



Study to assess the implementation by the EU Member States of certain provisions of Directive 1999/31/EC on the landfill of waste"

Final report

March 2017



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Study to assess the implementation by EU Member States of certain provisions of Directive 1999/31/EC on the landfill of waste

Final Report

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The views expressed herein are those of the consultants alone and do not necessarily represent the official views of the European Commission.

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1 ABBREVIATIONS

AT4	Respiration activity after four days
ATOs	Optimal territorial ambits
BAT	Best available techniques
BREF	Best available techniques reference document
DG Environment	European Commission's Directorate-General for Environment
ECJ	European Court of Justice
EfW	Energy from Waste
EWC	European Waste Code
EU	European Union
HDPE	High-density polyethylene
IMPEL	EU Network for the Implementation and Enforcement of Environmental Law
Industrial Emissions Directive (or IED)	Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
IPPC	Integrated pollution prevention and control
Landfill Directive (or LD)	Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste
<i>Malagrotta</i>	Case C-323/13, European Commission v. Italian Republic, Judgment of the Court (Sixth Chamber) of 15 October 2014
MBT	Mechanical biological treatment
MRF	Materials Recovery Facility
MSW	Municipal solid waste
MW	Municipal waste
PE	Polyethylene
PET (or PETE)	Polyethylene terephthalate
TOC	Total organic carbon
Waste Framework Directive (or WFD)	Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives
WEEE	Waste electrical and electronic equipment

2 EXECUTIVE SUMMARY

This *Study to assess the implementation by EU Member States of certain provisions of Directive 1999/31/EC on the landfill of waste*, carried out for the European Commission's Directorate-General for Environment (DG Environment), investigates the situation in the 28 Member States of the European Union (EU) as regards the landfilling of untreated non-hazardous municipal solid waste. The study:

- Examines the legal and operational implications of the ruling of the European Court of Justice in case C-323/13 (*Malagrotta*);
- Reviews Member States' legal frameworks and their concrete application, including approaches for inspection, to verify if they are sufficient to ensure compliance with pre-treatment requirements;
- Investigates compliance with pre-treatment requirements in 82 landfill sites across the 18 Member States with the highest landfilling rates¹;
- Proposes recommendations to improve the implementation of pre-treatment requirements.

The study is mainly based on desk research, legal analysis and field visits to landfill sites. Input from DG Environment, Member States' national authorities and the EU Network for the Implementation and Enforcement of Environmental Law (IMPEL) also informed the results.

The *Malagrotta* ruling

The ruling in *Malagrotta* clarified that the requirement in Article 6(a) of the Landfill Directive 1999/31/EC entails that:

- All waste *capable of undergoing pre-treatment* has to be pre-treated before it is landfilled. Exceptions are allowed only for inert waste, if pre-treatment is not technically feasible, and for other waste, if pre-treatment would not contribute to the protection of human health or the environment by reducing the quantity of the waste or the hazards it poses;
- Not any pre-treatment whatsoever has to be implemented, but the one which is the *most appropriate* to reduce *as far as possible* negative impacts on the environment and human health. Such pre-treatment should give effect to the waste hierarchy and pursue the best overall environmental outcome;
- Pre-treatment has to include, at a minimum, an *adequate selection* of the different waste streams;
- Pre-treatment has to include, at a minimum, the *stabilisation of the organic fraction* of waste.

The mere transposition of the provisions of the Landfill Directive is not sufficient for Member States to achieve compliance with pre-treatment requirements as described above. Actual fulfilment of those requirements will depend on how the concepts shown in italics are interpreted and applied. The judgment in *Malagrotta* does not provide details in these regards.

Findings about compliance with pre-treatment requirements

Most of the Member States have correctly transposed pre-treatment provisions as set out in the Landfill Directive. In virtually no Member State, however, have provisions been found that would specifically mandate the application of the most appropriate pre-treatment option, or provide guidance as to what pre-treatment option should be applied in different circumstances. Similarly, the adequate selection of waste streams and the stabilisation of the organic fraction are usually not enshrined in individual legal provisions. Nevertheless, compliance may be achieved, and in some instances is achieved, through a combination of legal rules (e.g. requiring separate waste collection, or banning the landfilling of organic waste, etc.) and waste management planning (e.g. high levels of incineration

¹ The 18 Member States were identified at the start of the study based on 2013 Eurostat data, the latest available at that time.

entail that only small amounts of waste are landfilled without pre-treatment). Overall, however, significant problems of compliance are found across the Member States. These include improper transposition of pre-treatment provisions, the persistent practice of landfilling significant amounts of untreated waste, and inadequacy of separate collection systems. In some Member States, the lack of sufficient pre-treatment infrastructure hinders compliance with pre-treatment requirements. In others, new capacity has become operational in 2016 which should allow compliance levels to be improved.

Out of the 82 landfill sites visited, only about a quarter (21) were found to be compliant with pre-treatment requirements. The majority of those compliant (15) were located in three Member States: Lithuania, Poland, and Slovenia.

Inspection of pre-treatment

Compliance with pre-treatment requirements should be verified by competent authorities, among other things, through analysis of self-monitoring reports that the operators of pre-treatment installations and landfill sites have to submit at least annually, and through on-site inspections of those facilities. Inspections are regulated under the Industrial Emissions Directive 2010/75/EU. It falls beyond the scope of this study to assess implementation of this Directive. In several Member States, it appears that the frequency requirements and the risk-based approach to inspections required by Directive are not consistently applied; one reason appears to be resource constraints at environmental inspection authorities. In addition, research by IMPEL indicates that verification of compliance with pre-treatment requirements is often not prioritised during inspections. Failures in the exchange of information among competent authorities, and in the dissemination of such information to the general public, further hinder the verification of compliance with pre-treatment requirements.

Recommendations

In order to improve the implementation of pre-treatment requirements, the following recommendations should be considered:

- EU level: clarify the meaning of pre-treatment; clarify if separate collection can constitute pre-treatment; support Member States in complying with pre-treatment requirements; address pre-treatment in waste management plans; support the development of adequate waste management infrastructure.
- Member State level: improve the transposition of pre-treatment requirements, as well as national regulatory frameworks regarding pre-treatment; appropriately development waste management infrastructure; improve separate waste collection systems; improve compliance at the landfills visited under this study; strengthen inspections.

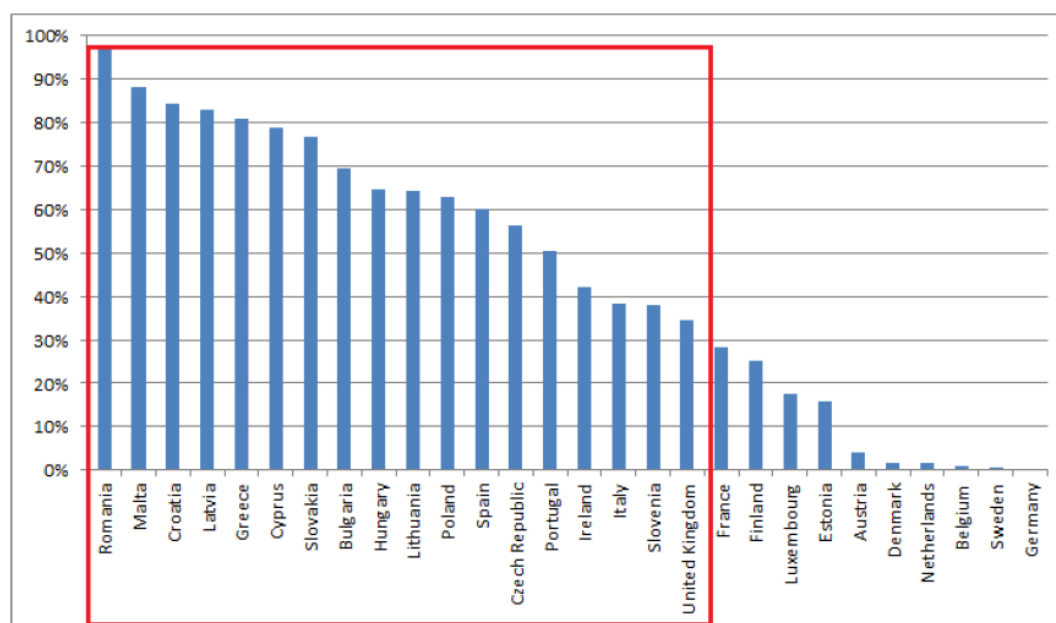
3 INTRODUCTION

This report provides the results of the *Study to assess the implementation by EU Member States of certain provisions of Directive 1999/31/EC on the landfill of waste*, for the European Commission's Directorate-General for Environment (DG Environment). The objective of the study was to assist DG Environment in investigating the situation in the 28 Member States of the European Union (EU) as regards the practice of landfilling untreated non-hazardous municipal solid waste. In particular, the study sought to assess if the provisions on pre-treatment set out in Directive 2008/98/EC on waste (Waste Framework Directive or WFD) and Directive 1999/31/EC on the landfill of waste (Landfill Directive or LD), as interpreted by the European Court of Justice (ECJ) in the ruling in case C-323/13 (so-called *Malagrotta* case), are correctly applied in the Member States.

The study consisted of four tasks:

- Task 1 identified the legal and operational implications of the *Malagrotta* ruling, based on a legal analysis of the ruling, the Waste Framework Directive and the Landfill Directive. It clarified the requirements applicable to the pre-treatment of waste before landfilling.
- Task 2 investigated, on the basis of desk research and legal analysis, if the legal frameworks of the Member States ensured compliance with the Landfill Directive in light of the *Malagrotta* ruling, taking into account legal provisions in force in the Member States as well as available information about their concrete application. Member State authorities were given the opportunity to review and comment on the findings of Task 2.² Their input was used to validate and complement the desk research and legal analysis.
- Task 3 consisted of visits to up to five landfill sites³ (see Annex 1) in the 18 Member States with the highest landfilling rates (shown in a red box in Figure 1 below), aiming to observe the situation on the ground concerning the pre-treatment of non-hazardous municipal solid waste.
- Task 4 developed recommendations to better implement pre-treatment requirements.

Figure 1 - Member States' landfilling rates (Eurostat 2013)



² DG Environment provided a list of officials to be contacted. All officials in the list were contacted via e-mail in November 2016. Input was received from officials representing 16 Member States: Austria, Bulgaria, Czech Republic, Estonia, Finland, Germany, Ireland, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, and United Kingdom.

³ In line with the Terms of Reference for the study, five landfill sites were selected in agreement with DG Environment for each of the 18 Member States with the highest landfilling rates, and visited by the project team. The complete list of landfill sites visited is provided in Annex 1. In three Member States (Cyprus, Ireland, and Malta), fewer than five sites existed which accepted non-hazardous municipal solid waste. Therefore, fewer than five sites could be visited in these countries.

The desk research found limited information on arrangements for the monitoring and enforcement of pre-treatment requirements in the Member States. For example, it was not possible to determine if landfills inspections included controlling that only pre-treated waste was landfilled, or how often such inspections were carried out in practice. During visits to landfill sites, landfills operators were asked questions concerning inspections. The information obtained, however, cannot be generalised as other landfill sites or pre-treatment facilities are not necessarily inspected at the same frequency. Additional insight was gathered through participation in a meeting of the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL)⁴, interviews with IMPEL officials from different Member States⁵, and a short questionnaire administered through the IMPEL information-sharing platform⁶, within the context of the 2011-2016 IMPEL project *Reinforcement programme on inspections skills according to the Landfill Directive*.

This report summarises the results of Tasks 1, 2 and 3, and provides recommendations for improving compliance with pre-treatment provisions, as interpreted in the *Malagrotta* judgment, as required by Task 4. Reports developed under Task 2 for each of the 28 EU Member States, and reports prepared under Task 3 for each of the 18 Member States identified above, are presented separately. The report is structured as follows:

- Section 4 presents the legal and technical implications of the *Malagrotta* ruling, based on Task 1 of this study.
- Section 5 provides a summary of Member States' compliance with pre-treatment provisions, as interpreted in the *Malagrotta* ruling, based on the analysis carried out in Tasks 2 and 3 of this study.
- Section 6 offers recommendations for improving compliance with pre-treatment requirements.
- Annex 1 includes the list of landfill sites visited under Task 3.
- Annex 2 provides a detailed overview of the findings from the landfill site visits conducted under Task 3.

⁴ Reinforcement programme on inspections skills according to the landfill directive, meeting in Zaandam, Netherlands, on 18 November 2016. IMPEL is an international non-profit association of the environmental authorities of EU Member States, acceding and candidate countries to the EU, as well as European Economic Area and European Free Trade Association countries. See <http://www.impel.eu/>

⁵ Interviews focused on Member States where the situation concerning pre-treatment remained less clear after desk research. Contacts of possible interviewees were provided by IMPEL for 10 Member States. All potential interviewees were contacted via e-mail to arrange an interview. Four interviews were carried out with interviewees from the following Member States: Italy, Latvia, Portugal, and Slovenia. Interviews were carried out via phone or, where the interviewee so requested, via e-mail. The latter method allowed for participation of interviewees who did not feel comfortable speaking in English. Where relevant, input from interviews was used to complement or validate the desk research.

⁶ The short questionnaire was approved by the Commission prior to being shared with IMPEL. Input was received from respondents representing three Member States: Belgium, Croatia, and Czech Republic. Where relevant, input from interviews was used to complement or validate the desk research.

4 LEGAL AND TECHNICAL IMPLICATIONS OF THE MALAGROTTA RULING

This section provides an overview of the *Malagrotta* ruling (Section 4.1) and identifies the legal and operational implications of the judgment (Section 4.2).

4.1 OVERVIEW OF THE MALAGROTTA RULING

By its judgment of 15 October 2014 in case C-323/13 *European Commission v. Italian Republic*, the European Court of Justice declared that the Member State had failed to comply with relevant EU waste law insofar as:

- (a) It failed to adopt all necessary measures to **avoid that municipal waste is landfilled without having undergone treatment, including an adequate selection of the different waste streams and the stabilisation of their organic fraction**; and
- (b) It failed to **establish, in one of its regions, an integrated and adequate network of waste management installations, taking into account best available techniques**.

In order to appreciate the importance of the *Malagrotta* ruling, one must consider the legal context of the ruling (see Section 4.1.1), the reading thereof proposed by the European Commission (see Section 4.1.2) and (partly) endorsed by the ECJ (see Section 4.1.3). Thereafter, it will be possible to fully understand the legal and operational implications of the ruling, which are presented in Section 4.2.

4.1.1 Legal context

4.1.1.1 The Waste Framework Directive

The keystone of European Union waste law is Directive 2008/98/EC on waste. This directive, like its predecessors,⁷ establishes a **general legislative framework** for the handling of waste in the EU.⁸

The main objective of this framework is **to protect the environment and human health** by, on the one hand, preventing or reducing the adverse impacts of waste generation and management and, on the other hand, reducing resource use and improving resource efficiency.⁹

The Waste Framework Directive sets out the **definitions** of key terms that are important to correctly understand legal provisions in this area. The most relevant definitions for our purposes are set out in Table 1 below.

Table 1 - Key definitions of the Waste Framework Directive

Waste Framework Directive definitions	Notes
Waste: any substance or object which the holder discards or intends or is required to discard	The ECJ has consistently endorsed a broad definition of 'waste'. ¹⁰ According to its case-law, the concept of waste comprises all objects and substances discarded by their owners, including those that are capable of economic reutilisation

⁷ The first legislative measure that set out a general framework for waste management in the EU was Directive 75/442/EEC. This directive was later repealed and replaced by Directive 2006/12/EC, in turn abrogated and replaced by the Waste Framework Directive.

⁸ See Recital 1, WFD.

⁹ Article 1, WFD.

¹⁰ In joined cases C-418/97 and C-419/97 (*ARCO Chemie Nederland*), the ECJ upheld the principle that 'the concept of waste cannot be interpreted restrictively'.

Waste Framework Directive definitions	Notes
	and those that have a commercial value and are collected for recycling, reclamation or re-use.¹¹ Moreover, the ECJ has clarified that the method of treatment or use of a substance does not determine conclusively whether it is waste. However, certain circumstances may constitute evidence that the substance is waste (e.g. the fact that no use for that substance other than disposal can be envisaged). Hence, the question whether a given substance is waste must be determined in the light of all the circumstances, regard being had to the aim of the directive and the need to ensure that its effectiveness is not undermined.¹² Note however that Article 2 WFD excludes certain waste and materials from its scope.
Bio-waste: biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants	Bio-waste as defined by the Waste Framework Directive constitutes a subset of 'biodegradable waste' – a broader concept defined by the Landfill Directive (see Table 2 below). However, our study did not find significant practical implications from this difference.
Treatment: recovery or disposal operations, including preparation prior to recovery or disposal	Note that the term 'treatment' is defined differently under the Waste Framework Directive and under the Landfill Directive (see Table 2 in Section 4.1.1.2 below). While under the Waste Framework Directive the concept of treatment encompasses all waste recovery and disposal operations, under the Landfill Directive treatment only refers to the pre-treatment of waste before landfilling.
Recovery: any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy	Recovery is meant to achieve the use of waste as a resource, thereby substituting natural resources in the economy and delivering benefits for the environment and human health.¹³ Recovery includes material recovery and energy recovery. The use of municipal solid waste (MSW) as a fuel (or other means to generate energy) is however only considered as energy recovery if certain minimum energy efficiency requirements are met.¹⁴ In general, material recovery should take precedence over energy recovery.¹⁵ Note that material recovery can take place following pre-treatment as defined under the Landfill Directive.
Disposal: any operation which is not recovery even where the operation has as a secondary	Ultimately, all waste is either recovered or disposed of. Thus, waste which is not recovered

¹¹ Joined Cases C-304/94, C-330/94, C-342/95 and C-224/95 (*Tombesi*).

¹² Joined cases C-418/97 and C-419/97 (*ARCO Chemie Nederland*).

¹³ See Article 3, Point 15, and Recital 19, WFD. In cases C-228/00 (*Commission v Germany*) and C-458/00 (*Commission v Luxembourg*), the ECJ confirmed that the incineration of waste constitutes recovery if its main objective is to generate energy, replacing the use of other materials that would have had to be used to fulfil that function, and thereby conserving natural resources.

¹⁴ See Article 23(4) and Annex II, WFD. See also Recital 20, WFD.

¹⁵ See Recital 7, WFD.

Waste Framework Directive definitions	Notes
consequence the reclamation of substances or energy	will be disposed of, e.g. through landfilling or incineration. ¹⁶
Best available techniques: best available techniques as defined in Article 2(11) of Directive 96/61/EC	Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC), was replaced in 2008 by Directive 2008/1/EC, itself superseded by Directive 2010/75/EU on industrial emissions. For the purposes of this study, the best available techniques described in the 2006 <i>Integrated Pollution Prevention and Control Reference Document on Best Available Techniques for the Waste Treatments Industries</i> ('2006 BREF Waste Treatment Industries' or 'BREF')¹⁷ are relevant, even though the BREF only applies to waste treatment industries, not to landfills.

Article 4 WFD establishes the priorities that must inform, in the order stated in that provision, all waste policies. In this so-called '**waste hierarchy**',¹⁸ disposal comes last. In other words, waste disposal is the last resort, which should only take place where other management options – such as prevention, recycling and recovery – are not applicable. While the described waste hierarchy indicates what in most cases constitutes the best overall environmental option,¹⁹ Member States may depart from it, especially where life-cycle thinking shows that, for specific waste streams, such derogation would achieve a better environmental outcome.²⁰ Such departures may not however prejudice the attainment of the targets set out for specific waste streams (described below).

Article 13 WFD sets out the **general requirement that all waste management operations are carried out without endangering human health or harming the environment**.²¹ This is particularly the case for waste disposal operations.²²

In order for waste to be managed properly, an **integrated and adequate network of waste recovery and disposal installations** must be in place. Article 16 WFD requires Member States to take appropriate measures to establish such network,²³ with the aim of becoming self-sufficient in waste management.²⁴ Such network should be designed in such a way as to enable waste to be disposed of or recovered in nearby installations.²⁵

The Waste Framework Directive also contains **specific provisions on individual waste streams**. Most notably, Article 11 WFD mandates the separate collection of at least **paper, metal, plastic and glass** to be put in place by 2015.²⁶ Furthermore, with a view to improving resource efficiency, it requires that:

- (a) By 2020, the preparing for re-use and recycling of at least such materials must be increased to

¹⁶ In case C-6/00 (ASA), the ECJ held that 'it must be possible to classify any waste treatment operation as either a disposal or a recovery operation, and a single operation may not be classified simultaneously as both a disposal and a recovery operation.'

¹⁷ The BREF is available at <http://eippcb.jrc.ec.europa.eu/reference/wi.html>

¹⁸ Article 4(1), WFD.

¹⁹ See Recital 31, WFD. Also note that, in illustrating the reasons that may justify departing from the waste hierarchy, the Recital refers, *inter alia*, to technical feasibility and economic viability.

²⁰ This possibility is expressly set out in Article 4(2), WFD.

²¹ Article 13, WFD.

²² Article 12, WFD.

²³ Article 16(1), WFD.

²⁴ Article 16(2), WFD.

²⁵ Article 16(3), WFD.

²⁶ Article 11(1), WFD.

at least 50% by weight;

- (b) By 2020, the preparing for re-use, recycling and other material recovery of **non-hazardous construction and demolition waste** must be increased to at least 70% by weight.²⁷

Finally, Article 22 WFD requires Member States to encourage the separate collection of **bio-waste** for composting and digestion, the environmentally appropriate treatment of bio-waste, and the use of environmentally safe materials produced from such bio-waste.²⁸

4.1.1.2 The Landfill Directive

In addition to the general framework directive described above, EU waste law is made up of specific legislative measures that govern individual treatment operations and waste streams. The disposal of waste by landfill is a treatment operation regulated by Directive 1999/31/EC on the landfill of waste.

The Landfill Directive aims **to prevent or reduce as far as possible the negative effects on the environment and on human health from landfilling of waste**. It lays down operational and technical requirements, as well as measures, procedures and guidance to achieve this goal.²⁹

Like the Waste Framework Directive, the Landfill Directive lays down the **definitions** of key concepts, some of which are worth recalling here.

Table 2 - Key definitions of the Landfill Directive

Landfill Directive definitions	Notes
Municipal waste: waste from households, as well as other waste which, because of its nature or composition, is similar to waste from household	The Landfill Directive classifies waste according to its origin and hazard characteristics. The concept of 'municipal waste' is based on the origin of the waste (households).
Hazardous waste: any waste which is covered by Article 1(4) of Council Directive 91/689/EEC of 12 December 1991 on hazardous waste	Council Directive 91/689/EEC on hazardous waste was repealed and replaced by the Waste Framework Directive. The Waste Framework Directive defines 'hazardous waste' as waste which displays one or more hazardous properties listed in its Annex III (e.g. the waste is explosive, flammable, ecotoxic, corrosive). ³⁰
Non-hazardous waste: waste which is not covered by paragraph (c)	The Landfill Directive clarifies that any waste not falling within the Waste Framework Directive definition of 'hazardous waste' is non-hazardous waste.
Inert waste: waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant	The definition of 'inert waste' is particularly relevant for the purposes of this study because inert waste may be landfilled without pre-treatment if such pre-treatment is not technically feasible (see further below). Inert waste is characterised by low leachability and pollutant content. Any leachate from inert

²⁷ Article 11(2), WFD.

²⁸ Article 21, WFD also regards a specific waste stream: waste oils. In particular, pursuant to Article 21(1), waste oils must be collected separately where technically feasible, treated in accordance with the waste hierarchy and the protection of human health and the environment, and kept segregated from other kinds of waste or substances where mixing them up would impede treatment and provided this separation is technically feasible and economically viable. However, as waste oils generally are hazardous waste, they are not covered by this study.

²⁹ Article 1(1), LD.

³⁰ Article 2, WFD. The list of hazardous properties is set out in Annex III, WFD.

Landfill Directive definitions	Notes
content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater	waste must have 'insignificant' ecotoxicity, and pose no danger to water or groundwater quality.
Landfill: a waste disposal site for the deposit of the waste onto or into land (i.e. underground), including: — internal waste disposal sites (i.e. landfill where a producer of waste is carrying out its own waste disposal at the place of production), and — a permanent site (i.e. more than one year) which is used for temporary storage of waste, but excluding: — facilities where waste is unloaded in order to permit its preparation for further transport for recovery, treatment or disposal elsewhere, and — storage of waste prior to recovery or treatment for a period less than three years as a general rule, or — storage of waste prior to disposal for a period less than one year	The Landfill Directive applies to any 'landfill' as defined in the Landfill Directive. However, exclusions are set out in Article 3 of the directive.
Treatment: the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery	As mentioned above (Table 1 in Section 4.1.1.1 above), the term 'treatment' is defined differently under the Landfill Directive than under the Waste Framework Directive. In order to avoid confusion, treatment as defined under the Landfill Directive will be called pre-treatment in the rest of this document. It should however be kept in mind that we will use this term merely to avoid confusion. Both the Landfill Directive and the Waste Framework Directive, as well as the <i>Malagrotta</i> judgment, only use the term 'treatment'. It is important to note the very broad definition of pre-treatment set out in the Landfill Directive. The wording of this definition is such that physical processes like e.g. grinding or compressing the waste would appear to constitute pre-treatment under the Landfill Directive, provided they reduce the volume or hazardous nature of the waste, facilitate its handling or enhance recovery (which grinding or compressing the waste arguably do, as they reduce the volume of waste and facilitate its handling). As it will be explained below, however, the ECJ has dismissed this interpretation in the <i>Malagrotta</i> ruling and clarified the meaning of pre-treatment under the Landfill Directive.
Leachate: any liquid percolating through the deposited waste and emitted from or contained within a landfill	Leachate can pollute soil and groundwater. ³¹ The Landfill Directive prescribes the adoption of measures to avoid or minimise such pollution (e.g. preventing water from precipitations or groundwater from entering into the landfilled waste). ³²

³¹ See Recital 12, LD.

³² See Annex I, Section 2, LD.

Landfill Directive definitions	Notes
	Appropriate pre-treatment of waste before landfilling (e.g. through mechanical biological treatments – MBT) can also significantly improve the leaching behaviour of the waste. ³³
Biodegradable waste: any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard	The Landfill Directive defines 'biodegradable waste' by reference to its capability to undergo (anaerobic or aerobic) decomposition. The concept is broader and fully includes that of 'bio-waste' as defined by the Waste Framework Directive (see Table 1 above). However, our study did not find significant practical implications from this difference. The definition of biodegradable waste does not refer to the waste being organic or inorganic. In principle, both organic and inorganic materials biodegrade given sufficient time. However, only organic substances decompose. Therefore, biodegradable waste corresponds to the 'organic fraction' of waste – a term used in the <i>Malagrotta</i> ruling but not in the directives.³⁴

The Landfill Directive applies to landfills as defined above.³⁵ Pursuant to the Landfill Directive, landfills must be classed in three categories, depending on the characteristics of the waste: landfills for hazardous waste, landfills for non-hazardous waste, landfills for inert waste.³⁶ This distinction is important for our purposes, because this project only concerns **landfills of non-hazardous waste**. Pursuant to the Landfill Directive, such landfills may be used for municipal waste, non-hazardous waste of other origin and certain stable, non-reactive hazardous waste, in accordance with the acceptance criteria set out in Annex II to the Landfill Directive³⁷ and further detailed in Decision 2003/33/EC.³⁸

Article 6(a) LD establishes the important rule that **only waste that has been subject to pre-treatment may be placed into a landfill**. It further gives Member States the option not to apply the rule to:

- (a) Inert waste for which treatment is not technically feasible;
- (b) Any other waste for which such treatment does not contribute to the objectives of the Landfill Directive to reduce the quantity of waste or the hazards to human health or the environment.

Neither the directive nor the *Malagrotta* ruling clarify the point at which pre-treatment should take place. Pre-treatment could thus be understood to include the segregation of different waste streams by

³³ 2006 BREF Waste Treatment Industries.

³⁴ The directives use the terms 'organic matter', 'organic waste components' (Annex II, Section 2, LD), 'organic material' (Annex III, Section 3, Footnote 4, LD and Article 3, Point 17, WFD), and 'organic substances' (Annex II, Point R3, WFD), without however defining them.

³⁵ Article 3(1), LD. However, note the exclusions set out in the remainder of Article 3, LD. Also note the temporary derogations allowed under Article 14, LD.

³⁶ Article 4, LD.

³⁷ Article 6(c), LD.

³⁸ Council Decision 2003/33/EC of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Note that, under Article 5(3), LD, certain waste may never be accepted into a landfill.

waste producers (e.g. households and businesses).³⁹ Such segregation would be in line with the objectives of achieving a better overall outcome for the protection of human health and the environment (and thus with the *Malagrotta* ruling). However, it may also be considered that pre-treatment can only occur once the waste has been collected by the appropriate body and prior to disposal, as actions by waste producers do not constitute pre-treatment for the purposes of the Landfill Directive.⁴⁰

Finally, it is worth recalling that the Landfill Directive requires Member States to adopt national strategies to **reduce the landfilling of biodegradable waste** by e.g. recycling, composting, biogas production or recovery of materials or energy.⁴¹ Such strategies must enable Member States to meet the Landfill Directive targets of:

- (a) By 2006, reducing biodegradable waste going to landfills to 75% of the total amount of biodegradable municipal waste produced by each Member State in 1995 (or the latest year before 1995 for which standardised Eurostat data is available);
- (b) By 2009, reducing biodegradable waste going to landfills to 50% of said amount;
- (c) By 2016, reducing biodegradable waste going to landfills to 35% of said amount.⁴²

4.1.2 The pleadings of the European Commission in the *Malagrotta* case

As mentioned above (Table 2 in Section 4.1.1.2), the Landfill Directive's definition of pre-treatment is worded in such a way as to suggest that physical processes constitute pre-treatment for the purposes of the directive, provided that they reduce the volume or hazardous nature of the waste, facilitate its handling or enhance recovery.

Italian authorities had allowed the landfilling of ground and/or compressed waste, considering that waste processed in such a way should be considered as pre-treated for the purposes of the Landfill Directive.⁴³

The European Commission contested such interpretation, arguing that the Landfill Directive's definition of pre-treatment should not be read in isolation, but in the light of the objectives of the Landfill Directive and the Waste Framework Directive to prevent or reduce negative impacts on the environment and human health.⁴⁴ Understood in this way, pre-treatment under the Landfill Directive may not simply consist of changing the characteristics of waste to reduce its volume or hazardous nature, facilitate its handling or enhance recovery – 'it must also result in preventing and reducing as far as possible hazards for human health and negative impacts on the environment'.⁴⁵ Merely grinding or compressing waste, without an adequate selection of different waste streams and some form of stabilisation of such streams, would not help pursue those objectives and would not therefore represent pre-treatment for the purposes of the Landfill Directive.⁴⁶ Rather – the European Commission argued –

³⁹ Article 2(h), LD defines 'treatment' as including sorting. The term 'sorting' is not defined in the Landfill Directive or Waste Framework Directive, so the definition does not help answer the question of whether sorting by waste producers constitutes pre-treatment for the purposes of the Landfill Directive.

⁴⁰ The Landfill Directive refers to 'treatment processes' (Recital 8, LD), thus suggesting that pre-treatment is a specialised technical operation. The reference to technical feasibility in Article 6(a) LD may be read as supporting this interpretation.

⁴¹ Article 5(1), LD.

⁴² Article 5(2), LD, read in conjunction with Article 18(1), LD. The Landfill Directive entered into force on 16 July 1999. Note that Article 5(2), third subparagraph, LD, allows Member States that in the baseline year landfilled more than 80% of their collected municipal waste to postpone the achievement of the targets by a period not exceeding four years.

⁴³ *Malagrotta*, paragraphs 13 and 14.

⁴⁴ *Malagrotta*, paragraphs 14 and 22. The European Commission referred, in particular, to Article 1, LD and to Articles 1, 4 and 13, WFD.

⁴⁵ *Malagrotta*, paragraphs 14 and 21.

⁴⁶ *Malagrotta*, paragraphs 14, 21 and 23.

‘insofar as a pre-treatment [option] exists which makes it possible to achieve a better overall outcome for the protection of human health and the environment...Member States would be obliged to adopt such pre-treatment [option]’.⁴⁷

In addition, the European Commission claimed that Italy had failed to establish an integrated and adequate network of waste disposal and recovery installations, taking into account best available techniques. In support of this contention, the European Commission pointed to the deficit in the mechanical-biological pre-treatment capacity in the region concerned. The insufficiency of that capacity was in turn deducted from the regional waste management plan, and from various emergency measures adopted by the Italian authorities.⁴⁸

4.1.3 The decision of the European Court of Justice – Critical review

After recalling that, under Article 6(a) LD, only waste that has been subject to pre-treatment may be landfilled, and the definition of pre-treatment in Article 2(h) LD, the ECJ stated that from a combined reading of those articles it follows that Member States are required ‘to take the necessary measures to ensure that all waste is subject to pre-treatment *which lends itself to it*, and that therefore no waste *capable of undergoing such pre-treatment* is landfilled as it is’ (emphasis added).⁴⁹

By underlining that the requirement to pre-treat waste (only) applies to waste which is capable of undergoing such pre-treatment, the ECJ defined the scope of the obligation more narrowly than the European Commission. The approach endorsed by the ECJ is however justified by the fact that the provision in Article 6(a) LD is itself qualified by the possibility to not pre-treat inert waste for which such pre-treatment is not technically feasible, or other waste for which pre-treatment does not contribute to the objectives of the directive (see Section 4.1.1.2 above). While the opening paragraphs of the ECJ’s decision in the *Malagrotta* case keep that possibility open, the remainder of the judgment reduces the space for such exceptions insofar as waste other than inert waste is concerned.

Indeed, the ECJ adhered to the purpose-driven interpretation suggested by the European Commission, and held that, taking into account the objectives of the Landfill Directive, *in transposing and applying* the directive, ‘Member States may [not] opt for any pre-treatment of waste whatsoever’, but rather have ‘the obligation to search and implement the *most appropriate* pre-treatment, including the stabilisation of the organic fraction of such waste, in order to reduce *as far as possible* the negative impacts of waste on the environment and, therefore, on human health’ (emphasis added).⁵⁰

It is worth of note that the ECJ expressly referred to both the legal transposition and the practical application of the directive, suggesting that not only the actual performance of pre-treatment operations, but also domestic legal provisions governing pre-treatment, must ensure compliance with the principles established in the *Malagrotta* ruling.

The ECJ endorsed the European Commission’s argument that not any pre-treatment complies with Article 6(a) LD, read in the light of the objectives of that directive, but only the most appropriate pre-treatment option that reduces as far as possible adverse impacts on human health and the environment. How stringent this obligation is clearly depends on the meaning given to the general clauses *most appropriate* and *as far as possible*. Against what criteria should appropriateness be judged? Is it a static or dynamic concept, so that expected future changes in waste amounts and characteristics should be taken into account? Should reference be made only to theoretical possibility, so that all depends on pre-treatment technologies? Or rather to economic possibility, thus taking into account also the cost-

⁴⁷ *Malagrotta*, paragraphs 21 and 22. Interestingly, Italy did not contest the interpretation of the concept of pre-treatment proposed by the European Commission. See *Malagrotta*, paragraph 24. Own translation.

⁴⁸ *Malagrotta*, paragraphs 26 and 46. Again, Italy did not deny that pre-treatment capacity in the region was insufficient.

⁴⁹ *Malagrotta*, paragraph 31. Own translation.

⁵⁰ *Malagrotta*, paragraph 33.

effectiveness of different options? What other trade-offs should be considered?⁵¹ These questions are not addressed in existing EU legislation⁵² or in the *Malagrotta* ruling, thus leaving leeway to Member States in implementing its principles in their laws and decision-making procedures – and offering opportunities for future developments in case-law. For the time being, it may be argued that the judgment of appropriateness must certainly consider the objectives of the Landfill Directive and Waste Framework Directive and the criterion of best overall environmental outcome⁵³ (the application of this criterion may for example justify less-than-optimal choices of pre-treatment options coupled with improved sorting).

While the judgment leaves questions open, and a correspondingly wide room of discretion in its implementation, it does lay down that, in order to comply with the directive, pre-treatment must at a minimum include (i) an adequate selection of the different waste streams,⁵⁴ and (ii) the stabilisation of the organic fraction of waste.

However, the ECJ stopped short of endorsing the European Commission's contention that there is a strict obligation upon Member States according to which, 'insofar as a pre-treatment [option] exists which makes it possible to achieve a better overall outcome for the protection of human health and the environment...Member States would be obliged to adopt such pre-treatment [option]' (see Section 4.1.2 above).

In relation to the alleged failure to establish an integrated and adequate network of waste disposal and recovery installations, taking into account best available techniques, the ECJ did not have to adjudicate on whether the European Commission's argument, which was based on an analysis of regional waste management plans and emergency measures adopted by the Italian authorities, was conclusive – Italy conceded the point.

4.2 LEGAL AND OPERATIONAL IMPLICATIONS OF THE MALAGROTTA RULING

In summary, the *Malagrotta* ruling confirmed the Landfill Directive's principle that all waste *capable of undergoing pre-treatment* must be pre-treated before being landfilled. In qualifying the principle, the *Malagrotta* ruling is respectful of the derogations allowed by the Landfill Directive.

The judgment added two minimum requirements for pre-treatment – it must include (i) an adequate selection of the different waste streams and (ii) the stabilisation of the organic fraction of waste.

Beyond this, the *Malagrotta* ruling clarified that, in transposing and applying the Landfill Directive, Member States must aim for *the most appropriate* pre-treatment option in order to reduce *as far as possible* negative impacts on the environment and human health. It however left to the discretion of Member States (and future case law) to determine what is most appropriate and possible in individual cases.

Based on the above analysis of the main elements of the judgment, the table below summarises the ECJ's conclusions in the *Malagrotta* ruling, sets out their legal meaning, and clarifies their operational implications.

⁵¹ Note, for example, that the 2006 BREF Waste Treatment Industries states that '[t]he selection of a treatment is not only a function of the type of waste, but other issues such as local constraints (e.g. waste strategy), logistic considerations and what type of treatments are available in the region are also important issues to consider'.

⁵² See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

⁵³ This criterion, explicitly set out in Article 4(2) WFD, is mentioned in *Malagrotta*, paragraph 36.

⁵⁴ The adequate selection of the different waste streams is actually never discussed by the ECJ – it only appears in the conclusions of the judgment.

Table 3 - Legal and operational implications of the *Malagrotta* ruling

Legal explanation	Operational implications
<i>Member States must take the necessary measures to ensure that only waste that has already been treated is placed in landfills. All waste which is capable of undergoing pre-treatment shall be pre-treated before landfilling.</i>	
Article 6(a) LD requires that only waste that has been subject to pre-treatment is landfilled. Neither the directive nor the <i>Malagrotta</i> ruling clarify the point at which pre-treatment should take place. In principle, the pre-treatment of waste could include the actions of waste producers (e.g. households and businesses) to segregate recyclable materials and biodegradable waste. This would meet the objective of achieving a better overall outcome for the protection of human health and the environment. However, it may also be considered that pre-treatment can only occur once the waste has been collected by the appropriate body and prior to disposal. The pre-treatment requirement is not absolute, as it may not apply to (i) inert waste for which pre-treatment is not technically feasible, as well as (ii) to any other waste for which such pre-treatment does not contribute to the objectives of the directive. In relation to case (i), the condition is technical feasibility. In relation to case (ii), it will be necessary to demonstrate that pre-treatment would not contribute to the achievement of the directive's objectives to prevent or reduce hazards for human health or adverse impacts for the environment. The <i>Malagrotta</i> ruling confirms the principle that waste must be pre-treated before being landfilled. The qualification that this rule applies to waste which is capable of undergoing pre-treatment is respectful of the derogations described above. Finally, account must be taken of the fact that, after the <i>Malagrotta</i> ruling, certain pre-treatment operations must always be applied (see further below).	There is limited discussion on the point at which pre-treatment waste can take place and thus the operational implications are open to discussion. The pre-treatment of waste could include the actions of waste producers (e.g. households and businesses) to segregate recyclable materials and biodegradable waste. In areas where successful measures to enable the source segregation of recyclable materials (paper, metal, plastic, glass and non-hazardous construction and demolition waste) and bio-waste (garden and food) are in place, only a small proportion of recyclable materials remain within the residual fraction. Therefore, it could be considered that MSW has undergone a sufficient pre-treatment to meet the objectives of the Landfill Directive and the remaining is suitable for disposal in landfills. In areas where source segregation is not in place, and all waste materials are mixed together within the MSW stream, pre-treatment measures are required. The recyclable and biodegradable fractions must be pre-treated because they are capable of being pre-treated. The recyclable fraction may typically include ferrous and non-ferrous metals, and different categories of plastics, and, if the input waste is suitable, cardboard and aggregates may also be recovered. The quality of recycling and biodegradable waste segregated from mixed MSW is lower compared to source segregated materials due to higher levels of contamination. Source segregated materials typically have higher market value and re-processing potential. Biodegradable waste segregated from mixed MSW has limited use and value even after biological stabilisation due to potential chemical contaminants such as heavy metals and physical contamination with non-biodegradable materials such as glass and plastic. As a result, they will commonly require disposal in landfills or in thermal treatment facilities. Source segregated bio-waste from parks and gardens is less contaminated and can be biologically treated before being utilised as

	an organic fertiliser to replace inorganic chemical fertilisers. Similarly the poorer quality of recyclables produced from mixed MSW often fail to meet re-processor's specifications and are often rejected and then disposed in landfill as a consequence. The level at which household segregation of recyclable material and biodegradable waste becomes insufficient to demonstrate pre-treatment is unclear. If only a small percentage is source segregated then further pre-treatment of the residual might be required to meet the objectives of the Waste Framework Directive and Landfill Directive. Linked to this, poor source segregation can lead to high levels of contamination and the rejection of material streams by re-processors. The rejected material has undergone pre-treatment, however it was insufficient to divert that waste from landfill and may result in it being sent for disposal. It is unclear if this is acceptable or if the reject material requires additional pre-treatment before landfill disposal. Poor source segregation leading to low quality recyclates and their rejection by re-processors would thus not be considered acceptable. The requirement for pre-treatment is not applicable to (i) inert waste for which pre-treatment is not technically feasible, or (ii) to any other waste for which such pre-treatment does not contribute to the objectives of the directive. The correct classification of waste streams is important to ensure that inert materials are not subjected to unnecessary pre-treatment because they are not technically feasible. Inert waste streams should remain separated from other waste streams. The classification and identification of (ii) any other waste for which such pre-treatment does not contribute to the objectives of the directive may lead to uncertainties. Member States will be required to justify and evidence that pre-treatment will not contribute towards the directives' objectives and therefore should not be pre-treated.
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In transposing and applying the directive, Member States are not free to choose any pre-treatment whatsoever, but must search and implement the most appropriate pre-treatment option in order to reduce as far as possible negative impacts on the environment and human health. Pre-treatment options should be designed in a way that allows giving full effect to the waste hierarchy to ensure best overall environmental outcome.

The reference to transposition and application indicates that Member States must ensure compliance with this conclusion of the *Malagrotta* ruling both through their regulatory frameworks and through practical administrative action.

Member States are required to search and implement *the most appropriate* pre-treatment option. The judgment does not provide criteria to guide the determination of which pre-treatment option is most appropriate, other than the reference to the objectives of the Landfill Directive and Waste Framework Directive. In particular, pre-treatment options should be designed in a way that allows giving full effect to the waste hierarchy.

In the light of the Waste Framework Directive and of the *Malagrotta* ruling, a further criterion may be mentioned, which consists of the pursuit of the best environmental outcome overall.

While certainly such criteria play a central role in the choice of the pre-treatment option to apply in each case, the relevance of other considerations may not be excluded (e.g. economic considerations, consideration of the expected future evolution of waste amounts and characteristics).

Thus, insofar as the determination of what pre-treatment option is most appropriate, the *Malagrotta* ruling leaves room of discretion to Member States.

After the ruling, this discretion is however limited by the fact that certain pre-treatment operations must always be applied (see further below).

The 'most appropriate pre-treatment option' is dependent on a wide range of factors including the waste's characteristics and composition, the existing waste management infrastructure and its proximity, BAT, the financial cost of pre-treatment and its effectiveness at reducing the risk of harm to human health and the environment. Moreover, trade-offs would need to be considered (e.g. where the most ambitious pre-treatment option available is more expensive or less available than incineration, Member States could resort to incineration over disposal in landfills). In each case, a detailed assessment may be required to determine the 'most appropriate' pre-treatment option.

Life cycle assessments or option appraisals could be considered as decision based tools to ensure that any negative environmental and human health impacts are considered and mitigated while considering other factors.

Although it is important to 'reduce as far as possible negative impacts' individual circumstances would require the 'most appropriate pre-treatment option' to be selected while considering the BAT and economic, process outputs and markets, the need for transportation to more distant facilities with better treatment, and political considerations.

As previously mentioned, poor source segregation or low quality treatment methods can lead to pre-treated materials being rejected by re-processors. This would be unacceptable as pre-treatment that leads to rejected materials suggests that the most appropriate pre-treatment is not in use. It is open to interpretation where the level of rejection is too high and if more appropriate pre-treatment methods are required.

If Member States and/or operators choose to implement MBT, the MBT installation will have to be designed in such a way that it allows giving full effect to the waste hierarchy, i.e. to separate to the extent possible waste that has not been separately collected and that is still recyclable or recoverable. With the reference to the waste hierarchy and the clarification of the term "treatment", the Court has pointed to an obligation to isolate recoverable but not recyclable waste and to treat it

	in accordance with the waste hierarchy.
<i>Pre-treatment must at a minimum include:</i> <i>(i) an adequate selection of the different waste streams/fractions [...].</i>	
While the <i>Malagrotta</i> ruling leaves some space for interpretation of its conclusions on which pre-treatment option to apply, it also sets minimum pre-treatment requirements, the first of which demands an adequate selection of the different waste streams. There is no definition of 'waste stream' or 'waste fractions' in the Landfill Directive or Waste Framework Directive. However, from how the term 'waste stream' is used in the Waste Framework Directive,⁵⁵ it follows that different waste streams are constituted of waste of different type and nature, with such difference resulting in specific treatment options being appropriate for each individual stream. The term 'waste fraction' is not used in the Landfill Directive. It is used only once in the Waste Framework Directive,⁵⁶ and several times in the <i>Malagrotta</i> ruling. From the way the term is used, it is clear that it refers to a specific subset of a larger waste stream. For example, the organic fraction of MSW is only that part of MSW which is organic. Again, the conclusion uses the general clause of 'adequate' selection, without defining what criteria should apply to determine what selection is adequate. As discussed above, the directives' objectives and the best environmental outcome overall are certainly relevant criteria, perhaps among others. For example, it may be argued that, in order to be adequate, the selection must always ensure the segregation of biodegradable waste in pre-treatment, as this would help achieve the Landfill Directive targets to reduce the landfilling of biodegradable waste. Furthermore, an appropriate selection should arguably sort out the waste streams for which the Waste Framework Directive lays down specific treatment requirements, i.e. at least paper, metal, plastic, glass, non-hazardous construction and demolition waste (by 2020), waste oils and bio-waste. It may also be argued that, apart from segregating different waste streams, adequate selection should reflect the different composition and qualities of waste	As previously mentioned the point at which pre-treatment is conducted is not specified and is open to interpretation. Source segregation of recyclable materials by households and businesses can cover a range of different recyclable materials including biodegradable waste. The materials to be segregated could be influenced by the availability of local reprocessing facilities to reprocess these materials. To encourage maximum participation in source segregation schemes, recyclable materials are commonly collected in co-mingled containers. For example, paper is collected with cardboard, or glass is collected with metals. Where co-mingled recyclates are collected together, material streams are sent for a second stage of pre-treatment to separate the individual materials streams and remove any contamination before being sent for reprocessing. Where recyclable material is mixed within un-sorted MSW and pre-treatment is required, evidence may be required to demonstrate that a pre-treatment process has been applied to the mixed MSW. In this case, pre-treatment could include processing through a 'dirty' Materials Recovery Facility (MRF), mechanical biological treatment or similar. A clear understanding of waste source, movement and treatment of any waste emerging from these processes and requiring landfilling may be required to demonstrate traceability and provide evidence that a pre-treatment has been undertaken prior to disposal. As an example, landfills would potentially have to take responsibility for ensuring that any waste accepted has received adequate pre-

⁵⁵ See, in particular, Article 3, Point 11, WFD.

⁵⁶ The Waste Framework Directive only uses the term 'fractions' once, in relation to hazardous waste. See Article 20, second subparagraph, WFD.

within an individual stream, in order to allow the application of the most appropriate pre-treatment process.⁵⁷ Understood in this way, the requirement for adequate selection would become integrated in the criteria and procedures for accepting waste into landfills and for determining which pre-treatment option to apply.⁵⁸ In addition, it is worth noting that the <i>Malagrotta</i> ruling refers to the 'selection' of waste streams, as opposed to 'separate collection'.⁵⁹ This entails that the selection must not necessarily take place upstream, but may occur at waste recovery or disposal stage.	treatment and where this cannot be traced, be forced to reject the material unless there are suitable provisions for an adequate pre-treatment on site. The adequate selection of recyclable material from mixed MSW may lead to greater transport distances to ensure suitable BAT. There is potential to increase the overall environmental and human impact based on additional transport/emissions.
<i>Pre-treatment must at a minimum include: [...] (ii) the stabilisation of the organic fraction of waste.</i>	
The second minimum pre-treatment requirement established in the <i>Malagrotta</i> ruling is the obligation to always stabilise the organic fraction of waste. There is no definition of 'organic fraction' of waste in either the Landfill Directive or the Waste Framework Directive. However, this term effectively corresponds to the concept of biodegradable waste as defined under the Landfill Directive. The stabilisation of the organic fraction of waste is important because it reduces the organic matter content of the waste which is then sent to final disposal (landfill or incineration) and it renders inert any biologically active organic materials (emissions from the stabilised residues can be reduced by about 90-98% compared to non-pre-treated waste under landfill conditions).⁶⁰	There is no clear discussion of what is considered 'stabilisation'. It is assumed this means aerobic or anaerobic decomposition, however what is considered to be an adequate level of stabilisation is not specified. The potential testing criteria and required levels of stabilisation could be interpreted differently by Member States. Evidence to prove an adequate stabilisation has been achieved would also have to be documented in order to prove the requirement has been met. If the level of adequate stabilisation is set this could apply to the whole waste stream before landfill disposal or if biodegradable waste is segregated from the mixed MSW, only be applied to the biodegradable fraction. If the biodegradable waste fraction is not removed from mixed MSW, then stabilisation would be required on a larger volume of waste before disposal into landfills. The organic (or biodegradable) fraction of MSW can be segregated by households for aerobic or anaerobic biological treatment. The stabilised organic outputs from these processes can be a valuable and marketable by-product as an organic fertiliser for use on agricultural land. In the case of anaerobic digestion, valuable biogas is also generated and can be used to generate heat and power or upgraded

⁵⁷ The 2006 BREF Waste Treatment Industries explains that such selection cannot be based solely on waste codes as set out in Commission Decision 2000/532/EC as amended (so-called European Waste Catalogue), because 'waste codes do not give much information in many cases about the composition of the waste classified. Waste with the same waste code may have totally different compositions and qualities'.

⁵⁸ See Annex II, LD. See also, in more detail, Council Decision 2003/33/EC (referred to in footnote 38).

⁵⁹ According to Article 3, Point 11, WFD, 'separate collection means the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment'.

⁶⁰ See 2006 BREF Waste Treatment Industries, pp. 50-51.

	for direct injection to national gas infrastructure. Biodegradable waste segregated from mixed MSW has the potential to contain heavy metals, plastic and glass restricting its use on agricultural land. The stabilised biodegradable waste will still be required to be disposed of in landfill after pre-treatment due to its high contamination. Source segregated biodegradable waste has a greater market value compared to the biodegradable waste extracted from mixed MSW.
Member States must establish an integrated and adequate network of mixed municipal and recovery facilities, taking into account the best available techniques.	
In the last conclusion of the <i>Malagrotta</i> judgment, the ECJ declared that Italy failed to fulfil its obligations under Article 16(1) WFD because it had not established an integrated and adequate network of waste management installations, taking into account best available techniques. The judgment is extremely brief on this point. The Commission inferred the existence of the violation from the insufficiency of MBT capacity in two Optimal Territorial Ambits (ATOs). ATOs are subdivisions of the national territory at the level of which Italy had decided to organise its waste management policy. They often correspond to provinces, and therefore fall between the regional and the local level. It is interesting to note, in this regard, that the principle of self-sufficiency laid down in Article 16(2) WFD applies to the Member State as a whole, not to the smaller subdivisions at the level of which the Member State may have chosen to organise its waste management policy. The principle of proximity, set out in Article 16(3) WFD, seeks to ensure waste is treated in the nearest appropriate installation to where it is generated, but it does not clearly entail that e.g. transfer within the same region is forbidden. However, earlier case law has clarified that, while 'Member States enjoy a measure of discretion as to the territorial basis which they consider appropriate if they are to achieve national self-sufficiency', if they choose to organise waste management at a lower-than-national level, then the principles of self-sufficiency and proximity should in principle be achieved at that level.⁶¹	Member States enjoy some discretion concerning the level at which they apply the principles of self-sufficiency and proximity. However, once they have made this determination, they must ensure that the network of waste recovery and disposal installations available within the area of choice is adequate to ensure the treatment of municipal waste generated in that area. Moreover, in establishing this network, Member States must take into account best available techniques. Insofar as waste treatment is concerned, these techniques are described in the 2006 BREF Waste Treatment Industries. Insofar as landfills are concerned, the provisions of the Landfill Directive constitute best available techniques.⁶³

⁶¹ Case C-297/08, *Commission v. Italian Republic*, Judgment of the Court (Fourth Chamber) of 4 March 2010. The quotation is from paragraph 62.

⁶³ Article 1(2) LD.

Italy conceded the Commission's claims. Therefore, the Court briefly adjudicated in favour of the Commission. It is also worth noting that, following the entry into force of the Waste Framework Directive, the principles of self-sufficiency and proximity apply in relation to both the disposal and the recovery of (mixed) municipal waste.⁶²	
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⁶² Both Article 16(2) and 16(3) WFD explicitly refer to both disposal and recovery of (mixed) municipal solid waste. This was not the case under the previous Council Directive 75/442/EEC on waste, whose Article 5 limited the principles of self-sufficiency and proximity to waste disposal only. Under Article 5 of Council Directive 75/442/EEC, the ECJ had concluded that the principles did not apply to waste recovery (case C-203/96, *Dusseldorp*, Judgment of the Court (Sixth Chamber) of 25 June 1998). This jurisprudence must be considered superseded by the Waste Framework Directive.

5 MEMBER STATES' COMPLIANCE WITH PRE-TREATMENT REQUIREMENTS

In order to assess Member States' compliance with the pre-treatment provisions of the Landfill Directive, as interpreted by the European Court of Justice in the *Malagrotta* ruling, we have reviewed key legislation, waste management plans and a selection of landfill permits in each Member State. Where appropriate, information from these sources was complemented through targeted desk research (e.g. to find relevant statistical data on waste management and pre-treatment).

Based on the Directives and on the *Malagrotta* ruling, Table 4 below summarises the key pre-treatment provisions against which compliance is assessed in the rest of this section.

Table 4 - Conclusions of the *Malagrotta* decision

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	The first conclusion of the <i>Malagrotta</i> judgment is that, pursuant to Article 6(a) of the Landfill Directive, all waste capable of undergoing pre-treatment must be pre-treated before it is placed in a landfill. Article 6(a) LD allows exceptions from this pre-treatment requirement for inert waste, where pre-treatment is not technically feasible, and for other waste, where pre-treatment would not contribute to the protection of human health or the environment by reducing the quantity of the waste or the hazards it poses. In order to verify compliance with this requirement, we considered both the legal provisions in force in the Member States, and the available information on their actual application. The legal provisions assessed included the definition of pre-treatment (Article 2(h) LD), and the requirement that waste must be pre-treated before landfilling (Article 6(a) LD).
2	Most appropriate pre-treatment option is applied	The second conclusion of the <i>Malagrotta</i> judgment is that Member States are not free to choose any pre-treatment whatsoever, but must search and implement the most appropriate pre-treatment option in order to reduce as far as possible negative impacts on the environment and human health. Such pre-treatment options should be designed in a way that allows giving full effect to the waste hierarchy to ensure best overall environmental outcome. In order to comply with this conclusion of the <i>Malagrotta</i> ruling, the mere transposition of the provisions of the Landfill Directive is not enough – Member States would need to have in place additional requirements concerning which pre-treatment processes are appropriate in different circumstances, or they would need to set criteria for making such determinations on a case-by-case basis.
3	Adequate selection of waste streams	The third conclusion of the <i>Malagrotta</i> judgment is that pre-treatment must at a minimum include an adequate selection of the different waste streams/fractions. Again, Member States would need to do something more than transposing the Landfill Directive in order to comply with this requirement.
4	Stabilisation of the organic fraction	The fourth conclusion of the <i>Malagrotta</i> judgment is that pre-treatment must at a minimum include the stabilisation of the organic fraction of waste. Like above, Member States would need to do something more than transposing the Landfill Directive in order to comply with this requirement.

5.1 OVERVIEW OF MEMBER STATES' COMPLIANCE WITH PRE-TREATMENT PROVISIONS

This section provides an overview of our conclusions on Member States' compliance with pre-treatment provisions (Table 5 below) and identifies key trends across Member States. Subsequent sections summarise key findings for each Member State.

Table 5 - Overview of Member States' compliance with the Landfill Directive in light of the *Malagrotta* decision

Key	
	The Member State fulfils requirements of the Landfill Directive in light of the <i>Malagrotta</i> ruling.
	The Member State (i) has provisions that support compliance but it does not completely fulfil the requirements of the Landfill Directive in light of the <i>Malagrotta</i> ruling; or (ii) has provisions that support compliance but there are indications that they are not being effectively applied in practice.
	The Member State does not fulfil the requirements of the Landfill Directive in light of the <i>Malagrotta</i> ruling.

Member State	The <i>Malagrotta</i> ruling conclusions				
	All waste is pre-treated		Most appropriate pre-treatment option is applied	Adequate selection of waste streams	Stabilisation of the organic fraction
	Definition of pre-treatment	Pre-treatment requirement			
Austria					
Belgium					
Bulgaria					
Croatia					
Cyprus					
Czech Republic					
Denmark					
Estonia					
Finland					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Poland					
Portugal					
Romania					
Slovakia					
Slovenia					
Spain					
Sweden					
UK					

The following overall trends are identified:

- Most Member States have **correctly transposed the pre-treatment provisions** of the Landfill Directive. However:

- The **definition of treatment** set out in Article 2(h) LD was **not transposed** in ten Member States – Austria, Belgium,⁶⁴ Croatia, Germany, Hungary, Ireland, Malta, Portugal, Romania, and the United Kingdom.⁶⁵ Failure to define treatment as required by the Directive can lead to confusion as to what type of operations can be regarded as fulfilling the pre-treatment requirement.
- The **pre-treatment requirement** of Article 6(a) LD was **not specifically transposed** in France, which however only allows the landfilling of waste that cannot be used or recovered under the current technical and economic conditions by extracting recoverable parts or reducing its polluting or otherwise hazardous characteristics.
- Cyprus and Slovakia introduced **exceptions from the pre-treatment requirement** which are not allowed by the Landfill Directive, permitting the landfilling of waste, other than inert waste, where pre-treatment is not technically feasible. The Directive allows this ground of exception only for inert waste. Insofar as other waste is concerned, the Directive permits exceptions only where pre-treatment would not contribute to reaching the objectives of the Directive by reducing the quantity of waste or the hazards it poses to human health and the environment.
- Five Member States (Estonia⁶⁶, Ireland⁶⁷, Latvia⁶⁸, Luxembourg⁶⁹, and the United Kingdom⁷⁰) consider **separate collection as a form of pre-treatment**.⁷¹ The Commission has raised doubts⁷² about whether effective separate collection can, by itself, fulfil the pre-treatment requirement of Article 6(a) LD (on this point, also see section 6.1).

⁶⁴ The definition is not transposed in Flanders, but it is in other regions.

⁶⁵ The definition is not transposed in England and Wales, but it is in Scotland and Northern Ireland. In addition, the definition is not transposed in the Åland Islands of Finland. However, because most of the waste generated in this part of the country is shipped for treatment to mainland Finland, where the definition is correctly transposed, the problem of conformity can be considered as having limited practical effect.

⁶⁶ In Estonia, waste streams that must be collected separately include paper and cardboard, packaging waste, plastics, metals, glass, biodegradable and non-biodegradable garden and park waste, wood, biodegradable kitchen and canteen waste; if the local government has organised separate collection in such a way as to significantly reduce the amount of mixed residual waste going to landfills, and increase recovery, then the mixed residual waste is considered as pre-treated. See Task 2 country report for more details.

⁶⁷ In Ireland, the minimum acceptable pre-treatment for MSW landfills consists of a source separated collection system (2 bin or equivalent) and, in the case of urban areas (population higher than 1,500 inhabitants), also separate collection of bio-waste (3 bin); where separate collection is not carried out to these standards, MBT must be applied in order to achieve an equivalent level of recovery. See Task 2 country report for more details.

⁶⁸ In Latvia, the national waste management plan states that a system for the separate collection of paper, metal, plastic and glass waste has been established; no requirement was found to separate and separately collect biodegradable waste; separate collection is considered part of the pre-treatment. See Task 2 country report for more details.

⁶⁹ In Luxembourg, the waste national waste management plan states that the separate collection system covers, most notably, packaging waste (plastic, metal, cardboard), wood, as well as organic waste; pre-treatment is considered to include separation at source. See Task 2 country report for more details.

⁷⁰ In England, separate collection notably covers paper, metal, plastic and glass waste (local councils decide based on local circumstances whether to offer separate collection of bio-waste); in Scotland, separate collection notably covers metal, plastic, glass, paper and cardboard waste (as well as food waste from food businesses which are located in non-rural areas and produce such waste in excess of set thresholds); in Northern Ireland, separate collection covers paper, metal, plastic and glass waste (as well as food waste from food businesses which produce such waste in excess of set thresholds). See Task 2 country report for more details.

⁷¹ This study focused on pre-treatment in order to prepare waste for disposal in landfills. It did not therefore investigate in detail the separate collection systems of the Member States. Confirmation that some Member States consider residual waste originating from a well performed separate collection as pre-treated, if certain conditions are met, can be found in Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

⁷² In the letter of formal notice to Italy that eventually led to the *Malagrotta* judgment, the Commission has indicated that a high level of separate collection does not by itself fulfil the pre-treatment requirement of Article 6(a) LD. However, the Commission did not raise this argument before the European Court of Justice, which therefore did not rule on it in *Malagrotta*. This point is thus not yet settled.

■ **Substantive amounts of waste are landfilled without pre-treatment.**

- This is recognised in the waste management plans of five Member States (Croatia, Greece, Malta, Portugal, and Spain).
- In addition, at least five Member States (including three of the six noted immediately above) do not have the necessary **waste management infrastructure** in place to ensure compliance with pre-treatment requirements. Although the situation is evolving, as plans are made for new facilities to be installed, the availability of infrastructure is found to be a problem in Bulgaria, Croatia, Cyprus, Greece, and Romania.
- As Table 6 shows, many of the 82 landfill sites visited across the 18 Member States with the highest landfilling rates were found not to be in compliance with the requirement to pre-treat waste prior to landfilling as required by the Landfill Directive, as interpreted in the *Malagrotta* ruling.

Table 6 - Key findings from landfill site visits

Key to landfill compliance scoring					
1	2	3	4		
No non-hazardous MSW received has been pre-treated to the required standard	Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard	Approximately or more than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard	All non-hazardous MSW received is likely to be pre-treated to the required standard		

Member State	Level of compliance				
	Landfill sites, tonnes of non-hazardous MSW received in 2015 ⁷³ , compliance scoring				
Bulgaria	Shumen	Yambol	Stara Zagora	Razlog and Bansko	Kardjali
	44,702	16,457	44,819	9,308	90,746
	2	2	2	2	2
Croatia	Mraclinska Dubrava	Totove	Diklo	Sveti Juraj	Karepovac
	13,532	13,449	71,000	2,565 ⁷⁴	117,888
	1	1	1	1	1
Cyprus	Paphos	Larnaka			
	67,362	113,500			
	1	4			
Czech Republic	Henčov – Jihlava	Skládka odpadů Vysoká	Košfálov	Zdechovice – Chvaletice	Jičín
	29,000	45,000	32,000	40,000	14,250
	2	2	3	2	3
Greece	Ano Liossia	Temploni	Mayrorahii	Northern Rhodes	Kefallonia
	1,982,726	56,868	418,000	93,652	23,236
	1	1	1	1	3
Hungary	Berettyóújfalu	Jánossomorja	Kaposmérő	Pusztázámor	Felső-Bácska (Vaskút)
	23,168	55,000	20,000	220,000	55,000
	2	2	2	2	3

⁷³ Additional amounts of non-hazardous MSW may be landfilled after pre-treatment in a pre-treatment facility. As the waste code changes following such pre-treatment, it is not possible to distinguish different waste streams once they have undergone pre-treatment, and thus provide more comprehensive figures.

⁷⁴ Estimate. The landfill is not equipped with a weighting procedure. The amount of waste accepted in the landfill is estimated based on the number of different trucks unloaded.

Member State	Level of compliance				
	Landfill sites, tonnes of non-hazardous MSW received in 2015 ⁷³ , compliance scoring				
Ireland	Drehid	Knockharley	Rathroeen	Ballynagran	
	207,545	45,181	31,398	38,109	
	2	3	2	3	
Italy	Bellolampo	Grosso	Gaggio	Vado Ligure	Sant' Arcangelo
	379,332	21,503	33,826	89,268	26,612
	1	3	3	4	4
Latvia	Getliņi	Dzīlā vāda	Križevniki	Kivītes	Grantiņi
	304,753	21,953	17,547	30,121	9,138
	4	2	4	3	2
Lithuania	Kaunas Lapės	Klaipėda	Panevėžys	Tauragė	Vilnius
	170,700	63,500	88,790	21,930	199,500
	4	4	4	4	4
Malta	Għallis				
	239,369				
	3				
Poland	Sułkowice	Nysa	Janczyce	Śląsin	Stare Lipiny
	781	1,869	15,022	0 ⁷⁵	11,688
	4	4	4	4	4
Portugal	Barlavento	Seixal	Fundão	Viana do Castelo	Leiria
	161,098	156,150	51,541	116,652	133,511
	2	2	4	1	2
Romania	Bihor Oradea	Piatra Neamt	Chitila	Glina	Albota
	137,569	14,892	264,474	217,276	143,831
	2	2	2	1	2
Slovakia	Zohor	Nový Tekov	Marín	Bzenica	Raznany
	41,494	46,489	18,890	3,865	9,400
	2	2	2	2	1
Slovenia	Leskovec	Špaja dolina	Unično novo	Globoko	Gajke
	44,910	10,900	13,488	11,964	12,403
	4	4	4	4	4
Spain	Góngora	Cogersa	Alcalá de Henares	Huesca	Gardelegi
	100,816	388,188	266,188	46,365	71,152
	2	2	2	2	3
UK	Greengairs	Tullyvar	Sutton Courtenay	Newport Docks	Hill and Moor
	290,880	26,961	70,796	27,000	168,555
	2	2	3	3	2

- In the *Malagrotta* judgment, the Court interpreted and thus clarified certain requirements of Landfill Directive. In particular, the Landfill Directive does not contain provisions expressly requiring Member States to search for and apply the most appropriate pre-treatment option, to guarantee an adequate selection of waste streams, or to ensure biodegradable waste is stabilised prior to landfilling. Thus, when transposing the Directive (Member States had an obligation to do this before 16 July 2001), Member States have not laid down specific provisions reflecting these requirements. Where compliance is achieved, fully or in part, this is mainly because:
 - With regard to **appropriate pre-treatment options**, at least five Member States have issued guidance recommending the use of specific pre-treatment methods, depending on the type of waste concerned. This is the case in Austria, Hungary, Italy, Lithuania, and Sweden. Given the *Malagrotta* ruling does not provide detailed guidance about how to identify the most appropriate pre-treatment option in different circumstances, clarifying the meaning of this

⁷⁵ All waste is pre-treated prior to landfilling at this site. For the reasons explained in footnote 73, the amount of waste considered as MSW landfilled at this site is zero.

requirement and its operational implications are going to be key issues in the implementation of the judgment.

- With regard to the **selection of waste streams**, at least six Member States have established well-functioning separate collection systems, which help keep away from landfills both recyclables and biodegradable waste. This is the case in Austria, Finland, Germany, Netherlands, Slovenia, and Sweden.
- At least seven Member States have introduced **landfill bans** that can contribute to achieving compliance with the adequate selection requirement by ensuring that banned waste streams are sorted out of the waste prior to landfilling. These bans can also contribute to compliance with the obligation to stabilise the organic fraction, where they impose conditions for landfilling (e.g. in terms of total content of organic carbon) that may only be achieved through pre-treatment operations. Relevant bans are in force in Austria⁷⁶, Belgium⁷⁷, Denmark⁷⁸, Finland⁷⁹, Germany⁸⁰, Latvia⁸¹, Netherlands⁸² and Sweden⁸³ (in addition, a ban will enter into force in the Czech Republic in 2024⁸⁴ and Scotland envisages introducing a ban in 2021⁸⁵).
- **Separate collection systems are found wanting** in 13 Member States (Bulgaria⁸⁶, Cyprus⁸⁷, Czech Republic⁸⁸, Denmark⁸⁹, Greece⁹⁰, Hungary⁹¹, Italy⁹², Malta⁹³, Portugal⁹⁴, Romania⁹⁵,

⁷⁶ In Austria, several landfilling bans are in force, notably covering waste with a TOC content exceeding 5% by weight, and combustible waste. These bans have contributed to ensure that, in recent years, almost no untreated biodegradable waste has been landfilled in Austria. See Task 2 country report for more details.

⁷⁷ In Belgium, several landfilling bans are in force in the Walloon Region, notably covering separately collected waste and biodegradable waste. See Task 2 country report for more details.

⁷⁸ In Denmark, the ban applies to combustible waste, including biodegradable waste. See Task 2 country report for more details.

⁷⁹ In Finland, a ban on the landfilling of biodegradable waste is in force in Åland. See Task 2 country report for more details.

⁸⁰ In Germany, waste may only be disposed in landfills if it meets strict criteria, e.g. in terms of organic content and TOC. See Task 2 country report for more details.

⁸¹ In Latvia, a ban is placed on the landfilling of organic waste from the food processing industry and wood processing waste, unless the landfill is equipped with biogas recovery facilities. See Task 2 country report for more details.

⁸² In the Netherlands, several landfilling bans are in force, notably covering biodegradable waste. See Task 2 country report for more details.

⁸³ In Sweden, the ban applies to separately collected combustible waste. See Task 2 country report for more details.

⁸⁴ In Czech Republic, the ban will apply to the landfilling of mixed municipal waste, recyclable and recoverable waste. A ban on the landfilling of biodegradable waste is also envisaged in the national waste management plan. See Task 2 country report for more details.

⁸⁵ In Scotland, the ban will apply to biodegradable waste. See Task 2 country report for more details.

⁸⁶ In Bulgaria, separate collection notably covers paper and cardboard, metal, plastic and glass waste, as well as biodegradable waste. The national waste management plan recognises that additional measures are needed to improve the effectiveness of the separate collection system. These include, for example: review of the criteria determining the coverage of the system (e.g. population, location, development indicators, location of waste management facilities); provision of equipment (containers, vehicles, etc.) for separate waste collection; construction and dissemination of information about the location of separate collection sites. Available information also indicates that waste is still largely collected as mixed waste. See Task 2 country report for more details.

⁸⁷ In Cyprus, there is no obligation to ensure separate waste collection. There is however a programme for the separate collection of packaging waste as part of an extended producer responsibility initiative, under which the following waste streams are separately collected: paper; plastic, metal and drink cartons; glass. The programme covers 78% of the country's population. The national waste management plan envisaged the adoption of further measures to improve separate collection (e.g. legislation requiring separate collection, technical and economic support to municipalities to implement separate collection systems, etc.). See Task 2 country report for more details.

⁸⁸ In Czech Republic, separate collection notably concerns paper, plastic, glass, metal and biodegradable waste. Available data however indicate that only a small share (15%) of MSW is separately collected. The share of biodegradable waste separately collected is also very low (2%). See Task 2 country report for more details.

⁸⁹ In Denmark, the municipal waste management plans reviewed under this study show that only a few waste streams are separately collected, notably paper and glass waste (however, some plans indicated the intention to expand separate collection to additional waste streams). Companies are obliged to sort bio-waste for the purpose of recovery. There is instead no general obligation for households to sort bio-waste – municipalities have competence to decide whether or not to require households to do so. Available information indicates that many municipalities have not introduced such requirements. See Task 2 country report for more details.

⁹⁰ In Greece, the national waste management plan recognises that an important part of the country is not yet reached by separate collection. Separate collection is mainly carried out for packaging waste. Although biodegradable waste represents

Slovakia⁹⁶, Spain⁹⁷, and the United Kingdom⁹⁸). The absence or ineffectiveness of separate collection hinders the adequate selection of waste streams, especially if the mixed waste is not pre-treated before it is landfilled.

- **Very low landfilling rates** in four Member States (Austria, Belgium, Netherlands, and Sweden) mean that, in these countries, issues of compliance with pre-treatment requirements, if any, are likely to have limited practical impact.

5.2 SUMMARY OF FINDINGS FOR EACH MEMBER STATE

This section offers an overview of the key conclusions about each Member State's compliance with waste pre-treatment requirements, as interpreted in the *Malagrotta* ruling. For the 18 Member States with the highest landfilling rates, a summary of the main findings from the landfill site visits is provided in text boxes. The full analysis underpinning this section can be found in the Task 2 and Task 3 deliverables. Furthermore, a more detailed overview of the findings from the visits to individual landfill sites is provided in Annex 2.

5.2.1 Austria

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

about 44% of MSW in this Member State, it is largely not separately collected. However, national legislation sets a target to reach at least 5% separate collection of bio-waste by weight by the year 2015 (raising to 10% by 2020), which should spur improvements on this aspect of waste management. See Task 2 country report for more details.

⁹¹ In Hungary, the national waste management plan recognises that the country lags behind in terms of separate waste collection. Mostly two waste streams – biodegradable waste and plastic waste – are separately collected (23.2% and 21.2% of total volume, respectively). The plan aims to improve the situation by envisaging mandatory sorting of paper, metal, plastic and glass waste, among other measures. See Task 2 country report for more details.

⁹² In Italy, the separate collection rate is about 45% country-wide. Regional rates vary widely, from 67.6% in Veneto to 12.5% in Sicily. There is a requirement in national law to separately collect bio-waste. See Task 2 country report for more details.

⁹³ In Malta, there appears to be no separate collection of biodegradable waste. See Task 2 country report for more details.

⁹⁴ In Portugal, the separate collection system notably covers paper and cardboard, metal, plastic and glass waste. However, substantive amounts of biodegradable waste and mixed waste are still sent to landfills without adequate selection. See Task 2 country report for more details.

⁹⁵ In Romania, available information shows that the share of waste separately collected does not reach 5% of the total amount of waste collected. Biodegradable waste is not systematically separately collected. See Task 2 country report for more details.

⁹⁶ In Slovakia, municipalities are required to ensure the separate collection of paper, plastic, metal, glass and biodegradable waste. The national waste management plan however acknowledges that many municipalities do not fulfil these requirements and as a result separate collection levels are insufficient. See Task 2 country report for more details.

⁹⁷ In Spain, separate collection notably covers paper and cardboard, metal, plastic and glass waste, as well as bio-waste. However, separate collection is not widespread and it does not appear that recyclable waste and biodegradable waste streams are systematically sorted out prior to landfilling. See Task 2 country report for more details.

⁹⁸ In England, separate collection notably covers paper, metal, plastic and glass waste (local councils decide based on local circumstances whether to offer separate collection of bio-waste); in Scotland, separate collection notably covers metal, plastic, glass, paper and cardboard waste (as well as food waste from food businesses which are located in non-rural areas and produce such waste in excess of set thresholds); in Northern Ireland, separate collection covers paper, metal, plastic and glass waste (as well as food waste from food businesses which produce such waste in excess of set thresholds). There are indications that biodegradable waste is not separately collected in an effective manner in all areas of the United Kingdom. In Wales, for example, the waste management plan recognised that additional efforts are needed in order to meet the EU targets for separate collection. The waste management plan for England notes that, while almost all local authorities collect garden waste, about half collect food waste. See Task 2 country report for more details.

Article 2(h) LD, which defines ‘treatment’ for the purposes of the Landfill Directive, is not transposed. Austria has only transposed the definition of treatment set out in the Waste Framework Directive. This situation creates problems of conformity. However, their practical impact may be very limited, given that only a minor fraction of MSW (0.4%) is landfilled in Austria. In addition, national bans on the landfilling of waste with high total organic carbon (above 5%) and of combustible waste, contribute to ensuring that waste is pre-treated before it is landfilled.

Austrian law does not specifically require that the most appropriate pre-treatment option must be applied, or provide general criteria for choosing such option. However, national rules exist which recommend the use of different pre-treatment methods, depending on the type of waste concerned. Furthermore, Austria issued guidelines, in 2002, on the state-of-the-art in MBT, thus providing a reference for authorities and operators for taking informed choices on the use of this pre-treatment option. In 2014, 38,6% of municipal waste was treated by incineration, indicating that this is one of the most important methods to pre-treat non-hazardous municipal waste before landfilling. Therefore, while full compliance with the requirement of the Landfill Directive as interpreted in the *Malagrotta* ruling to search and implement the most appropriate pre-treatment option is not legally guaranteed, Austria has taken meaningful steps to achieve it in practice.

In line with the Waste Framework Directive, Austria has established separate waste collection systems for paper, metal, plastic and glass, as well as bio-waste. In addition, the above-mentioned landfilling bans contribute to ensuring that biodegradable waste and thermally recoverable waste are not landfilled. Nearly 60% of all MSW is separately collected, thus indicating that the selection of waste streams in Austria can be considered adequate.

Finally, the landfilling bans contribute to ensuring that the organic fraction of MSW is stabilised before being landfilled.

5.2.2 Belgium

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

In Belgium, waste legislation and waste management systems are different across the three regions of Brussels Capital Region, Wallonia, and Flanders. They are therefore discussed separately in this section.

The Brussels Capital Region has faithfully transposed all relevant EU requirements concerning pre-treatment. As there are no landfills in this region, no problems of compliance arise.

Wallonia has also correctly transposed relevant provisions of the Landfill Directive. In addition, it has banned the landfilling of various waste streams, notably including separately collected MSW and biodegradable waste. These bans contribute to achieving compliance with the Landfill Directive as interpreted by the *Malagrotta* ruling, insofar as the residual waste disposed of in landfills will contain a lower amount of recyclables (thus contributing to ensuring an adequate selection of waste streams) and biodegradable waste (thus avoiding the need to stabilise it before landfilling). However, the described obligation targets specific waste streams. Although its scope is wide, there is a risk that residual waste may still be landfilled without appropriate pre-treatment. Indeed, the only type of pre-treatment required for all landfilled waste is that it must be compacted prior to be placed in the landfill. This mere physical process may not constitute the most appropriate pre-treatment option in

accordance with the *Malagrotta* judgment. Further concerns arise from the fact that the regional waste management plan dates back to 1998, which may mean the regional waste management framework is not sufficiently up-to-date.

Flanders did not transpose the definition of treatment set out in Article 2(h) LD, although its legislation does require that waste must be pre-treated before it is landfilled. The region has banned the landfilling of separately collected waste (contributing to compliance with the requirements of the Landfill Directive as interpreted by the *Malagrotta* ruling for an adequate selection of waste streams) and rolled out an extensive system of bio-waste collection and treatment (reducing the organic fraction reaching landfills). There is however no obligation to search for and implement the most appropriate pre-treatment option or to stabilise residual biodegradable waste before it is landfilled. While this may create problems of compliance, these problems are likely to have extremely limited practical impact, as landfilling rates in Flanders are below 0.5%.

More generally, Belgian national statistics indicate that, in aggregate across the country, less than 1% of waste is landfilled. Thus, potential issues of compliance with the Landfill Directive as interpreted by the *Malagrotta* ruling would appear to be of reduced actual significance.

5.2.3 Bulgaria

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Bulgaria has correctly transposed relevant provisions of the Landfill Directive. However, its waste management system is undergoing important changes, with existing landfills mostly in the process of being closed or rehabilitated, and new landfills being constructed. Few pre-treatment facilities are already operational, which are not enough to ensure compliance with the pre-treatment requirement. The National Waste Management Plan recognises that the closure of landfills is behind schedule, and that there are gaps in the development of more modern facilities which are necessary to fully implement the hierarchy of waste set out in Article 4(1) WFD.

The landfill permits reviewed under Task 2 include requirements for the manual selection of waste streams, and the shredding and baling of waste prior to landfilling. While these operations may help manage the permitted capacity of the landfill more efficiently, the Landfill Directive as interpreted by the *Malagrotta* judgment requires that the most appropriate pre-treatment option must be applied, and that such physical operations do not satisfy this requirement.

Our research found that Bulgaria does not have a general system for the separate collection of MSW, instead relying on mixed collection. While landfill permits do provide for the manual selection of waste streams, the selection that can be performed manually at landfill level is likely incapable of ensuring compliance with the Landfill Directive as interpreted by the *Malagrotta* judgment, concerning adequate selection of waste streams.

Similarly, no national provision or other indication has been found that would ensure biodegradable waste is stabilised before it is landfilled.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
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Key findings from landfill site visits

In Bulgaria, five site visits were completed at Kardjali landfill, Razlog/Bansko landfill, Stara Zagora landfill, Shumen landfill and Yambol landfill.

In all of the landfills visited, the majority of the waste deposited was not pre-treated prior to landfilling. In particular, the share of untreated waste was ~55% in Yambol, ~60% in Shumen, ~70% in Stara Zagora, ~95% in Razlog/Bansko, and ~98% in Kardjali.

Where pre-treatment was applied, it mainly consisted of the removal of recyclable materials. There are currently only three MBT facilities in operation in Bulgaria (in Sofia, Plovdiv and Varna), which are not sufficient to ensure adequate pre-treatment of all waste destined for landfilling. However, the planned development of Regional Waste Management Centres, including pre-treatment facilities, should lead to a future improvement in the pre-treatment of waste prior to landfilling.

The selection of waste streams is pursued primarily through separate collection. However, the landfill site visits showed that, in three out of five sites, recyclable fractions still represented non-negligible proportions of the waste landfilled (26%-40%). Loads deposited at the landfills during our visits contained recyclables such as plastics, paper and metals that could have been separated relatively easily from the mixed waste stream prior to disposal.

Due to lack of infrastructure, biodegradable waste was not sorted out and stabilised prior to landfilling.

Figure 2 - Entrance to the Yambol landfill in Bulgaria, with Materials Recovery Facility visible in the background



5.2.4 Croatia

The Malagrotta ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	

Neither Croatia's legislation nor its national waste management plan provide a definition of pre-treatment. While such definition has been found in counties' waste management plans, the periods of application of both the national and the relevant counties' waste management plans have expired. Therefore, in addition to not having a valid definition of pre-treatment, Croatia does not have a key component of its waste management framework – waste management plans.

Nevertheless, Croatian legislation does require that all waste must be pre-treated before it is landfilled. The draft national waste management plan for the period 2015 – 2021 (not yet adopted as of the end of 2016) however states that the majority of MSW is still landfilled without pre-treatment. Therefore, the legislative requirement appears not to be properly applied in practice. One of the reasons for this failure may be that waste management infrastructure in this country is not yet sufficiently developed.

Thus, Croatia does not currently comply with the requirements of the Landfill Directive as interpreted by the *Malagrotta* judgment, though the situation may improve if and when the planned infrastructure will become operational.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits	
In Croatia, five site visits were completed at Mraclinska Dubrava landfill, Totove (near Čakovec) landfill, Diklo, Zadar landfill, Sveti Juraj landfill, and Karepovac landfill.	
Our site visits found that, at all landfills visited, nearly all waste is landfilled without any pre-treatment, except from the separation of bulky waste and upstream separate waste collection where available. As waste is landfilled without any pre-treatment, the organic fraction is not separated or stabilised prior to landfilling.	

Figure 3 - The Diklo landfill in Croatia



5.2.5 Cyprus

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	

Cyprus has transposed the requirement that waste may only be landfilled after pre-treatment. However, while pre-treatment is correctly defined, Cypriot legislation allows exceptions to the pre-treatment obligation that go beyond the Landfill Directive. In particular, waste (other than inert waste) may be landfilled without pre-treatment if such pre-treatment is not technically feasible. The Directive allows this ground of exception only for inert waste. Insofar as other waste is concerned, the Directive permits exceptions only where pre-treatment would not contribute to reaching the objectives of the Directive by reducing the quantity of waste or the hazards it poses to human health and the environment. In this regard, Cypriot legislation is therefore not in conformity with the Directive.

Having said this in relation to the legal framework, our research indicates that, in practice, Cyprus may not be in compliance with the pre-treatment requirement. Out of the five districts of Cyprus, only two are served by integrated waste management installations that include pre-treatment facilities (MBT). A third district does not have any pre-treatment facility, and the remaining two do not have either pre-treatment facilities or legal landfills.⁹⁹

Cyprus has not laid down any provision requiring the application of the most appropriate pre-treatment option. Moreover, while some separate waste collection is taking place (paper, packaging, metal, drink cartons and glass), local authorities are not obliged to implement separate waste collection systems (however, the introduction of such obligation is currently under consideration).

Finally, as regards biodegradable waste, there is no provision in the Cypriot legal system mandating the stabilisation of the organic fraction before landfilling. The recently adopted national waste management plan 2015 – 2021 estimates that, in 2011, more than 300,000 tonnes of biodegradable waste were landfilled without pre-treatment, thus exceeding targets for the reduction of organic waste landfilling by over 100%.

Thus, Cyprus does not currently comply with most relevant aspects of the Landfill Directive as interpreted by the *Malagrotta* ruling. However, the new national waste management plan does reveal an effort to improve waste management in the country, including as regards pre-treatment of waste before landfilling.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Cyprus, only two non-hazardous waste landfills were operational at the time of the study: Paphos landfill and the Larnaca-Famagusta Integrated Waste Management Installations (hereinafter, the Larnaca installations).
The Paphos landfill does not have any pre-treatment facilities on-site. All waste disposed of in this landfill is untreated. The Larnaca installations have on-site pre-treatment facilities including a MBT plant, an MRF facility, and a composting plant. At this site, all waste is pre-treated prior to being landfilled. Compost is produced and recyclable materials (glass, metal, plastics, and paper) are recovered.
The selection of waste streams is mainly performed through separate collection. Further separation of different waste streams is carried out at the Larnaca installations, which includes the extraction of the organic fraction, the great majority of which undergoes stabilisation.
The Larnaca installations serve two out of the five districts of Cyprus. The installations can be considered to comply with all the relevant requirements of the Landfill Directive as interpreted by <i>Malagrotta</i> ruling. This is however not the case for the Paphos landfill and the other three districts not relying on the Larnaca installations.

⁹⁹ The European Court of Justice, in case C-412/12, considered two landfill sites in these districts illegal and gave Cyprus two years (a deadline which expired at the end of 2015) to close them.

Figure 4 - Weighbridge at the Integrated installations for the management of municipal solid waste, regions of Larnaca – Famagustain, in Cyprus



5.2.6 Czech Republic

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

The provisions of the Landfill Directive on pre-treatment have been correctly transposed in the Czech Republic. However, neither Czech law nor the reviewed waste management plans mandated any treatment operation other than separate waste collection and energy recovery. The latest waste management plan only provides for the possibility to supplement sorting with a complementary technology of waste processing prior to material and energy recovery, but this is not an obligation. One of the landfill permits examined did include a requirement for the stabilisation of biodegradable waste prior to landfilling, but this was not the case for others. Mixed municipal waste undergoes compression – a physical treatment which is not sufficient according to the *Malagrotta* ruling. Thus, the Czech waste management framework does not currently ensure that waste is systematically pre-treated before landfilling. Furthermore, there is no requirement to search for and apply the most appropriate pre-treatment option.

As regards the selection of waste streams, Czech law obliges municipalities to implement the separate collection of paper, plastics, glass, metal and vegetable waste. The precise scope of separate collection systems is determined in the waste management plans. However, available data indicates that only about 15% of MSW, and about 2% of biodegradable waste, is in fact separately collected. No information has been found that would suggest that, before landfilling, residual mixed waste undergoes further selection or that the residual organic fraction is stabilised. Therefore, compliance with these two requirements of the Landfill Directive as interpreted by the *Malagrotta* judgment is not currently guaranteed in the Czech Republic. It is however worth noting that a ban on the landfilling of mixed municipal waste and recyclable or reusable waste will come into force in 2024. If properly implemented, this ban could significantly contribute to achieving an adequate selection of waste streams.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In the Czech Republic, five site visits were completed at Jicin landfill, Jihlava landfill, Kostalov landfill, Vysoka landfill, and Zdechovice landfill. The waste deposited in these landfills is mostly untreated. Only at one of them a sorting line for the separation of different types of waste is being tested. However, this is only a mechanical process which is not capable, by itself, of ensuring compliance with relevant requirements of the Landfill Directive as interpreted by the <i>Malagrotta</i> ruling. Composting facilities exist at the sites, but these are used to treat separately collected bio-waste, not to stabilise the biodegradable fraction of mixed waste prior to landfilling. This is despite the fact that the residual waste contains significant quantities of organic waste.

Figure 5 - Mechanical pre-treatment operation (rotary sieve) at the Zdechovice landfill in the Czech Republic



5.2.7 Denmark

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Denmark has correctly transposed the provisions of the Landfill Directive related to pre-treatment, and available information does not suggest problems of implementation of pre-treatment requirements.

Denmark has not laid down any provision concerning the choice and application of the most appropriate pre-treatment option, but there are indications that compliance may be achieved in practice through proper application of the pre-treatment requirement.

Moreover, municipalities are responsible for the separate collection of MSW, and have discretion in deciding which waste streams should be covered by the separate collection system. Our research indicates, in many municipalities, separate collection does not currently cover biodegradable waste. No requirement has been found that would ensure that, where appropriate, residual mixed waste undergoes a selection of waste streams before landfilling. A high share of organic waste is treated through incineration. A ban on the landfilling of combustible waste, including biodegradable waste, has been in force since 1 January 1997.

5.2.8 Estonia

The <i>Malagrotta</i> ruling conclusions			
1	All waste is pre-treated	Definition of pre-treatment	😊
		Pre-treatment requirement	😊
2	Most appropriate pre-treatment option is applied		😊
3	Adequate selection of waste streams		😐
4	Stabilisation of the organic fraction		😐

Estonia has correctly transposed the pre-treatment provisions of the Landfill Directive. All landfills in this country implement pre-treatment operations (sorting, MBT, and/or composting), and only about 8% of MSW is landfilled, thus indicating that the majority of MSW is either recovered, incinerated, or treated prior to landfilling. Therefore, Estonia can be considered to comply with the pre-treatment requirement.

Estonia researched the most appropriate waste treatment options when developing its waste management plan, carrying out a life-cycle analysis of the environmental impacts of different MSW management alternatives. The analysis concluded that recycling is the best option and that the incineration of mixed MSW in modern facilities is environmentally sustainable and helps reduce the amount of biodegradable waste landfilled. MBT was considered as a flexible complementary technology. The analysis also recognised that emphasis on incineration and MBT may entail some trade-offs with separate waste collection and recycling. Estonia can thus be regarded as compliant with the requirement of the Landfill Directive as interpreted by the *Malagrotta* judgment to search for and implement the most appropriate pre-treatment option.¹⁰⁰

Estonia has implemented a separate collection system covering over a dozen waste streams, including recyclables such as paper, metal, plastic and glass, and biodegradable waste. Its legislation provides that, in areas where separate waste collection achieves significant reductions in residual mixed waste and increases in waste sent for recovery, the residual mixed waste can be considered as pre-treated. This provision may encourage local authorities to improve separate waste collection and recovery, however it does not by itself ensure full compliance with the requirement to adequately select waste streams, especially considering that, in Estonia, biodegradable waste still constitutes on average 48% of residual waste. While the small amounts of waste landfilled in this country may reduce the practical impact of this problem, repealing the contentious provision would help resolve the issue.

5.2.9 Finland

The <i>Malagrotta</i> ruling conclusions			
1	All waste is pre-treated	Definition of pre-treatment	😊
		Pre-treatment requirement	😊
2	Most appropriate pre-treatment option is applied		😐
3	Adequate selection of waste streams		😊
4	Stabilisation of the organic fraction		😐

In Finland, waste legislation and the waste management system are different between the mainland and the Åland Islands. The pre-treatment provisions of the Landfill Directive have been correctly transposed in the former, whereas in the latter the definition of pre-treatment is not transposed. However, because the MSW generated in the Åland Islands is largely shipped to the mainland for

¹⁰⁰ It may be worth recalling that, in line with Article 4(2) WFD, the *Malagrotta* judgment does not require the application of specific treatment operations, but leaves it to Member States to determine which options deliver the best overall environmental outcome in individual cases.

treatment and landfilling, the practical impact of this problem of conformity is limited. This is confirmed by the fact that we have not found information that would suggest failure to properly apply pre-treatment requirements in this country.

Finland has not laid down any provision concerning a search for and implementation of the most appropriate pre-treatment option. Its separate collection system appears adequate, covering paper, carton, glass, metal, plastics and bio-waste. In addition, the landfilling of biodegradable waste is generally prohibited, save for certain exceptions. However, our research showed that, at least in some parts of the country, the separate collection of bio-waste was not effective and significant amounts of biodegradable waste could still be found in the mixed residual waste directed to landfill without further treatment. Thus, while the selection of waste streams appears largely adequate, some issues remain in some areas of the country in relation to the separate collection and stabilisation of the organic fraction of waste.

5.2.10 France

The <i>Malagrotta</i> ruling conclusions			
1	All waste is pre-treated	Definition of pre-treatment	😊
		Pre-treatment requirement	😐
2	Most appropriate pre-treatment option is applied		😐
3	Adequate selection of waste streams		😊
4	Stabilisation of the organic fraction		😐

France has correctly transposed the definition of treatment set out in Article 2(h) LD, but has not transposed the pre-treatment requirement of Article 6(a) LD, thus giving rise to a problem of conformity. This problem is only in part alleviated by a provision which only allows the landfilling of “ultimate waste”. This is defined as waste which can no longer be re-used or recovered under the current technical and economic conditions by extracting recoverable parts or reducing its polluting or otherwise hazardous characteristics. Therefore, in principle, waste should be pre-treated before landfilling where necessary to sort out recyclable fractions and to reduce emissions, including emissions from biodegradable waste, which should to this end be stabilised prior to landfilling.

France has not adopted any provision specifically requiring a search for and application of the most appropriate pre-treatment option. Again, the described provision on ultimate waste may help promote adequate waste treatment operations, but does not by itself ensure compliance with the requirement of the Landfill Directive as interpreted by the *Malagrotta* judgment. However, that provision does support an adequate selection of waste streams, as recyclables and biodegradable waste do not constitute ultimate waste that may be landfilled.

There is no specific requirement that residual organic waste must be stabilised before landfilling. However, France has provided for the separate collection and biological recovery of biodegradable waste in order to limit greenhouse gas emissions and promote the production of compost. Though this does not ensure that the landfilling of untreated organic waste is avoided, it does help reduce its amount.

5.2.11 Germany

The <i>Malagrotta</i> ruling conclusions			
1	All waste is pre-treated	Definition of pre-treatment	😐
		Pre-treatment requirement	😊
2	Most appropriate pre-treatment option is applied		😊
3	Adequate selection of waste streams		😊

Germany requires the treatment of waste prior to landfilling, but has not transposed the definition of treatment set out in Article 2(h) LD, thus creating a problem of conformity.

Germany only allows waste which meets strict national requirements to be landfilled. These conditions include a low content of organic matter which, it is considered, may only be achieved through pre-treatment. These provisions can thus be regarded as ensuring that waste is pre-treated before landfilling.

No provision has been found that would ensure the application of the most appropriate pre-treatment option. However, the above-mentioned landfilling conditions entail that waste must always be pre-treated before it is landfilled. In practice, thermal treatment is the treatment option of choice for most municipal waste. Germany can thus be regarded as compliant with the requirement of the Landfill Directive, as interpreted in the *Malagrotta* judgment, to search for and implement the most appropriate pre-treatment option.

Insofar as the selection of waste streams is concerned, German law requires that, from 1 January 2015 at the latest, separate collection must be carried out for at least paper, metal, plastic and glass, as well as bio-waste. We did not find indications that separate collection is not being carried out effectively, and therefore conclude that Germany complies with the Landfill Directive, as interpreted in the *Malagrotta* judgment, in this regard. Furthermore, the condition that only waste with low organic content may be landfilled ensures biodegradable waste is stabilised prior to landfilling.

5.2.12 Greece

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Greece has correctly transposed the pre-treatment provisions of the Landfills Directive. However, the lack of sufficient pre-treatment facilities in this country indicates low compliance with pre-treatment requirements. This problem is exacerbated by a very high landfilling rate (over 80%).

There is no provision that mandates the application of the most appropriate pre-treatment option. This said, the national and regional waste management plans, by tailoring waste management approaches to local situations, can potentially help to improve pre-treatment.

Insofar as the selection of waste streams is concerned, the implementation of a separate collection scheme ("Blue Bins") has managed to divert considerable amounts of packaging waste away from landfills. National recycling targets for plastics, wood, paper and cardboard have also been met. However, separate collection is still insufficient in relation to glass and metals, and has not yet been systematically rolled out for biodegradable waste. Thus, separate collection does not ensure an adequate selection of waste streams, and there is no evidence that such selection is carried out downstream, prior to landfilling. Therefore, this requirement of the Landfill Directive, as interpreted in the *Malagrotta* judgment, is not complied with.

Finally, because biodegradable waste is for the most part not separately collected or pre-treated, it is likely that the majority of organic waste is landfilled without prior stabilisation. Therefore, Greece

fails to comply with this aspect of the Landfill Directive, as interpreted in the *Malagrotta* decision, too.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Greece, five site visits were completed at Ano Liosia landfill, Mavrorahi (Thessaloniki) landfill, Kefalonia landfill, Northern Rhodes landfill and Temploni landfill.
The waste deposited in these landfills is mostly untreated. Even though separate collection systems exist, it appears that they do not consistently deliver high-quality recyclables that can be materially recovered. Nearly half of the separately collected waste sent to MRF thus ends up in landfills.
Similarly, the requirement for the stabilisation of the organic fraction is largely not complied with. Only the landfill sites of Kefalonia and Ano Liosia are equipped with facilities to pre-treat biodegradable waste. The stabilisation of the organic fraction appears to be satisfactory at the Kefalonia landfill, whereas it is not adequate in Ano Liosia, a landfill which serves the majority of the Greek population.

Figure 6 - Clinical waste deposited in the Mavrorahi Landfill / Thessaloniki landfill in Greece



5.2.13 Hungary

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Hungary has not specifically transposed the definition of treatment set out in Article 2(h) LD. Its legislation refers to pre-treatment processes which largely correspond to those set out in Article 2(h) LD. However, the references to thermal treatment and to the fact that pre-treatment should facilitate the handling of waste or enhance recovery are not transposed. Therefore, a problem of conformity arises in this regard. The absence of a clear definition may cause confusion in the actual application of legal provisions on pre-treatment.

In line with Article 6(a) LD, Hungary has provided that only pre-treated waste may be landfilled. Competent authorities may allow exceptions, notably on the grounds that pre-treatment options that could reduce the quantity of waste or its hazards for human health and the environment are not feasible. While the legislative framework would be clearer if it univocally stated the grounds for granting exceptions from the pre-treatment obligation, our analysis of landfill permits suggests that pre-treatment requirements are being properly applied when authorising landfilling operations. Therefore, Hungary can be regarded as complying with the pre-treatment requirement.

Hungary has not set out any provision requiring the most appropriate pre-treatment option to be applied. However, its legislation expressly mentions a variety of pre-treatment techniques. This may help competent authorities choose the ones that should be used in different situations. Therefore, while compliance is not fully ensured, Hungary has some provisions in place that can support the implementation of appropriate pre-treatment options.

The national waste management plan acknowledges that there are shortcomings in the separate waste collection system. However, Hungary only allows the landfilling of bio-waste after it has been stabilised via mechanical-biological processes. As this condition only applies to bio-waste, other types of organic waste are not covered, and may end up in landfills without prior treatment.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Hungary, five site visits were completed: Pusztazámor landfill, Jánossomorja landfill, Kaposmérő landfill, Berettyóújfalu landfill, and Vaskút landfill. Our site visits found that, even though some pre-treatment was carried out at all sites visited, the amount of waste pre-treated and the type of pre-treatment were insufficient to achieve compliance with the requirements of the Landfill Directive, as interpreted in the <i>Malagrotta</i> ruling. In particular, mechanical sorting was implemented at the landfills, which according to the judgment is not by itself sufficient to fulfil the objectives of the Landfill Directive. The organic fraction was separated and stabilised at three out of five sites only. In the others, it was landfilled without any pre-treatment.

Figure 7 - Open tip face at the Kaposmérő landfill in Hungary



5.2.14 Ireland

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

In line with Article 6(a) LD, Ireland requires that waste that has not undergone pre-treatment may not be landfilled. However, Ireland has not transposed the definition of pre-treatment set out in Article 2(h) LD, which creates problems of conformity, though national rules state that pre-treatment includes separate collection of waste.

In addition, rules set out by the Irish Environmental Protection Agency require landfill operators to demonstrate that all waste accepted in the landfills is adequately pre-treated, including pre-treatment of biodegradable waste. In the absence of information indicating poor application of these requirements, it can be concluded that Ireland is largely compliant with the pre-treatment obligation.

Ireland did not introduce specific provisions that would ensure that the most appropriate pre-treatment option is sought and applied. Therefore, this requirement of the Landfill Directive, as interpreted in the *Malagrotta* judgment, is not complied with.

National rules consider separate collection of waste as fulfilling the pre-treatment requirement, provided certain conditions are met. For urban areas with a population above 1,500, these conditions include the separate collection of bio-waste. If the conditions are not met, then the waste must be sent for mechanical-biological treatment, thus ensuring that waste streams will be adequately selected and, if appropriate, stabilised, before landfilling.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Ireland, four landfill sites were visited: Rathroeen landfill (closing in 2016), Drehid landfill, Knockharley, and Ballynagran. No other landfill site relevant for this study was operational at the time of the visits.
At the landfills visited, the separation of waste streams was mainly conducted through dirty MRF separating bulky materials, organic waste, and residual waste.
Out of the four landfills visited, only one had a pre-treatment facility on-site, which consisted of a composting installation to stabilise the organic fraction prior to landfilling. ¹⁰¹ Another two required test results confirming that organic waste was stabilised before allowing disposal into the landfills.
Therefore, Ireland does not currently comply with the requirements of the Landfill Directive, as interpreted in the <i>Malagrotta</i> ruling. However, a significant improvement is expected in the near future, with the commissioning of a 600,000 tonnes energy-from-waste facility slated for 2017. A significant amount of waste will be diverted from existing sites to the new facility once it enters into operation.

Figure 8 - Price list at the Rathroeen landfill in Ireland

RATHROEEN PRICE LIST 2014	
RECYCLING STANDARD BAG	€3.40 (per visit)
WHEELIE BIN 140L / 240L	€6.80 (each)
ALL HAZARDOUS WASTE	€6.80 / €13.60
WEIGHING WASTE	€5.00 (per visit)
MINIMUM CHARGE WEIGHING	€221.33 (per tonne)
WEIGHT DOCKET	€25.00
COMPOSTER	€25.00
SINGLE MATTRESS	€30.00
SINGLE BASE	€6.80
DOUBLE MATTRESS	€6.80
DOUBLE MATTRESS & BASE	€13.60
GREENWASTE & SOLIMBLR	€22.70
CAR LOAD	
SINGLE CAR AXLE TRAILER	€3.40
DOUBLE CAR AXLE TRAILER	€7.50
TRACTOR TRAILER / SMALL TRUCK	€15.00
TYRES	€22.70
CAR OR VAN TYRE	
TRACTOR OR TRUCK TYRE	
WEIGHING TYRES	€1.00
FREE ITEMS	€16.00
CLOTHES, ALL ELECTRICAL ITEMS / ALL BATTERIES / ALL LIGHT BULBS	€160.00 (per tonne)
THANK YOU	

¹⁰¹ Another had a civic amenity site allowing households to dispose of segregated waste streams, which however relates more to separate collection than to downstream pre-treatment.

5.2.15 Italy

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Italy has correctly transposed the provisions of the Landfill Directive regarding pre-treatment. The problems of conformity that led to the *Malagrotta* judgment rather arose from the interpretation and practical application of those provisions. Insofar as interpretation is concerned, in 2013 the Minister of Environment issued a circular that clarified the meaning of pre-treatment requirements in a way that complies with the Landfill Directive, as interpreted in the *Malagrotta* ruling.¹⁰² The circular, and the interpretation it offers, do not however have general legally binding force.

Insofar as the application of those requirements is concerned, recent data suggest that the majority of waste (70%) is pre-treated before it is landfilled. The rest is likely to be landfilled without pre-treatment. For part of this waste at least, this may be justified on the grounds of exception laid down in Article 6(a) LD. In addition, as there is spare MBT capacity in the country, the availability of infrastructure does not appear to be the main constraint to further pre-treatment. Based on this information, our analysis concludes that the share of waste landfilled without pre-treatment may be relatively small.¹⁰³

Italy has not introduced specific binding requirements for the application of the most appropriate pre-treatment option. The above-mentioned circular provides examples of types of pre-treatment that would satisfy EU requirements (anaerobic digestion after selection, MBT and incineration with energy recovery). However, the circular is not legally binding and it is too recent to assess its practical impact. A landfill permit issued after the circular, reviewed for this study, makes the operation of the landfill conditional on an MBT facility being installed (however, it does not expressly mention the circular). Other landfill permits reviewed for the purposes of this study only require physical pre-treatment operations (e.g. shredding), which are not enough to satisfy the Landfill Directive, as interpreted in the *Malagrotta* ruling. Thus, the situation is currently mixed – while Italy has taken steps to comply with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling, it has not yet achieved full compliance.

Insofar as the selection of waste streams is concerned, separate collection rates hover around 45% in Italy, with wide differences across the country (from 12.5% in Sicily, to 67.6% in Veneto). The already mentioned circular states that pre-treatment must always include an adequate selection of different waste streams, but – as said above – it is non-legally binding and fairly recent. Other than this, there is no national legislative provision requiring such a selection prior to landfilling. Therefore, also in this case, full compliance with the Landfill Directive, as interpreted in the *Malagrotta* ruling, is not yet guaranteed.

Italian law does not require the stabilisation of the organic fraction of waste prior to landfilling, although the circular does state that pre-treatment must always include this operation. For the same

¹⁰² The 2013 circular replaced an earlier one, issued in 2009, according to which grinding, shredding and sifting could be considered adequate pre-treatment.

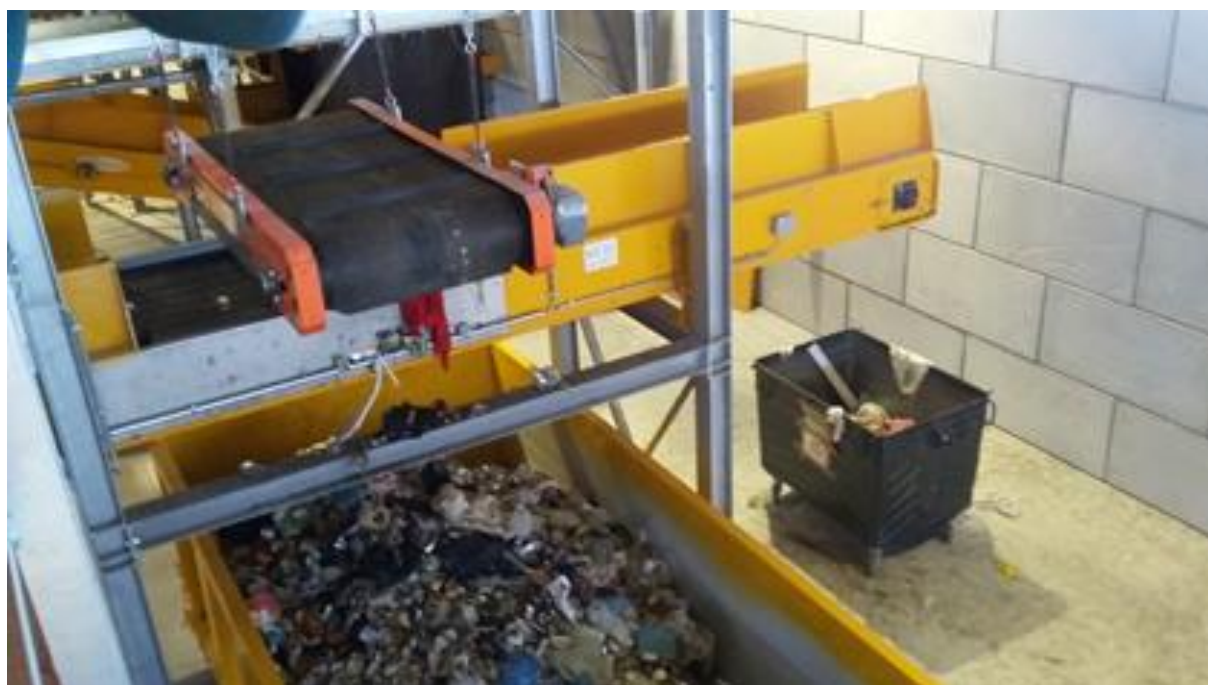
¹⁰³ This conclusion is based on national-level data. It cannot be excluded that specific areas of the country will exhibit different levels of compliance with pre-treatment requirements. More detailed information is presented in the country report prepared under this project. We will seek to capture further evidence of regional differences through the visits to landfills under Task 3 of this project, as sites to be visited are located in different areas of the country.

reasons explained above, we conclude that Italy is not yet fully compliant with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Italy, five landfill sites were visited: Bellolampo (Palermo), Grosso (Torino), Gaggio (Bologna), Vado Ligure (Savona), Sant' Arcangelo (Potenza).
At one of the landfill sites visited, an MBT facility was planned which, once operational, will pre-treat all waste to be deposited at that site in line with the requirements of the Landfill Directive, as interpreted in the <i>Malagrotta</i> ruling. However, the facility was not yet operational at the time of the site visit. All other sites had processes in place to pre-treat MSW prior to landfilling; however three of them only removed metal fractions and the organic fraction of waste. This does not appear sufficient to fulfil requirements in the Landfill Directive, as interpreted in the <i>Malagrotta</i> ruling, to ensure an adequate selection of waste streams and the stabilisation of the organic fraction of waste prior to landfilling.

Figure 9 - Detail of an MBT plant (sieving and removal of metals phase) at the Bellolampo landfill in Italy



5.2.16 Latvia

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Latvia has correctly transposed the provisions of the Landfill Directive regarding pre-treatment. It considers that separate waste collection contributes to fulfilling pre-treatment requirements¹⁰⁴. Information in regional waste management plans indicate that significant pre-treatment capacity has

¹⁰⁴ This conclusion is based on information contained in waste management plans. See country reports for more details.

been installed across Latvia¹⁰⁵. Available information does not suggest problems of implementation of pre-treatment requirements.¹⁰⁶

Latvia has not laid down specific provisions for ensuring the most appropriate pre-treatment option is applied.

Insofar as the selection of waste streams is concerned, provision was made for separate collection systems to be established by 31 December 2014, covering paper, metal, plastics and glass. Available information indicates that separate collection has improved in recent years.

Latvian rules ban the landfilling of organic waste from the food processing industry and wood processing waste, unless the landfill is equipped with biogas recovery facilities. Moreover, Latvian rules require that landfills must be equipped with a sorting site and other appropriate equipment¹⁰⁷ if biodegradable waste is to be accepted at the landfill. Finally, EU funds were used to finance many composting facilities, which are now operational in the country.¹⁰⁸ This situation thus suggests that Latvia is largely compliant with the requirement to stabilise the organic fraction of waste prior to landfilling.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Latvia, five site visits were completed (see Figure 10 below): Getliņi landfill, Džilā vāda landfill, Križevnīki landfill, Ķīvītes landfill, and Grantiņi landfill.
Three landfill sites (Getliņi, Kivites, and Križevnīki) were equipped with on-site MBT plants. Our visits confirmed that virtually all waste landfilled at this sites undergoes pre-treatment. These plants are relatively new, having started operations in late 2015, and are capable of separating paper, metal, plastic, glass, and biodegradable waste.
At the two other landfill sites (Džilā vāda and Grantiņi), pre-treatment was instead insufficient. Džilā vāda had a pre-treatment facility in place, but it was not operational during winter. At Grantiņi, a pre-treatment facility is scheduled to begin operations in 2019.
Insofar as organic waste is concerned, two landfill sites are equipped with a bioreactor and a third one composts biodegradable waste, using the stabilised residue to cover the landfill. The remaining two sites do not however stabilise the organic fraction prior to landfilling. At one of them, a composting facility is due to become operational in 2019.

¹⁰⁵ The national waste management plan includes a list of facilities (mainly separate collection facilities, composting facilities, and mechanical pre-treatment facilities) that were built using EU financing. It does not provide detailed descriptions of the facilities. The regional waste management plans reviewed under this study offer more details about the facilities available in relevant regions. See Task 2 country report for more details.

¹⁰⁶ Rather, there are signs of pre-treatment overcapacity in the country, as population and waste generation per inhabitant decrease, while separate waste collection and recovery improve.

¹⁰⁷ Latvian law states that ‘in a landfill, the waste acceptance and treatment zone shall have... a waste treatment and sorting site, which shall be equipped with: ... appropriate technological equipment if biodegradable waste is to be accepted at the landfill site’ (Regulation No. 1032 Paragraph 18). See Task 2 country report for more details. The visits to landfill sites conducted under this study showed that: three out of five sites visited had on-site MBT plants; another had an on-site MBT plant, which was not however operational during winter; on the last site, a MBT plant was scheduled to become operational in 2019.

¹⁰⁸ Similarly to pre-treatment facilities, the viability of at least some composting facilities appears to be uncertain.

Figure 10 - Landfill sites visited in Latvia



5.2.17 Lithuania

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Lithuania has correctly transposed the definition of pre-treatment set out in Article 2(h) LD. Its laws provide that only waste that has been subject to pre-treatment, and is not suitable for recycling or reuse, may be landfilled. Our research indicates that compliance with these provisions used to be low, due to delays in the construction of the necessary pre-treatment facilities. These installations became operational in 2016.

No legal provision has been found that specifically requires the application of the most appropriate pre-treatment option. However, the national waste management plan envisages different treatment operators depending on the waste stream concerned – e.g. separation and biological treatment for biodegradable waste, separation and material recovery for recyclable materials, separation and energy recovery for suitable waste. Energy recovery would be used where other treatment options are not feasible. The infrastructure needed to implement the plan is currently available, as most of the planned pre-treatment facilities became operational in 2016. The planning of these facilities was based on feasibility studies. Therefore, it can reasonably be expected that Lithuania will be largely compliant with the requirement to select the most appropriate pre-treatment options.

Similar considerations apply in relation to the selection of waste streams and the stabilisation of the organic fraction of waste – here too, the main obstacle towards achieving full compliance was the absence of the necessary infrastructure. As most of the planned infrastructure has become operational, Lithuania can be expected to be largely compliant with applicable requirements.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
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Key findings from landfill site visits

In Lithuania, five site visits were completed: Kaunas Lapės landfill, Klaipėda landfill, Panevėžys landfill, Tauragė landfill, and Vilnius landfill.

Four of the five landfills had MBT plants on-site. These plants separate out recyclables such as paper, metal, plastic, glass, and organic waste.

The other (Kaunas Lapės) did not carry out pre-treatment on-site, but since the beginning of 2016 it only accepts pre-treated waste.

The organic fraction is either stabilised (by composting or anaerobic digestion) prior to landfilling, or incinerated.

The landfills visited can thus be considered to comply with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling.

Figure 11 - Manual sorting of recyclables at the Panevėžys landfill in Lithuania



5.2.18 Luxembourg

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Luxembourg has correctly transposed the provisions on pre-treatment laid down in the Landfill Directive. Available information does not suggest problems of implementation of pre-treatment requirements.

In Luxembourg, municipalities – individually or through their associations (called “syndicates”) – organise municipal waste collection, recovery and disposal. Waste is sent to different facilities, depending on its nature, for appropriate treatment. Biological stabilisation, MBT, and energy recovery are among the processes used to this end. This system thus gives reasonable assurances that the most appropriate pre-treatment option is applied.

Separate collection, which is considered as a form of pre-treatment, covers a number of waste streams, including paper, plastics, glass, and bio-waste. Separate collection, together with the pre-treatment approach described above, is likely to achieve good levels of compliance with relevant requirements of the Landfill Directive, as interpreted in the *Malagrotta* judgment.

5.2.19 Malta

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Malta has not transposed the definition of pre-treatment set out in Article 2(h) LD. While its legislation requires that only pre-treated waste may be landfilled, the national waste management plan clearly indicates that the country still relies on extensive landfilling without any form of pre-treatment.

Given this situation, and the absence of a provision requiring the application of the most appropriate pre-treatment option, compliance with this aspect of the Landfill Directive, as interpreted in the *Malagrotta* ruling, is not achieved either.

From the information included in the national waste management plan, it appears that the sorting and separate collection of waste are still insufficient, and do not include separate collection of biodegradable waste. The plan sets out priorities for improving this situation, in particular as regards the management and treatment of recyclables, bio-waste and residual mixed waste. In particular, bio-waste should be separately collected and sent to composting or anaerobic digestion with biogas production. Residual mixed waste should be treated in MBT facilities before it is landfilled. While the plan would, if properly implemented, improve Malta’s compliance with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling, full compliance is not yet achieved.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Malta, only one landfill site existed at the time of the visits which accepts non-hazardous municipal waste: the Ghallis landfill. This was the only landfill visited in this country.
Even though a separate collection system is operational in Malta, which isolates four recyclable waste streams (paper and cardboard, glass, metal, and plastics), our site visit found indications that the system was insufficient to guarantee an adequate selection of waste streams prior to landfilling. In particular, separation of biodegradable waste was still being piloted in some municipalities, and although some organic waste is stabilised through anaerobic digestion prior to landfilling, not all waste is pre-treated before disposal.

Figure 12 – The Ghallis landfill in Malta



5.2.20 Netherlands

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

The provisions of the Landfill Directive on pre-treatment are correctly transposed in legal system of the Netherlands. Available information does not suggest problems of implementation of pre-treatment requirements.

Rather, available data indicates that the majority of waste (79%) is recovered (material or energy recovery) or incinerated (20%), with only a minor part being landfilled (1%). The prohibition to landfill untreated waste in combination with landfill bans on 64 specific waste categories (including combustible residues from pre-treatment) results only non-combustible residues from sorting, recovery and recycling being landfilled. However, there is no national provision specifically requiring the application of the most appropriate pre-treatment option, and it cannot be confirmed that the requirement of the Landfill Directive, as interpreted in the *Malagrotta* ruling, to search for and implement the most appropriate pre-treatment option is fulfilled in practice.

Separate collection covers a number of waste streams, including paper, plastics, glass and biodegradable waste. The separate collection is around 50%, and there is a target to increase it to 75% by 2020. There is no specific obligation to stabilise the organic fraction of waste before landfilling.

However, the very limited amounts of waste actually landfilled in the country ensure that potential problems of compliance should have only very limited practical significance in the Netherlands.

5.2.21 Poland

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	

Poland has correctly transposed the provisions of the Landfill Directive on pre-treatment. Pre-treatment facilities appear to have sufficient capacity (about 7.5 million tonnes for MBT and 3 million tonnes for biological treatment) to process waste landfilled in Poland (about 6 million tonnes). Therefore, Poland can be considered to largely meet pre-treatment requirements.

As regards the choice of pre-treatment option, Poland has instituted a system that significantly relies on MBT. Our research did not find feasibility studies or other analyses supporting the choice of this particular approach. Therefore, while Poland has taken meaningful steps towards ensuring proper waste pre-treatment, we could not confirm whether it can be considered to achieve full compliance with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling.

The selection of waste streams is mandatory, and is mainly carried out as part of MBT processes. Polish legislation requires that such processes must at least ensure that recoverable fractions of mixed municipal waste are sorted out. In addition, separately collected bio-waste must be composted or otherwise recovered as useful materials. This approach can be considered capable of ensuring that waste streams are adequately selected before the waste is landfilled.

Poland aims to eliminate all landfilling of separately collected biodegradable waste by 2021. Meanwhile, under the approach described above, the biodegradable fraction must be selected out of the waste.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits

Five site visits were completed in Poland: Jancyce landfill, Stare Lipiny landfill, Nysa landfill, Sulkowice landfill, and Slajino landfill.

Our visits found no evidence of waste being landfilled without pre-treatment. Manual and mechanical processes were in place to separate the different fractions of waste and prepare recyclable waste for material recovery. Composting was used to stabilise biodegradable waste prior to landfilling.

Figure 13 - Waste after stabilisation in composting cells at the Janczyce landfill in Poland



5.2.22 Portugal

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Portugal has not transposed the definition of treatment set out in Article 2(h) LD. While it does require that waste should be pre-treated before landfilling, available data shows that a large share of municipal waste is still landfilled without pre-treatment. According to Portugal's *Strategic Plan for Urban Waste*, the direct landfilling of waste without pre-treatment should be completely eliminated by 2030 (only).

Portugal has not introduced requirements for the application of the most appropriate pre-treatment option. Although the national waste management plan does refer to mechanical treatment, composting and MBT, this is not enough to ensure compliance with this aspect of the Landfill Directive, as interpreted in the *Malagrotta* ruling.

Separate collection systems exist in Portugal, but they do not ensure an adequate selection of waste streams as required by the Landfill Directive, as interpreted in the *Malagrotta* ruling. In particular,

mixed waste continues to be landfilled without selection of waste streams, and significant amounts of biodegradable waste are landfilled without prior stabilisation.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
Five site visits were completed in Portugal: Barlavento landfill, Seixal landfill, Fundão landfill, Viana do Castelo landfill, and Leiria landfill.
Even though four out of the five landfills visited had MBT facilities on-site, their capacity was insufficient to pre-treat all waste accepted at the sites. Thus, a part of the waste was landfilled without pre-treatment. In particular, our visits found that waste was adequately pre-treated only at only one site (Fundão landfill). In another three landfills, only a minor share of waste underwent pre-treatment prior to landfilling (40% in Leiria, 15% in Barlavento, 10.4% in Seixal). At one landfill (Viana) waste was landfilled without any pre-treatment.
Where pre-treatment is carried out, it removes metals, plastics, paper and cardboard, and other biodegradable materials. Glass is instead usually left in the residual waste and landfilled rather than recovered.
Biodegradable waste is pre-treated to the extent that the MBT capacity allows. However, as already mentioned, this is insufficient to treat all biodegradable waste, and a part of it is landfilled without being stabilised.

Figure 14 - Mixed waste, including organic waste, at the Leiria landfill in Portugal



5.2.23 Romania

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Romania has not transposed the definition of treatment set out in Article 2(h) LD. While Romanian legislation does require that waste should be pre-treated before landfilling, available information

indicates that the necessary waste management infrastructure is still incomplete and therefore actual compliance with the pre-treatment requirement is currently low.

Management plans at different levels contain some guidance concerning pre-treatment approaches, but they mainly refer to physical processes such as sorting, grinding, and compressing, which do not meet the requirements set out in the Landfill Directive, as interpreted in the *Malagrotta* ruling. Biological treatment (e.g. composting) is also mentioned. In general, the plans present these approaches as possibilities for the future, confirming that, at present, they are not systematically applied.

Separate collection rates in Romania are below 5% and, as pre-treatment is lacking, the requirement of the Landfill Directive, as interpreted in the *Malagrotta* ruling, for adequate selection of waste streams cannot be achieved. Achievement of targets of the Landfill Directive for the reduction of biodegradable waste landfilling and the stabilisation of the organic waste landfilled is not ensured.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits	
In Romania, five site visits were completed at the Oradea landfill, Piatra Neamt landfill, Glina landfill, Chitila landfill, and Albota landfill.	
Only a minor share of the waste landfilled at these sites was pre-treated (15% or less). Although some pre-treatment processes are in place (MBT, mechanical sorting, manual sorting), these are generally insufficient to pre-treat all waste to be landfilled (70% to 99% of the waste landfilled was mixed waste containing recyclable materials). Also, these processes do not separate and stabilise the organic fraction of waste.	

Figure 15 - Untreated waste deposited at the Glina landfill in Romania



5.2.24 Slovakia

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Slovakia has transposed the requirement that waste may only be landfilled after pre-treatment. However, while pre-treatment is correctly defined, Slovak legislation allows exceptions to the pre-

treatment obligation that go beyond the Landfill Directive. In particular, waste (other than inert waste) may be landfilled without pre-treatment if such pre-treatment is not technically feasible. The Directive allows this ground of exception only for inert waste. Insofar as other waste is concerned, the Directive permits exceptions only where pre-treatment would not contribute to reaching the objectives of the Directive by reducing the quantity of waste or the hazards it poses to human health and the environment. In this regard, Slovak legislation is therefore not in conformity with the Directive.

The waste management plans reviewed did not include any provision on pre-treatment. Landfill permits only mandated physical pre-treatment processes such as the grinding and compressing of waste, thus indicating that the requirement of the Landfill Directive, as interpreted in the *Malagrotta* ruling, to apply the most appropriate pre-treatment option is not fulfilled.

Slovakia does not currently appear to ensure an adequate selection of waste streams before landfilling or the stabilisation of the organic fraction. In fact, the waste management plans and the landfill permits allow the landfilling of (untreated) biodegradable waste.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Slovakia, five site visits were completed at the Zohor landfill, Kalná nad Hronom (Nový Tekov) landfill, Kalnô (Marin) landfill, Žiar nad Hronom (Bzenica) landfill, and Sabinov (Raznany) landfill. Our site visits showed that mechanical sorting and other pre-treatment (e.g. shredding, compaction) of waste was carried out on-site at two out of five of the sites (Zohor and Kalnô). At another site (Žiar nad Hronom), no pre-treatment was carried out on-site, but about 60% of the waste accepted originated from off-site mechanical treatment facilities. At the remaining two sites (Kalná nad Hronom and Sabinov), pre-treatment was not carried out either on-site or off-site, and waste was landfilled without pre-treatment. Also, at none of the sites visited was there any separation and stabilisation of the organic fraction of waste prior to landfilling.

Figure 16 - Waste deposited at the Bzenica landfill in Slovakia



5.2.25 Slovenia

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Slovenia has correctly transposed the provisions of the Landfill Directive on pre-treatment. Until recently, the country lacked the necessary infrastructure to ensure that all waste was pre-treated before landfilling. The waste management plan explicitly indicates that the majority of mixed municipal waste collected (83%, or 362,036 tonnes) was landfilled without pre-treatment in 2011. The plan sets the goal of eliminating the landfilling of untreated mixed waste by 2020. To achieve this goal, it envisaged the construction of about 400,000 tonnes a year of additional pre-treatment capacity. According to the Ministry of Environment, sufficient capacity had been installed by the end of 2015 to pre-treat nearly all mixed municipal waste generated in the country. This information is confirmed in the new waste management plan. Therefore, we conclude that Slovenia can reasonably be expected to approach compliance with the pre-treatment requirement as interpreted in the *Malagrotta* judgment.

Slovenian legislation provides that biological and mechanical-chemical pre-treatment should be used for mixed municipal waste. Pre-treatment should include the extraction of recyclables and waste fractions suitable for thermal treatment, as well as the stabilisation of biodegradable waste through

aerobic or anaerobic processes. There is therefore a framework of rules that could ensure the application of appropriate pre-treatment options.

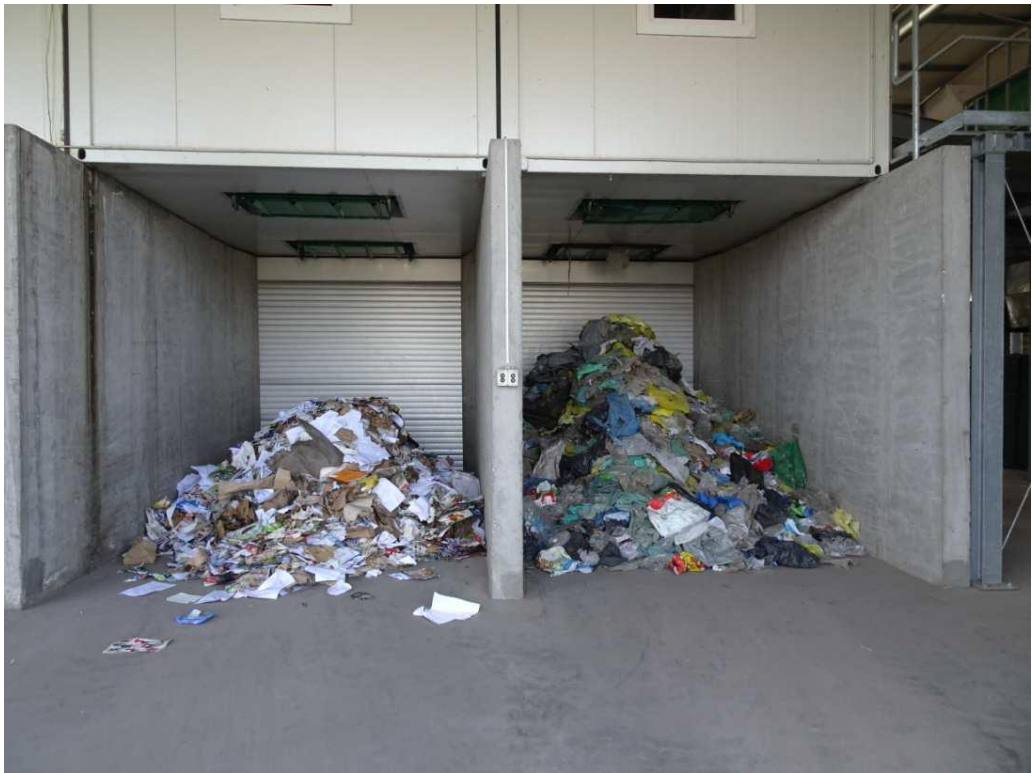
In Slovenia, separate collection systems cover a variety of waste streams, notably including paper, metal, plastics, glass, and bio-waste. Mechanical pre-treatment of residual waste is also required, in order to further extract recyclable and combustible fractions, as mentioned in the previous paragraph. Separate collection infrastructure is considered adequate, and fairly high separate collection rates are achieved in the country (nearly 65%). Therefore, Slovenia can be regarded as complying with the requirement of the Landfill Directive, as interpreted in the *Malagrotta* ruling, for an adequate selection of waste streams prior to landfilling.

While the law does not specifically require the stabilisation of the organic fraction of waste before landfilling, it does support compliance with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling, by indicating the types of pre-treatment to be applied, which include the biological treatment of organic waste. This, together with the effectiveness of the separate collection systems (which include bio-waste), provides assurances that the amounts of non-stabilised organic waste landfilled in Slovenia should be relatively small.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Slovakia, five site visits were completed at the Leskovec landfill, Špaja dolina landfill, Unično novo landfill, Globoko landfill, and Gajke landfill.
Three of the landfill sites visited pre-treat waste on-site through MBT. The others accept pre-treated waste from off-site MBT facilities. The pre-treatment applied separated recyclable waste (paper and cardboard, plastic, metal, and glass) in an effective manner – no recyclable materials were observed in the landfill. The organic fraction was separated and stabilised.
Thus, the landfills were found to comply with the requirements of the <i>Malagrotta</i> judgment.

Figure 17 - Recyclable waste after sorting at the Leskovec landfill in Slovenia



5.2.26 Spain

The <i>Malagrotta</i> ruling conclusions		
1	All waste is pre-treated	Definition of pre-treatment
		Pre-treatment requirement
2	Most appropriate pre-treatment option is applied	
3	Adequate selection of waste streams	
4	Stabilisation of the organic fraction	

Spain has correctly transposed the provisions of the Landfill Directive on pre-treatment. However, the national waste management plan reveals that 6 million tonnes of waste were landfilled without pre-treatment in 2012, thus suggesting that compliance with these provisions is low in practice.

Spain has not set out any legal provision that would ensure the application of the most appropriate pre-treatment option is sought and implemented, or that the organic fraction of waste is stabilised prior to landfilling.

Moreover, separate collection is not yet widespread in Spain, and it does not appear that recyclables or biodegradable waste are systematically sorted out before waste is landfilled.

Therefore, Spain does not currently comply with the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In Spain, five site visits were completed at the Cogersa landfill, Huesca landfill, Gardelegi landfill, Alcala Landfill, and Gongora landfill.
Our site visits found that only one landfill site had an MBT facility which ensures the pre-treatment of waste prior to landfilling. The plant separates paper and cardboard, plastics, metals, aluminium, and glass. It also stabilises the organic fraction of waste. At the other landfills, instead, waste is landfilled without any pre-treatment.

Figure 18 - Plastic bottles, drink cartons, cardboard, plastic packaging, metals and organic waste deposited in the Cogersa landfill in Spain



5.2.27 Sweden

The <i>Malagrotta</i> ruling conclusions			
1	All waste is pre-treated	Definition of pre-treatment	😊
		Pre-treatment requirement	😊
2	Most appropriate pre-treatment option is applied		😊
3	Adequate selection of waste streams		😊
4	Stabilisation of the organic fraction		😊

Sweden has correctly transposed the provisions on pre-treatment laid down in the Landfill Directive. Available information does not suggest problems of implementation of pre-treatment requirements.

Sweden has not introduced specific requirements for the application of the most appropriate pre-treatment option. However, the national waste management plan provides that biodegradable waste (such as food waste) should be composted, used for biogas production, or incinerated (with residues used as fertilisers). This requirement, together with the very low landfilling rate (about 1%) prevailing in the country, suggests that the objective to use the most appropriate pre-treatment options is achieved in practice.

Households are required by law to sort their waste, and the separate collection of various waste streams – including paper, plastics, metal, glass and biodegradable waste – appears to be effective. Sweden can thus be considered to fulfil the requirement of the Landfill Directive, as interpreted in the *Malagrotta* ruling, for adequate selection of waste streams.

Finally, Sweden has banned the landfilling of certain waste streams, including organic waste.

5.2.28 United Kingdom

The <i>Malagrotta</i> ruling conclusions			
1	All waste is pre-treated	Definition of pre-treatment	😞
		Pre-treatment requirement	😊
2	Most appropriate pre-treatment option is applied		😞
3	Adequate selection of waste streams		😊
4	Stabilisation of the organic fraction		😞

The United Kingdom has transposed the requirement that waste may not be accepted at landfills unless it has been pre-treated. However, the definition of pre-treatment set out in Article 2(h) LD has been transposed in Scotland and in Northern Ireland, but not in England and Wales. Furthermore, no provision has been found that would ensure the application of the most appropriate pre-treatment option.

The United Kingdom has introduced provisions requiring the separate collection of waste streams for which the Waste Framework Directive sets out recycling targets. Receptacles for food waste and other bio-waste must be provided in Northern Ireland, and the waste management plans for all areas of the country encourage the separate collection of bio-waste. Guidance by the Environment Agency considers separate collection of waste as fulfilling the pre-treatment requirement. However, little is said about further pre-treatment, in case separate collection is not in place or ineffective. This guidance does not appear to be in compliance with the duty to search and implement the most appropriate pre-treatment option for the purpose of reducing negative impacts on the environment and human health, particularly since it does not include any condition on the quality of source segregation. These concerns are exacerbated by data indicating that the separate collection of biodegradable waste

is insufficient and lagging behind objectives, at least in some areas of the country. Therefore, adequate selection of waste streams prior to landfilling is currently not ensured.

Insofar as organic waste is concerned, apart from the forthcoming landfilling ban on biodegradable waste in Scotland, no provisions were found that would amount to a requirement to stabilise (or prevent the landfilling of) biodegradable waste in the UK. Therefore, the conclusion must be that compliance with this requirement of the Directive, as interpreted in the *Malagrotta* ruling, is not guaranteed.

The box below summarises key findings from the landfill site visits carried out in this country.

Key findings from landfill site visits
In the UK, five site visits were completed: two in England (Sutton Courtenay landfill, and Hill and Moor landfill), one in Scotland (Greengairs landfill), one in Wales (Newport landfill), and one in Northern Ireland (Tullyvar landfill).
The site visits found that waste streams are generally selected in an adequate manner through separate collection, MRF and MBT facility. The selection includes separation of paper, plastic, metal, and glass. The landfills accept waste from pre-treatment facilities, as well as directly from households and commercial collection. The latter is landfilled without pre-treatment, which is not in compliance with the requirements of the <i>Malagrotta</i> ruling. Moreover, except where separate collection of biodegradable waste and MBT facilities are available, the organic fraction of waste is not separated out or stabilised prior to landfilling.

Figure 19 - The Tullyvar Landfill in the United Kingdom (Northern Ireland)



5.3 MEMBER STATES MONITORING AND ENFORCEMENT ACTIVITIES

This section provides an overview of Member State activities for the monitoring and enforcement of requirements on the pre-treatment of waste in the Member States. Clear information on these aspects proved difficult to gather through desk research. In particular, while information was gathered regarding enforcement related to waste management generally, less information was found regarding pre-treatment in particular. Member States were given the opportunity to review and provide input into country reports, including as regards monitoring and enforcement. Input was received from the authorities of 16 Member States, but few commented on monitoring and enforcement¹⁰⁹. Additional information was gathered through a meeting with¹¹⁰, and a short questionnaire to officials from the IMPEL network¹¹¹, within the context of the 2011-2016 IMPEL project *Reinforcement programme on inspections skills according to the Landfill Directive*.

In relation to the 18 Member States with the highest landfilling rates, the findings from the desk research were complemented through information gathered during the site visits, by asking relevant questions to the operators of the landfills visited, and through interviews with national officials associated with the IMPEL network¹¹². While efforts have been made to ensure the completeness and accuracy of the results presented in this section, it cannot be excluded that additional monitoring and enforcement activities take place in the Member States which could not be captured by the methodology for this study.

This section first describes inspection of landfills in general, and then focuses on inspections specifically related to the pre-treatment of waste.

Inspection of landfills

Landfills¹¹³ and pre-treatment facilities¹¹⁴ have to comply with the provisions of the Industrial Emissions Directive (IED), including as regards environmental inspections. Member States had to achieve compliance with these requirements by 7 January 2013¹¹⁵. The text box below summarises the main provisions on monitoring and enforcement in the Industrial Emissions Directive that are relevant for this study.

Main monitoring and enforcement provisions of the Industrial Emissions Directive

Under the Industrial Emissions Directive, permits have to include a requirement for the operator to inform

¹⁰⁹ Limited input on monitoring and enforcement was received from the authorities of seven Member States (Bulgaria, Czech Republic, Germany, Ireland, Netherlands, Slovenia, and Spain). In general, the information mainly helped identify competent authorities and periodic reports on their activities. In some cases, statistical data about the number of inspections carried out in the Member State was obtained. This information was taken into account in the Task 2 country reports and in this final report.

¹¹⁰ Reinforcement programme on inspections skills according to the landfill directive, meeting in Zaandam, Netherlands, on 18 November 2016.

¹¹¹ The short questionnaire was approved by the Commission prior to being shared with IMPEL. Input was received from respondents representing three Member States: Belgium, Croatia, and Czech Republic. Where relevant, input from interviews was used to complement or validate the desk research.

¹¹² Interviews focused on Member States where the situation concerning pre-treatment remained less clear after desk research. Contacts of possible interviewees were provided by IMPEL for 10 Member States. All potential interviewees were contacted via e-mail to arrange an interview. Four interviews were carried out with interviewees from the following Member States: Italy, Latvia, Portugal, and Slovenia. Interviews were carried out via phone or, where the interviewee so requested, via e-mail. The latter method allowed for participation of interviewees who did not feel comfortable speaking in English. Where relevant, input from interviews was used to complement or validate the desk research.

¹¹³ The IED applies to landfills receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, excluding landfills for inert waste. See Annex I, Point 5.4, IED.

¹¹⁴ The IED applies to the disposal and recovery of non-hazardous waste with a capacity exceeding 50 tonnes per day (disposal only) or 75 tonnes per day (recovery only, or a mix of disposal and recovery), which involve treatment operations such as biological treatment, physico-chemical treatment, treatment in shredders of metal waste, or anaerobic digestion (in the latter case, the capacity threshold is 100 tonnes per day). See Annex I, Point 5.3, IED.

¹¹⁵ Article 80(1) IED.

the competent authority, at least annually, about the results of emissions monitoring and other data to allow the competent authority to verify compliance with permit conditions¹¹⁶.

The Industrial Emissions Directive further requires Member States to set up a system of environmental inspections addressing all pertinent environmental impacts from relevant installations¹¹⁷. As part of this system, one or more environmental inspection plan(s) must be established¹¹⁸, covering all installations concerned¹¹⁹. The plan(s) must include, among other things, an assessment of relevant significant environmental issues, procedures for drawing up programmes for inspections, and provisions on cooperation between different inspection authorities¹²⁰.

Environmental inspections feature both routine and non-routine inspections. Routine inspections are made based on programmes that Member States competent authorities draw up in accordance with the environmental inspection plan(s). The programmes include, among other things, provisions on the frequency of site visits¹²¹. While Member States have some discretion in setting the frequency, the Directive lays down minimum requirements – the period between two site visits to the same installation has to be based on a systematic appraisal of environmental risks and must not exceed one year for high-risk installations and three years for low-risk ones¹²². Moreover, in case significant violations of permit conditions are found, the Directive requires an additional site visit to be performed within six months¹²³.

Similarly to the Industrial Emissions Directive, the Landfill Directive requires landfill operators to report to the competent authority, at least once a year, on the types and quantities of waste disposed of in the landfill, as well as the results of the landfill monitoring programme¹²⁴. Available information suggests that in not all Member States these self-monitoring reports are submitted to the authority competent for monitoring and enforcing national provisions transposing the Landfill Directive – rather, they may be submitted to the permitting authority, and never reach monitoring and enforcement bodies¹²⁵. This situation can hinder the efficacy of inspections in general as well as the verification of compliance with pre-treatment requirements.

Our research shows that monitoring and enforcement competences are allocated at different levels of government (national, regional, or municipal) in different Member States, and that the actual frequency of inspections varies from country to country.

Table 7 below indicates the approximate minimum frequency of inspections as well as the main authorities that are in charge of routine inspections (for non-routine inspections, including for example when crime is suspected, police authorities may also be involved). The table was compiled based on national provisions on inspections, where available, and input gathered from IMPEL. While all efforts have been made to ensure that the information in the table is accurate, it was not possible to systematically verify it against literature, consultation of Member State authorities or interviews¹²⁶.

¹¹⁶ Article 14(1)(d) IED.

¹¹⁷ Article 23(1) IED.

¹¹⁸ Environmental inspection plans may be established at national, regional or local level.

¹¹⁹ Article 23(2) IED.

¹²⁰ Article 23(3) IED.

¹²¹ Article 23(4), first subparagraph, IED.

¹²² Article 23(4), second subparagraph, IED.

¹²³ Article 23(4), third subparagraph, IED.

¹²⁴ Article 9(d) LD.

¹²⁵ See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016. The source does not specify which Member States are concerned.

¹²⁶ Our research did not find publications providing an overview of national authorities competent for inspections and the actual frequency of those inspections. Member State officials who reviewed country reports did not generally provide new information about monitoring and enforcement. A small set of interviews was carried out under the project, which did not cover all Member States.

Table 7 - Monitoring authorities and frequency of inspections in the Member States

Member State	Authorities for regular inspections	Approximate minimum frequency of inspections			
		Risk-based approach ¹²⁷	Yearly or more	Every three years or less	N/A
Austria	Lander authorities			X	
Belgium	Regional authorities				X
Bulgaria	Regional environmental inspectorates (under Ministry of Environment)		X		
Croatia	Ministry of Environment	X	X		
Cyprus	Department of Environment		X		
Czech Republic	Environmental inspectorate			X	
Denmark	Municipalities (overseen by EPA)			X	
Estonia	National inspectorate, local municipalities				X
Finland	N/A				X
France	Various national, regional and local bodies				X
Germany	Lander (Federal States)				X
Greece	Environmental Inspectorate		X		
Hungary	Regional environmental inspectorates under National Inspectorate	X			
Ireland	EPA and local authorities		X		
Italy	Regional Environment Protection Agencies on behalf of competent authorities (Regional or Provincial government)	X ¹²⁸			
Latvia	State Environmental Service including Regional Boards				X
Lithuania	Regional Environmental Protection Departments under Ministry of Environment		X		
Luxembourg	Environment Department of Ministry of Sustainable Development				X
Malta	Malta Environmental Planning Authority		X		
Netherlands	Regional and local authorities	X			
Poland	Voivodship Environmental Inspectorates and Chief Inspectorate		X		

¹²⁷ Where a risk-based approach is implemented, the actual frequency of inspections will depend on the risk associated with each landfill or pre-treatment facility.

¹²⁸ A risk assessment tool (SSPC) based on the IRAM tool produced in a IMPEL project, is widely used by the regional environmental agencies, to prioritise inspections (high and low risk corresponding to a yearly or three years' inspection frequency).

Member State	Authorities for regular inspections	Approximate minimum frequency of inspections			
		Risk-based approach ¹²⁷	Yearly or more	Every three years or less	N/A
Portugal	General Inspectorate of Agriculture, Sea, Environment and Spatial Planning; plus Coordination Commissions on Regional Development; Regional Services of Environment Ministry	X	X		
Romania	National Environmental Guard		X		
Slovakia	Environmental Inspectorate and district authorities	X	X		
Slovenia	Environmental Inspectorate	X	X		
Spain	Regions (Autonomous Communities)	X			
Sweden	County Administrative Boards	X			
United Kingdom	Environment Agency (England), Gibraltar Department of Environment, Northern Ireland Environment Agency, Natural Resources Wales, Scottish EPA	X			
TOTAL		10	12	3	7

Based on the information gathered, it appears that only five Member States regularly publish data on the number of inspections in the waste field: Cyprus, Czech Republic, Denmark, Ireland and Poland. In addition, in at least one case – Scotland in the United Kingdom – the inspection authority publishes the results of enforcement work across all facilities, including those for waste management.¹²⁹ Similar data are not always found for other Member States. At the same time, the analysis of self-monitoring reports is usually considered as an inspection. However, in not all Member States are the results of such review recorded in a final document¹³⁰. Failure to produce and disseminate information about the inspections carried out and their results makes it difficult for civil society organisations and the general public to understand the level of monitoring and compliance with environmental protection requirements¹³¹. Moreover, inspectors should be able to obtain and review the results of these analyses, as they are useful in preparing for on-site visits¹³².

Inspections of waste pre-treatment requirements

Research carried out under the IMPEL project found that inspectors use different strategies to assess whether waste has been pre-treated before landfilling. Usually, pre-treatment is checked during routine inspections and by reviewing relevant documentation. The basis characterisation of waste may also be requested from the waste producer. Normally, controls include checking what the waste source is, if the self-monitoring system is properly implemented at the landfill site, if waste is pre-treated and if so

¹²⁹ See: <http://www.sepa.org.uk/regulations/authorisations-and-permits/compliance-assessment-scheme/>

¹³⁰ See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹³¹ In this regard, it is worth recalling that Article 7 of Directive 2003/4/EC requires Member States to ensure that public authorities organise the environmental information relevant to their functions and held by or for them with a view to its active and systematic dissemination to the public. Member States are further required to ensure that environmental information progressively becomes available in easily accessible electronic form. The information must include, among other things, data or summaries of data derived from activities affecting, or likely to affect, the environment. See Article 7(1) and (2)(e), Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC.

¹³² See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

how. In addition, the waste can be analysed to understand if pre-treatment is needed (relevant parameters include total organic carbon, water content, flammability, etc.)¹³³.

The IMPEL project showed that pre-treatment is not usually considered as a priority for inspections¹³⁴. In certain circumstances, this can be justified. In particular, failure to adequately pre-treat waste may be due to the lack of appropriate infrastructure in the local area. In this case, the inspector will be aware of the problem and it would not be useful to focus on it during the site visit. In other cases, it may be well-known, including to the inspector, that in the relevant geographical area waste follows a specific pathway, and it is unlikely that any significant amount of waste which was capable of pre-treatment is landfilled untreated. This could be the case for example where there are high levels of separate collection and recovery, and the small amounts of residual waste are incinerated, so that most waste that is landfilled is waste coming from (material or energy) recovery facilities¹³⁵. In all other cases – notably, where a significant share of waste goes to pre-treatment facilities such as MBT plants before landfilling – systematic checks and inspections to ensure compliance with pre-treatment requirements become important.

Discussions in late 2016 with enforcement officials involved in the IMPEL project¹³⁶ indicate that some Member States in this category were still developing their approaches to the inspection of the pre-treatment requirements set out in the *Malagrotta* ruling. One reason is that several Member States have expanded their pre-treatment capacity in recent years, moving from a situation without sufficient facilities to one where all or a significant share of residual waste is now pre-treated before landfilling (see section 5.2 above). In 2017, the IMPEL Landfill Project will focus on approaches for the inspection of waste pre-treatment.¹³⁷ Nonetheless, one concern raised in these discussions and also in some of the interviews with IMPEL officials is that the insufficiency of human resources is a common problem for many national competent authorities, which constrains monitoring activities¹³⁸.

Concluding notes regarding inspections

Information reviewed under this study does not allow definite conclusions as to whether Member States have achieved compliance with the requirements on environmental inspections in the Industrial Emissions Directive, including as regards the frequency of inspections¹³⁹. There are however indications that, at least in some Member States, competent authorities are still in the course of adapting to the relatively new provisions on inspections laid down in the Directive, particularly as regards their frequency. Moreover, it appears that many Member States are still developing their approaches for the inspection of pre-treatment requirements.

5.4 SUFFICIENCY OF PRE-TREATMENT CAPACITY

An overview of the sufficiency of (existing and planned) pre-treatment capacity in the Member States

¹³³ See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹³⁴ See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹³⁵ Interview with Mr Romano Ruggeri of the Regional Environment Protection Agency of Sardinia (Italy) of 30 November 2016. Of course, in the case of inspections at pre-treatment facilities (whether or not on a landfill site), the inspector will check that waste is pre-treated in the facility as required by the permit.

¹³⁶ In particular at the Reinforcement programme on inspections skills according to the landfill directive, meeting in Zaandam, Netherlands, on 18 November 2016.

¹³⁷ IMPEL, Landfill project: Terms of Reference 2017. Available at: <http://www.impel.eu/wp-content/uploads/2015/10/2017-06-Landfill-project-2017.pdf>

¹³⁸ Interviews with Mr Romano Ruggeri of the Regional Environment Protection Agency of Sardinia (Italy) of 30 November 2016 and with Ms. Jana Miklavčič of the Ministry of Environment of Slovenia of 2 December 2016. A recent IMPEL project developed a risk assessment tool (IRAM) that is increasingly used in Member States to prioritise inspections according to IED frequency requirements.

¹³⁹ It was not among the objectives of this project to verify Member States' compliance with the provisions of the Industrial Emissions Directive.

is presented in Table 8 below. The table focuses on mechanical-biological treatment (MBT) capacity. Despite extensive desk-based research, it cannot be ensured that all existing and planned MBT facilities were identified; moreover, capacity figures for MBT facilities were not always available, in particular for planned facilities.

Of the 18 Member States with the highest landfilling rates, none were found to have sufficient pre-treatment capacity country-wide¹⁴⁰, though this level was close in Italy and Slovenia. Of the other 10 Member States, it appears that five currently have sufficient pre-treatment capacity. When including information about facilities in development, it appears that all ten Member States will have sufficient capacity in the future.

The landfill visits themselves gathered information on the extent of pre-treatment of waste arriving at the sites. Although their goal was not to gather country-wide information, this site-based information, summarised in the table, provides context for the overall estimates of pre-treatment capacity.

Table 8 - Comparison of waste arisings and pre-treatment capacity identified

The 18 MS visited	MSW arisings 2015 (thousand tonnes)	MSW landfilled 2015 (thousand tonnes)	Existing MBT capacity sufficient	Existing and planned MBT capacity sufficient	Information from the site visits
Bulgaria	3,011	1,994	☹️	☹️	Options for the pre-treatment of waste are currently limited nationally. Only 7 mechanical biological treatment (MBT) facilities currently operational in Bulgaria.
Croatia	1,654	1,319	☹️	☹️	There is currently no mechanical or biological pre-treatment of MSW prior to landfilling. One MBT plant is in development.
Cyprus	541	403	😊	😊	Of the two landfills, Larnaca includes an integrated waste management facility including MBT and a similar facility is planned for the second site.
Czech Republic	3,337	1,755	☹️	☹️	Emphasis on incineration in some regions negating the need for pre-treatment. There are no MBT facilities currently operating, and one is in development.
Greece	5,585	4,507	☹️	☹️	In Greece, there are limited biological treatment facilities currently in operation. MRF rejection rates remain high at 50%.
Hungary	3,712	1,991	☹️	☹️	4 MBT facilities in the country but insufficient capacity to treat all waste. No MBTs are in development.

¹⁴⁰ The Member State summaries in section 5.2 reported information from the landfill site visits conducted under this study, where applicable. This section instead provides information on country-wide aggregate pre-treatment capacity.

The 18 MS visited	MSW arisings 2015 (thousand tonnes)	MSW landfilled 2015 (thousand tonnes)	Existing MBT capacity sufficient	Existing and planned MBT capacity sufficient	Information from the site visits
Ireland	2,693	1,028	☹️	☹️	Country is moving away from landfill with a 600,000tpa Energy from Waste (EfW) facility north of Dublin. Some MBT capacity existing.
Italy	29,524	7,819	😊	😊	Based on data from the Italian National Institute for Environmental Protection and Research.
Latvia	857	494	😊	😊	MBT facilities on 4 of the 5 sites visited with one planned on the remaining site.
Lithuania	1,300	702	😊	😊	MBT facilities operational on 4 of the 5 sites during visits. The 5 th site only accepted waste pre-treated by an off-site facility, and now has its own MBT.
Malta	269	241	😊	😊	One landfill on the island with an MBT in commissioning to treat all the waste prior to disposal. Operational in 2016.
Poland	10,863	4,808	☹️	☹️	All sites visited accepting waste pre-treated by MBT.
Portugal	4,710	2,307	😊	😊	Of the 5 sites visited, 4 had MBT facilities on-site however all experienced capacity issues in peak periods.
Romania	4,953	3,558	☹️	☹️	Focus on building integrated waste management systems such as the one in Bucharest. No existing MBT plants operating, visits identified two MBT plants in operation or in construction.
Slovakia	1,784	1,226	☹️	☹️	Three facilities for mixed municipal waste treatment entered in operation in 2016, however all are situated in Western Slovakia.
Slovenia	926	210	😊	😊	Three of the landfill sites visited had MBT facilities on-site and the remaining two sites accept pre-treated MSW from MBT facilities located off site. Since, more MBT plants have become operational in the country.
Spain	20,151	11,101	☹️	☹️	One site was served by an MBT but many landfills are accepting waste that has not been pre-treated.

The 18 MS visited	MSW arisings 2015 (thousand tonnes)	MSW landfilled 2015 (thousand tonnes)	Existing MBT capacity sufficient	Existing and planned MBT capacity sufficient	Information from the site visits
United Kingdom	31,567	7,124	☹️	😊	Some sites accepting waste from MBT but the majority is accepted without pre-treatment other than source segregation or recycles.

The other ten MS					
Austria	4,836	121	😊	😊	N/A
Belgium	4,708	43	😊	😊	N/A
Denmark	4,485	51	😊	😊	N/A
Estonia	473	35	😊	😊	N/A
Finland	2,738	315	😊	😊	N/A
France	33,399	8,603	☹️	☹️	N/A
Germany	51,046	106	😊	😊	N/A
Luxembourg	356	63	😊	😊	N/A
Netherlands	8,855	125	😊	😊	N/A
Sweden	4,377	35	😊	😊	N/A

6 RECOMMENDATIONS FOR IMPROVING COMPLIANCE WITH PRE-TREATMENT REQUIREMENTS

This section offers recommendations for improving the implementation of the pre-treatment requirements laid down in the Landfill Directive, as interpreted by the ECJ in the *Malagrotta* ruling.

The recommendations aim to address the problems identified earlier in this report. Most of these are common to many Member States, and therefore can be meaningfully addressed in a coordinated manner at EU level. EU-level recommendations are provided in section 6.1. Where issues specific to individual Member States are identified, detailed recommendations are presented in section 6.2.

6.1 EUROPEAN UNION LEVEL RECOMMENDATIONS

1) Clarifying the meaning of ‘treatment’

Our study suggests that there is confusion about the concepts of ‘treatment’ for the purposes of the Waste Framework Directive, and ‘treatment’ for the purposes of the Landfill Directive (called ‘pre-treatment’ in this report to avoid confusion). As indicated above (section 5.1), ten Member States have not transposed the definition of ‘treatment’ set out in the Landfill Directive. This failure is often associated with the correct transposition of the rest of the Landfill Directive, as well as the definition of treatment under the Waste Framework Directive, indicating that Member States may not have appreciated that ‘treatment’ has different meanings under the two Directives (see Table 1 and Table 2 in section 4.1.1)¹⁴¹.

Uncertainty about the type of pre-treatment required can forestall the achievement of the ultimate

¹⁴¹ Confirmation about the importance of proper transposition can be found in Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

objectives of the Landfill Directive to prevent or reduce as far as possible the negative effects on the environment and the risks to human health from the landfilling of waste. We recommend that the Commission should raise awareness among Member States about the pre-treatment required to comply with the Landfill Directive, while at the same time monitoring the correct transposition of the relevant definition into the Member States' legal orders.

Awareness-raising activities can include, for example, the development of guidance (to be translated in all official languages of the EU¹⁴²) explaining the pre-treatment requirement in the Landfill Directive, as interpreted by the ECJ in the *Malagrotta* ruling. The guidance should include the Commission's view on certain key aspects left open by the ECJ (e.g. what pre-treatment options can be considered 'most appropriate' in different situations and for different waste streams, what selection of waste streams can be taken as 'adequate') in order to help Member States and other stakeholders (e.g. citizens and non-governmental organisations) understand the concrete implications of the ruling¹⁴³.

Further awareness-raising and capacity building among Member State authorities in charge of monitoring and enforcement could be carried out through the IMPEL network, focusing in particular on pre-treatment¹⁴⁴. Sharing experiences on approaches implemented in different Member States could lead to the development and implementation of good practice in this field.

2) Clarifying if separate collection constitutes pre-treatment

A specific area of uncertainty is whether separate waste collection constitutes 'treatment' for the purposes of the Landfill Directive. The Landfill Directive states that 'treatment' includes 'sorting',¹⁴⁵ without however defining this term. The Waste Framework Directive, in defining 'collection', states that it includes 'preliminary sorting',¹⁴⁶ thus suggesting that sorting may be an operation taking place further downstream.¹⁴⁷

Our investigation has found that at least some Member States¹⁴⁸ consider separate waste collection as a form of pre-treatment, and so they deem that the pre-treatment requirement is satisfied if such collection is properly carried out. In these cases, however, residual mixed waste is sent to landfills without the stabilisation of its organic content. The Commission has expressed the view that even a high level of separate collection of MSW does not, by itself, rule out the obligation to pre-treat residual waste prior to landfilling it, except where it is demonstrated that pre-treatment would not contribute to preventing or reducing as far as possible negative impacts on the environment and hazards to human health.¹⁴⁹ The ECJ has not expressly ruled in the *Malagrotta* case on this point.

¹⁴² Confirmation about the importance of information being translated in all official languages of the EU can be found in Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹⁴³ The need for such guidance emerged from the interviews with Ms. Evita Muižniece-Treija of Latvia of 2 December 2016 and with Ms. Jana Miklavčič of the Ministry of Environment of Slovenia of the same date. It is further confirmed in Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹⁴⁴ Pre-treatment of waste prior to landfilling is going to be the focus of the IMPEL Landfill project in 2017. The project will seek to support the inclusion of checks on pre-treatment in inspection activities. It will investigate Member State criteria on pre-treatment. See IMPEL, Landfill Project: Terms of Reference 2017. Available at: <http://www.impel.eu/wp-content/uploads/2015/10/2017-06-Landfill-project-2017.pdf>

¹⁴⁵ Article 2(h), Landfill Directive.

¹⁴⁶ Article 3(10), WFD.

¹⁴⁷ The term 'sorting' is used in the Waste Framework Directive on another two occasions, both referring to downstream waste treatment operations (Annex I on disposal operations and Annex II on recovery operations).

¹⁴⁸ Estonia, Ireland, Latvia, Luxembourg, and the United Kingdom. Confirmation that, in some Member States, residual waste originating from a well performed separate collection can, if certain conditions are met, be considered as pre-treated can be found in Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹⁴⁹ Letter of formal notice SG(2011)D/9693 C(2011)4113.

The Commission's approach, if supported, could amount to mandating the installation of MBT capacity. Yet, once such MBT capacity is installed, there will be less incentive to improve separate waste collection, which would in turn hamper material and energy recovery, thus running counter to the waste hierarchy of Article 4(1) of the Waste Framework Directive. At the same time, the investment required to install MBT capacity, or simply to stabilise the organic fraction, may not be cost-effective if there is little demand for the resulting recovered or stabilised materials, which would thus be landfilled anyway. From an environmental perspective, such efforts may not achieve the best overall environmental outcome¹⁵⁰ if e.g. the energy needed for the pre-treatment process exceeds the environmental benefit of pre-treatment. In order to ensure that the right incentives are given to Member States to pursue the waste management options that achieve the best overall environmental outcome, it is recommended that the Commission should clarify that effective separate collection of waste can contribute to fulfilling the pre-treatment requirement of the Landfill Directive, and that investment in pre-treatment capacity may not be cost-effective or achieve the best overall environmental outcome in all circumstances. These concerns are reflected in a recent Commission proposal for amending the Landfill Directive¹⁵¹. In addition, the Commission could consider developing criteria to determine when pre-treatment would not help prevent or reduce negative impacts on the environment and risks to human health in a meaningful way¹⁵².

3) Supporting Member States in complying with pre-treatment requirements

As mentioned above (section 4.2 and recommendation 1), the *Malagrotta* judgment clarified requirements that are not expressly set out in the Landfill Directive. In particular, the judgment clarified that Member States are not free to apply any pre-treatment option whatsoever, but must search and implement *the most appropriate* pre-treatment method to reduce *as far as possible* the negative impacts of landfilling on the environment and human health. Moreover, the judgment clarified that pre-treatment must in all cases include at least an *adequate* selection of different waste streams, and the stabilisation of the organic fraction of waste.

It has been stated that the stringency of these requirements will depend on the meaning given to the general clauses italicised above. Several considerations will have to be made in order to determine whether an option is the most appropriate in specific circumstances (see section 4.1 for some examples), and whether a certain level of selection can be considered adequate. The *Malagrotta* judgment does not go into detail about what aspects (environmental, economic, temporal, geographical, infrastructural, etc.) can legitimately be taken into account in assessing the appropriateness of different pre-treatment options.

In order to better specify the practical implications of the requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling, and to guide Member States and other stakeholders in applying the principles of the judgment in concrete situations, it is recommended that the Commission develops a handbook and/or good practices document, based on real-life examples, showing how the best pre-treatment option should be selected within the framework of an integrated approach to waste prevention and management. The guidance might indicate how Member States should address the requirements of the Landfill Directive, as interpreted in the

¹⁵⁰ Article 4(2), WFD requires that, when applying the waste hierarchy, Member States have to take measures to encourage the options that deliver the best overall environmental outcome.

¹⁵¹ European Commission, Proposal for a Directive of the European Parliament and of the Council amending Directive 1999/31/EC on the landfill of waste, COM(2015) 594 final. In particular, Recital 8 aims to, among other things, 'avoid the development of excessive capacity for the treatment of residual waste facilities, such as through energy recovery or low grade mechanical biological treatment of untreated municipal waste, as this could result in undermining the achievement of the Union's long-term preparation for reuse and recycling targets for municipal waste...while Member States should take all necessary measures to ensure that only waste that has been subject to treatment is landfilled, compliance with such obligation should not lead to the creation of overcapacities for the treatment of residual municipal waste.'

¹⁵² See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

Malagrotta ruling, while also considering policy goals for a circular economy¹⁵³. These documents should be translated in all official languages of the EU to allow the widest possible use by all interested parties¹⁵⁴.

4) Addressing pre-treatment in waste management plans

The Waste Framework Directive requires Member States to establish waste management plans containing an analysis of their waste management situation and measures to improve waste management on their territory. These plans should be coherent with the strategies to reduce the landfilling of biodegradable waste, developed under the Landfill Directive.¹⁵⁵ Both the plans and the strategies must be notified to the Commission.¹⁵⁶ The Waste Framework Directive also requires cooperation between the Commission and Member States in drawing up waste management plans.¹⁵⁷

Within this framework, it is recommended that the Commission should continue the substantive evaluation of the waste management plans and the strategies to reduce the landfilling of biodegradable waste, in order to help Member States identify and implement the (pre-)treatment approaches that are most appropriate in different circumstances. In doing so, attention should be paid not to over-rely on MBT¹⁵⁸ as a pre-treatment technology, given that better overall environmental outcomes can usually be achieved through effective separate collection, recycling and recovery of waste. In searching for the most appropriate options, reference should be made to the environmental and health protection objectives of EU waste law, and efforts should focus on implementing the waste hierarchy and the principles of the circular economy. Where failures to comply with applicable requirements persist, infringement procedures should also be considered.

5) Supporting the development of adequate waste management infrastructure

Our study finds that, in several Member States, the failure to pre-treat waste prior to landfilling is associated with a lack of adequate waste management infrastructure, including pre-treatment capacity (see section 5.1). For many EU-13 Member States, as well as southern EU-15 Member States, European Structural and Investment Funds have provided a major source of public investment for the waste sector.¹⁵⁹

In parallel with the review of waste management plans, it will be valuable for the Commission to encourage Member States to use EU funds to support compliance with the *Malagrotta* decision, along with other EU waste requirements. Guidance can focus on methods to identify the most appropriate option for waste treatment.

¹⁵³ The usefulness of such guidance was underlined, for example, in the interview with Mr Marco Candeias of General Inspectorate of Agriculture, Sea, Environment and Spatial Planning (IGAMAOT) of Portugal of 6 December 2016.

¹⁵⁴ Confirmation about the importance of information being translated in all official languages of the EU can be found in Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹⁵⁵ Article 28, WFD; Article 5, LD.

¹⁵⁶ Article 33, WFD; Article 5(1), LD.

¹⁵⁷ Article 32, WFD. The requirement also applies in relation to waste prevention programmes developed under Article 29 of the Waste Framework Directive.

¹⁵⁸ See Municipal Waste Compliance Promotion Exercise 2014-5: Executive Summary, which finds that ‘some countries are relying too heavily on Mechanical Biological Treatment (MBT)...which renders it difficult to meet the targets [in the Waste Framework Directive and Landfill Directive to increase recycling and reduce the landfilling of biodegradable waste]. MBT does yield some recyclables; it also produces a lower grade compost, which often struggles to find a market.’ The quality of recyclables and compost produced through MBT is often too low for them to be used as products in the economy.

¹⁵⁹ COWI, Milieu Ltd and CSIL, Environment - Final Report - Work package 6 Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), 2016. Available at: http://ec.europa.eu/regional_policy/en/information/publications/evaluations/2016/environment-final-report-work-package-6-ex-post-evaluation-of-cohesion-policy-programmes-2007-2013-focusing-on-the-european-regional-development-fund-erdf-and-the-cohesion-fund-cf

For Member States that devote a major share of European Structural and Investment Funds resources to the waste sector, the Commission could also review current spending priorities and plans in the waste sector, to assess their effectiveness in supporting compliance with the *Malagrotta* decision as well as EU waste legislation in general.

6.2 MEMBER STATE LEVEL RECOMMENDATIONS

Recommendations for individual Member States are provided in Table 9 below. The table indicates, based on the findings of this study presented earlier in the report, the areas where Member States should focus their efforts as a priority in order to improve compliance with pre-treatment requirements, as interpreted in the *Malagrotta* ruling. These areas are:

- **Transposition of the definition of pre-treatment**

As mentioned above (section 5.1), the definition of ‘treatment’ laid down in Article 2(h) LD is not transposed in the legal orders of all Member States, thus creating uncertainty about what types of waste management operations contribute to fulfilling pre-treatment requirements. The Member States concerned should improve their regulatory frameworks in this regard by correctly transposing Article 2(h) LD.

- **Exceptions from pre-treatment requirements**

Certain Member States (see section 3.1) have introduced grounds of exceptions from pre-treatment requirements that are not allowed by the Landfill Directive. In order to ensure that pre-treatment is always required when the directive demands it, the Member States concerned should repeal these exceptions from their legal orders.

- **Regulatory frameworks for pre-treatment**

In several Member States, regulatory frameworks on pre-treatment should be improved to support the implementation of pre-treatment requirements, as interpreted in the *Malagrotta* ruling. Depending on the Member State, the issues to be addressed were found in legislation, in waste management plans, in permits, or in non-binding guidance documents. In particular:

- In **Belgium**, legislation applicable in the region of Wallonia includes bans on the landfilling of separately collected MSW and biodegradable waste. While these bans have broad application, there is a risk that waste streams not specifically covered may be landfilled without pre-treatment, even though such pre-treatment may be required by the Landfill Directive. Moreover, regional legislation only requires that residual waste is compacted prior to landfilling, whereas the *Malagrotta* ruling found that this physical process is not sufficient to fulfil pre-treatment provisions in the Landfill Directive.
- In **Bulgaria**, landfill permit conditions only require the manual selection, shredding and bailing of waste prior to landfilling, which as stated above is not enough to comply with the pre-treatment requirements of the Landfill Directive.
- **Croatia**, in addition to not having transposed Article 2(h) LD, did not have waste management plans in force at the time of our study.
- In the **Czech Republic**, national provisions only require separate waste collection and energy recovery as treatment operations. There is instead no requirement for pre-treatment prior to landfilling. The landfill permits examined as part of this study did not generally include the condition that biodegradable waste must be stabilised before it is landfilled.
- In **Romania**, the outdated waste management plans mainly envisage the sorting, grinding and compressing of waste prior to landfilling – mechanical operations that are not sufficient to achieve compliance with pre-treatment requirements of the Landfill Directive, as interpreted in the *Malagrotta* ruling.
- In **Slovakia**, in addition to exceptions from pre-treatment requirements not allowed by the

Landfill Directive, we have found that the landfill permits we examined only mandated physical pre-treatment processes such as the grinding and compressing of waste, which are not enough to comply with the pre-treatment provisions of the Landfill Directive, as interpreted in the *Malagrotta* judgment. Moreover, the waste management plans and landfill permits reviewed allow the landfilling of (untreated) biodegradable waste.

- In the **United Kingdom**, in addition to Article 2(h) LD not having been transposed, we have found an official guidance document according to which separate waste collection can, by itself, fulfil pre-treatment requirements. The document does not make this conditional on a certain level of effectiveness of separate collection being achieved. Moreover, no provisions were found requiring the stabilisation of biodegradable waste prior to landfilling.
- **Separate collection of waste considered as pre-treatment**
As mentioned above (section 6.1), there is some uncertainty about whether separate collection can be considered as a form of pre-treatment. Member States that understand separate collection as contributing to fulfilling pre-treatment requirements should be aware of this uncertainty.
- **Waste management infrastructure**
In some Member States (see section 3.1), failure to comply with pre-treatment requirements is associated with a lack of waste management infrastructure. This is not always limited to MBT or other pre-treatment technologies, but also e.g. recycling and recovery capacity. Investing in developing an adequate network of waste management installations is a priority.
- **Improving separate waste collection systems**
Whether or not separate collection is considered as a form of pre-treatment, effective separate collection systems can reduce the amount of residual waste landfilled, and therefore the need for pre-treatment. Moreover, by facilitating the recycling and recovery of waste, they contribute to the faithful implementation of the waste hierarchy and to the objectives of the circular economy. Member States whose separate collection systems are found wanting (see section 3.1) should improve this aspect of their waste management approach.
- **Improving compliance at the landfills visited under this study**
In most of the landfills visited under this study, the majority of waste was landfilled without pre-treatment as required by the Landfill Directive, as interpreted in the *Malagrotta* ruling (see **Table 6** on p. 28). Efforts to improve the implementation of pre-treatment requirements should include improving compliance at these landfill sites.
- **Strengthening inspections, including checks on the pre-treatment of waste**
The frequency of inspections of landfill sites, and whether or not such inspections include verification that waste is properly pre-treated before being landfilled, varies widely across Member States. The Industrial Emissions Directive lays down requirements on routine and non-routing environmental inspections, which all Member States have to comply with. A general recommendation is that Member States implement these requirements ambitiously, notably by ensuring routine inspections are carried out at (or above) the frequency required by the Directive, that the quality of pre-treated waste exiting pre-treatment facilities is adequate, and that monitoring reports submitted by landfill operators at least once a year¹⁶⁰ are properly reviewed to identify potential problems of compliance¹⁶¹.

Member States should also consider providing detailed guidance to monitoring and enforcement authorities (including inspectors) concerning the verification of compliance with pre-treatment requirements. This guidance should take into account the recommendations developed by

¹⁶⁰ Article 12(b), second subparagraph, LD.

¹⁶¹ Such problems may arise, for example, where the pre-treatment facility which should pre-treat the waste prior to landfilling experiences frequent momentary stoppages, and therefore is unable to consistently work at the expected capacity.

IMPEL¹⁶². In particular, it would be important to systematically cross-check the records at the waste producer, at the pre-treatment facility, and at the landfill site concerning the types and quantities of different waste streams, and what pre-treatment has been applied (and, if none, why). Inspections at landfill sites should include controls of key parameters (e.g. total organic carbon, water content, flammability, etc.) that could suggest the waste has not been adequately (pre-)treated.

Competent authorities should analyse self-monitoring reports in order to verify possible signs of non-compliance with pre-treatment requirements. Here, Member States should ensure that the self-monitoring reports produced by landfill operators reach the authorities competent for monitoring and enforcement (not only the permitting authorities¹⁶³), in order to facilitate the verification of compliance with pre-treatment requirements. The results of these analyses should be formalised in a document, which should be made available to inspectors. It is recommended that inspectors review this information in preparation for the on-site visit¹⁶⁴. This is critical for the success of the inspection because it allows the inspector to ask targeted questions and focus the investigation on those aspects of the landfill operation which show high potential of non-compliance¹⁶⁵.

In 2017, the IMPEL Landfill Project will focus on the inspection of pre-treatment of waste¹⁶⁶; it will be valuable for Member States to follow this work and take on board guidance any conclusions that may result.

Civil society organisations and the general public should be informed about the results of monitoring and enforcement activities¹⁶⁷. They can play an important role in supporting competent authorities' efforts to monitor and enforce pre-treatment provisions, e.g. by submitting complaints. It is therefore recommended that Member States take steps to ensure that competent authorities formalise the results of inspections (both on site, and through analysis of operators' self-monitoring reports) in documents to be made available online.

¹⁶² See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016. See also Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Inspection guidance book for Landfill inspection: A practical book with guidance on activities on landfills, 2016

¹⁶³ See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹⁶⁴ See Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Landfill Directive implementation: Analysis of the gaps found during the running of the Landfill Project, 2016.

¹⁶⁵ See also Ruggeri R. et al. (IMPEL), IMPEL Landfill Project: Inspection guidance book for Landfill inspection: A practical book with guidance on activities on landfills, 2016.

¹⁶⁶ Pre-treatment of waste prior to landfilling is going to be the focus of the IMPEL Landfill project in 2017. The project will seek to support the inclusion of checks on pre-treatment in inspection activities. It will investigate Member State criteria on pre-treatment. See IMPEL, Landfill Project: Terms of Reference 2017. Available at: <http://www.impel.eu/wp-content/uploads/2015/10/2017-06-Landfill-project-2017.pdf>

¹⁶⁷ Article 7, Directive 2003/4/EC.

Table 9 - Member State level recommendations

Member State	Correctly transpose the definition of pre-treatment	Repeal undue grounds of exception from pre-treatment requirements	Improve regulatory framework for pre-treatment (legislation, waste management plans, permits, guidance)	Consider that separate collection may not be sufficient to fulfil the pre-treatment requirement	Invest in waste management infrastructure	Improve separate collection systems	Ensure compliance with requirements for the selection and stabilisation of organic waste	Improve compliance with pre-treatment requirements at landfills visited under this study
Austria	x							
Belgium	x		x					
Bulgaria			x		x	x	x	x
Croatia	x		x		x		x	x
Cyprus		x			x	x	x	x
Czech Republic			x			x	x	x
Denmark						x	x	
Estonia				x			x	
Finland							x	
France	x						x	
Germany	x							
Greece					x	x	x	x
Hungary	x					x		x
Ireland	x			x				x
Italy						x	x	x
Latvia				x				x
Lithuania					x			
Luxembourg				x				
Malta	x					x	x	x
Netherlands								
Poland								

Member State	Correctly transpose the definition of pre-treatment	Repeal undue grounds of exception from pre-treatment requirements	Improve regulatory framework for pre-treatment (legislation, waste management plans, permits, guidance)	Consider that separate collection may not be sufficient to fulfil the pre-treatment requirement	Invest in waste management infrastructure	Improve separate collection systems	Ensure compliance with requirements for the selection and stabilisation of organic waste	Improve compliance with pre-treatment requirements at landfills visited under this study
Portugal	x					x	x	x
Romania	x		x		x	x	x	x
Slovakia		x	x			x	x	x
Slovenia					x			
Spain						x	x	x
Sweden								
UK	x		x	x		x	x	x

ANNEX 1

List of landfill sites visited

Key to landfill compliance scoring			
1	2	3	4
No non-hazardous MSW received has been pre-treated to the required standard	Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard	Approximately more than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard	All non-hazardous MSW received is likely to be pre-treated to the required standard

Member State	#	Landfill site	Compliance scoring
Bulgaria	1	Shumen landfill Site	2
	2	Yambol Landfill Site (Drajevo, Hadjidimitrovo)	2
	3	Stara Zagora Landfill (Hristianovo and Bogomilovo)	2
	4	Bansko Landfill Site	2
	5	Kardjali Landfill Site	2
Croatia	1	Mraclinska Dubrava	1
	2	Totove (near Čakovec)	1
	3	Diklo, Zadar	1
	4	Sveti Juraj	1
	5	Karepovac	1
Cyprus	1	Paphos	1
	2	Larnaka	4
Czech Republic	1	Henčov – Jihlava	2
	2	Skládka odpadů Vysoká	2
	3	Košfálov	3
	4	Zdechovice – Chvaletice	2
	5	Jičín	3
Greece	1	Athens (Ano Liossia Landfill)	1
	2	Temploni landfill	1
	3	Thessaloniki Landfill	1
	4	Northern Rhodes Landfill – Rhodes	1
	5	Kefallonia	3
Hungary	1	Pusztázámor	2
	2	Jánossomorja	2
	3	Kaposmérő	2
	4	Berettyóújfalu	2
	5	Vaskút	3
Ireland	1	Knockharley	3
	2	Drehid, Offaly operated by Bord Na Mona at Ballynagran	2
	3	Rathroeen, Ballina, Mayo operated by Mayo County Council	2
	4	Wicklow operated by Greenstar	3
Italy	1	Palermo (Bellolampo)	1
	2	Torino (Grosso)	3
	3	Bologna (Gaggio)	3
	4	Savona (Vado Ligure)	4
	5	Potenza (Sant' Arcangelo)	4
Latvia	1	Landfill "Getlīņi",	4
	2	Landfill "Dzīlā vāda",	2
	3	Landfill "Križevniki",	4
	4	Landfill "Kivītes",	3
	5	Landfill "Grantīņi"	2
Lithuania	1	Vilnius landfill	4

	2	Kaunas Lapės landfill	4
	3	Klaipėda landfill	4
	4	Panevėžys landfill	4
	5	Tauragė landfill	4
Malta	1	Għallis	3
Poland	1	Lipnie Stare (region Warsaw)	4
	2	Sułkowice (Krakow region)	4
	3	Landfill in Nysa (region Opole)	4
	4	Janczyce (South East of Poland)	4
	5	Stąjsin, North-West Poland	4
Portugal	1	Barlavento landfill, operated by Algar	2
	2	Seixal landfill, operated by Amarsul	2
	3	Fundão landfill, operated by Resiestrela	4
	4	Viana do Castelo landfill, operated by Resulima	1
	5	Leiria landfill, operated by Valorlis	2
Romania	1	BIHOR Oradea Sanitary Landfill	2
	2	Piatra Neamt	2
	3	Chitila, Bucuresti	2
	4	Glina	1
	5	Albota landfill (Arges county)	2
Slovakia	1	Zohor (Bratislava region)	2
	2	Kalná nad Hronom (Nitra region)	2
	3	Kalnô (Marin, Žilina region)	2
	4	Žiar nad Hronom (Banská Bystrica region)	2
	5	Sabinov (Raznany) landfill	1
Slovenia	1	Leskovec	4
	2	Špaja dolina	4
	3	Unično novo	4
	4	Globoko	4
	5	Gajke	4
Spain	1	Vertedero del Centro de Tratamiento de Residuos de Góngora	2
	2	Vertedero de residuos no peligrosos de COGERSA	2
	3	Depósito controlado de Alcalá de Henares	2
	4	Vertedero controlado de la agrupacion n. 1 – Huesca	2
	5	Vertedero de Gardelegi	3
United Kingdom	1	Hill and Moor (England)	2
	2	Newport (Wales)	3
	3	Greengairs Landfill, Greengairs, Airdrie (Scotland)	2
	4	Sutton Courtenay (England)	3
	5	Tullyvar (Northern Ireland)	2

ANNEX 2

Overview of findings from landfill sites visits

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
BULGARIA								
Shumen landfill Site	BG3 Northern and Eastern Bulgaria.	44,702	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	With the start of pre-treatment activities at the off-site MRF in January 2016, it could be considered that ca. 80 % of received onsite municipal and similar SW is pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals. The biodegradable fraction is not separated at the MRF.	The incoming MSW (80 %) is pre-treated at the off-site MRF only by separation of recyclable materials as plastics, paper, glass and metals; the share of recovered recyclables (except inert fraction) is relatively low (26%).	The incoming MSW (80 %) is pre-treated at the off-site MRF only by separation of recyclable materials as plastics, paper, glass and metals; the share of recovered recyclables (except inert fraction) is relatively low (26%). Due to the current lack of appropriate facilities, the biodegradable waste is not separated and stabilised, except some small quantities being grinded at source for production of wooden chips.	Due to the current lack of appropriate facilities, the biodegradable waste is not separated and stabilised, except some small quantities being grinded at source for production of wooden chips.
Yambol Landfill Site (Drajevo, Hadjidimitrovo)	BG3 Northern and Eastern Bulgaria.	16,457	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-	Since the start of the landfill operations in December 2015, ca. 90% of received municipal and similar	Since the start of the landfill operations in December 2015, ca. 90% of	Since the start of the landfill operations in December 2015, ca. 90% of received municipal and	There is a lack of appropriate facilities for processing/ stabilisation

¹⁶⁸ Additional amounts of non-hazardous MSW may be landfilled after pre-treatment in a pre-treatment facility. As the waste code changes following such pre-treatment, it is not possible to distinguish different waste streams once they have undergone pre-treatment, and thus provide more comprehensive figures.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				treated to the required standard.	SW onsite is pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals. However, because of the lack of appropriate facilities for processing/stabilisation (composting, anaerobic digestion, etc.), the biodegradable fraction is not separated at the off-site MRF. 10 % of the collected MW is not pre-treated for recovery of recyclables; 100 % of biodegradable materials are not separated/stabilised.	received municipal and similar SW onsite is pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals.	similar SW onsite is pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals. However, because of the lack of appropriate facilities for processing/stabilisation (composting, anaerobic digestion, etc.), the biodegradable fraction is not separated at the off-site MRF. 10 % of the collected MW is not pre-treated for recovery of recyclables; 100 % of biodegradable materials are not separated/stabilised.	(composting, anaerobic digestion, etc.), the biodegradable fraction is not separated at the off-site MRF. 10 % of the collected MW is not pre-treated for recovery of recyclables; 100 % of biodegradable materials are not separated/stabilised.
Stara Zagora Landfill (Hristianovo and Bogomilovo)	BG3 Northern and Eastern Bulgaria.	44,819	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	With the start of the MRF activities in April 2015, it is assumed by the municipality that ca. 90 % of the collected MW has been pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals. The biodegradable	With the start of the MRF activities in April 2015, it is assumed by the municipality that ca. 90 % of the collected MW has been pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals.	With the start of the MRF activities in April 2015, it is assumed by the municipality that ca. 90 % of the collected MW has been pre-treated by recuperation of recyclables (waste streams) as paper, plastics, glass and metals. The biodegradable	The biodegradable fraction of MW is neither separated nor further processed (stabilised) at source/MRF. There is a small quantity of green (garden) waste in the city park "Ayazmoto" that is composted "in situ".

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					fraction is not separated at the off-site MRF. No other pre-treatment of MSW and/or its biodegradable fraction (stabilisation) is carried out currently, except an "in situ" self-composting of a small quantity of green (garden) waste in the city park "Ayazmoto".		fraction is not separated at the off-site MRF. No other pre-treatment of MSW and/or its biodegradable fraction (stabilisation) is carried out currently, except an "in situ" self-composting of a small quantity of green (garden) waste in the city park "Ayazmoto".	
Razlog and Bansko Landfill Site	BG4 South-Western and South-Central Bulgaria.	9,308	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Not all MSW is pre-treated prior to landfill. There is a lack of appropriate local facilities and infrastructure. There is some source segregation of packaging waste (plastics, paper, cardboard, metals and glass) by householders. There is some garden waste (53.3 t for 2015) from parks and public areas. Reportedly, only ca. 5 % of the collected waste has been pre-treated by sources segregation and the collection of garden waste.	There is a lack of appropriate local facilities and infrastructure. There is some source segregation of packaging waste (plastics, paper, cardboard, metals and glass) by householders. There is some garden waste (53.3 t for 2015) from parks and public areas. There are no MBT or other treatment facilities available.	This system is implemented in the region of Razlog and Bansko since 2007 and a system of 3-coloured containers (yellow, blue and green) is currently implemented. The yellow bin is used to collect plastics and metals, the blue bin - paper & cardboards and the green bin for glass. The share of recovered recyclable materials is ca. 29% of 42 t source collected packaging waste. The biodegradable materials are not	The biodegradable materials are not source separately collected by this system. No other pre-treatment of MSW and/or its biodegradable fraction (stabilisation) is carried out currently. There is some garden waste (53.3 t for 2015) from parks and public areas for the production of pellets.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
							source separately by households collected by this system. There is some garden waste (53.3 t for 2015) from parks and public areas for the production of pellets.	
Kardjali Landfill Site	BG4 South-Western and South-Central Bulgaria.	90,746	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Not all MSW is pre-treated prior to landfill. There is a lack of appropriate local facilities and infrastructure. There is some source segregation of packaging waste (plastics, paper, cardboard, metals and glass) by householders. Reportedly only ca. 2 % of collected waste has been pre-treated before landfilling by separate collection of packaging waste at source and recovery of recyclable materials as plastics, paper, glass and metals.	There is a lack of appropriate local facilities and infrastructure. There is some source segregation of waste (plastics, paper, cardboard, metals and glass) by householders. There are no MBT or treatment facilities available.	A collection system in bi-coloured containers (yellow and green) is used. The yellow bin is used to collect plastics, paper and metals, the green one - for glass. The biodegradable materials are not source separately collected by this system. No other pre-treatment of MSW and/or its biodegradable fraction (stabilisation) is carried out currently.	The biodegradable materials are not source separately collected by this system. No other pre-treatment of MSW and/or its biodegradable fraction (stabilisation) is carried out currently.
CROATIA								
Mraclinska Dubrava	HR0 Hrvatska (Croatia).	13,532	N	1 – No non-hazardous MSW received has been pre-	No. The majority of MSW is not pre-treated prior to landfilling.	NA	No pre-treatment for the selection of different waste streams. However,	Separately collected biodegradable material is being

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				treated to the required standard.			since the separately collected waste is growing approx. 5% per year, a proportion of MSW is declining every year. Source segregation collects paper, plastics, glass, combined plastic/ metallic packaging, and garden/food waste.	sent to composting plant. There is no biostabilisation of the organic fraction that remains within the MSW. There is roughly 37% of biodegradable material within the MSW.
Totove (near Čakovec)	HR0 Hrvatska (Croatia).	13,449	N	1 – No non-hazardous MSW received has been pre-treated to the required standard.	No. The majority of MSW is not pre-treated prior to landfilling.	NA	No pre-treatment for the selection of different waste streams. Source segregation collects paper, plastics, glass, metals, combined plastic/metallic packaging, old batteries.	Garden/ food waste is not collected separately and is disposed of in landfill without biostabilisation.
Diklo, Zadar	HR0 Hrvatska (Croatia).	71,000	N	1 – No non-hazardous MSW received has been pre-treated to the required standard.	No. The majority of MSW is not pre-treated prior to landfilling.	NA	No pre-treatment for the selection of different waste streams. Source segregation collects paper, glass, plastic packaging, other packaging, metals.	Garden/ food waste is not collected separately and no biodegradable material in the waste is stabilised before landfilling.
Sveti Juraj	HR0 Hrvatska (Croatia).	2,565 ¹⁶⁹	N	1 – No non-hazardous MSW received has been pre-treated to the required	No. The majority of MSW is not pre-treated prior to landfilling.	NA	No pre-treatment for the selection of different waste streams. Source segregation collects paper, plastics,	Garden/ food waste is not collected separately and is disposed of in landfill without

¹⁶⁹ Estimate. The landfill is not equipped with a weighting procedure. The amount of waste accepted in the landfill is estimated based on the number of different trucks unloaded.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				standard.			glass, metals, combined plastic/metallic packaging, and old batteries.	biostabilisation.
Karepovac	HR0 Hrvatska (Croatia).	117,888	N	1 – No non-hazardous MSW received has been pre-treated to the required standard.	No. The majority of MSW is not pre-treated prior to landfilling.	NA	No pre-treatment for the selection of different waste streams. Source segregation collects paper, plastics, glass, combined plastic/metallic packaging.	Garden/ food waste is not collected separately and is disposed of in landfill without biostabilisation. There is roughly 35% of biodegradable material within the MSW only.
CYPRUS								
Paphos	CYO Cyprus.	67,362	N	1 – No non-hazardous MSW received has been pre-treated to the required standard.	No waste received on the site have been pre-treated. Excluding clinical waste that are checked through the provision of a written statement to ensure that are pre-treated (sterilised).	NA	No, On the tipping face the type of recyclable material found on the site is paper, cardboard, plastic, glass, wood and yard trimmings. The waste discharged by vehicles contained mostly food scraps, wood and yard trimmings.	There is no separate collection of garden and food waste. There is n biostabilisation of the organic fraction prior to landfilling.
Larnaka	CYO Cyprus.	113,500	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, all waste received go through the MBT facility onsite.	Mechanical – Biological Treatment Plant (MBT) for the treatment of solid waste, with a capacity of 160,000 tonnes/year of mixed municipal	Films, PET, PE/PP, Paper and Cardboard, Metal, Glass and separate organic fraction.	A composting plant for the composting of the organic material, with an average processing capacity of 16,000 tonnes/y of green waste (such as garden and lawn clippings) and

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
						solid waste from households to recover recyclable materials (Films, PET, PE/PP, Paper and Cardboard, Metal, Glass) and separate organic fraction. The organic fraction is treated in a composting facility at the landfill site.		26,000 tonnes/y of organic material (such as food) sorted in the landfill facilities.
CZECH REPUBLIC								
Landfill Henčov – Jihlava	CZO Czech republic.	29,000	Y (Composting Facility)	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	The pre-treatment in the sense of the Malagrotta judgement is not applied to the waste accepted at the landfill. The waste that is brought to the landfill is the residual waste arising from a separate collection system, whereby producers of waste separate recyclables and some bio-waste at source. However, the residual waste is then brought to the landfill directly and is not subjected to any treatment prior to being brought to the site and is not subjected to any treatment at the site	Source segregation applied at households. No other pre-treatment of MSW (MBT) is applied.	It is obligatory for all municipalities to provide a public system of sorting with a minimum of 5 commodities (paper, plastic, glass, metal, organic waste) being separated plus a special system for collecting hazardous waste. Not further separation or pre-treatment prior to landfilling.	Next to the landfill is a composting facility to which are diverted biological materials which are suitable for composting. The inert waste (soil) and building waste are placed on dedicated ground and used for reclamation body of the landfill (soil) or strengthening roads (building waste) or as a technical layer (other inert materials). About 3,300 tonnes per year (11% of total received waste). The product of composting (high quality compost) is

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					prior to being landfilled.			used as fertiliser for agricultural purposes.
Skládka odpadů Vysoká	CZO Czech republic.	45,000	Y (Composting Facility)	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Pre-treatment of the residual MSW is not applied in 100% of cases, i.e. no non-hazardous waste is pre-treated to the required standard. The residual MSW is brought from areas where separate collection schemes are in operation. The landfill also operates a composting facility for source separately collected biodegradable material. The biodegradable fraction within the MSW is not pre-treated.	Source segregation applied at households. No other pre-treatment of MSW (MBT) is applied. The compost is used as a remedial layer on the landfill. A unit is operated to remove building waste. The inert materials and building waste are used as technological layers.	The incoming residual MSW at the site is from an area where extensive separate collection of recyclables (and to a lesser extent bio-waste) is implemented. Separately collected fractions are subject to treatment. The residual waste is not pre-treated. The MSW contains a significant amount of plastic materials. These material could be separated by a rotary sieve. As much as 40% of the total waste mass (~60% by volume) appears to comprise lightweight materials, much of which could readily be separated by mechanical, manual and automated sorting techniques. The biodegradable fraction within the MSW is not pre-	The residual waste is not pre-treated. The biodegradable fraction within the MSW is not pre-treated. MSW contains kitchen waste (bones, peelings, food scraps and green waste). The proportion of biodegradable waste observed on the working face was very low, circa. 5 – 10%.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
							treated.	
Landfill Košťálov	CZO Czech republic.	32,000	Y (Composting Facility)	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Pre-treatment of the residual MSW is not applied in 100% of cases, i.e. no non-hazardous waste is pre-treated to the required standard. The residual MSW is brought from areas where separate collection schemes are in operation. The landfill also operates a composting facility for source separately collected biodegradable material. The biodegradable fraction within the MSW is not pre-treated.	Source segregation applied at households. No other pre-treatment of MSW (MBT) is applied. The compost is used as a remedial layer on the landfill. A unit is operated to remove building waste. The inert materials and building waste are used as technological layers.	The incoming residual MSW at the site is from an area where extensive separate collection of recyclables (and to a lesser extent bio-waste) is implemented. Separately collected fractions are subject to treatment. The residual waste is not pre-treated. The MSW contains a lot of plastic materials. These materials could be separated by a rotary sieve. It is estimated about 30 % of total amount of MSW (approx. 40 % of the volume). The biodegradable fraction within the MSW is not pre-treated.	Residual waste is not pre-treated. The biodegradable fraction within the MSW is not pre-treated. MSW contains kitchen waste (bones, peelings, food scraps and green waste). It's about 5 % of total amount (less than 5 % of volume).
Landfill Zdechovice – Chvaletice	CZO Czech republic.	40,000	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	The landfill operates a treatment line for sorting MSW. The line is currently in trial operation and they are testing processing different kinds of MSW and industrial waste. The principle operation is the	No, 100% of received residual waste is without any kind of pre-treatment (e.g. MBT). All residual MSW is however collected from areas where separate collection systems	All residual MSW is collected from areas where separate collection systems are in place. Recyclables are collected in coloured containers and sorted for onward processing (recycling / re-use).	On the same site as the landfill is a composting area where separately collected biodegradable materials which are suitable for composting are processed. The composting process

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					separation of metals and sieving remainder into two fractions. The lightweight fraction (oversize) is used as alternative fuel, and the heavyweight fraction (undersize) is used as technological layer in the body of the landfill. The pre-treatment is not applied in 100% of cases at the moment as the treatment plant is in the commissioning phase. Once commissioned, the plant will treat all incoming waste.	are in place. Recyclables are collected in coloured containers and sorted for onward processing (recycling / re-use).		is applied to about 1,500 tonnes per year (10%) of separately collected bio-waste – it is not applied to residual waste and therefore is not used for the active removal of biodegradable fractions. MSW contains kitchen waste (bones, peelings, food scraps). About 5% of amount (less than 5% of volume).
Landfill Jičín	CZO Czech republic.	14,250	Y (Composting Facility)	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	100% of received waste is without any kind of pre-treatment (e.g. MBT). However, 100% of received waste is subject to separate collection provisions and most of the recyclable components are sent to recycling processes.	Source segregation applied at households. No other pre-treatment of MSW (MBT) is applied.	Separation of the MSW from citizens to the colour bins and separation of the industrial waste made by producers (e.g. paper, plastic, glass, metal, beverage cartons, biological waste) is pre-treatment as set out in Czech legislation. No further separation or pre-treatment prior to landfilling. The MSW contains a	About 1,500 tons per year of bio-waste is separately collected through the brown bin system (about 10% of the all MSW). This is composted. The bio-waste collection system only removes a proportion of the biodegradable material in the MSW. A large proportion of the biodegradable

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
							significant amount of plastic materials. These material could be separated by a rotary sieve. About 15% of total amount (approx. 25% of volume) of MSW received.	component remains in the residual MSW waste stream, which is landfilled directly without treatment.
GREECE								
Athens (Ano Liossia Landfill)	EL3 Attiki.	1,982,726	y	1 – No non-hazardous MSW received has been pre-treated to the required standard.	Not all MSW is pre-treated prior to landfilling, only 9.4% of total waste.	MBT is applied to part of the waste to remove recyclables and stabilise the organic fraction, however this is only to a small fraction of MSW.	Small proportion has separation of 1. Aluminium 2. Ferrous metals 3. Residual Derived Fuel 4. Organic material at the MBT on site. The rest goes to landfill and there is not adequate selection prior to landfill.	Proportion treated through MBT the organic material is separated before aerobic biological treatment to compost type A.
Temploni landfill	EL6 Kentriki Ellada.	56,868	Y (MRF Source segregated materials only)	1 – No non-hazardous MSW received has been pre-treated to the required standard.	No. Pre-treatment, as far as sorting is concerned, is carried out by householders (source segregation-blue collection bins for recyclable materials - paper, glass, plastic and metal), while municipalities are responsible for the collection and shipment. The majority of incoming waste to the landfill derives from the green bins (residual	NA. Source segregation by households is conducted, but there is no other form of MSW pre-treatment prior to landfilling.	NA. Source segregation by households is conducted, but there is no other form of pre-treatment prior to landfilling. A relatively large proportion of recyclables could be separated if they were pre-sorted either at the source or in MRF from the observations on the tipping face (An estimate could be around 20%	Biodegradable material is not removed since there is no pre-treatment or any treatment facility.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					waste) which does not undergo further pre-treatment prior to landfilling. There are no MSW pre-treatment activities on-site, only MRF for the sorting of source segregated recyclables.		recyclable material). More than 40% of MSW that arrives at the landfill site is organic waste and contains biodegradable material. A large percentage, possibly 50% could be separated.	
Mayrorahii (Thessaloniki) Landfill	EL5 Voreia Ellada.	418,000	N	1 – No non-hazardous MSW received has been pre-treated to the required standard.	No. Pre-treatment, as far as sorting is concerned, is carried out by householders (source segregation-blue collection bins for recyclable materials - paper, glass, plastic and metal), while municipalities are responsible for the collection and shipment. The majority of incoming waste to the Mavrorahi landfill derives from the green bins (residual waste) which does not undergo further pre-treatment prior to landfilling. There are no waste treatment activities on-site.	NA. Source segregation by households is conducted, but there is no other form of pre-treatment prior to landfilling.	NA. Source segregation by households is conducted, but there is no other form of pre-treatment prior to landfilling. The Landfill Operator's estimation is around 30% are recyclables on the tipping face. There is no separation of organic waste from the residual waste therefore 100% of such material is disposed in the landfill.	There is no separation of organic waste from the residual waste therefore 100% of such material is disposed in the landfill. The Landfill Operator's estimation is that biodegradable material is around 40% of the total amount of waste. The biodegradable material contains food, garden and wood waste. There is no segregation, removal or waste stabilisation of the biodegradable material before landfilling.
Northern Rhodes Landfill	EL4 Nisia Aigaiou, Kriti.	93,652	N	1 – No non-hazardous MSW	There is no treatment being applied apart	NA. Source segregation	There is no separate collection of waste	A major part of waste accepted

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
– Rhodes				received has been pre-treated to the required standard.	from the one for the bulky material (shredder). No removal of recyclable materials is executed (paper, metal, plastic, glass, and biodegradable waste). There is no treatment activity that may remove the biodegradable material.	expected to be implemented once the MRF is available to segregation the dry recyclables. No MBT treatment of MSW prior to landfilling.	at source and waste is mixed as collected from the bins. Therefore, a very large proportion of recyclables contained in the waste could be identified. The analysis of waste ending up in the landfill is paper 28%, plastic 21%, metals 3% and glass 7%. A major part of waste accepted consists of biodegradable material. There is no separate collection system and no treatment facility. Therefore, all biodegradable material ends up non-separated to be landfilled.	consists of biodegradable material. There is no separate collection system and no treatment facility. Therefore, all biodegradable material ends up non-separated to be landfilled.
Kefallonia	EL6 Kentriki Ellada.	23,236	Y	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	80% of the waste is tipped in the entry area of the waste treatment plant in order to proceed to the MBT process. The other 20% (rough estimation) is bulky waste that cannot enter the facility since it is of bigger size. 55% (12,780 tonnes) of the total	There is a system of Mechanical – Biological pre-treatment of waste in operation on site, dry recyclables such as paper, plastic, metal, aluminium are separated with organic waste as intermediate product and	Recyclables collected via blue bins enter the landfill and they are concentrated in a certain area to be taken by the Greek Recycling Company via a contract. The content of the green bins enters the MBT facility and there is an	All municipal waste has high percentage of biodegradable material, since no sorting is taking place at source (home). The organic fraction is being separated on site. 55% (12780 tonnes) of the total tonnage (23,236

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					tonnage (23,236 tonnes) is organic waste. An estimated 90-95% of biodegradable material is removed through treatment.	compost as the final product. Waste after it is shredded by the shredder enters through a conveyor belt into a sieve of 6cm, where it is divided into two fractions, the drier one consists of plastic, metal and paper and it is transferred directly with a press container into the landfill. Recyclable materials are still landfilled, not sure if better treatment/disposal could be considered in the future. Organic waste is stabilised before landfilling.	estimation that 20% could be recyclables. All municipal waste has high percentage of biodegradable material, since no sorting is taking place at source (home). The organic fraction is being separated on site.	tonnes) is organic waste. An estimated 90-95% of biodegradable material is removed through treatment. All biodegradable material is stabilised in the accelerated bio-oxidation cell with the aid of forced airflow. There are specific cells in the landfill site where composting is carried out with airflow. This results to the stabilisation and sanitisation of the waste. It is compost that is used for Landfill site/cells covering.
HUNGARY								
Berettyóújfalu	HU3 Great Plain and North (Észak és Alföld).	23,168	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	About 6 percent of the waste is diverted to the local pre-treatment (sorting plant) facility. The rest of the waste gets to the tipping area without pre-treatment.	The small amount of MSW that is pre-treated is mechanically sorted and the biodegradable fraction is biostabilised prior to landfilling, however the majority of the waste is not pre-treated prior to	The small amount of MSW that is pre-treated is sent to a sorting hall at the site, which carries out the sorting of paper, plastic, glass and the biodegradable fraction. All other MSW is not pre-treated prior to landfilling	The small amount of MSW that is pre-treated is sent to a sorting hall at the site, which segregated the biodegradable waste for composting and stabilisation before sending to the landfill tipping face. All other MSW is not

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
						landfilling.	- Metal is collected together with plastic - Paper, plastic gets into bales -Green waste (biodegradables) gets composted and stabilised before sending to the landfill tipping face.	pre-treated prior to landfilling.
Jánossomorja	HU2 Transdanubia (Dunántúl).	55,000	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	There is some pre-treatment on site and at a facility near to the landfill, however not all waste is treated. The nearby treatment facility only opened in 2016 and once fully operational will sort and remove recyclables, biodegradables, and apply mechanical pre-treatment. It will be pre-treating some of the 27,500 tonnes of EWC (European Waste Code) group 20 and after the pre-treatment any residual EWC group 19 will be landfilled in this landfill.	There is some mechanical treatment and separation of the paper, card, packaging, glass and the biodegradable fraction. However not all MSW is treated through the pre-treatment.	There is some mechanical treatment and separation of the paper, card, packaging, glass and the biodegradable fraction. However not all MSW is treated through the pre-treatment.	There is some mechanical treatment and separation of the paper, card, packaging, glass and the biodegradable fraction. However not all MSW is treated through the pre-treatment. The biodegradable fraction that is separated is aerobically stabilised; however not all biodegradable material is removed and therefore some goes to landfill without any pre-treatment.
Kaposmérő	HU2 Transdanubia (Dunántúl).	20,000	Y	2 – Less than 50% of non-hazardous MSW received is likely	According to site contacts, about 10,000 tonnes of the total of 20,000	There is no MBT facility on-site. There is mechanical pre-	There is no MBT facility on-site. There is mechanical pre-treatment to	There is no segregation of the biodegradable fraction of the MSW

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				to be pre-treated to the required standard.	tonnes of waste received per year is diverted to the local pre-treatment facility. In our opinion this is less than 10% due to the low capabilities of the sorting equipment and conditions for pre-treatment in the IPPC permit of the facility.	treatment to remove paper, PET, paper and metal, however not all waste is treated. Glass is not removed and there is no segregation of the biodegradable fraction.	remove paper, PET, paper and metal, however not all waste is treated. Glass is not removed and there is no segregation of the biodegradable fraction.	prior to landfilling. All biodegradable material is landfilled without biostabilisation.
Pusztázámor	HU1 Central Hungary (Közép-Magyarország).	220,000	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No, about 150,000 tonnes of the total 250,000 tonnes received per year of non-hazardous municipal waste is landfilled without pre-treatment. There is a Mechanical treatment process: - sorting of portion over 8 cm and below 30 cm – this goes to incineration to the Mátrai Power Station in Visonta (Hungary) - about 100,000 tonnes are handed over to Reston Kft. (a contractor carrying out the pre-treatment of waste). About 60% of this portion is going to be 19 12 10 or Residual Derived Fuel waste,	No MBT facility onsite. There is mechanical sorting to remove the fraction suitable for incineration and Residual Derived Fuel. Approximately 60% of all MSW is treated like this. There is no biostabilisation of the organic fraction.	There are separate collections for biodegradable, paper, plastic, metal and glass waste in the municipalities mentioned and these are not delivered to this landfill. The pre-treatment of the MSW on site removes material suitable for incineration and Residual Derived Fuel.	There is no separation of the organic fraction from the MSW and there is no biostabilisation prior to landfilling.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					which can be / is incinerated - the rest (40%) is landfilled locally as 20 03 01.			
Felső-Bácska (Vaskút)	HU3 Great Plain and North (Észak és Alföld).	55,000	Y	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	All MSW is pre-treated through the mechanical treatment process, however there are still recyclable materials present in the MSW at the tipping face. There is segregation of the biodegradable fraction and biostabilisation prior to landfilling.	There is mechanical and biological treatment prior to landfilling; however, there was still recyclable material visible on the tipping face after pre-treatment.	Paper, plastic, metal and glass and other packaging waste are separately collected at source. The MSW is pre-treated by grinding, metal removal and then separation of the heavy fraction. However, the effectiveness of the mechanical treatment is unclear as there are recyclable materials visible on the tipping face.	The pre-treatment of the MSW include the separation of the smaller (under 8cm) fraction before being composted and stabilised. The stabilised material is then landfilled.
IRELAND								
Drehid	IE0 Ireland.	207,545	Y (Composting Facility)	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	All residual waste is collected from households with three bin source separation system. Some residual waste is treated at MRF (no breakdown or proportion disclosed) and the fines and bulky waste are sent for disposal in landfill. No breakdown of EWC codes available to understand	No MBT facility for pre-treatment of MSW before landfilling. Some residual waste is treated at MRF (no breakdown or proportion disclosed) and the fines (once composted) and bulky waste are sent for disposal in landfill.	Household waste streams are source segregated using three bin system, blue bin for dry recycling, brown bin for garden & food waste and a black bin for residual waste. Some residual waste is treated at MRF (no breakdown or proportion disclosed) stem, blue bin for dry	Organic fines are separated from some of the residual waste (off site) and are biologically stabilised before disposal. Any residual waste that is not pre-treated may contain organic materials and it is not stabilised prior to landfilling.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					breakdown of source and treatment.		recycling, brown bin for garden & food waste and a black bin for residual waste.	
Knockharley	IE0 Ireland.	45,181	N	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Waste is accepted from pre-treatment facilities such as sorting transfer stations, dirty MRF, and residual waste from kerbside collections that have source segregation available. 31% of all incoming waste is pre-treated at a dirty MRF prior to landfilling. Organic fines are separated off site and the MRF and stabilised prior to landfilling. Not all MSW is pre-treated prior to disposal.	No MBT facility for pre-treatment of MSW before landfilling. Some residual waste is treated at MRF and the fines (once composted) and bulky waste are sent for disposal in landfill.	Household waste streams are source segregated using three bin system, blue bin for dry recycling, brown bin for garden & food waste and a black bin for residual waste.	Organic fines are separated from some of the residual waste (off site) and are biologically stabilised before disposal. Any residual waste that is not pre-treated may contain organic materials and it is not stabilised prior to landfilling.
Rathroeen	IE0 Ireland.	31,398	Y (Civic amenity site for householders to segregate recyclables)	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No, the majority of MSW is not pre-treated prior to landfilling. Source segregation of recyclables by households and a civic amenity site reduce the amount of residual waste disposed by households. However, there is no further treatment of residual waste	NA. No MBT facility for pre-treatment of MSW before landfilling. Source segregation at homes and civic amenity site are the only facilities available.	Household waste streams are source segregated using three bin system, blue bin for dry recycling, brown bin for garden & food waste and a black bin for residual waste. Materials that can be segregated at the civic amenity include: Clear, green, brown glass	There is no MBT or stabilisation of the organic fraction. Source segregation and segregation at the civic amenity site. Any remaining organic material in the residual waste is not stabilised prior to landfilling. Some recyclable material such as wood garden waste that has been shredded

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					before landfilling		bottles and jars; aluminium drink cans; Steel food cans; Textiles and shoes; Plastic bottles (PET/PETE, HDPE/PE); Tetra Pak; Paper, cardboard; Books; CDs; Scrap metal; Wood; Tyres; Gas Cylinders; WEEE; Waste cooking oils, motor oils, oil filters; Light bulbs including fluorescents; Waste chemicals and paint; Hard plastics; Garden; and Residual waste. There is no further sorting or segregation of materials from the residual waste before landfill.	and used as daily cover, no food or large bulks of garden waste visible.
Ballynagran	IE0 Ireland.	38,109	N	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Waste is accepted from pre-treatment facilities such as sorting transfer stations, dirty MRF, and residual waste from kerbside collections that have source segregation available. Organic fines are separated off site and the MRF and stabilised prior to landfilling. Not all MSW is pre-treated	No MBT facility for pre-treatment of MSW before landfilling. Some residual waste is treated at MRF and the fines (once composted) and bulky waste are sent for disposal in landfill.	Household collected waste and MSW from commercial sources. Household waste streams are source segregated using three bin system, blue bin for dry recycling, brown bin for garden & food waste and a black bin for residual waste.	Organic fines are separated from some of the residual waste (off site) and are biologically stabilised before disposal. Any residual waste that is not pre-treated may contain organic materials and it is not stabilised prior to landfilling.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					prior to disposal.			
ITALY								
Palermo – Bellolampo Landfill	ITG Insular Italy.	379,332	Y	At the moment: 1 – No non-hazardous MSW received has been pre-treated to the required standard. When MBT plant will be operative: 5 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	During 2015, mechanical treatment mobile plants (as coarse shredding, and removal metals) have been used to treat all waste disposed in the landfill (EWC 20 03 01 and other codes 20) before the MBT facility is fully operational. At the moment, biodegradable materials are not removed (temporary phase). New MBT expected to be fully operational by August 2016.	Coarse mechanical treatment (at the landfill) and mechanical and biological treatment at the MBT plant. New MBT expected to be fully operational by August 2016. When the MBT is completely operational, all loads will be directed to the MBT plant.	Presently, only coarse mechanical treatment shredding and removing metals. Biodegradable materials are not removed.	At the moment, biodegradable materials are not removed (temporary phase). As the MBT facility becomes fully operational, all biodegradable materials will be completely stabilised through the biological line at the MBT plant.
Torino – Grosso Landfill	ITC Northwest Italy.	21,503	N	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	25.76% of all waste accepted was EWC code 20 03 01. And 21,503 tonnes were not pre-treated before disposal. There is no MBT onsite. The landfill disposes of MSW directly from collection rounds and from other pre-treatment facilities.	NA, onsite. On the tipping face some loads contain potentially recyclable materials (e.g. plastic, wood, and paper) but they are not easily removable and account for 20%. The share of biodegradable material is less than 10 %	NA, onsite. On the tipping face some loads contain potentially recyclable materials (e.g. plastic, wood, and paper) but they are not easily removable and account for 20%. The share of biodegradable material is less of 10 %.	NA, onsite. On the tipping face the share of biodegradable material is less of 10 %. It is unclear if this has been stabilised or not at other pre-treatment sites.
Bologna –	ITD Northeast Italy.	33,826	Y	3 –	On site, there is a	The adjustment of	The sieving	The sieving

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
Gaggio Bologna Landfill				Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	mobile plant to carry out mechanical treatment of incoming waste. This pre-treatment of mixed municipal waste (EWC 20 03 01) is carried out through a shredding/sieving treatment, to achieve the separation of waste in two parts: heavy (dry fraction), and light (wet fraction). All loads of MSW are diverted to the treatment mobile plant.	permit (No 95324, of 16 June 201) has added a sieving treatment to the shredding treatment. The light fraction is disposed of in the landfill and the heavy fraction is sent to other biological plants. The light fraction is gathered for its disposal in the landfill, and recovery the heavy fraction in other biological plants.	treatment achieves removal of biodegradable material. If during shredding and sieving treatments undesirable waste are visible (as tyres, ferrous metals, and scrap) these are manually removed and disposed in specific areas.	treatment on site achieves removal of biodegradable material (heavy fraction). The share of removed heavy fraction is around 7% of all treated waste. The organic fraction is sent to stabilisation treatment plants
Savona – Vado Ligure Landfill	ITC Northwest Italy.	89,268	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Onsite MBT in place, that shreds and sieves waste before the heavy biodegradable fraction is biostabilised. Sieving process removes the biodegradable fraction and a magnetic separator removes metals. Biodegradable fraction (heavy fraction) is biostabilised offsite. The light fraction (after shredding, sieving and metal removal) is	At present, the process of removal of metals, and the separation of organic fraction (as heavy fraction) is carried out by the mechanical treatment. Amount of recovered materials are as follows: - Heavy fraction as EWC 19 05 01: 19,375 t, 35,22 % - EWC 19 12 02 (ferrous metals) : 111 t, 0,20 %	The MBT process only removes metals and the organic material for biostabilisation.	Onsite MBT in place, that shreds and sieves waste before the heavy biodegradable fraction is biostabilised. Sieving process removes the biodegradable fraction and a magnetic separator removes metals. Biodegradable fraction (heavy fraction) is biostabilised offsite.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					transported to the tipping face.			
Potenza – Sant'Arcangelo Landfill	ITF South Italy.	26,612	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	MBT: Bags are lacerated, coarse shredding of all material, metal removal by magnetic separator, sieving (80mm) to separate into a light and heavy fraction. The heavy fraction which includes the organic fraction is biological processed (Aerobic and Anaerobic). The light fraction, eventual manual sorting treatment to improve quality of this waste (as combustible fraction, or potential recyclable materials).	Mechanical treatment (coarse shredding, opening of waste bags, removal metals, sieving) Biological treatment (biological process) Manual selection (if necessary) of light fraction.	The mechanical treatment removes light recyclable materials (paper, plastic, cardboard, metals and other inert materials). This fraction is around 45% of the waste total. If necessary, a manual selection is carried out on the light fraction coming from mechanical treatment to improve quality of recoverable waste or combustible fraction. Heavy fraction is around 55% and removed for biostabilisation.	MBT: Bags are lacerated, coarse shredding of all material, metal removal by magnetic separator, sieving (80mm) to separate into a light and heavy fraction. The heavy fraction which includes the organic fraction is biologically processed (Aerobic and Anaerobic).
LATVIA								
Getliņi Landfill	LVO Latvia.	304,753	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Incoming waste is sent to pre-treatment facility. Pre-treatment includes sorting to remove recyclables and biodegradable waste. Biodegradable waste is sent to bioreactor for stabilisation. All incoming waste is	Yes, MBT on site. Pre-treatment includes sorting to remove recyclables and biodegradable waste. Biodegradable waste is sent to bioreactor for stabilisation. All incoming waste is sent to pre-	The pre-treatment facility removes paper, metal, plastic, glass, and biodegradable waste. Pre-treatment facility operates since November 2015. As per January 2016 from all incoming waste 14% of recyclables and 50%	Yes, ~ 50%. The pre-treatment facility removes all biodegradable material from the incoming waste, which is around 50% of incoming waste. Biodegradable material is treated in bioreactor. Bioreactor is a separate cell with

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					sent to pre-treatment facility.	treatment facility.	of biodegradable waste was removed.	installed landfill gas extraction system.
Dzīļā vāda Landfill	LVO Latvia.	21,953	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Incoming waste is landfilled without pre-treatment. The pre-treatment technology available on site cannot be used in winter. Paper, plastic, glass and biodegradable waste is seen at the landfilled waste.	There is mobile pre-treatment equipment in the landfill, but there is no adequate hangar; therefore, pre-treatment equipment is located outdoors and cannot work during winter season. Pre-treatment equipment consists of a mobile drum crusher «TERMINATOR 3400 D» that provides material crushing and a mobile 3 – fraction sorting machine «MULTISTAR L3 – FLOVERDISC». No MBT pre-treatment of MSW prior to landfilling.	NA, the pre-treatment technology is not active. Paper, plastic, glass and biodegradable waste are mixed with the landfilled waste.	NA, the pre-treatment technology is not active. Paper, plastic, glass and biodegradable waste are mixed with the landfilled waste.
Križevniki Landfill	LVO Latvia.	17,547	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Mixed municipal waste is directed to pre-treatment facility. Pre-treatment facility removes paper, metal, plastic, glass, and biodegradable waste. The pre-treatment facility has	Pre-treatment facility removes paper, metal, plastic, glass, and biodegradable waste. The pre-treatment facility has been operational since 2016; therefore, no	Pre-treatment facility removes paper, metal, plastic, glass, and biodegradable waste. The pre-treatment facility has been operational since 2016; therefore, no	Yes, ~ 30%. The pre-treatment facility removes all biodegradable material from the incoming mixed municipal waste, which is around 30% of incoming mixed municipal waste.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					been operational since 2016; therefore, no data on the quantity of waste it has treated and recovered is yet available. The pre-treatment facility removes all biodegradable material from the incoming mixed municipal waste, which is around 30% of incoming mixed municipal waste. Biodegradable waste is composted in open air composting field.	data on the quantity of waste it has treated and recovered is yet available. The pre-treatment facility removes all biodegradable material from the incoming mixed municipal waste, which is around 30% of incoming mixed municipal waste. Biodegradable waste is composted in open air composting field.	data on the quantity of waste it has treated and recovered is yet available. The pre-treatment facility removes all biodegradable material from the incoming mixed municipal waste, which is around 30% of incoming mixed municipal waste. Biodegradable waste is composted in open air composting field.	Biodegradable material is composted and used for covering the landfill. Biodegradable waste is composted in open air composting field.
Kivītes Landfill	LVO Latvia.	30,121	Y	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Incoming waste is sent to pre-treatment facility. Pre-treatment includes sorting to remove recyclables and biodegradable waste. Biodegradable waste is sent to bioreactor for stabilisation. It is planned that 90% will be sent to the pre-treatment facility every day.	Mechanical sorting. Pre-treatment facility has to remove at least 15% of recyclable material from incoming mixed municipal waste. The pre-treatment facility removes paper, metal, plastic, glass, and biodegradable waste. The pre-treatment facility has been operating since January 2016. In February 2016,	Mechanical sorting. Pre-treatment facility has to remove at least 15% of recyclable material from incoming mixed municipal waste. The pre-treatment facility removes paper, metal, plastic, glass, and biodegradable waste. The pre-treatment facility has been operating since January 2016. In February 2016, 16.5% of recyclables and 65% of	Yes, ~ 61%. The pre-treatment facility removes all biodegradable material from the incoming waste, which is around 61% of incoming waste. Biodegradable material is stabilised in bio-cell (separate cell with installed landfill gas extraction system).

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
						16.5% of recyclables and 65% of biodegradable waste was removed.	biodegradable waste was removed.	
Grantiņi Landfill	LVO Latvia.	9,138	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	All other MSW that is not included in the separate collections is sent directly to landfill. Waste to landfill is mostly (~95%) transported in closed vehicles. There is no pre-treatment of waste on-site, however a sorting facility and composting facility are planned to be operational in 2019.	NA. There is no pre-treatment of waste on-site, however a sorting facility and composting facility is planned to be operational in 2019.	Unsorted waste is landfilled. There is evidence of recyclable materials and biodegradable waste in the waste at the tip face.	Unsorted waste is landfilled. There is evidence of recyclable materials and biodegradable waste in the waste at the tip face.
LITHUANIA								
Kaunas Lapės landfill	LT0 Lithuania.	170,700	N	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Only pre-treated (Chapter 19) municipal waste has been accepted from 2016. Only category 19 12 12 waste (other waste from mechanical treatment of waste other than those mentioned in 19 12 11) have been accepted for landfilling from 2016. Pre-treated MSW is delivered from MBT plants in containers.	MBT facility is situated on a separate site and removes metals, biodegradable waste, and combustible waste which is sent to Klaipėda incineration facility.	MBT facility is situated on a separate site and removes metals, biodegradable waste, and combustible waste which is sent to Klaipėda incineration facility.	The MBT process removes most of biodegradable material but exact proportion of removed material is not known (MBT facility is situated on a separate site and operated by another private company). Yes, stabilised technical compost (not suitable for agricultural application) is produced from

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
								biodegradable waste and used for waste covering and reinforcement of landfill slopes.
Klaipėda landfill	LT0 Lithuania.	63,500	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes.	Yes, recyclables and organic fraction are removed. Organic waste including biodegradable material is incinerated - this may not be the most appropriate pre-treatment method compared to composting or AD.	Yes, including paper, metal, plastic, glass and organic waste.	Not stabilised but incineration as final disposal method. Organic waste including biodegradable material contained in MSW is removed and directed for incineration.
Panevėžys landfill	LT0 Lithuania.	88,790	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, MBT on site. Municipal waste is pre-treated at the MBT facility which separates recyclables including paper, metal, plastic, glass, and biodegradables.	Yes, MBT on site. Municipal waste is pre-treated at the MBT facility which separates recyclables including paper, metal, plastic, glass, and biodegradables.	Yes, MBT on site. Municipal waste is pre-treated at the MBT facility which separates recyclables including paper, metal, plastic, glass, and biodegradables.	Most of the biodegradable material contained in MSW is removed and is stabilised using anaerobic digestion and composting.
Tauragė landfill	LT0 Lithuania.	21,930	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes. 100% is pre-treated in-situ before disposal. Both Chapter 19 and Chapter 20 waste may be accepted at the landfill (see above), but only pre-treated (Chapter 19) municipal waste is	MBT on site. Incoming waste is pre-treated at the sorting line which includes waste shredding, screening of biodegradable waste and manual separation of recyclables.	Source segregation is also in place at householder level. Pre-treatment facility was constructed in 2011. It includes shredding, screening of biodegradable fraction and manual	Biodegradable waste screened out at the sorting line is composted; stabilised compost is used for waste covering.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					deposited.	Biodegradable waste screened out at the sorting line is composted; stabilised compost is used for waste covering.	separation of recyclables. Biodegradable fraction is composted, compost is used for waste covering and reinforcement of landfill slopes. All incoming municipal waste is pre-treated.	
Vilnius landfill	LTO Lithuania.	199,500	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes. A small mechanical pre-treatment facility is operated on the site, accepting MSW from small municipalities. The facility includes shredding, screening of biodegradable fraction and manual separation of recyclables, though some part of biodegradable fraction is disposed on the landfill without stabilisation. A new up-to-date MBT facility has been constructed on a separate site and currently is being tested. It is expected that it will start operating in April 2016.	Yes, recyclables and organic fraction are removed. New facility onsite that will also be active in April 2016.	Source segregation is also in place at householder level. Incoming waste is pre-treated at the sorting line which includes waste shredding, screening of biodegradable waste and manual separation of recyclables. The new up-to date pre-treatment plant has been constructed and started operating from the beginning of May 2016. The new plant will ensure adequate pre-treatment required by the Malagrotta judgement.	Partial. Most of biodegradable fraction screened at the pre-treatment facility on site is handed over to UAB biodegradable composting plant but some part of it is disposed of on the landfill without stabilisation. When new pre-treatment facility will start operating, organic waste will be dried and used as fuel.
MALTA								
Ghallis	MT0 Malta.	239,369	N	3 – Approximately	A good portion of MSW landfilled in	The proportion of material that is	Not all material is pre-treated	The biodegradable fraction is

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Malta (the only operational landfill) has not been pre-treated to the standard required by the Malagrotta judgement.	treated: Sant'Antnin Waste Treatment Plant with a total combined capacity of 71,000 tonnes for the treatment of waste through an MRF, MTP and AD. Additional facility active in 2016 also an MBT. Not all material is pre-treated currently through MBT.	currently through MBT and therefore not all waste streams segregated after collection before the landfill.	separated and stabilised using AD. Not all material is currently pre-treated and some biodegradable waste is landfilled without pre-treatment.
POLAND								
Sutkowice Landfill	PL2 REGION POŁUDNIOWY.	781	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	At the facility no mixed municipal waste is processed. Mixed waste is only stored not disposed at the site in Sutkowice. In a next step, this waste is forwarded to the external Regional Municipal Waste Treatment Facility. Household waste ash is selectively collected and then, as the only fraction, subjected directly to the D5 process.	NA. No MBT. No other types of treatment apply except the sorting of selectively collected waste glass and paper. The site is mainly used as a transfer station and there is no pre-treatment. MSW is exported off site to the external Regional Municipal Waste Treatment Facility.	NA. No MBT. No other types of treatment apply except the sorting of selectively collected waste glass and paper. This form of treatment results in the separation of recyclable cardboard and newspaper waste, and glass waste divided into two groups: coloured and transparent. The site is mainly used as a transfer station and there is no pre-treatment. MSW is exported off site to the external Regional Municipal	NA. No MBT. Glass fractions are removed, however the site is mainly used as a transfer station and there is no pre-treatment. Waste with potential biodegradable elements is not processed at the site. MSW is exported off site to the external Regional Municipal Waste Treatment Facility. There is no biostabilisation that takes place onsite and there is no biostabilisation of the household ash

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
							Waste Treatment Facility.	prior to landfilling.
Landfill in Nysa (region Opole)	PL5 REGION POŁUDNIOWO-ZACHODNI.	1,869	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, all waste accepted is pre-treated prior to landfilling through the onsite MBT.	Yes, following types of treatment are applied: •Mechanical biological treatment •Sorting line for recyclable materials such as paper, metal, plastic, biodegradable waste and other. •Composter for green waste and other biodegradable waste collected in selective way. •Installation for stabilising biological parts of mixed waste from biological mechanical installation •The biodegradable waste amount in 45-55% and recyclable materials in 2-3% of 8,495.58 Mg.	Yes, the MBT onsite sorts the paper, metal, plastic and biodegradable waste from the MSW. All material is treated.	Yes, the MBT onsite segregated biodegradable waste before the biological parts are stabilised. The biodegradable waste amount is 45-55%. Composter for green waste and other biodegradable waste collected in selective way.
Janczyce (South East of Poland)	PL3 REGION WSCHODNI.	15,022	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the	Yes, the site has a biological mechanical installation for the pre-treatment of	Yes, the site has a biological mechanical installation for the pre-treatment of	From mixed MSW collected in selective way it is extracted: - Raw materials	Yes, 100% of all biodegradable waste is stabilised in composting process before it is

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				required standard.	received waste. The activities include the separation of fractions for biological stabilisation, the separation of raw materials such as paper, carton packaging, multi material packaging (plastics) and metals, the separation of high-energy fraction for the production of alternative fuels, the stabilisation of biological fraction with the size of 0-80 mm, the recovery process at the site and the storage of waste not useful for further processing.	received waste. The activities include the separation of fractions for biological stabilisation, the separation of raw materials such as paper, carton packaging, multi material packaging (plastics) and metals, the separation of high-energy fraction for the production of alternative fuels, the stabilisation of biological fraction with the size of 0-80 mm, the recovery process at the site and the storage of waste not useful for further processing.	(around 35%) - Ballast (around 65%) The raw materials are split into: - Newsprint paper - Carton packaging - Multi material packaging • Film packaging (clean/dirty) • PET bottles sorted by colours and sort out PET bottles with PCV labels • Packaging from household detergents (majority HDPE and LDPE) • Packaging from hazardous products like oil, plan protection products etc. • PP packaging - Strap metals - Ballast which is baled and transported to external producer of alternative fuel.	landfilled.
Stajsin, North-West Poland	PL4 REGION PÓŁNOCNO-ZACHODNI.	0 ¹⁷⁰	y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, 100% of waste suitable for pre-treatment is pre-treated in an MBT onsite. The facility does not accept waste after	There is a waste sorting plant in function which is equipped, inter alia, with 10 optical sorters that enables sorting	There is a waste sorting plant in function which is equipped, inter alia, with 10 optical sorters that enables sorting several raw	Yes, all biodegradable material in the waste is stabilised by composting before landfilling.

¹⁷⁰ All waste is pre-treated prior to landfilling at this site. For the reasons explained in footnote 73, the amount of waste considered as MSW landfilled at this site is zero.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					processing in other regional installations.	several raw waste fractions. Plastics, Paper, metals, tetra pack and glass. Stabilisation of the organic waste fraction based on Novacomp technology for composting. An intense phase in the hall of the composting plant.	waste fractions. Plastics, Paper, metals, tetra pack and glass. Stabilisation of the organic waste fraction based on Novacomp technology for composting. An intense phase in the hall of the composting plant.	
Stare Lipiny (region Warsaw)	PL1 REGION CENTRALNY.	11,688	N	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	There is no pre-treatment onsite however it is accepted from other pre-treatment facilities. The waste observed on the tipping face appears to be fully processed with limited recyclable materials visible and no biodegradable material visible. The type of pre-treatment facilities that the waste was accepted from was unavailable.	NA. There is no pre-treatment onsite however it is accepted from other pre-treatment facilities. The waste observed on the tipping face appears to be fully processed with limited recyclable materials visible and no biodegradable material visible. The type of pre-treatment facilities that the waste was accepted from was unavailable.	NA. There is no pre-treatment onsite however it is accepted from other pre-treatment facilities. The waste observed on the tipping face appears to be fully processed with limited recyclable materials visible and no biodegradable material visible. The type of pre-treatment facilities that the waste was accepted from was unavailable.	No, biostabilisation onsite, all material is pre-treated off site. It is unknown the type of pre-treatment that takes place, however, on the landfill no biodegradable material was noticed.
PORTUGAL								
Barlavento landfill, operated by Algar	PT1 Mainland Portugal.	161,098	Y	2 – Less than 50% of non-hazardous MSW received is likely	The MT plant separates recyclable iron metal (not aluminium) and	Yes. Mechanical removal of dry recycling and biodegradable	The MT plant separates recyclable iron metal (not	The paper and cardboard is so contaminated that it is kept together

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				to be pre-treated to the required standard.	scrap, plastics (PET, HDPE, film, mixed plastics), glass, "liquid food cardboard packaging" (e.g. "Tetra pack"), WEEE, as well as biodegradable waste. The paper and cardboard is so contaminated that it is kept together with the biodegradable waste. The residual waste of MT (code 19) goes to the landfill. Up to the working capacity of MT plant, the non-hazardous MSW (code 20 03 01) delivered to "Barlavento site" undergoes pre-treatment in this unit. Even though the MT is authorised to have a maximum annual capacity of 150,000 tonnes/year, its actual working capacity is 110,000 tonnes/year. So, approximately 60,000 tonnes had no pre-treatment and went straight to landfill. Currently, with the present	fraction is removed and exported off site for biological treatment. However, the capacity of the MT and biological treatment is insufficient which means significant amounts are sent to landfill in busy times.	aluminium) and scrap, plastics (PET, HDPE, film, mixed plastics), glass, "liquid food cardboard packaging" (e.g. "Tetra pack"), WEEE, as well as biodegradable waste. The paper and cardboard is so contaminated that it is kept together with the biodegradable waste. The residual waste of MT (code 19) goes to the landfill. Up to the working capacity of MT plant, the non-hazardous MSW (code 20 03 01) delivered to "Barlavento site" undergoes pre-treatment in this unit. Even though the MT is authorised to have a maximum annual capacity of 150,000 tonnes/year, its actual working capacity is 110,000 tonnes/year. So, approximately 60,000 tonnes had no pre-treatment and went straight to	with the biodegradable waste. Currently, with the present Algar's set up, 10,000 tonnes/year of the biodegradable waste sorted in the MT at Barlavento site goes to Algar's MTB at São Brás de Alportel to be biostabilised by anaerobic digestion. The remaining, around 65,000 tonnes/year is discharged in Barlavento Algarvio landfill.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					Algar's set up, 10,000 tonnes/year of the biodegradable waste sorted in the MT at Barlavento site goes to Algar's MTB at São Brás de Alportel to be biostabilised by anaerobic digestion. The remaining, around 65,000 tonnes/year is discharged in Barlavento Algarvio landfill.		landfill. Currently, with the present Algar's set up, 10,000 tonnes/year of the biodegradable waste sorted in the MT at Barlavento site goes to Algar's MBT at São Brás de Alportel to be biostabilised by anaerobic digestion. The remaining, around 65,000 tonnes/year is discharged in Barlavento Algarvio landfill.	
Seixal landfill, operated by Amarsul	PT1 Mainland Portugal.	156,150	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	The proportion of all non-hazardous MSW received in Seixal eco-park to be processed in the MBT unit is expected to be 54% in 2016 and 79% in 2017. This means that in 2017, when it is expected to be operating in full capacity (372 tonnes/day), all non-hazardous MSW "with valorisation potential" received in the eco-park is to undergo pre-treatment in the MBT. Presently, the MBT is	Yes, MBT in trial stages but all suitable waste (79% of the waste accepted) is due to be treated by 2017.	The proportion of all non-hazardous MSW received in Seixal eco-park to be processed in the MBT unit is expected to be 54% in 2016 and 79% in 2017. This means that in 2017, when it is expected to be operating in full capacity (372 tonnes/day), all non-hazardous MSW "with valorisation potential" received in the eco-park is to undergo pre-treatment in the MBT.	Presently, the MBT is equipped only to sort metals, glass and biodegradable waste. The latter undergoes biostabilisation. The demand for the resulting compost, mainly by the local gardening companies, is higher than what is possible to be produced. A future investment is being put together for equipping the MBT for additionally sorting

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					equipped only to sort metals, glass and biodegradable waste. The latter undergoes biostabilisation. The demand for the resulting compost, mainly by the local gardening companies, is higher than what is possible to produce. A future investment is being put together for equipping the MBT for additionally sorting paper/cardboard and plastics. Until then, these materials are landfilled as residual waste of the MBT unit mechanical treatment.		Presently, the MBT is equipped only to sort metals, glass and biodegradable waste. The latter undergoes biostabilisation. The demand for the resulting compost, mainly by the local gardening companies, is higher than what is possible to produce. A future investment is being put together for equipping the MBT for additionally sorting paper/cardboard and plastics. Until then, these materials are landfilled as residual waste of the MBT unit mechanical treatment.	paper/cardboard and plastics. Until then, these materials are landfilled as residual waste of the MBT unit mechanical treatment.
Fundão landfill, operated by Resiestrela	PT1 Mainland Portugal.	51,541	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, MBT onsite, treats all waste. Recyclables arriving in the non-hazardous MSW are sorted. These include glass, paper/cardboard, ferrous metal (objects containing aluminium and alloys are sorted by hand because of the	Yes. Recyclables arriving in the non-hazardous MSW are sorted. These include glass, paper/cardboard, ferrous metal (objects containing aluminium and alloys are sorted by hand because of the	Recyclables arriving in the non-hazardous MSW are sorted. These include glass, paper/cardboard, ferrous metal (objects containing aluminium and alloys are sorted by hand because of the current relative	The biodegradable waste sorted by trommel screen, after which it still contains a relevant amount of contaminating pieces of non-biodegradable waste (i.e. plastics). With very residual exception (i.e. that

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					current relative weight of alloys, technology available such as foucault devices do not work top spate aluminium), plastics (PET, PEAD, PE, mixed plastic, tetra pack). The biodegradable waste sorted by trommel screen, after which it still contains a relevant amount of contaminating pieces of non-biodegradable waste (i.e. plastics). At this stage, it is biostabilised by composting.	the current relative weight of alloys, technology available such as foucault devices do not work top spate aluminium), plastics (PET, PEAD, PE, mixed plastic, tetra pack). The biodegradable waste sorted by trommel screen, after which it still contains a relevant amount of contaminating pieces of non-biodegradable waste (i.e. plastics). At this stage, it is biostabilised by composting.	weight of alloys, technology available such as foucault devices do not work top spate aluminium), plastics (PET, PEAD, PE, mixed plastic, tetra pack). The biodegradable waste sorted by trommel screen. At this stage, it is biostabilised by composting.	contain in less of 0.2% of non-hazardous MSW that "Resiestrela site" in 2015), all biodegradable material in the waste is indeed stabilised before it is landfilled. At this stage, it is biostabilised by composting.
Viana do Castelo landfill, operated by Resulima	PT1 Mainland Portugal.	116,652	N	1 – No non-hazardous MSW received has been pre-treated to the required standard.	There is no pre-treatment applied to the household waste. MBT have been planned at Resulima however political circumstances have changes and they are awaiting a solution for the non-hazardous MSW.	NA, No pre-treatment available on site or in planning at the moment.	NA, not applicable as no waste arriving to "Resulima site" is expected to be pre-treated.	NA, not applicable as no waste arriving to "Resulima site" is expected to be pre-treated.
Leiria landfill, operated by Valoris	PT1 Mainland Portugal.	133,511	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-	A fraction of the waste delivered undergoes pre-treatment in the existing MBT unit; the	Yes. Mechanical removal of dry recycling and biodegradable fraction is removed	The MBT sorts to remove plastic and metals recyclables, as well as biodegradable	A fraction of the waste delivered undergoes pre-treatment in the existing MBT unit.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				treated to the required standard.	value of this fraction is limited by the unit yearly capacity to process unsorted MSW up to the standard – i.e. approx. 47,273 tonnes of MSW (code 20 03 01) goes to landfill with no pre-treatment- (107,273 tonnes of non-hazardous MSW accepted – 60,000 capacity of MBT).	and exported off site for biological treatment. However, the capacity of the MT and biological treatment is insufficient which means significant amounts are sent to landfill in busy times.	waste. It also sorts to remove not recyclable glass that, together with the remaining residual waste of this unit, is landfilled. The paper and cardboard are used in the biological treatment.	The MBT sorts to remove plastic and metals recyclables, as well as biodegradable waste. It also sorts to remove not recyclable glass that, together with the remaining residual waste of this unit, is landfilled. The paper and cardboard are used in the biological treatment. Actually, the most limiting factor is the anaerobic digestion biological treatment set up capacity of the unit (i.e. 20,000 tonnes/year). Although it can sort up to 60,000 tonnes/year of non-hazardous MSW, it remains 2,000 tonnes/year of biodegradable material separated at the MT step that cannot undergo biostabilisation and has to be landfilled.
ROMANIA								
BIHOR Oradea Sanitary Landfill	R01 Macroregiunea.	137,569	Y	2 – Less than 50% of non-	Approximately 85% of the municipal	Not at present. There is a	Not at present. There is a	Source segregated biodegradable

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				hazardous MSW received is likely to be pre-treated to the required standard.	waste accepted on site is landfilled without pre-treatment. It is estimated that the untreated disposed waste contains about 20% recyclable waste (expressed gravimetrically). Part of these materials could be separated relatively easy. It is estimated that the untreated disposed waste contains about 50% biodegradable waste (expressed gravimetrically). There are pre-treatment facilities onsite for the treatment of sources segregated materials. There is also an MBT plant in construction and it is expected that almost all non-hazardous MSW received in the Eco Bihor landfill to be pre-treated to the required standard.	mechanical-biological treatment plant is built on site (at the time of the visit it was under technological testing) and in the process of authorization (testing period), for mixed municipal waste, with an estimated capacity of 60,000 tonnes per year. This will enable selection of recyclable waste from the mixed municipal waste, decreasing the amount of recyclable waste to be landfilled. Consequently, after the MBT is put into operation, it is expected that almost all non-hazardous MSW received in the Eco Bihor landfill to be pre-treated to the required standard.	mechanical-biological treatment plant built on site (at the time of the visit it was under technological testing) and in the process of authorisation (testing period), for mixed municipal waste, with an estimated capacity of 60,000 tonnes per year. This will enable selection of recyclable waste from the mixed municipal waste, decreasing the amount of recyclable waste to be landfilled. Consequently, after the MBT is put into operation, it is expected that almost all non-hazardous MSW received in the Eco Bihor landfill to be pre-treated to the required standard.	quality compost used as a cover material on the landfill. In 2015, it represented about 80% of the total quantity of resulting compost. Analysis of low-quality compost used in daily coverage on landfill are not carried out. Waste accepted on site and sent to landfill (about 85% of the total quantity of municipal waste accepted on site) does not undergo any pre-treatment process before landfilling. Therefore, the biodegradable material in the waste is not stabilised.
Piatra Neamt	RO2 Macroregiunea.	14,892	Y	2 – Less than 50% of non-hazardous MSW received is likely	Not all the quantity of municipal waste accepted for landfilling is pre-	No MBT, but some sorting and removal of recyclables on site.	The sorting process ensures the removal of recyclable waste (paper/cardboard,	There is also a composting plant, with a capacity of 25.000 tonnes/year

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				to be pre-treated to the required standard.	treated. In the year 2015, about 64% of the total quantity of municipal waste accepted on site for landfilling is waste that result from a rotating screen process on site. Mechanical treatment of MSW – sorting using rotating screen – for municipal mixed collected waste. The sorting process ensures the removal of recyclable waste (paper/cardboard, metal, plastic and glass). A very small part of sorted waste is sent to recycling. The rest is co-incinerated in cement kilns.	Not all waste is treated prior to landfilling. There is composting on site but is for source segregated biodegraded material and not the biodegradable fraction within the MSW residual waste.	metal, plastic and glass). There is also a composting plant, with a capacity of 25.000 tonnes/year for source segregated materials only.	for source segregated materials only. The composting process takes place on a concrete platform, in uncovered piles, providing the necessary oxygen and moisture. The resulting fraction is temporary stored on the site, in order to be recovered. For the moment is temporary stored. The Operator intend to sell it. If it fails, the treated waste probably will be landfilled. The degree of stabilisation of waste is not monitored. (There is no legal requirement in this regard and it is not required by IPPC/IED permit requires this).
Chitila, Bucuresti	RO3 Macroregiunea.	264,474	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	There is a MBT on site, but only 37% of the quantity of municipal waste accepted on site enters the stage of mechanical treatment. The sorting process	Yes, MBT facility on site however it only treats 37% of the MSW accepted on site. However, due to the high degree of contamination of mixed collected waste, the quantity	The sorting process ensures the removal of recyclable waste (paper/cardboard, metal and plastic). There is also biological treatment – for the sorting installation output	Biological treatment process ensures treatment of waste having biodegradable contents in order to stabilise it. The resulting fraction (which represents

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					ensures the removal of recyclable waste (paper/cardboard, metal and plastic). However, due to the high degree of contamination of mixed collected waste, the quantity of waste sorted out which can be sent to recycling represents approx. 3% of the total quantity of waste that enters the plant. Approx. 44% of the total quantity of waste that enters the plant was co-incinerated in a cement plant. There is also biological treatment – for the sorting installation output and for green waste separate collected. Only 30% of the fraction resulting from mechanical treatment enters the biological treatment stage.	of waste sorted out which can be sent to recycling represents approx. 3% of the total quantity of waste that enters the plant. Approx. 44% of the total quantity of waste that enters the plant was co-incinerated in a cement plant.	and for green waste separately collected.	about 15% of the total quantity of waste entering the installation) is used as cover material on landfill. The biological treatment phase lasts for 3-4 weeks and occurs on a concrete platform, in covered piles, providing the necessary oxygen and moisture.
Glina	RO3 Macroregiunea.	217,276	Y	1 – No non-hazardous MSW received has been pre-treated to the required standard.	95% of the total amount of municipal waste accepted on site represents the waste collected directly from the generators, without	Only Mechanical sorting and segregation onsite. The sorting process ensures the removal of recyclable waste	The sorting process ensures the removal of recyclable waste (paper/cardboard, metal and plastic). No activities of biodegradable	No activities of biodegradable waste treatment are carried out on site in order to reduce the contents of

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					undergoing a previous process of pre-treatment. The only waste treatment operation applied on site is mechanical sorting – for municipal mixed collected waste. The sorting process ensures the removal of recyclable waste (paper/cardboard, metal and plastic). However, due to the high degree of contamination of mixed collected waste, the quantity of waste sorted out which can be sent to recycling represents approx.4% of the total quantity of waste that enters the plant. Approx. 9% of the total quantity of waste that enters the plant was co-incinerated in a cement plant.	(paper/cardboard, metal and plastic). There is no biological segregation or stabilisation prior to landfilling.	waste treatment are carried out on site in order to reduce the contents of biodegradable material. There is no stabilisation of biodegradable waste.	biodegradable material. There is no stabilisation of biodegradable waste.
Albota landfill	RO1 Macroregiunea.	143,831	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Onsite treatment of sources segregated materials, however there is no MBT for the pre-treatment of MSW. On the tipping face there is some manual segregation of the recyclable	No MBT of MSW. Onsite treatment of sources segregated materials, however there is no MBT for the pre-treatment of MSW. On the tipping face there	On the tipping face there is some manual segregation of the recyclable waste (especially PET) by approx. 30 people. This activity is done in order to reduce the	The biodegradable fraction separated from the source segregated materials is composted, however any biodegradable material within the

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					waste (especially PET) by approx. 30 people. This activity is done in order to reduce the landfilled waste volume and for landfill capacity saving. 870 tonnes of PET were selected in 2015.	is some manual segregation of the recyclable waste (especially PET) by approx. 30 people. This activity is done in order to reduce the landfilled waste volume and for landfill capacity saving. 870 tonnes of PET were selected in 2015.	landfilled waste volume and for landfill capacity saving. 870 tonnes of PET were selected in 2015.	MSW is not biostabilised prior to landfill.
SLOVAKIA								
Zohor (Bratislava region)	SKO Slovakia.	41,494	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No. Only about 30% of the no hazardous waste is pre-treated (i.e. 30% of 110,028 tonnes accepted).	No biological treatment of the organic fraction. MT Technology for sorting, shredding and production of Residual Derived Fuel is applied for MSW.	NA, any sorting is only to generate Residual Derived Fuel, the segregated materials are not sent to recycling or reprocessing. Materials used as fuel and organic fraction goes to the landfill.	NA. No biological stabilisation of the organic fraction. Materials used as fuel are separated and organic fraction goes to the landfill. Green waste (waste from parks, gardens and similar) is forbidden to landfill by legislation. Biodegradable waste accepted to the landfill is only as a part of mixed municipal waste and this waste is not stabilised. Biodegradable waste is also found in the waste after MBT and is not biostabilised prior to landfill.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
Nový Tekov (Kálná and Hronom, Nitra region)	SKO Slovakia.	46,489	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Most of the waste accepted to the landfill comes from household and national legislation does not require any pre-treatment of mixed municipal waste. The Slovak legislation requires separation at source of several waste streams from municipal waste (described in country report). No other pre-treatment is required.	NA. No pre-treatment of MSW prior to landfilling.	NA. No pre-treatment of MSW prior to landfilling. Slovak legislation requires separation at source of several waste streams from municipal waste (described in country report) - source segregated materials include paper, glass, metals, PET, PE foils, polystyrene. No garden waste can be landfilled. This is strictly controlled by Slovak Environmental Inspectorate under penalty. Food waste can be a part of a mixed municipal waste as not all municipalities must separately collect food waste.	No garden waste can be landfilled. This is strictly controlled by Slovak Environmental Inspectorate under penalty. Food waste can be a part of a mixed municipal waste as not all municipalities must separately collect food waste. Biodegradable waste that is still in the residual waste is not biostabilised prior to landfilling.
Marin Landfill (Kálnô - Marin, Žilina region)	SKO Slovakia.	18,890	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Most of the waste accepted to the landfill comes from household and national legislation does not require any pre-treatment of mixed municipal waste. The Slovak legislation requires separation at source of several waste	NA. No pre-treatment of MSW prior to landfilling.	NA. No pre-treatment of MSW prior to landfilling. Slovak legislation requires separation at source of several waste streams from municipal waste (described in country report) - source segregated materials include	No garden waste can be landfilled. This is strictly controlled by Slovak Environmental Inspectorate under penalty. Food waste can be a part of a mixed municipal waste as not all municipalities must separately

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					streams from municipal waste (described in country report). No other pre-treatment is required.		paper, glass, metals, PET, PE foils, polystyrene. No garden waste can be landfilled. This is strictly controlled by Slovak Environmental Inspectorate under penalty. Food waste can be a part of a mixed municipal waste as not all municipalities must separately collect food waste.	collect food waste. Biodegradable waste that is still in the residual waste is not biostabilised prior to landfilling.
Bzenica Landfill (Žiar and Hronom, Banská Bystrica region)	SKO Slovakia.	3,865	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	There is no pre-treatment onsite. About 60 % of all accepted waste (19,323 tonnes accepted) come from the pre-treatment facility (shredding, material sorting and metals removal). The pre-treatment does not include any biostabilisation of the organic fraction. All other MSW is not pre-treatment prior to landfill.	There is MT of some of the MSW off site, however there is no biostabilisation of the organic fraction prior to landfill. All other MSW is not pre-treated prior to landfill.	The 60% if MS that is pre-treated prior to landfill sorts materials and removes metals, however it does not segregate the organic fraction. Source segregation at home separates paper, plastics, glass, metals and green waste and it is forbidden to landfill source segregated materials.	Biodegradable waste must be separated in source and it is forbidden to landfill separated biodegradable waste by legislation. Any organic waste that is still in the MSW is not separated by pre-treatment and is not biostabilised prior to landfilling.
Raznany landfill	SKO Slovakia.	9,400	N	1 – No non-hazardous MSW received has been pre-treated to the required	Most of the waste accepted to the landfill comes from household and national legislation does not require any	NA. No pre-treatment of MSW prior to landfilling.	NA. No pre-treatment of MSW prior to landfilling. Slovak legislation requires separation at source of several	No garden waste can be landfilled. This is strictly controlled by Slovak Environmental Inspectorate under

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				standard.	pre0treatmet of mixed municipal waste. The Slovak legislation requires separation at source of several waste streams from municipal waste (described in country report). No other pre-treatment is required.		waste streams from municipal waste (described in country report) - source segregated materials include paper, glass, metals, PET, PE foils, polystyrene. No garden waste can be landfilled. This is strictly controlled by Slovak Environmental Inspectorate under penalty. Food waste can be a part of a mixed municipal waste as not all municipalities must separately collect food waste.	penalty. Food waste can be a part of a mixed municipal waste as not all municipalities must separately collect food waste. Biodegradable waste that is still in the residual waste is not biostabilised prior to landfilling.
SLOVENIA								
Leskovec	SLO Slovenia.	44,910	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, all waste received go through the shredding and separate the heavy and light fraction. Metals are removed on site, other recyclable materials are removed by treatment offsite.	MBT is not specifically mentioned, but all recyclable materials are removed from the residual waste before landfilling. Residual waste is tested to ensure that it meets the required limits for TOC, AT4 and caloric values.	Separated into heavy and light fraction, metals removed onsite all other recyclables are removed off site. Does not specify the recyclables that are removed off site.	Residual waste after treatment is tested for some parameters such as TOC AT4 and calorific value before landfilling. So disposed residual does not include recyclable materials and biodegradable material.
Špaja dolina	SLO Slovenia.	10,900	N	4 – All non-hazardous MSW received is likely	Yes. Treatment of mixed municipal waste is carried out	Yes. Snaga d.o.o. has environmental permit for	After treatment of mixed municipal (20 03 01) waste residual	Snaga d.o.o. has environmental permit for treatment

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				to be pre-treated to the required standard.	offsite. Treatment of mixed municipal waste is treated by an MBT facility. After treatment of mixed municipal waste residual waste (stabilised organic fraction) is disposed on the landfill.	treatment of mixed municipal waste on MBT facility by D9 and D8. After treatment residual waste is disposed on landfill Špaja dolina. Residual waste has waste evaluation which is accompanied by the analysis where it is written that parameters (TOC, AT4, caloric value) meet the limit values for landfilling. So disposed residual does not include recyclable materials and biodegradable material.	waste does not contain recyclable materials because they are removed in the treatment process (D9) by MBT facility of company Snaga d.o.o. Ljubljana. Residual waste has waste evaluation which is accompanied by the analysis where it is written that parameters (TOC, AT4, caloric value) meet the limit values for landfilling. So disposed residual does not include recyclable materials and biodegradable material. When the residual of mixed municipal waste is disposed on the landfill it does not contain recycled material.	of mixed municipal waste on MBT facility by D9 and D8. After treatment residual waste is disposed on landfill Špaja dolina. Residual waste has waste evaluation which is accompanied by the analysis where it is written that parameters (TOC, AT4, caloric value) meet the limit values for landfilling. So disposed residual does not include recyclable materials and biodegradable material. Residual of mixed municipal waste which is disposed on the landfill Špaja dolina after does not contain biodegradable material.
Unično novo	SL0 Slovenia.	13,488	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes. Onsite mechanical sorting of mixed MSW into paper, plastic, metal and glass, the light fraction (Substitute fuel) and heavy (organic) fraction.	Yes, MBT pre-treatment of mixed MSW. Paper, plastic, metal and glass separated from the light fraction (substitute fuel) and heavy (organic) fraction.	Yes, MBT pre-treatment of mixed MSW. Paper, plastic, metal and glass separated from the light fraction (substitute fuel) and heavy (organic) fraction. Organic	Yes, MBT pre-treatment of mixed MSW. Paper, plastic, metal and glass separated from the light fraction (substitute fuel) and heavy (organic) fraction.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
						Organic fraction is biostabilised before being disposed of.	fraction is biostabilised before being disposed of.	1) Heavy (organic) fraction of 20 03 01 in 1st paragraph with treatment by D8; In the hall for biological treatment heavy fraction of mixed municipal waste from the sorting procedure is treated by D8 (biostabilisation) - biological treatment which results stabilised organic fraction which are discarded by D1.
Globoko	SL0 Slovenia.	11,964	N	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes. Treatment of mixed municipal waste is carried out outside of the location of landfill Globoko. Treatment of mixed municipal waste for the company Komunala Trebnje is carried out on the MBT facility of company Kostak d.d. After treatment of mixed municipal waste residual waste (stabilised organic fraction) is disposed on the landfill Globoko.	Yes. Kostak d.d. has environmental permit for treatment of mixed municipal waste on MBT facility by D9 and D8. After treatment residual waste is disposed on landfill Globoko. Residual waste has waste evaluation which is accompanied by the analysis where it is written that parameters (TOC, AT4, caloric value) meet the limit values for landfilling. So	Treatment of mixed municipal waste (20 03 01) is carried out, outside of the location of landfill Globoko. Treatment of mixed municipal waste for the company Komunala Trebnje is carried out on the MBT facility of company Kostak d.d. After treatment of mixed municipal waste residual waste does not contain recyclable and biodegradable materials because they are removed in the treatment	After the process of treatment is finished on the MBT facility of company Kostak d.d. the residual waste (stabilised organic fraction) is brought back to the location of landfill Globoko, where the residual waste (stabilised organic fraction) is disposed on the landfill.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
						disposed residual does not include recyclable materials and biodegradable material. Residual waste after treatment 20 03 01 (stabilised organic fraction) which is disposed on landfill has the same code 20 03 01. This is written in the Decree on waste landfill.	process (D9, D8) by MBT facility Kostakd.d. (Specific materials removed were not available).	
Gajke	SL0 Slovenia.	12,403	Y	4 – All non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes. Onsite mechanical sorting of mixed MSW into paper, plastic, metal and glass, the light fraction (Substitute fuel) and heavy (organic) fraction.	Yes, MBT pre-treatment of mixed MSW. Paper, plastic, metal and glass separated from the light fraction (substitute fuel) and heavy (organic) fraction. Organic fraction is biostabilised before being disposed of.	Yes, MBT pre-treatment of mixed MSW. Paper, plastic, metal and glass separated from the light fraction (substitute fuel) and heavy (organic) fraction. Organic fraction is biostabilised before being disposed of.	Yes, MBT pre-treatment of mixed MSW. Paper, plastic, metal and glass separated from the light fraction (substitute fuel) and heavy (organic) fraction. 1) Heavy (organic) fraction of 20 03 01 in 1st paragraph with treatment by D8; In the hall for biological treatment heavy fraction of mixed municipal waste from the sorting procedure is treated by D8 (biostabilisation) - biological treatment which

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
								results stabilised organic fraction which are discarded by D1.
SPAIN								
Vertedero del Centro de Tratamiento de Residuos de Góngora	ES2 NORESTE.	100,816		2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No, some rejected materials from recycling plants is accepted however, these are packaging recycling and paper recycling, there is no evidence of biostabilisation.	NA, Source segregated recyclables are sorted, but no stabilisation and no pre-treatment of residual MSW. There is separate collection in place at least for paper and cardboard, light packaging, glass, bio-waste, bulky waste, WEEE, batteries, medicine waste and construction and demolition waste.	NA. No pre-treatment of residual MSW. There is separate collection in place at least for paper and cardboard, light packaging, glass, bio-waste, bulky waste, WEEE, batteries, medicine waste and construction and demolition waste.	NA. No biostabilisation of the biodegradable fraction of the MSW prior to landfilling. There is separate collection in place at least for paper and cardboard, light packaging, glass, bio-waste, bulky waste, WEEE, batteries, medicine waste and construction and demolition waste.
Vertedero de residuos no peligrosos de COGERSA	ES1 NOROESTE.	388,188	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No, some rejected materials from recycling plants is accepted however, these are packaging recycling and paper recycling, there is no evidence of biostabilisation.	NA, Source segregated recyclables are sorted off site, but no stabilisation and no pre-treatment of residual MSW.	NA. No pre-treatment of residual MSW.	NA. No biostabilisation of the biodegradable fraction of the MSW prior to landfilling. There is separate collection in place at least for paper and cardboard, light packaging, glass, bio-waste, bulky waste, WEEE, batteries, medicine waste and construction and demolition waste.
Depósito	ES3 COM. DE MADRID.	266,188	N	2 – Less than 50%	No, some rejected	NA, Source	NA. No pre-	NA. No

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
controlado de Alcalá de Henares				of non-hazardous MSW received is likely to be pre-treated to the required standard.	materials from recycling plants is accepted however, these are packaging recycling and paper recycling, there is no evidence of biostabilisation.	segregated recyclables are sorted, but no stabilisation and no pre-treatment of residual MSW.	treatment of residual MSW. There is separate collection in the area for paper, packaging and glass (apart from other fractions as batteries, medicines, WEEE, and textiles). There is no separate collection of food waste.	biostabilisation of the biodegradable fraction of the MSW prior to landfilling. There is separate collection in place at least for paper and cardboard, light packaging, glass, bio-waste, bulky waste, WEEE, batteries, medicine waste and construction and demolition waste.
VERTEDERO CONTROLADO DE LA AGRUPACION Nº1-HUESCA	ES2 NORESTE.	46,365	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard. The residual fraction is not treated, but other fractions are treated, as packaging waste, pruning waste and bulky waste.	No, MSW is not pre-treated. Some rejected materials from recycling plants is accepted however, these are packaging recycling and paper recycling, there is no evidence of biostabilisation.	NA, Source segregated recyclables are sorted off site, but no stabilisation and no pre-treatment of residual MSW.	NA. No pre-treatment of residual MSW.	NA. No biostabilisation of the biodegradable fraction of the MSW prior to landfilling. There is separate collection in place at least for paper and cardboard, light packaging, glass, bio-waste, bulky waste, WEEE, batteries, medicine waste and construction and demolition waste.
Vertedero de Gardelegi	ES2 NORESTE.	71,152	N	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required	Since June 2015 all the residual waste goes to the MBT plant, therefore almost all the waste is pre-treated. Rejects from the MBT plant contain dirty	Local MBT plant that has treated all municipal waste from Alva since June 2015 and the rejected waste is sent to landfill. MBT separates out	Local MBT plant that has treated all municipal waste from Alva since June 2015 and the rejected waste is sent to landfill. MBT separates out	The site accepts the 19 05 01 non-composted fraction of municipal and similar waste and 20 02 01 biodegradable waste without any

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
				standard.	plastic or cardboard that could not be sorted.	plastics, card, cartons, metals, aluminium and glass.	plastics, card, cartons, metals, aluminium and glass. The rejects from the MBT plant contain paper and plastic waste that could not be sorted in the MBT plant are sent to landfill. There is a separate collection for paper, packaging and glass, batteries, medicines, WEEE, textiles, park and garden waste, construction and demolition waste and bulky waste. There is also selective collection for bio-waste, but not in all the area of the landfill.	biostabilisation. Organic matter from the MBT plant is stabilised.
UNITED KINGDOM								
Greengairs	UKM Scotland.	290,880	N	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No. There is no pre-treatment onsite, it is a disposal site only. 55,537 tonnes of waste with EWC code starting with 19 was accepted in 2015. This accounts for 14% of all waste accepted (384,035 tonnes in 2015). Source segregation at houses include dry recycling (paper,	NA. Source segregation at households and residual waste accounts for 75% (289,635 tonnes) of waste disposed (EWC 200301, mixed Municipal waste). This waste is received directly from residual municipal collections where	No pre-treatment. However, source segregation at houses include dry recycling (paper, card, plastics, metals and glass) and food and garden segregation. Scotland have introduced legislation that requires all businesses to source	Na. No pre-treatment of residual MSW and stabilisation of the organic fraction. However organic fraction expected to be low due to source segregation of food waste by households and the requirement of food businesses to source segregation food

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					card, plastics, metals and glass) and food and garden segregation. 75% (289,635 tonnes) are accepted on to the site with EWC 200301 (mixed Municipal waste). This waste is received directly from residual municipal collections where households and commercial properties segregate dry recyclable and organic waste from residual waste.	households and commercial properties segregate dry recyclable and organic waste from residual waste.	segregate metal, plastic, glass, paper and card from Jan 2014. Food waste is also segregated by food businesses that produce over 5kg of food waste per week. There is also a ban on any metal, glass, paper, card and food that is collected separately for recycling from going to incineration or landfill by 2014.	waste if they produce 5 kg per week.
Tullyvar	UKNO Northern Ireland.	26,961	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No pre-treatment of residual waste onsite. Some waste accepted from other pre-treatment sites and from source segregated households. Some waste accepted is pre-treated at MRF before landfilling. 45% (32, 770 tonnes) are accepted on to the site with EWC 200301 (mixed municipal waste). This waste is from residual municipal collections where households and commercial properties segregate	NA. No MBT facility for pre-treatment of MSW before landfilling. Source segregation at homes and civic amenity site are the only facilities available.	Household source segregation in place, which include dry recycling such as paper, card, glass, plastics and metals, there are also source segregated garden waste, however there is no source segregated food waste.	No. Any organic fines from MRF are stabilised off site and tested prior to landfilling, however, there is no biostabilisation of the organic fraction within the residual waste and this is directed to landfill.

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					dry recyclable and organic waste from residual waste.			
Sutton Courtenay	UKJ South East, England.	70,796	Y	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Yes, Council collected residual waste from householders is sent to the MRF onsite. Cardboard, metal, glass, paper, wood, plastic is segregated and baled for reprocessing. Large bulky items or items that cannot be burnt are removed and landfilled. WEEE items are segregated and reprocessed. All remaining material including trommel fines (including any biodegradable fraction) are baled and sent as Residual Derived Fuel to the nearest EfW.	No MBT, but MRF and the biodegradable fraction is exported off site to EfW and so is not landfilled.	Yes, Cardboard, metal, glass, paper, wood, plastic is segregated and baled for reprocessing. Large bulky items or items that cannot be burnt are removed and landfilled. WEEE items are segregated and reprocessed. All remaining material including trommel fines (including any biodegradable fraction) are baled and sent as Residual Derived Fuel to the nearest EfW. Also source segregation to separate dry recyclables such as paper, card, plastics, metals and glass.	Biodegradable fraction is removed from the residual fraction within the Dirty MRF, all biodegradable fraction is baled and sent to a EfW facility and is not landfilled.
Newport Docks	UKL Wales.	27,000	Y	3 – Approximately 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	Bulky waste removed from residual waste prior being sent to EfW facility and civic amenity. No other pre-treatment of residual waste onsite. Some waste is	NA. No MBT facility for pre-treatment of MSW before landfilling. Bulky waste removed from residual waste, source segregation at homes and civic	Household source segregation in place, which include dry recycling such as paper, card, glass, plastics and metals, there are also source segregated	Household source segregation in place, which include dry recycling such as paper, card, glass, plastics and metals, there are also source segregated

Landfill	Nuts Region 1	Tonnes of MSW received in 2015 ¹⁶⁸	Pre-treatment in-situ (Y/N)	Level of compliance (1-4)	Is all waste pre-treated before disposal?	Is the most appropriate pre-treatment option is applied?	Is there adequate selection of waste streams?	Is there stabilisation of the organic fraction?
					accepted from other pre-treatment sites.	amenity site are the only facilities available.	food and garden waste.	food and garden waste. There is no biostabilisation of the organic fraction that remains in the residual prior to landfilling.
Hill and Moor	UKG West Midlands, England.	168,555	Y	2 – Less than 50% of non-hazardous MSW received is likely to be pre-treated to the required standard.	No pre-treatment of residual waste onsite. Some waste accepted from other pre-treatment sites.	NA. No MBT facility for pre-treatment of MSW before landfilling. Source segregation at homes and civic amenity site are the only facilities available.	Household source segregation in place, which include dry recycling such as paper, card, glass, plastics and metals, there are also source segregated garden waste, however there is no source segregated food waste.	Household source segregation in place, which include dry recycling such as paper, card, glass, plastics and metals, there are also source segregated garden waste, however there is no source segregated food waste. There is no biostabilisation of the organic fraction prior to landfilling.

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