



In-built Triggered Enzymes to Recycle Multi-layers: an Innovation for Uses in plastic-packaging

D8.5: Legislative review and recommendations report

WP8: Communication, dissemination and exploitation activities; assessment of legislative and economic factors

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Abbreviations

CEAP	Circular Economy Action Plan
CLP	Classification, labelling and packaging
ECHA	European Chemical Agency
EPR	Extended producer responsibility
MFF	Multiannual Financial Framework
SUPs	Single-use plastics
PPWD	Packaging and Packaging Waste Directive
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
WFD	Waste Framework Directive

Executive summary

A comprehensive set of legal obligations guides national and international rules of production, trade and end-of-life management of various materials, products, and most specifically packaging materials. Increased environmental awareness around the globe has led to fast-paced developments in the legislative field. Countries are enforcing existing rules and supplementing them with more thorough ones, with the aim of effectively addressing the issues of packaging and plastic waste.

TERMINUS must therefore stay abreast of the newest developments and likewise be able to anticipate upcoming changes. The success of this technology's implementation will heavily rely on the compliance with presently established rules, but also on its adaptability and conformity with upcoming revisions and additions to the legislation.

Within this report, a legislative review is presented, pertaining to TERMINUS, its technology and processing. The review focuses on the European legislation and the respective implications.

Deliverable report

Introduction

Fast-paced developments in the production, consumption and end-of-life management of packaging products, and more specifically plastics, have created a dynamic legislative environment in Europe and further. Increasing pressures from consumers to move towards more sustainable products, resource use and more effective waste management, has sped up the process of revisions of existing legislation and likewise initiated the creation of new ones.

Compliance with the extensive set of rules will be of outmost importance for the successful implementation of TERMINUS. The technology must be developed in a way that is mindful of currently established rules, but also to allow for adaptability and readiness when it comes to possible novelties in the legislative texts.

To facilitate the understanding of the applicable legislation and aid in anticipating upcoming steps, this report provides an overview of the relevant European legislation. It is important to note, however, that different Member States within the EU can have varying legal implications and that the legislation as laid out in this report is subject to changes throughout the duration of the project. To enable effective mitigation of risks in the legislative environment, project meetings (e.g. General Assemblies) shall include when necessary updates on the pertinent developments.

As far as the legislative outset in Europe is concerned, on 1 December 2019 the new European Commission entered offices. Its upcoming five-year term considers environment to be the key policy area, with measures such as the Waste Package, Green Deal and Single Use Plastics Directive, among others, as the focus for the upcoming months.

Many reviews are foreseen for 2020-2022, for the already existing legislation. Establishment of more ambitious targets, their enhanced enforcement, as well as sustainable production and consumption trends are some of the factors that will characterise the upcoming developments, playing a crucial role in Europe's transition towards circular economy.

Legislative review

The subsequent review will look to the various strategies, Communications, Directives, and Regulations, of relevance to TERMINUS and its technology. Following sections will consider the different measures individually, explaining their aim and scope, and where necessary, highlighting their implications for the project.

The report covers legislative texts which are not legally binding (i.e. Communications and Recommendations), as well as those that are (i.e. Directives and Regulations).

Non-binding legislative overview

European Plastic Strategy (Communication)

In January 2018, the European Commission's (EC) Communication on a European Strategy for Plastics in a Circular Economy¹ was published, presenting guiding measures for action at the EU level. The document presents a vision for a new circular economy for plastics, laying out a workplan and measures to turn this vision into a reality. Several of the policies envisaged in the workplan are today part of the EU legislative framework or are in the process of becoming law.

Within this vision, the European Union is to address the overarching problems related to plastics production, use and management, and turn these factors into opportunities for creating a smart, sustainable, innovative and competitive industry.

The Communication explains how the change from a linear to a circular economy can be achieved in the European Union, while the Annexes² to this Communication, propose the actions to do so. Specifically, Annex I looks to the list of future measures to implement the Strategy, whereas Annex II lists the measures recommended to the national authorities and the industry.

Improving the economics and quality of plastics recycling

The measures to implement the Strategy call for the manufacturing of durable plastic products, enabling for reuse and high-quality recycling, with the overall aim of ensuring all products placed on the market are either reusable or recyclable by 2030. Within this vision, changes in production and design would enable higher plastics recycling rates for all key applications to a point where, by 2030, more than half of plastics waste generated in Europe is recycled.

To enable the achievement of these targets, the strategy advocates for increased sorting and recycling capacity. With that, the Strategy highlights the need to improve the economics and quality of plastics recycling, through design for recyclability, by boosting the demand for recyclates, as well as by enhancing and harmonizing separate collection and sorting.

Curbing plastic waste and littering

Furthermore, the commitments focus on reduction of waste and litter in our environment, calling for measures at EU and national levels to reduce the unnecessary generation of waste, notably for

¹ A European Strategy for Plastics in a Circular Economy; COM (2018) 28, available online: https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF

² Annexes to COM (2018) 28, the European Strategy for Plastics in a Circular Economy; available online: https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_2&format=PDF

over-packaged and single-use items. This gave rise to the formulation of the Single-use Plastics Directive (SUPs Directive), explained in more detail below.

The Strategy looks as well to the rising problems of microplastics and calls for a clear framework for the handling of biodegradable plastics.

Driving investment and innovation towards circular solutions

In parallel, “creating an enabling framework for investment and innovation is central to implementing this strategy”. While the EU can play an enabling role, through EU research funding for instance, the actions from private and public sectors will be crucial in this field.

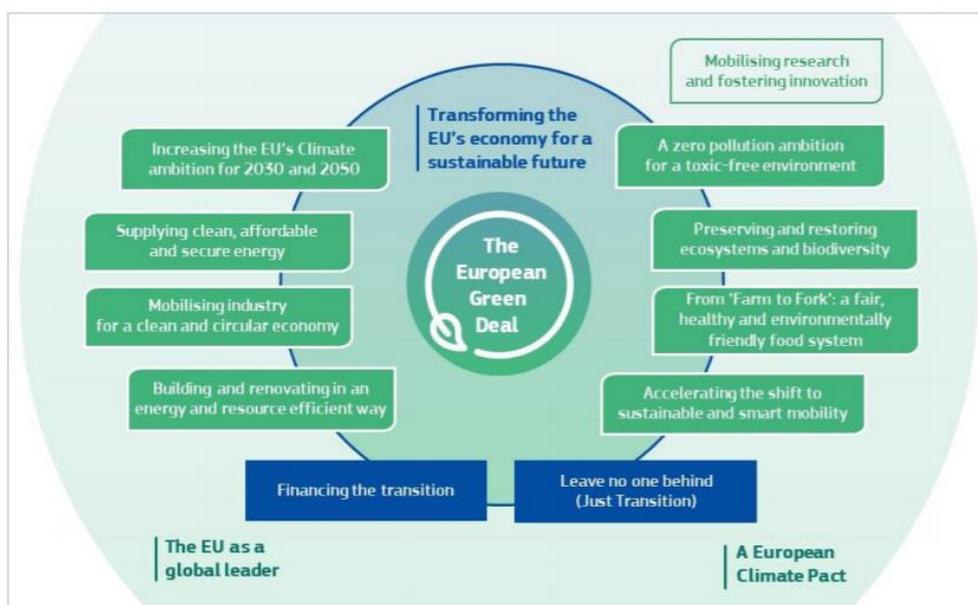
Harnessing global action

The Communication calls also for efforts to be made at the international level by creating international fora to address plastics littering in the marine environment.

With this Strategy, the Commission calls on all the value chain actors to endorse the laid out objectives, with the aim of realising the new reality for plastics and harnessing a global action towards a sustainable and circular economy for plastics.

The Green Deal (Communication)

The European Green Deal³ provides a roadmap and an ambitious package of measures for creating a sustainable and green European economy, with zero net emissions by 2050.



The European Green Deal⁴

The Communication represents the most ambitious package of measures that should enable European citizens and businesses to benefit from sustainable green transition. Measures

³ The European Green Deal, COM (2019) 640; available online: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

⁴ Source: The European Green Deal, COM (2019) 640

accompanied within the roadmap range from ambitiously cutting emissions, investing in cutting-edge research and innovation, to preserving EU's natural environment. Supported by investments in green technologies, sustainable solutions and new businesses, the Green Deal can be a new EU growth strategy. Involvement and commitment of the public and of all stakeholders is crucial to its success.

The roadmap calls for a sustainable product policy leading to significant waste reduction. In this sphere, Commission is to consider “legal requirements to boost the market of secondary raw materials with mandatory recycled content” and propose a model for the separate collection of waste. It also reinstates the requirement of having all packaging placed on the market be reusable or recyclable by 2030.

All the established and forthcoming European policies will have to contribute to the goals of the European Green Deal. Likewise, the Commission calls on the Member States to step up the efforts when it comes to the enforcement of legislation and policies.

In terms of the EU budget, the Commission has proposed a number of new revenue streams, also known as Own Resources, and one of these relies on the non-recycled plastic packaging waste.

Within the scope of the Green Deal, Commission has adopted a New Industrial Strategy for Europe and a new Circular Economy Action Plan, released on March 10 and 11, respectively. More information on these can be found below.

The Annex⁵ to this Communication provides an overview off all the actions included within the roadmap and their indicative timelines.

New Industrial Strategy for Europe (Communication)

The Commission’s Communication on A New Industrial Strategy for Europe⁶, highlights the need for a new industrial approach in Europe, which is “fit for the ambitions of today and the realities of tomorrow”. The strategy lays out a vision for the European industry, to be achieved by 2030 and beyond, and points to the necessary fundamental actions.

A set of fundamentals which are inter-linked and meant to reinforce each other guide this Strategy and the action-plan for its accomplishments:

- Creating certainty for the industry: a deeper and more digital single market
- Upholding a global level playing field
- Supporting industry towards climate neutrality
- Building a more circular economy
- Embedding a spirit of industrial innovation
- Skilling and reskilling
- Investing and financing the transition

⁵ Annexes to the European Green Deal; available online: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf

⁶ A New Industrial Strategy for Europe, COM(2020) 102; available online: https://ec.europa.eu/info/sites/info/files/communication-eu-industrial-strategy-march-2020_en.pdf

The Strategy bases its foundations on the complementary ecological and digital transitions, coupled with the competitiveness on global scale. New technologies, investments and innovation are vital in this transition. In such a transition, Europe aims to steer away from protectionists and distortive practices, and instead leverage the impact of its single market and through it establish global standards, while at the same time reinforce its industrial and strategic autonomy.

Circular Economy Action Plan (Communication)

The Circular Economy Action Plan (2020)⁷ was released on 11th March as a policy initiative foreseen by the Green Deal. It provides “a future-oriented agenda for achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens and civil society organisations.”

Within the Plan, a set of initiatives is presented, which in an interrelated way promote a strong and coherent policy framework for sustainable products, services and business models, leading to transformed consumption patterns that would eliminate the production of waste. Moreover, the indicated measures aim to reinforce the establishment of a well-functioning secondary raw materials market.

The overarching aim of the measures presented within the plan is to:

- Encourage the production of sustainable products across Europe and make it a norm; where the Commission aims to make the Ecodesign framework applicable to a broader range of products
- Empower consumers and public buyers; where the EC aims to revise the EU consumer law and therefore ensure better and more trustworthy information flow towards the citizens, while at the same time work on establishing the ‘right to repair’ and ensuring that companies can substantiate the environmental claims
- Address the resource-heavy sectors with high circularity potential, such as packaging and plastic; where the EC will review the Packaging and Packaging Waste Directive (see below), with the aim of reinforcing the essential requirements for packaging, and will likewise propose mandatory recycled content requirements and waste reduction measures, as well as address the release of microplastics into the environment
- Ensure less waste; where the EC will revise the necessary legislation, make a proposal for harmonised separate collection of waste, enhance the implementation of EPR schemes and address the waste exports, among others

Multiannual Financial Framework (MFF)

Within the proposal for the new MFF⁸, and to avoid losses to the EU budget caused by Brexit, the EC has proposed to include a tax on plastics to be collected from those Member States in relation to the amount of non-recyclable plastic packaging placed on the market.

⁷ Circular Economy Action Plan (2020): https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

⁸ More information: <https://www.consilium.europa.eu/en/policies/eu-budgetary-system/multiannual-financial-framework/>

The Own Resource⁹ contribution would be proportional to the quantity of non-recycled plastic packaging waste reported each year to Eurostat. Member States' contributions to the Own Resource would be calculated by applying a call rate of EUR 0,80/kg call rate to this quantity, which could bring around EUR 7 billion per year.

The estimated percentage of total revenue from the plastic packaging waste-based Own Resource in the Commission's proposal is 4% (7 billion euros) of the overall MFF.

Implications for the project

While the above-mentioned Strategies and Plans do not bear direct legal implications, they will give rise to a number of revisions to the already existing legislation and could lead to the creation of the new ones, as is the case for SUPs Directive.

The end of this reports contains a table with the envisaged upcoming reviews. Nonetheless, careful consideration should be given to any other developments in the legislative field.

Legally binding legislative overview

Waste Framework (Directive)

The "take-make-dispose" principle of the linear economy has led to growing waste generation across the world, and with it has identified the many flaws of the system. As part of Europe's measures towards creating a circular economy, the Waste Framework Directive (WFD)¹⁰, stipulates the measures to tackle this problem. Considered to be the umbrella framework for waste legislation, it was revised in summer 2018 (by Directive 2018/851) under with the so-called revision of the Waste Package, that includes revised Directives targeting packaging and packaging waste, end-of-life vehicles, batteries, waste from electrical and electronic appliances, landfill, among others.

As specified in the amended Article 1, this Directive "lays down measures to protect the environment and human health by preventing or reducing the generation of waste, the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use, which are crucial for the transition to a circular economy and for guaranteeing the Union's long-term competitiveness."

Waste management as stipulated in Article 4 is guided by the waste-hierarchy, depicted as follows: 1) prevention, 2) re-use, 3) recycling, 4) recovery and 5) disposal. Member States are instructed to use economic instruments and incentives to support the application of the waste-hierarchy principles.

⁹ Unlike national budgets the Union is not able to borrow. Instead it relies on financing through 'Own Resources'. There are three main types of own resources today: 1. contributions from Member States based on their income level measured by gross national income (GNI), 2. contributions based on value added tax (VAT), 3. customs duties collected at the external borders of the Union.

¹⁰ *OJ L 312, 22.11.2008*, p. 3. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives; consolidated version is available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008L0098-20180705&from=EN>

Introduced with the 2018 revision, for Member States that opt to implement extended producer responsibility (EPR) schemes, Article 8a of Directive lays out the general minimum requirements for doing so. In such a case the Member State would have to ensure that contributions for products put on the market by the producer should cover (not applicable to the EPR schemes established under Directive 2000/53/EC¹¹, 2006/66/EC¹², 2012/19/EU¹³):

- “costs of separate collection of waste and its subsequent transport and treatment, including treatment necessary to meet the Union waste management targets, and costs necessary to meet other targets and objectives as referred to in point (b) of paragraph 1, taking into account the revenues from re-use, from sales of secondary raw material from its products and from unclaimed deposit fees,
- costs of providing adequate information to waste holders in accordance with paragraph 2,
- costs of data gathering and reporting in accordance with point (c) of paragraph 1.”

Furthermore, the costs should “not exceed the costs that are necessary to provide waste management services in a cost-efficient way. Such costs shall be established in a transparent way between the actors concerned.”¹⁴

In addition, Article 14 stipulates:

1. “In accordance with the polluter-pays principle, the costs of waste management, including for the necessary infrastructure and its operation, shall be borne by the original waste producer or by the current or previous waste holders.
2. Without prejudice to Articles 8 and 8a, Member States may decide that the costs of waste management are to be borne partly or wholly by the producer of the product from which the waste came and that the distributors of such product may share these costs.”

Consequently, in Members States where such schemes are applied, manufacturers taking up TERMINUS technologies would have to contribute, in accordance with set individual rules.

Article 11 outlines the principles for the preparing for re-use and recycling of waste and provides for specific targets to be attained in the EU.

According to the WFD, Member States should take necessary steps to achieve:

- (a) “by 2020, the preparing for re-use and the recycling of waste materials such as at least paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households, shall be increased to a minimum of overall 50 % by weight”

¹¹ *OJ L 269, 21.10.2000*, p. 34–43, Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles; consolidated version is available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02000L0053-20180704&from=EN>

¹² *OJ L 266, 26.9.2006*, p.1, Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators; consolidated version is available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006L0066-20180704>

¹³ *OJ L 197, 24.7.2012*, p. 38–71, Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE); consolidated version is available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704>

¹⁴ See note 11

With the amendments included in Directive (EU) 2018/851¹⁵, Member States are to set up separate collection for at least paper, metal plastic and glass, while the targets are extended as follows:

- (c) “by 2025, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 55 % by weight;
- (d) by 2030, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 60 % by weight;
- (e) by 2035, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 65 % by weight.”

By 31 December 2028, the EC is to review the target for the re-use and recycling of municipal waste.

Other aspects under the scope of WFD include by-products, end-of-waste status, prevention of waste, recovery, rules on the calculation of the attainment of the above-mentioned targets, hazardous waste, waste oils, bio-waste, issue of permits, minimum standards, etc.

Implications for the project

As multi-layer and multi-material packaging presents a significant share of packaging placed on the European market and therefore of the generated waste, TERMINUS technology can greatly contribute towards the achievement of the above-mentioned targets. By improving the design of these packaging materials, TERMINUS will aid in the efforts of waste prevention. However, extended producer responsibility principles and the cost of end-of-life management, could fall onto the manufacturers of packaging using TERMINUS technology, as outlined in the Directive.

Packaging and Packaging Waste (Directive)

Packaging and its various forms exhibit functionalities that are highly beneficial for the preservation of the packaged goods. Offering increased protection during transportation and handling, prolonging shelf-life and ultimately helping reduce food waste, are among the qualities describing packaging, which consequently its increased use over the years.

However, to ensure sustainable production, handling and post-use treatment and to harmonise the varying national measures, Directive 94/62/EC¹⁶, on packaging and packaging waste (PPWD), was adopted.

All packaging placed on the market and all the generate packaging waste fall under the scope of this Directive. Prevention of packaging waste and in addition reuse, recycling and recovery, all with the aim of reduction of disposed waste, are the guiding principles for this legal text.

Furthermore, and in addition to above-mentioned principles, the Directive sets specific targets for the recycling and recovery of packaging waste. Following the revision of the text, Directive (EU)

¹⁵ Included in the consolidated version of the WFD, see note 11

¹⁶ *OJ L 365, 31.12.1994, p. 10*, European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste; consolidated version is available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01994L0062-20150526&from=EN>

2018/852¹⁷, Article 6 stipulates that the Member States must take the necessary measures to attain the following, in order to comply with the Directive:

- “(f) no later than 31 December 2025 a minimum of 65 % by weight of all packaging waste will be recycled;
- (g) no later than 31 December 2025 the following minimum targets by weight for recycling will be met regarding the following specific materials contained in packaging waste:
 - (i) 50% of plastic;
 - (ii) 25% of wood;
 - (iii) 70% of ferrous metals;
 - (iv) 50% of aluminium
 - (v) 70% of glass
 - (vi) 75% of paper and cardboard;
- (h) no later than 31 December 2030 a minimum of 70 % by weight of all packaging waste will be recycled;
- (i) no later than 31 December 2030 the following minimum targets by weight for recycling will be met regarding the following specific materials contained in packaging waste:
 - (i) 55% of plastic;
 - (ii) 30% of wood;
 - (iii) 80% of ferrous metals;
 - (iv) 60% of aluminium
 - (v) 75% of glass
 - (vi) 85% of paper and cardboard;”

Essential Requirements

Under Article 9, PPWD specifies that all packaging can be placed on the market only if it adheres to the essential requirements, which are specified in Annex II of the Directive.

With respect to the requirements on the manufacturing and composition of the packaging, the following is required:

- “Packaging shall be so manufactured that the packaging volume and weight be limited to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packed product and for the consumer.
- Packaging shall be designed, produced and commercialized in such a way as to permit its reuse or recovery, including recycling, and to minimize its impact on the environment when packaging waste or residues from packaging waste management operations are disposed of.

¹⁷ See note 17

- Packaging shall be so manufactured that the presence of noxious and other hazardous substances and materials as constituents of the packaging material or of any of the packaging components is minimized with regard to their presence in emissions, ash or leachate when packaging or residues from management operations or packaging waste are incinerated or landfilled.”

Following the amendments to Article 9, the EC is to submit a report, examining the feasibility of reinforcing the essential requirements, by 31 December 2020. With this report, the EC is working on the amendments to the essential requirements, as Article 9 specified, with the aim of “improving design for reuse and promoting high quality recycling, as well as strengthening their enforcement”.

As outlined in the Plastics Strategy, the review of the essential requirements has as an objective to ensure that all plastic packaging, placed on the EU market will be made reusable or recyclable, by 2030.

PPWD further outlines measures for prevention of waste, reuse and recovery of packaging, waste collection systems, marking of packaging, standardisation, presence of heavy metals in packaging and measures on reporting on the achievement of the targets¹⁸, among others.

Implications for the project

However, for the purposes of TERMINUS close attention must be paid to the Directive’s implications concerning set recycling and recovery targets, as well as the essential requirements for the manufacturing and composition of packaging. As for the targets set out in the WFD, TERMINUS technology can greatly contribute towards the achievement of those in PPWD. However, the revision of the targets, to be completed by 31 December 2024, and possible amendments to the essential requirements must be anticipated by the consortium, to ensure full compliance with the Directive.

Single-use Plastics (Directive)

The Directive “on the reduction of the impact of certain plastic products on the environment”¹⁹ (SUPs Directive) entered into force on 2 July 2019. The objective of this directive is to limit the adverse effects of certain plastic products onto the environment, and especially the marine environment and human health. SUPs Directive shall prevail over WFD and PPWD, where the principles conflict among the three.

The Annex to the Directive lists the single-use plastic products under to scope of this Directive. The list of products provided within the Annex will be subject to consumption reductions, restrictions on placing on the market, product requirements, marking requirements, EPR, separate collection and/or

¹⁸ *OJ L 112*, 26.4.2019, p. 26–46, Commission Implementing Decision (EU) 2019/665 of 17 April 2019 amending Decision 2005/270/EC establishing the formats relating to the database system pursuant to European Parliament and Council Directive 94/62/EC on packaging and packaging waste; available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D0665&from=GA>

¹⁹ *OJ L 155*, 12.6.2019, p. 1–19, Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment; available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0904&from=EN>

awareness raising measures. According to the Annex, paints, inks and adhesives are not covered by this Directive.

As defined in Article 3, a single use plastic product “means a product that is made wholly or partly from plastic and that is not conceived, designed or placed on the market to accomplish, within its life span, multiple trips or rotations by being returned to a producer for refill or re-used for the same purpose for which it was conceived”.

The EC is developing guidelines to include examples of what is to be considered as SUPs under the scope of this Directive. These guidelines are to be finalised by 3 July 2020.

Implications for the project

With respect to the TERMINUS technology, implications explained below are valid under this Directive.

Food containers

- Consumption reduction, where MS must take action to significantly reduce the consumption of these products, in a sustainable manner and where such measures must achieve a quantitative consumption reduction by 2026, in comparison to 2020. (Article 4)
- Extended producer responsibility, where producers must cover the costs as laid out in the WFD and PPWD, as well as costs concerning awareness raising, waste collection and costs of cleaning litter and where these do not exceed the costs that are necessary for the execution of such services. (Article 8(2))
- Awareness raising, where measures should be taken to inform citizens and establish incentives for responsible consumer behaviour and where information should be shared on available re-usable alternatives, waste management options, but also on the adverse effects that littering, and improper waste disposal pose. (Article 10)

For these specific measures, the following products are included:

“Food containers, i.e. receptacles such as boxes, with or without a cover, used to contain food which:

- (a) is intended for immediate consumption, either on-the-spot or take-away,
- (b) is typically consumed from the receptacle, and
- (c) is ready to be consumed without any further preparation, such as cooking, boiling or heating,

including food containers used for fast food or other meal ready for immediate consumption, except beverage containers, plates and packets and wrappers containing food.”

Packets and wrappers

For “packets and wrappers made from flexible material containing food that is intended for immediate consumption from the packet or wrapper without any further preparation” measures on EPR and awareness raising, as explained above, shall apply.

By 3 July 2021 MS are to define the measures intended for the consumption reduction targets. These would be made publicly available and integrated into the reporting, as explained under Article 13, which MS are obliged to submit for each calendar year.

Based on the regular reporting and evaluations over the years, the overall directive is to be reviewed by 3 July 2027. This evaluation should among other aspects include the review of items listed in the Annex, as well as assessments on the new consumption patterns, business models with respect to reusable items and the change of materials used in single-use plastics products.

Food contact (Regulation)

As packaging containing food will be among the main outlets for TERMINUS technology, strict food-contact legislation will have to be respected.

When it comes to food safety, all policies and measures reflect on the entire food chain, from production to consumption.

In Europe, Directive 2001/95/EC²⁰ ensures high and uniform product safety, while Regulation (EC) 178/2002²¹ lays down the rules of food law and procedures for food safety, which additionally established the European Food Safety Authority, as the reference body for the authorisations of food contact materials.

Moreover, Regulation (EC) No 1935/2004²² is the framework Regulation on the materials and articles intended to come into contact with food. It stipulates the materials and articles should be manufactured according to good manufacturing practices²³, and ensure that no transfer of constituents to food occurs during the envisaged use, which can put in jeopardy human health, cause unwanted changes to the composition of the food or deteriorate its characteristics (Article 3). Likewise, the Regulation sets out the rules for the authorization of substances in the manufacture of materials, the procedures for inspection and control, the labelling of materials and objects, the written declaration of conformity, traceability and protective measures.

New substances to be used to manufacture plastic food contact materials can be added to the positive list²⁴ via the following procedure:

- Applicant submits an application to the competent authority of a MS by providing a technical dossier, containing the information specified in the guidelines for the safety assessment of a food contact additive and a summary of the technical dossier

²⁰ *OJ L 11, 15.1.2002, p. 4–17*, Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety; Latest consolidated version is available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02001L0095-20100101&from=EN>

²¹ *OJ L 31, 1.2.2002, p. 1–24*, Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02002R0178-20190726&from=EN>

²² *OJ L 338, 13.11.2004, p. 4–17*, Regulation (EC) No 1935/2004 of the European Parliament and of the Council of 27 October 2004 on materials and articles intended to come into contact with food; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02004R1935-20210327&from=EN>

²³ To guide the good manufacturing practices the Commission Regulation (EC) No 2023/2006 was established; *OJ L 384, 29.12.2006, p. 75–78*, Commission Regulation (EC) No 2023/2006 of 22 December 2006 on good manufacturing practice for materials and articles intended to come into contact with food; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R2023-20080417&from=EN>

²⁴ https://www.chemsafetypro.com/Topics/Food_Contact/Positive_List_of_Food_Contact_Additives_in_EU.html

- The national contact points then forward the application to the European Food Safety Authority (EFSA). EFSA checks the validity of the application according to the EFSA Guidance and makes a proposal

Furthermore, specific rules guide the use of plastic materials²⁵ and recycled plastics²⁶, in food contact applications.

Implications for the project

TERMINUS will be subject not only to the above-mentioned regulation, but also to any specific Member States legislation, and in case where technology will be applied outside of Europe, to the legislation applicable in those specific regions.

Detailed implications of food contact regulation, the safe use of materials, as well as the rules under REACH Regulation and the Biocides Regulation, as applicable to this project will be evaluated in the upcoming deliverable: “Report on regulatory aspects and food contact safety”.

Furthermore, useful links section at the end of this report includes references to some of the applicable legislation in this domain.

Use of chemicals and substances

The use of chemicals and substances is strictly monitored in Europe. Overseeing the sustainable management of chemicals, the European Chemical Agency (ECHA)²⁷ is central reference point.

The overarching principles guiding the safe use of chemicals in Europe are lined out in the Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)²⁸ and Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP)²⁹. More comprehensive review on the two is provided below.

REACH (Regulation)

The objective of the REACH Regulation is to harbour a safe use of chemicals in Europe, while at the same time ensure the competitiveness of the European chemicals industry and safeguard human health and the environment. REACH applies to all chemical substances.

²⁵ *OJ L 12*, 15.1.2011, p. 1–89, Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02011R0010-20190829&from=EN>

²⁶ *OJ L 86*, 28.3.2008, p. 9–18, Commission Regulation (EC) No 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods and amending Regulation (EC) No 2023/2006; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008R0282-20151026&from=EN>

²⁷ More information on ECHA, its responsibilities and organisation can be found here: <https://echa.europa.eu/home>

²⁸ *OJ L 396*, 30.12.2006, p. 1, Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1907-20190702&from=en>

²⁹ *OJ L 353*, 31.12.2008, p. 1–1355 Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation); consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008R1272-20190726&from=en>

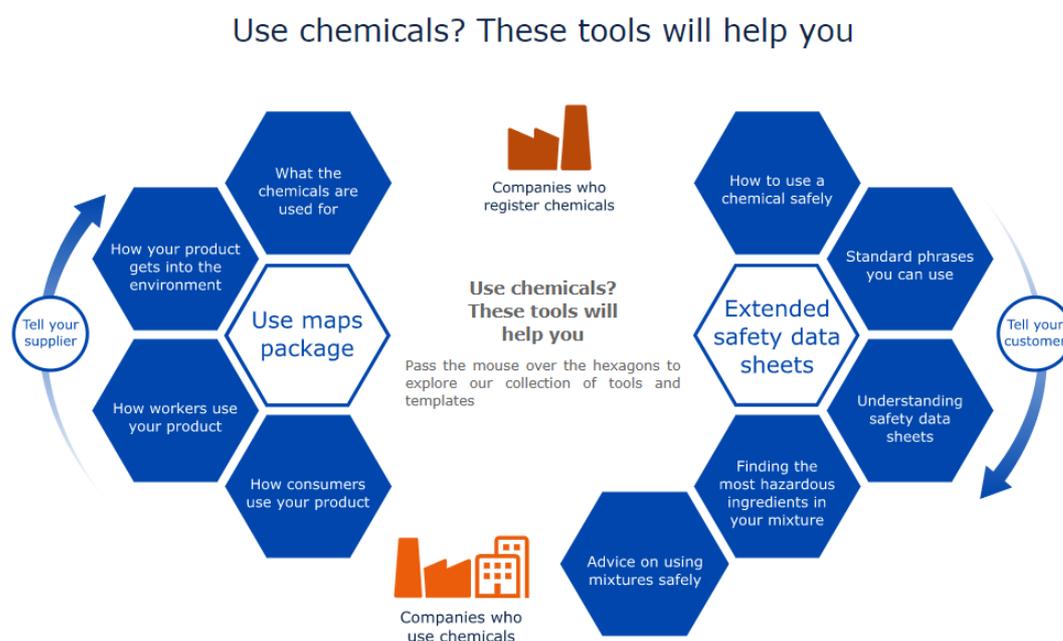
To comply with the measures lined out in the Regulation, companies must identify and manage risks entailed in the use of substances they manufacture, demonstrating to ECHA their safety but also appropriately informing consumers on the same.

The Regulation establishes the procedures for collecting and assessing the information on such chemicals. Following a company's registration of a given substance, ECHA is tasked with evaluating the given registration. Together with Member States authorities, specialised ECHA committees assess any risks a given substance can pose, and based on such assessment authorities can ban or restrict from use the substances in question, or alternatively constraint their use to prior authorisations.

Different actors in the value chain, taking up TERMINUS technology, will have different roles under REACH, and the effective flow among all of them will ensure optimal availability of the information.

ECHA website provides extensive information on REACH, its implications and the different elements that comprise this Regulation³⁰. Among this information, obligations for the different value chain actors are described³¹.

Furthermore, the following diagram depicts the flow of information to be followed and with its interactive functionalities³² explains the different available tools for the compliance with REACH:



³⁰ <https://echa.europa.eu/regulations/reach/understanding-reach>

³¹ <https://echa.europa.eu/communication-in-the-supply-chain>

³² For interactive functionalities follow the provided source link: <https://echa.europa.eu/communication-in-the-supply-chain-infographic>

Classification, labelling and packaging of substances and mixtures (CLP) (Regulation)

Much like REACH, CLP aims to ensure the protection of human health and the environment, when it comes to the use of chemicals, but further than that it allows for the free movement of these chemicals, given that they comply with all the necessary legislation. CLP is applicable in all the Member States and for all industries.

The primary aim of CLP is to determine if a substance exhibits hazardous properties, and where this is the case to ensure proper classification, labelling and packaging of it.

Given that one of the primary intended applications for TERMINUS technology will be food-contact packaging, hazardous or toxic substances are not expected to be used. The picture below presents an overview of the pictograms used in CLP classifications.

Extensive information on the Regulation, its implications and obligations can be found on the ECHA website³³.



CLP Pictograms³⁴

³³ <https://echa.europa.eu/regulations/clp/understanding-clp>

³⁴ Source: <https://echa.europa.eu/regulations/clp/clp-pictograms>

Landfill of waste (Directive)

Directive 1999/31/EC³⁵ on the landfill of waste defines the different categories of waste and likewise divides the types of landfills into classes. Its objective is to prevent and reduce the effect landfills have on the environment and the human health and for that a standard procedure for the acceptance of waste into landfills is established. Furthermore, the Directive calls for a progressive reduction of landfilling of recyclable waste.

With the most recent revision³⁶ of the Directive, Member States are obliged to ensure that waste collected for re-use and recycling is not sent to landfills and specifically that as of 2030 no recyclable or waste suitable for recovery is accepted in the landfills.

Member States are additionally obliged to ensure that no more than 10% of the municipal waste is landfilled by 2035.

Implications for the project

Although this Directive has no direct impact on the manufacturing or consumption of TERMINUS applications, it will facilitate the collection of these materials. The efforts to reduce the amount of recyclable waste going to landfills will be very beneficial in ensuring that TERMINUS packaging gets collected, sorted and recycled.

EU Taxonomy (Regulation)

The Taxonomy Regulation provides for a general framework that is meant to allow for the progressive development of an EU-wide classification system for environmentally sustainable economic activities.

While the Regulation does not provide an exhaustive list of environmentally sustainable economic activities, it does define what qualifies as such an activity. This is intended to help investors allocate funds to green activities.

The Regulation is assisted by the EU Technical Expert Group on Sustainable Finance (TEG)³⁷. Whereas the Regulation has not yet been published, it is possible to define key concepts for the industry of plastic waste recycling, by extrapolating information from these final Reports. The TEG report, in fact, provides information on the manufacturing of plastics in primary form, from recycled or renewable feedstock.

³⁵ *OJ L 182, 16.7.1999, p. 1–19*, Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste; consolidated version available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01999L0031-20180704&from=EN>

³⁶ Amendment included under Directive (EU) 2018/850, included in the consolidated version under note 43

³⁷ EU Technical Expert Group on Sustainable Finance, Taxonomy Technical Report, available online at: https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf

Manufacture of plastics in primary form shall comply with at least one of the following three criteria and when relevant with the additional criteria, reported below:

- 1) The plastics in primary form shall be manufactured by mechanical recycling.
- 2) The plastics in primary form shall be manufactured by chemical recycling.³⁸
- 3) Manufacture of plastics in primary form shall be wholly or partially derived from renewable feedstock and the carbon footprint of the plastics in primary form, manufactured wholly or partially from renewable feedstock shall be lower when compared to the carbon footprint of the plastics in primary form manufactured with fossil fuel feedstock.

Additional criteria are laid down to take into consideration land use, protection of forests and exclude new greenfield oil palm three plantation. For more details, see page 227 of TEG REPORT.

Next steps

The taxonomy for climate change mitigation and climate change adaptation should be established by the end of 2020, in order to ensure its full application by end of 2021. For the four other objectives, the taxonomy should be established by the end of 2021 for an application by the end of 2022.

Implications for the project

TERMINUS packaging and packaging in general, could be subject to the implication lined out within the EU Taxonomy Regulation. This could give rise to establishment of additional EPR schemes or increased repartitions for the packaging manufacturers.

³⁸ When applying criterion 2, the carbon footprint of the plastics in primary form, manufactured by chemical recycling, shall be lower when compared to the carbon footprint of the plastics in primary form manufactured with fossil fuel feedstock. The carbon footprint shall be calculated in accordance with ISO 14067:2018 and validated by a third party.

Conclusion and recommendations

The given report presents some of the key legislative principles, to which the TERMINUS technology must adhere. It is of outmost importance to note that this list is non-exhaustive, in the sense that Member States individual legislation might be of overarching importance in certain instances and in the sense that the reviewed legislation is subject to further amendments.

Careful consideration is due to the identified implications. Furthermore, for the optimum implementation of the project, the consortium should regularly review legislative novelties, assess the potential risks this would bear and establish mitigation efforts for the same. With that, the following table presents the currently foreseen revisions to be considered.

Upcoming legislative revisions and deadlines

Landfill of Waste Directive	By 31 December 2024, EC to revise the 10% threshold for landfilling operations by 2035
Plastic Strategy	EC guidance on the eco-modulation of EPR fees (ongoing meetings) Lifecycle impacts of alternative feedstocks for plastic production (ongoing meetings) Guidelines on separate collection and sorting of waste (ongoing meetings)
Packaging and Packaging Waste Directive (PPWD)	By 31 December 2020, EC to reinforce essential requirements (ongoing meetings) By 27 November 2021, EC to present a report on the effectiveness of reduction measures for plastic carrier bags By 31 December 2024, EC to review the recycling targets, re-use targets, and the data on reusable packaging (provided also by WFD)
Single Use Plastics Directive (SUP)	By 3 January 2021, EC to adopt implementing acts laying down the format for reporting data and information By 3 July 2020, EC to adopt an implementing act laying down the methodology for the calculation and verification of the separate collection targets By 3 July 2020, EC to publish guidelines including examples of what is to be considered a single-use plastic product By 1 January 2022, EC to adopt implementing acts on rules for the calculation and verification of the recycled-content target in beverage bottles By 3 July 2027, EC to review the Directive
Waste Shipment Regulation (WSR)	By 31 December 2020, EC might submit a legislative proposal for revision/recast, taking into account, inter alia, the reports from the MS (ongoing meetings) + review of the annexes to reflect the changes at the UN level
Waste Framework Directive (WFD)	By 5 January 2020, ECHA Database (ongoing meetings) By 5 January 2020, EC guidelines for MS for separate collection of hazardous waste from households (ongoing meetings) By 31 December 2023, bio-waste to be separated and recycled at source, or collected separately and not mixed (ongoing meetings) By 31 December 2024, EC to establish recycling targets for C&D, textile waste, commercial waste, non-hazardous industrial waste and other waste streams and municipal waste and municipal bio-waste By 31 December 2024, EC to assess the disposal operations of Annex I, with a view of introducing possible restrictions and disposal reduction targets By 1 January 2025, MS to set up fractions for separately collected hazardous waste to avoid contamination By 31 December 2028, EC to review the 2035 municipal waste targets

Useful links

European Plastics Strategy COM(2018) 28	https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF Annexes: https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_2&format=PDF
The European Green Deal COM(2019) 640	https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf Annex: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf
The New Industrial Strategy COM(2020) 102	https://ec.europa.eu/info/sites/info/files/communication-eu-industrial-strategy-march-2020_en.pdf
New Circular Economy Action Plan	https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf Annex: https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan_annex.pdf
Multiannual Financial Framework	https://www.consilium.europa.eu/en/policies/eu-budgetary-system/multiannual-financial-framework/
Waste Framework Directive (consolidated version) Directive 2008/98/EC	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008L0098-20180705&from=EN Includes the following amendments: Regulation (EU) No 1357/2014, Directive (EU) 2015/1127, Regulation (EU) 2017/997 and Directive (EU) 2018/851
Packaging and Packaging Waste Directive (consolidated version) Directive 94/62/EC	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01994L0062-20150526&from=EN Includes the following amendments: Regulation (EC) No 1882/2003, Directive 2004/12/EC, Directive 2005/20/EC, Regulation (EC) No 219/2009, Directive 2013/2/EU and Directive (EU) 2015/720
Single-use Plastics Directive Directive (EU) 2019/904	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0904&from=EN
Directive on general product safety (consolidated version) Directive 2001/95/EC	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02001L0095-20100101&from=EN Includes the following amendments: Regulation (EC) No 765/2008 and Regulation (EC) No 596/2009
Regulation on general principles and requirements of food law (consolidated version)	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02002R0178-20190726&from=EN Includes the following amendments: Regulation (EC) No 1642/2003, Regulation (EC) No 575/2006, Regulation (EC) No 202/2008, Regulation

Regulation (EC) No 178/2002	(EC) No 596/2009, Regulation (EU) No 652/2014, Regulation (EU) 2017/228 and Regulation (EU) 2019/1243
Regulation on materials and articles intended to come into contact with food (consolidated version) Regulation (EC) No 1935/2004	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02004R1935-20210327&from=EN Includes the following amendments: Regulation (EC) No 596/2009 and Regulation (EU) 2019/1381
Regulation on good manufacturing practice for materials and articles intended to come into contact with food (consolidated version) Regulation (EC) No 2023/2006	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R2023-20080417&from=EN Includes the following amendment: n Regulation (EC) No 282/2008
Positive List of Food Contact Substances in EU	Positive List of Food Contact Substances in EU
Regulation on plastic materials and articles intended to come into contact with food (consolidated version) Regulation (EU) No 10/2011	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02011R0010-20190829&from=EN Includes the following amendments: Regulation (EU) No 321/2011, Regulation (EU) No 1282/2011, Regulation (EU) No 1183/2012, Regulation (EU) No 202/2014, Regulation (EU) No 865/2014, Regulation (EU) 2015/174, Regulation (EU) 2016/1416, Regulation (EU) 2017/752, Regulation (EU) 2018/79, Regulation (EU) 2018/213, Regulation (EU) 2018/831, Regulation (EU) 2019/37, Regulation (EU) 2019/988 and Regulation (EU) 2019/1338 of 8 August 2019
Summary and Guidance on Regulation (EU) No 10/2011	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3AAsa0028
Administrative Guidance for the preparation of applications for the safety assessment of substances to be used in plastic Food Contact Materials	https://efsa.onlinelibrary.wiley.com/doi/pdf/10.2903/sp.efsa.2017.EN-1224
Regulation on recycled plastic materials and articles intended to come into contact with foods (consolidated version) Regulation (EC) No 282/2008	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008R0282-20151026&from=EN Includes the following amendment: Regulation (EU) 2015/1906
Regulation concerning the making available on the market and use of biocidal products (consolidated version)	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02012R0528-20140425&from=EN Includes the following amendments: Regulation (EU) No 736/2013, Regulation (EU) No 837/2013 and Regulation (EU) No 334/2014

Regulation (EU) No 528/2012	
REACH Regulation (consolidated version) Regulation (EC) No 1907/2006	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1907-20190702&from=en
Understanding REACH Regulation – ECHA website	https://echa.europa.eu/regulations/reach/understanding-reach
CLP Regulation (consolidated version) Regulation (EC) No 1272/2008	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008R1272-20190726&from=en Includes the following amendments: Regulation (EC) No 790/2009, Regulation (EU) No 286/2011, Regulation (EU) No 618/2012, Regulation (EU) No 487/2013, Regulation (EU) No 517/2013, Regulation (EU) No 758/2013, Regulation (EU) No 944/2013, Regulation (EU) No 605/2014, Regulation (EU) 2015/491, Regulation (EU) No 1297/2014, Regulation (EU) 2015/1221, Regulation (EU) 2016/918, Regulation (EU) 2016/1179, Regulation (EU) 2017/776, Regulation (EC) No 1272/2008 and Regulation (EU) 2019/1243
Understanding CLP Regulation – ECHA website	https://echa.europa.eu/regulations/clp/understanding-clp
Directive on the landfill of waste (consolidated version) Directive 1999/31/EC	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01999L0031-20180704&from=EN Includes the following amendments: Regulation (EC) No 1882/2003, Regulation (EC) No 1137/2008, Directive 2011/97/EU and Directive (EU) 2018/850