

Esteemed European Commission,

we express thanks for the opportunity of submitting our comments on the Greenbook concerning the management of bio-waste in the European Union. The European Biogas Association (EBA) formed this year represents 11 national biogas associations whose members are affected directly by the EU's bio-waste directive.

Question 1: Waste prevention is at top of the EU's waste treatment hierarchy. From your experience, what could be specific bio-waste prevention action at EU level?

The national waste laws, such as represented by the Recycling and Waste Management Act in Germany and the Waste Management Act in Austria, give top priority to the prevention of waste in the waste hierarchy. A difference should be made between biogenous waste from food industry, trade and industry (e.g., restaurants and the grocery trade) and biogenous waste from households and similar sources.

It is known that an enormous amount of food is produced in excess of what is actually needed and this excess quantity is treated as waste by the food trade and also by households and must be disposed of. Counter-measures (such as education campaigns at European level and management training courses in the food trade) would be requisite. Educating children and other young people and raising in them an awareness of the value of food would also be important.

A solution practiced in some countries is the setting up of so-called social (i.e., low-price) markets selling consumable food products which cannot be sold in the regular market, at lower prices to less well-off buyers. Cooperation with these low-price markets could be made obligatory for food chain stores.

One of the most prominent measures for the prevention of biogenous waste is private composting. This should be encouraged in any case. As much as about 80% of all biogenous waste could be composted in private gardens in rural areas and areas with settlement structure. As the examples of Flanders (BE) and Austria show, as much as 50% of kitchen and garden waste is composted in private gardens, on average. In addition to the required consultation, training and education and the setting up of multi-annual demonstration projects, a suitable reporting system to the Commission on the action taken and the results achieved in private garden composting seems reasonable.

Municipal waste contains between 30 and 70 % biogenous waste, but we do not see a real possibility of effectively reducing this proportion. Only consistent separate collection of biogenous waste can ensure that the nutrients the waste contains are recycled to natural systems after use in biogas plants and, in addition, carbon-neutral energy can be produced from such waste.

In Item 1 of Annex IV of the Waste Framework Directive, reference is made to the fact that member states can use planning actions or economic tools to improve the efficiency and/or use of resources. The increasing scarcity of phosphorus as natural input should be mentioned here, in particular, much of which can be returned to nature if bio-waste is used under sustainable programs. A major precondition for this is that waste is collected by type and this is taken care of in Article 22 of the said Directive.

So a bio-waste directive on EU level is welcomed generally in the context of resource application and carbon dioxide saving.

Question 2: Do you see benefits or disadvantages of further restricting the amount of biodegradable waste that is allowed on landfills beyond the targets already set in the EU Landfill Directive? If yes, should this be done on EU level or left decide by Member States?

In view of the fact that every effort must be made to counter the threatening scarcity of nutrient resources, the implementation of the prohibition of disposing biogenous waste in landfills is an urgent necessity. This can be achieved most realistically by the separate collection of waste. An EU bio-waste directive would assist EU member states in implementing the objectives of the Landfill Directive more efficiently.

To further reduce methane emission from landfills, any remaining unavoidable biogenous waste in „residual waste“ which cannot be recycled should be pre-treated in a mechanical-biological or thermal plant before final disposal.

Question 3: Which options for the treatment of bio-waste diverted from landfills would you prefer to see strengthened and what would you see as their main benefits? Do you think that the choice of the treatment of bio-waste diverted from landfills should benefit from a wider and more consistent use of life-cycle assessment studies?

In addition to the problem areas posed by the energy crisis and the climate change, the highest achievable efficiency of using natural nutrient resources will be a major issue in the use of fertilizers in future. For example, 1 ton of fresh vegetable waste contains about 1 kg nitrogen, 0.15 kg phosphorus and 0.22 kg potassium. Plus, of course, all trace elements which plants need for growing. The production of 1 kg of pure nitrogen alone consumes about 10 kWh energy, without considering the prior product stages or the subsequent mineral fertilizer logistics. Considering the usual provision of energy by natural gas, this yields direct incineration emission of about 2 kg CO₂ / kg pure nitrogen. Added must be the negative effects of the use of mineral fertilizer on soil life, soil health and nitrate leaching into the groundwater.

The fermentation of bio-waste is a combined way of making use of substance and energy which ensures that all nutrients contained in the feedstock substrate are again made available to crops in the field as fertilizer and the energy contained is used efficiently as biogas, a high-grade energy source. The biogas contains much of the chemically bonded energy as methane and has several advantages:

- Energy source of high energy content (approx. 5 – 7 kWh /m³)
- Clean incineration (reduces NOx emission by about 80 % and dust emission nearly to 0 in comparison with diesel and fuel oil)
- Versatile use
- Combined generation of heat and electricity
- Injection in the natural gas distribution system
- Fuel

In addition to this, it is also known that the humus content in farming soil and the related degradation of soil are phenomena observed throughout Europe. Desertification is on the advance, especially in southern countries. Digestates have a soil activating effect, in addition to fertilizing the crop. Fertilized fields have a substantially higher biological soil activity and, related to this, can absorb and store more water and therefore protect the soil better from erosion and drying out.

So looking at the cycle as a whole, the separate collection of waste is the most reasonable and most efficient way of using bio-degradable waste, both as a resource and a source of energy, because the energy needed for keeping up operations is provided by the production of biogas and the excess energy can be used in a carbon-neutral way. The simultaneous use of digestate as fertilizer is undoubtedly a recycling method within the meaning of utilization methods R3 and R10 of Annex 1 of the Waste Framework Directive. As such, they should be ranking higher than thermal utilization.

Article 4 (waste hierarchy) of the EU Directive 2008/98/EC defines the sequence of priorities of the waste hierarchy. Digestation is the method by which biogenous waste can be returned to the natural cycle by treatment followed by the application of the digestate and biogas. These are undoubtedly measures according to Article 4 b (preparation for reutilisation) and represent the next level of the waste hierarchy, after prevention.

In the case of the undifferentiated thermal utilisation of biogenous waste, on the other hand, the nutrients are either found in the ash or the exhaust gases which can only be recovered by extensive filtration. Especially when mixed with other types of waste and thereby increasing the concentration of heavy metals, neither the grate ash nor the filter ash is suitable as fertiliser of agricultural crops but would, in turn, entail high energy and cost inputs.

Experience with life-cycle analyses has shown that the results depend strongly on which parameters are considered. Regrettably, studies comparing purely thermal treatment, composting and digestation have failed to consider parts of a comprehensive LCA. We believe that if the possible carbon sinks, the nutrient cycle and the effects of each method on the soil properties are considered, the methods of LCA available at present are not suitable for making objectifiable comparisons between different treatment options in terms of their long-term effects on the environment. Consequently, they cannot be referred to as valid basis for decision-making.

Question 4: Do you think that energy recovery from bio-waste can make a valuable contribution to sustainable resource and waste management in the EU and meeting the EU's renewable energy targets in a sustainable way, and, if so, under which conditions?

The energy recovery from bio-waste can only be sustainable if the nutrient circles are closed. Digestate can be used for soil improvement and fertilization in farming and landscaping. The target of a bio-waste directive should be to cover all organic waste in a state of purity which permits their conversion to organic fertilizer of high purity without expensive treatment. The simultaneous generation of energy should be attempted to obtain the highest possible form of upgrading biological residue under these conditions.

Heat-only use is not an alternative to the recycling of substances because it does not support a closed nutrient cycle and also does not involve the activation of soil by organic fertilizer. Besides, the use only as heat always leaves ash that must be disposed of in landfills due to the co-incineration and, consequently, contamination by heavy metals. The co-incineration of waste very rich in water, as is the natural case with bio-waste, reduces the calorific value of the feedstock and therefore also the obtainable electric efficiency of the incineration system.

Digestation of non-lignified bio-waste and composting of material rich in structure, possible together with digestate, should be a reasonable way of utilisation. Only very contaminated, dry materials with little nutrient content should be allowed to be incinerated.

Question 5: Do you see a need for promoting bio-waste recycling (i.e. compost production or use on land of composted material) and, if so, how? How can synergies be achieved between bio-waste recycling and energy recovery? Please provide the necessary evidence.

Bio-waste recycling is also possible in an anaerobic environment. The digestate produced can be marketed directly or, after composting, as digested products, liquid, solid or as compost. As mentioned repeatedly before, the value of organic fertilizers is in their content of humus and nutrients. As the prices of mineral fertilizers are going up substantially, the demand for organic fertilizer cannot be met in many regions. This advantageous situation should be exploited and additional potential energy used in carbon-neutral and sustainable ways, especially in regions lacking nutrients and water.

The area-wide collection of biogenous waste followed by biological treatment is a target worthwhile pursuing on European level from an ecological and economic viewpoint. Therefore, the definition of obligatory collection targets for biogenous waste from households and also from industry is the measure promising most success. The best way of doing this is by setting a certain number of kilograms of biogenous waste to be collected separately per head of the population in a year. A stepwise approximation to the target level in the way practiced in the case of the reduction targets for biodegradable waste in the Landfill Directive would be reasonable for the introductory period.

It should be noted that the non-inclusion of the follow-up costs does not result in one or the other method being treated preferentially (no or low ecological tax on landfills, landfill disposal fees generally too low, redevelopment costs of landfills...).

Question 6: In order to strengthen the use of compost/digestate:

-Should quality standards be set for compost as a product only or also for compost of lower quality still covered by the waste regime (e.g. for applications not linked to food productivity)?

-Should rules for the use of compost/digestate (e.g. limits on pollutant concentration in compost/digestate and land on which compost/digestate is applied) be set?

-Which pollutants and concentrations should these standards be based on?

Basically, a uniform product regime for quality compost from separately collected bio-waste would be desirable. Experience has shown that the ideas concerning quality vary widely among EU member states and therefore it would be extremely unlikely that a uniform quality standard (e.g., limits for heavy metals, minimum content of organic substance, plant compatibility, biological stability, etc.) would be possible to achieve. The required quality should always be linked to the intended application and that would reasonably be a national competence.

After a first appraisal, we suggest to focus, in Europe, on the implementation of separate collection, at first, because this is the most efficient quality assurance. As regards quality criteria, we suggest to define a minimum standard for organic fertilizer as „product“ within the meaning of a final waste directive. In addition to this, member states can define national application requirements to ensure national soil protection and handle product declaration.

The system of quality assurance according to which statutory requirements must be met and a product is required to comply with certain higher product quality parameters if it is to be put in a higher product quality has proven practicable in Germany and Austria. To encourage participation in a quality assurance scheme and thereby assure a higher quality standard, some relief has been granted by law for those taking part in a quality assurance scheme.

-Which are the arguments for/against the use of post (digestate) from mixed solid waste?

The German and Austrian waste laws prohibit mixing of waste to exclude contaminated waste from being recycled. From this, it is clear that mixed municipal waste is not suitable for sustainable recycling as intended by utilization method R10. Where municipal waste is not collected separately, the diffuse entry of contaminants that cannot reliably be defined is unavoidable. In view of this, a final risk assessment in terms of soil protection would not be implementable either professionally or financially even if the range of contaminants to be analysed was extended appropriately. The essential quality assurance for the production of fertilizer is based on the restriction of organic inputs which can be collected systematically, separately cleanly as defined fractions at their origins.

Studies have shown that composts from mixed waste have a higher content of contaminants and therefore cause a higher accumulation of contaminants in the soil to which they are applied regularly. This is not acceptable under the approach of precautionary ecological protection, in particular, because there is sufficient evidence that the utilization of separate organic fractions is more cost effective than other methods.

The technical expenditure of mixed waste treatment is much higher requiring higher capacities and collection areas and causes higher transport costs. Sustainable local organisational structures can only be obtained on the basis of separate collection.

Based on twenty years of experience and underlined by opinion polls, institutional as well as private buyers of compost give three critical aspects as confidence-building and maintaining measures in a product:

- transparent quality assurance (accepted quality label)

- the separate collection of the input materials.
- Many also refer to the regional circular flow economy.

The mechanical/biological treatment of mixed residual waste should, in any case, be restricted exclusively to the treatment before disposal in a landfill or possibly for recultivation of landfill areas and for road building, etc.

Question 7:

Is there any evidence of gaps in the existing regulatory framework concerning the operational standards for plants which do not fall under the IPPC scope and if so, how should this be addressed?

Basically, our opinion is that biogas plants processing kitchen waste from households and catering establishments mainly from separate collection in bio-waste containers should fall under the waste management and no longer under the hygiene regulations. Environmental requirements, most of which concern emission such as odour, dust, germs, effluent, are only of local significance as a function of local conditions and relate to process management and less to the technologies applied. Therefore, legislation in these matters should exclusively be left to member states. The definition of the state-of-the-art in engineering on European level would inevitably lead to an over-proportional demand for technologies which could neither be substantiated nor bear a reasonable proportion to the achievable ecological benefit in terms of their cost-benefit ratio. This would ignore the requirements of local, small-area solutions, e.g., in rural or alpine areas. It would also imply renunciation of acceptedly ecological waste management concepts such as have for years been established also with support of public grants.

Question 8: What are the advantages and disadvantages of the abovementioned bio-waste management techniques? Do you see obstacles preventing the further developments and introductions of these techniques?

Composting is the way of making use of organic waste which is easy to practice technically. Compost returns nutrients and humus to the soil. Treatment produces emission and consumes energy.

The incineration of bio-waste can only substitute fossil fuels if a certain minimum efficiency is obtained because greenhouse gas emissions can only be prevented in this way. The energy balance of the incineration of kitchen waste is very low due to the high content of water in the waste. Thermal treatment destroys nutrients and organics essential to soil. Local plants, in contrast with plants tied to a particular site whose digestate is spread in nearby fields, require high transportation expenditure.

Digestion represents the combination of the uses of material and energy. The high-quality digestate produced contains humus and all nutrients, including trace elements with good plant availability. The application of digestate improves the pore volume, the water retention capacity of the soil and increases the microbial activity of soil. Thus, the treatment of bio-waste in digestion plants and the subsequent application of the digestate closes a sustainable cycle. In addition, fossil fuels are substituted by biogas, a methane gas which can be put to versatile use. A minor portion is needed for the operation of the biogas plant, any excess quantity can be converted to

electricity, heat or cold or be upgraded for injection in the natural gas distribution system or used as renewable fuel. Combustion produces very few emissions in comparison with diesel fuel or fuel oil. Locally sited biogas plants require only very short transportation distances and a high level of regional value creation is involved.

The focus among the methods should be on making use of bio-waste materials in order not to lose the valuable organic substance and nutrients. If, in addition, excess energy is generated like is the case with digestion, this method should also be preferred.

As regards the question of statutory obstacles, we had to state that the European Hygiene regulation 1774/2002 is being interpreted and also practiced in disfavour of the local utilisation in many member states. Rules should be put in place which allow the local processing and utilisation of biogenous waste to further the recycling concept as described in these comments. Generally, digestate should no longer be classed as waste but as product (Article 6, Directive 2008/98/EC).

We once more express our thanks for having been given the opportunity of submitting these comments and will be available to you for answering any questions you may have.