

Collection, Treatment and Use of Bio-Waste

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1. Introduction

Article 22 sentence 1 lit. a) of the Waste Framework Directive (WFD)¹ orders member states to take measures to encourage the separate collection of bio-waste leading to composting and digestion. According to Article 3 No 4 WFD the term *bio-waste* encompasses garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants. The term is more precise than just mere biodegradable waste, comprising other biodegradable material such as natural textile fibers, paper, cardboard or waste from wood processing.

The annual amount of bio-waste in the EU adds up to between 118 and 138 million tons of which about 88 million tons are municipal waste. By 2020 the amount of waste is to increase annually by 10 %.²

Apart from waste prevention at the source management of bio-waste includes the collection (separate or together with mixed waste), the (anaerobic) digestion and the (aerobic) composting, incineration and the disposal on landfills.

¹ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

² Communication from the Commission to the council and the European Parliament on future steps in bio-waste management in the European Union, COM (2010) 235 final, 18.05.2010, p.2.

The management of bio-waste differs from one EU member state to the other. There are examples of only some rather weak initiatives but also ambitious political and legal measures.³

The EU average landfills approximately 40 % of its bio-waste, some member states even up to 100 %. Landfilling deprives economy and nature's cycle irretrievably of valuable resources (manure, energy). In regard to the respective standards landfilling harbours dangers for the environment such as the emission of greenhouse gas or the pollution of soil and groundwater. Seeing that, the landfilling of bio-waste stands in contrast to the guiding principles of EU waste policies. It stands most notably in contrast to the EU waste hierarchy forming the foundation of member state waste management strategies (compare Article 4 I and II WFD).

The five-step waste hierarchy provided by the WFD – prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery and disposal – became a central aspect of German waste legislation formed by the so-called Kreislaufwirtschaftsgesetz, (ff. abbrev. KrWG)⁴ translating approximately to 'cycle waste management act'.

2. EU bio-waste management

Against this backdrop – and apart from waste prevention – the EU aims for bio-waste management, nevertheless allowing member states to decide what constitutes best management options considering local circumstances such as population density or the demand for e.g. manure or energy.

The European Commission prefers composting and anaerobic digestion – in consideration of economy and ecology – as these options offer the best results concerning inevitable bio-waste.

According to the Commission high quality of the source material is the prior condition for composting and digestion. In most cases this can be assured by the separate collection of waste. To facilitate high quality recycling or high quality digestion the Commission advises member states to implement systems for the separate collection of waste.⁵

The Federal Republic of Germany advocates for a special bio-waste directive in order to bring together all necessary schemes of bio-waste management on EU level and hence to draw up regulations for the basic goals for separate collections.⁶

The European Commission sees yet no need for further regulation – the WFD and the Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (Deponierichtlinie) are seen as sufficient – as such the Commission hinders all plans to draw up a special directive for bio-waste and therefore also the introduction of basic goals for its separate collection. As a result there are only declarations of intend in form of a Green Book for bio-waste management in the European Union (2010) and a Commission's statement in regard to further steps in bio-waste management in the European Union (2010).

³ Green Paper on the management of biowaste in the European Union, COM (2008), 811 final, 03.12.2008, p. 2.

⁴ Kreislaufwirtschaftsgesetz dating from 24.02.2012 (BGBl. I p. 212). It became effective on 01.06.2012 and is the new regulation of German cycle management and waste law replacing previous legislation.

⁵ COM (2010) 235 final (see footnote 2), p. 9.

⁶ Beschluss of Bundesrat, 09.07.2010, BR-Drs. 299/10.

3. Listing and emergence of bio-waste in the Federal Republic of Germany

In the Federal Republic of Germany there already are systems based on the separation of waste fluxes at their sources.⁷ 8.9 million tons of bio- and green household waste are listed annually and led to material and/or energy recovery already today. This comprises about 21 % of the entire German emergence of household waste in the year 2010 of approximately 43 million tons.⁸

Still, Germany is far off from a comprehensive introduction of systems for the separate collection of bio- or green waste. There are 96 public waste disposal authorities (of altogether 405) providing bio-waste containers for waste producers and waste holders. This applies to approximately 14.3 million people. 67.5 million people live in areas where bio-waste containers have been introduced.

The real rate of connection in this regions only amounts to 56 %. Therefore further 30 million German citizens don't have access to bio-waste containers. A total of almost 44 million people and thus more than half of the German citizens have no bio-waste container.⁹

4. Introduction of an obligation for separate collection (Getrennsammlungspflicht, § 11 KrWG)

Previously there was no national obligation for separate collections of bio-waste in Germany. With § 11 KrWG¹⁰ comes the codification of such an obligation and the power to issue statutory instruments regarding the recovery of bio-waste and sewage sludge.

According to § 11 I KrWG by January 1 2015 bio-waste that is subject to the obligation to make waste available (Überlassungspflicht) under § 17 I KrWG has to be collected separately, insofar as this is necessary for compliance with the requirements of § 7 I till IV and § 8 I KrWG. This is to implement Article 22 sentence 1 lit. a) WFD.¹¹

4.1. Existence of an obligation to make waste available

According to § 17 Abs. 1 KrWG the obligation for separate collections applies only for bio-waste to be made available for public waste disposal authorities. The obligation to make waste available, however, does not apply as far as waste producers or waste holders intend to take out their own scheme of recovery. Under certain conditions legislative authority allows for private households to handle the recovery of their own waste.

⁷ Compare Vetter, NVwZ 1999, S. 622 (623); Zandonella/Thärichen, NVwZ 1998, p. 1160 (1160).

⁸ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit/Umweltbundesamt (Hrsg.), Ökologisch sinnvolle Verwertung von Bioabfällen, Anregungen für kommunale Entscheidungsträger, 2012, p. 11

⁹ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit/Umweltbundesamt (Hrsg.), Ökologisch sinnvolle Verwertung von Bioabfällen, Anregungen für kommunale Entscheidungsträger, 2012, p. 10.

¹⁰ In accordance with the usage in German law in the following sections are marked with the sign “§”, paragraphs are marked with Latin letters (I, II, etc.) followed by sentences (“S.”).

¹¹ Amtl. Begr., BT-Drucks. 17/6052, p. 81.

As it is common to compost bio-waste, waste producers and waste holders are allowed to recover their waste within the limits of their own private grounds. If a lot of proprietors take advantage of composting – as it is known to happen in rural areas – one must ask what kind of bio-waste listing might come in handy after a cost-benefit ratio (bio-waste containers, decentralized waste containers, disposal at civic collection stations).¹²

4.2. Caveats

The obligation for the separate collection of bio-waste only exists as far as the basic obligation for recovery goes, plus the dictate for the order of precedence and the dictate of high quality (§ 8 I KrWG). Thus and in contrast to the opinion voiced by the manure industry the obligation for separate collections is not categorical – in other words- it is not without reservation.

Basic obligation for recovery (Verwertungsgrundpflicht)

The obligation for the separate collection in § 11 I KrWG is to ensure recovery being of high quality, *ordnungsgemäß* and *schadlos*, meaning in accordance with the law codified in waste legislation and other ordinances of administrative law, and harmless.¹³

In detail:

Waste producers and waste holders are obligated to recover. As a rule, recovery has priority over disposal.¹⁴

Recovery needs to be in accordance with the law codified in German waste legislation and other ordinances of administrative law. Moreover, recovery must be harmless and as such one must avoid adverse effects on public well-being resulting from the waste's condition and its contamination. Further, also the accumulation of pollutants needs to be avoided.¹⁵

The obligation for recovery (only) applies for waste producers or waste holders if recovery is feasible and reasonable. Thus, there needs to be a market or the possibility of a market for either energy or recovered material.¹⁶

Because of the cross reference on § 7 KrWG both the technical feasibility and economic reasonability factor when it comes to whether to collect separately or not. These regulative aspects refer to the differentiation of recovery and disposal. When the technical and economic feasibility are doubtful a recovery operation such as composting or digestion can be omitted. This does not open the door to landfilling as still the priority of recovery still applies over disposal. Insofar, waste has to be recovered.¹⁷

As far as a priority recovery operation such as the separate collection and digestion is not technically feasible and not economically reasonable it cannot be mandated. In that case the waste holder is obligated to execute a recovery operation of similar ranking. If that is

¹² Queitsch, AbfallR 2011, p. 30 (31).

¹³ Amtl. Begr., BT-Drucks. 17/6052, p. 73.

¹⁴ Compare § 7 II KrWG, regulation also the case when priority of certain recovery operations does not exist.

¹⁵ Compare § 7 III KrWG.

¹⁶ Compare § 7 IV KrWG: recovery is reasonable if its benefits are not disproportioned to its cost.

¹⁷ Compare Kunig, in: Kunig/Paetow/Versteyl, KrW-/AbfG, Kommentar, 2nd edition 2003, § 5, side number 30.

not possible the waste holder is allowed to execute the next rank of recovery operations namely the integrated incineration of bio-waste for the generation of energy as warmth and electricity.¹⁸ The technical feasibility is not based on *best available techniques*, but requires practicability and not a mere theoretic and speculative possibility. A recovery operation is impractical when technical procedures cannot be employed effectively.¹⁹

If proof shows that in individual cases these requirements are met as there are no suitable facilities for the digestion or composting integrated energy recovery in form of incineration is permissible.²⁰

The caveat of economic reasonability also applies in regard to the obligation for recovery, but there is little danger that there is no market for the output of material recovery. As such, economic reasonability is seldom in doubt as marketability is its key aspect.²¹

Dictate of priority and dictate of high quality

The basic principle of an obligation for the separate collection is watered down by the priority of the certain recovery operation in regard to the kind and state of waste best ensuring protection for mankind and environment (§ 8 I S. 1 KrWG). Therefore the kind of recovery operation shall be executed offering the best option. The following needs to be considered:

- expected emissions,
- the proportion of natural resource protection,
- energy input and energy output,
- the accumulation of pollutants in products, in waste for recovery or in following products.

This catalogue is not exclusive. The impacts on the climate, on the soil and other subjects of environmental protection have to figure in a comparative environmental survey as well. For material recovery of bio-waste in form of digestion/composting and its use on the soil argues the improvement of the soil's organic chemistry provided with fertilizing agents (phosphates, nitrogen and calcium). Digestate as manure can close regional metabolic cycles and substitute artificial oil based fertilizer.

But composting and digestion of bio-waste is not per se the best option. This shows a comparison with the integrated energy recovery when it comes to climate-relevant carbon credits.²² Both composting and digestion result in further emissions (methan, nitrous oxide, ammonia) to be taken into consideration when it comes to the carbon footprint.²³ Of course this also depends on the technical aspects of the facility and the conditions of use of manure and digestates. Moreover, heavy metals are withdrawn from the material cycle and deposited of but cinder and slag need special care.

¹⁸ Kersandt, in: Schink/Versteyl (ed.), KrWG, Kommentar, 2012, § 11, side number 13.

¹⁹ Kunig, in: Kunig/Paetow/Versteyl, KrW-/AbfG, Kommentar, 2nd edition 2003, § 5 side number 31 f.

²⁰ Kersandt, in: Schink/Versteyl (ed.), KrWG, Kommentar, 2012, § 11, side number 14.

²¹ Schink, in: Schink/Versteyl (ed.), KrWG, Kommentar, 2012, § 7, side number 43.

²² Compare EU-Recycling 01/2012, p. 5.

²³ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit/Umweltbundesamt (ed.), Ökologisch sinnvolle Verwertung von Bioabfällen, Anregungen für kommunale Entscheidungsträger, 2012, p. 38.

These and further angles need to be evaluated in order to arrive at the best option in an individual case. Only equivalent recovery operations are optional for waste producers/holders. And this is a rather impossible case.

As stated in § 8 I S. 3 KrWG, while executing a recovery operation one should aim for high quality recovery ensuring protection for mankind and environment. This regulation has solely programmatic character²⁴ and only applies to the technical execution of the recovery operation, it does not relate to the choice between different kinds of recovery. The addition of the dictate to protect mankind and the environment is mere substantiation of what was meant with harmlessness of recovery.

5. Requirements for bio-waste recovery

The obligation for separate collections can be substantiated on statutory level. Such a statutory ordinance could regulate what kind of waste constitutes bio-waste, what requirements apply to separate collection and to the treatment and on which criteria recovery is based.

§ 11 II S. 1 KrWG states future regulative matter for a statutory ordinance for the advancement of bio-waste recovery. Possible regulation might apply to the following:

- definition of what constitutes bio-waste;
- requirements for the separate collection of bio-waste
- requirements for treatment, namely material recovery, e.g. composting, digestion, extraction of certain components (for instance so-called *phosphorus recycling*) and energy recovery, e.g. recovery of biogas from digestion, immediate incineration;
- material requirements for the used or treated bio-waste as well as the use in regard to other produce, such as limits for pollutants, hygiene requirements, use of incinerator cinder from energy recovery
- Limitations or bans for the circulation of bio-waste under consideration of its kind and state, origin, quantity, form and time of its use on soil, character of the soil, place of use and type of use.

§ 11 III S. 1 KrWG expands the power in § 11 II S. 1 to issue a statutory instrument on the procedure to evaluate the requirements for bio-waste recovery. This includes:

- inspection obligations and inspection methods in regard to the effectiveness of the treatment, the character of untreated and treated bio-waste, the respective procedures and further action;
- examination of the soil;
- methods to verify control- and survey requirements (proof and register, business diaries, probes, analyses, electronic communication etc.)

In regard to the contaminant content the quality requirements for manure and digestive products are high. The legal framework for this is formed by the equally updated Bioabfallverordnung (statutory for bio-waste)²⁵ regulating the recovery of bio-waste on soils for agriculture, forestry or gardening concerning its treatment and use. There one can find regulations for the material recovery of bio-waste including hygiene provisions and safety values for contaminant contents.

²⁴ Schink, in: Schink/Versteyl (ed.), KrWG, Kommentar, 2012, § 8, side number 14.

²⁵ Bioabfallverordnung vom 21.09.1998 (BGBl. I p. 2955), zuletzt geändert durch Art. 1 und Art. 4 der Verordnung vom 23.04.2012 (BGBl. I p. 611).

6. Systems of quality control

To ensure stable quality levels for purchasers most composting facilities and increasingly more fermentation plants (digesters) are included in a regular system of independent quality control by a quality control association. Quality control associations provide that only suitable and non-hazardous basic material end up in recovery. They further regulate requirements for the treatment and quality of the fertilizer output and its proper use.²⁶

Legislative authority has recognized this usage of bio-waste recovery quality control systems especially by quality control associations (e.g. Bundesgütegemeinschaft Kompost e.V.)²⁷ in § 12 KrWG. According to the explanatory memorandum legislative authority promises consolidation and development of these systems and thus offers consolidation for the self-regulative power of the economy and relief for legal implementation.²⁸

For the advancement of cycle waste management and to ensure a high level of protection for humankind and the environment § 12 I KrWG states that while producing or treating bio-waste a regular system of quality control can be established. This constitutes a voluntary system regulating binding provisions for quality control from the production of bio-waste to the end of recovery implementing and complementing the legal guidelines of the statutory for bio-waste.²⁹

7. Conclusion and outlook

EU bio-waste politics show a clear preference for the separate collection of bio-waste for composting and digestion. As there are no binding basic goals for separate collections there is much manoeuvring room for member states. With focus on environmental conservation and the protection of resources and to level competitive disadvantages an EU directive for bio-waste would come in handy.

The caveats of feasibility and reasonability narrow the obligation for separate collection of bio-waste in German waste legislation. These criteria should be interpreted with caution.

Furthermore there is also a caveat in favour of a recovery operation offering the best option in comparison. Evaluation in individual cases has to show whether this applies to separate collections with the purpose of composting and digestion or the integrated energy recovery of bio-waste. If the general criteria in KrWG are to become enforceable there is the need for substantiation in form of a statutory ordinance the power to issue in the hands of Federal Government under § 11 II KrWG.

Whatsoever, the implementation of the obligation for separate collections asks for systematic and continuous public relation to increase quantity, to control quality and to reduce contaminant content.

²⁶ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit/Umweltbundesamt (ed.), *Ökologisch sinnvolle Verwertung von Bioabfällen, Anregungen für kommunale Entscheidungsträger*, 2012, p. 35.

²⁷ See Vetter, NVwZ 1999, p. 622 (623).

²⁸ Amtl. Begr., BT-Drucks. 17/6052, p. 82.

²⁹ Amtl. Begr., BT-Drucks. 17/6052, p. 82.

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