure 158: Clearing / Recultivation / Fallow land recycling

8.8. FURTHER DEVELOPMENT OF CONTAMINATED SITE LEGISLATION

At a national as well as at an international level, the contaminated sites remediation model represents a success story. In the entire EU area, there is no comparable funding model providing earmarked charges from waste management for the remediation of contaminated sites. Yet experience has also shown a need for adaptation and, accordingly, there will be enhanced investment in the remediation of disused contaminated commercial and industrial sites besides the remediation of priority contaminated sites. The approval policy practiced so far for remediation projects on the basis of substantive-law provisions, in particular of the Water Rights Act, is being developed further according to use-oriented aspects by way of a separate contaminated sites remediation act.

Building on the management of contaminated sites mission statement and the results of the "Contaminated Sites 2010" project, new approaches for the remediation and subsequent use of contaminated sites will be worked out, and the new legal framework conditions provided for in the government programme will be created.

The backbone of this project is the consideration of circumstances that are specific to locations and types of utilisation in the framework of risk assessment, thus prompting a paradigm change placing the emphasis on the repair principle. Both the risk assessment of a contaminated site and also the derivation of corresponding objectives of action are not only geared towards the detected pollutants and their reaction potential and site-specific factors, but also towards the possible dispersion of pollutants and the use of the site and/or of the respective protected resources.

In order to reduce the uncertainties that frequently emerge during the (re)use of former industrial and commercial sites, and to enable or speed up a revitalisation of such areas, the Federal Ministry of Agriculture, Forestry, Environment and Water Management intends to use contaminated site contributions to support investigations and remediation measures for polluted premises even if such are not deemed as contaminated sites. To this end, there are plans to earmark 5 % of the revenues generated by contaminated site contributions and also to include competitors in the funding scheme. With this new funding instrument, the minimisation of restrictions of use of certain sites that are due to contamination and, eventually, the reintegration into the economic cycle can be kicked off, and a key contribution to the reduction of the use of undeveloped land in Austria can be made.

According to unanimous expert opinion, for a continuation of the success story "Remediation of contamintated sites" with the overriding aim defined in the mission statement to complete the remediation of contaminated sites in Austria within two generations (by 2050), annual resources of approximately € 100 million are required (public and private funds). Therefore, the provision of the required public funds amounting to at least € 70 million also makes a medium-term adjustment of the current contribution system necessary.

Figure 159: Slurry wall excavation

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