MSc Program
Environmental Technology & International Affairs

Governance of hazardous additives in plastics

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“Master of Science”

supervised by
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Vienna, 03.11.2020

Affidavit

I, **PHILIPP GASSER, BA**, hereby declare

1. that I am the sole author of the present Master's Thesis, "GOVERNANCE OF HAZARDOUS ADDITIVES IN PLASTICS", 103 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

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Abstract

On international level, intergovernmental institutions, conferences and forums present a coherent development and buildup of principles and measures in both the areas of chemicals and waste: from humble beginnings of only gathering information and evaluation of substances via risk assessment to an environmentally sound management approach based on full lifecycle assessment, all in the context of sustainability. A clear pattern emerged, reflected in increasing codification of environmental and health protection measures in international multilateral agreements, creating international environmental law. Soft law has trickled down into supranational and national level where it shaped environmental policy and subsequently has led to the implementation of the concepts contained in the international sources. In the aspect of international agreements, the thesis elaborated on the Basel and Stockholm Convention. On supranational level, the competences of the European Union increased in complexity and expanded into new regulatory areas, parallel to the developments on international level. As an international organization itself with full legal personality, the European Union has not only implemented but also shaped those developments. The governance of the hazardous additive decaBDE in plastics is a cross-sectional issue, the areas in which legislation can be found is product and chemicals regulation, but also in waste legislation. DecaBDE was found to be explicitly regulated under the Stockholm Convention, REACH, RoHS2, and POPS.

Key words: Basel Convention, CLP, DecaBDE, REACH, RoHS2, Stockholm Convention, TEU, TFEU

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1 Introduction

1.1 Hazardous additives in plastics

In 2018, the plastics industry in Europe consisted of nearly 60,000 enterprises that had over 1.6 million employees, and created a turnover of more than € 360 billion (PlasticsEurope, 2019, p. 8). The industry is an important sector of the European economy. 359 million tons of plastic were produced globally, out of this nearly 62 million tons in Europe (ibid., p. 14), but only 9.4 million tons were recycled (ibid., p. 9), while 12.4 million tons were incinerated and 7.2 million tons deposited in landfills (ibid., p. 28). Worldwide, overall an amount of 8,300 million tons of plastics have been produced till 2015, out of which 6,300 have become waste (Geyer et al., 2017). In 2015, the European Union has embraced the goal of creating a circular economy and fostering recycling to provide the industry with secondary resources, increasing resource efficiency (European Commission (Commission), 2020a). It set ambitious recycling quotas, with 55 percent plastic packaging waste to be recycled (ibid.). In 2018, it followed up with a plastic strategy as the concept of circularity would not take off in the sector because virgin plastic being less complex to handle and also more economical (ibid.). Plastics are a very versatile material, with varying properties from light to heavy, from sturdy to very mellow, and thus, there are many different types of it: the most common resin being sought after in 2018 was polypropylene with 19.3 percent market share, followed closely by light density polyester with 17.5 percent (PlasticsEurope, 2019, p. 22). At its basis lies a carbon structure, first forming a monomer and then in larger structures polymers (FCIO, n.d.-a), but the secret of its properties are defined by what is being added to it: the so-called additives. They fulfill various different roles. There are colorants and stabilizers, plasticizers, fillers, and flame retardants, the latter three making up 75 percent of all additives (Geyer et al., 2017). As their name says, flame retardants are intentionally added to decrease the fire hazardousness of plastics (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit, 2020). Flame retardants have been used widely in electric and electronic equipment such as computers, televisions or other appliances in which an electric current potentially could ignite the plastic cause a fire (ibid.). As many of these products have a long life span, the flame retardant as a chemical substance keeps showing up in the waste stream and can cause issues for recycling (Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants (SC COP), 2016a, p. 4).

Furthermore, according to UNEP, electric and electronic equipment is often exported at the end of its lifespan as secondhand goods and then disposed illegally (United Nations Environment Programme (UNEP), 2015), thus shifting the burden to developing countries and causing negative externalities. A very widely used flame retardant is bis(pentabromophenyl) ether, decabromodiphenyl ether or simply decaBDE, which is part of the group of polybrominated diphenyl ethers (PBDE) and is still being manufactured or imported in between a hundred and a thousand tons per year in Europe (European Chemicals Agency (ECHA), 2020). 1,100,000 and 1,250,000 tons of commercial decaBDE, a PBDE mix consisting to 90 percent of decaBDE, were stated to have been produced worldwide in between 1970 and 2005 (Watson et al., 2010, p. 10, referring to Schenker 2008, Li 2010). Of this, 90 percent is said to be used in plastics polymers at a typical concentration "of 10-15% by weight" (Bipro, 2015, p. 16). In 2011, the concentration of decaBDE in electric and electronical waste was estimated at a 390 (+/-45) mg/kg (Bundesamt für Umwelt, 2017, p. 10), with a decrease of 24 percent or 120 mg/kg since 2003 (ibid, p. 13). This amounted to about 25 tons decaBDE annually (ibid., p. 11) out of an estimated 70,000 tons electric and electronical waste in total per annum in all of Switzerland (ibid., p. 8) with a plastic content of around 20,000 tons (ibid., p. 9). Out of all PBDE "present in articles", "up to around 20% [were estimated to] end up in the recycling stream (SC COP, 2016a). PBDEs had been found in children's toys in the past already (Chen et al., 2009), and newer research traced DecaBDE again in various different children's toys as it was reported to be "the primary toxic component of electronic waste" (DiGangi et al., 2017). Another study found traces of DecaBDE in "black polymeric food contact articles" on the European market (Puype, et al., 2015). Furthermore, it was reported that new European Union legislation would instead of protecting human health and the environment endanger it by allowing DecaBDE to reenter the market in form of recycled plastic as a secondary resource (Center for International Environmental Law, 2019).

These reports warrant it to review how decaBDE is governed and regulated internationally and supranationally in the European Union. Research questions therefore are:

- Which legislation and policy is there for additives in plastics?
- What are the interactions between the different legal instruments?
- What is the regulatory status of decaBDE?
- Who are the actors in the regulatory field?

1.2 Scope of the thesis, its' sources and limitations

For the intent of this thesis, governance is meant to firstly include binding legal instruments and statutory hard law such as treaties, European Union regulations and directives, and secondly non-binding soft law measures, such as global initiatives, strategic approaches, and action programs. Therefore, the sources of environmental law, overarching policies, legislation implemented or designed to implement those policies, and subordinated regulatory instruments enacted to put the provisions' aim into effect will be discussed. Geographically, the focus is on governance in the EU. Thus, a review will include the supranational policy and legislation, as well as the relevant international framework and agreements applicable or affecting the aforementioned regime. Temporally, the thesis is to include the historic events shaping international environmental law regarding chemicals as well as the current state of law, with a focus on the last 15 years and on current developments.

Due to the nature of the topic, this thesis consists of a descriptive analysis. It is based on sources of law and secondary research. The main scientific method is literature review. Included are international treaties, documents and publications by the United Nations and their agencies, law forming the EU and created by its institutions involved at all stages of the legislative process, mainly the European Commission, the European Parliament and the Council of the European Union, plus by the relevant committees and authorities. These sources are available to the public on the websites of the respective institutions or accessible through the EUR-Lex website. International forums and agreements will be cited. Additionally, political and legal opinions of stakeholders will be listed and explained where relevant.

The matter of the governance of hazardous additives in general and decaBDE in particular in plastics touches upon many different policy areas and thus, provisions regulating hazardous additives are distributed over a multitude of legislation, both horizontally as well as specifically. Policy areas include the environment, health, waste, development (in the EU, the internal market and the customs union). In order to provide some comprehension of the matter's complexity, this thesis will deal with the following topics, with the intention to present their aim and the interlinkages between them, and their overall relevance for trying to end the use of hazardous additives in plastics and thus also ending the dirty recycling cycles, and ultimately contributing to a non-toxic environment:

- An overview of the international treaties and frameworks approaches dealing with chemicals, health and waste;
- The legal basis for legislative action in EU;
- Legislative acts and measures in the areas of product and chemical substance regulation;
- The regulatory status of decaBDE.

Natural limitations to answer the research questions arose from the complexity of the legal environment. The author tried to cover the current status, combine the available information and point out problematic aspects to the best of his knowledge.

2 Governance on international level

2.1 Soft and hard law

The first part of this thesis will cover international actors and instruments governing chemical and partially waste management as well as the corresponding development of global policy. The reason for the author to do so is not only to work out the historical evolution of international cooperation in this area to depict the increment in importance of the matter, but also to explain a state's motivation to formulate domestic policy and legislation. It should be mentioned though that international cooperation and subsequent proliferation of international policy is not necessarily a top-down flow process; instead it could maybe be described as a process of cross-fertilization; it never should be forgotten that the main actors in the international environment are primarily states or in the case of the European Union a group of states, which firstly try to promote their own position based on the policy ideas that they already have devised for themselves. As a starting point, acts of international law and policy, and the sources that create them will now be discussed.

Codified, thus written down, international agreements "are the most stable source of international law"; they can be called treaties, charters, or conventions (Abass, 2012, p. 30). Two or more sovereign states as subjects of international law have concluded them in a fashion that they are legally bound by the treaty itself. These agreements are thus so called hard law. The benefit of such a regime is that the rules created apply not only to the one state but to all of the states which are party to the treaty, unless reservations to certain aspects were made permissible explicitly in the treaty text. The treaties usually include mechanisms to amend their provisions: often a state as a party has to act jointly with the other parties to the treaty, in consensus, when formulating these provisions within a body established by the rules of the treaty, but sometimes also majority voting schemes exist to overcome deadlocks, as for example in the Charter of the United Nations (UN Charter) in Article 108: "Amendments […] shall come into force for all Members […] when they have been adopted by a vote of two thirds of the members of the General Assembly and ratified […] by two thirds of the Members of the United Nations, including all the permanent members of the Security Council" (United Nations (UN), n.d.-a). In other cases, amendments of the treaty only bind that state which has ratified the amendment, as for example in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and

their Disposal in Article 17 paragraph 5: "Amendments adopted […] shall enter into force between Parties having accepted them [… and …] for any other Party […] after that Party deposits its instrument of ratification, approval, formal confirmation or acceptance of the amendments" (Secretariat of the Basel Convention (BC Secretariat), 2020, pp. 26-27). In either case, a state has to seek the co-operation of its peers in order to represent its own interests. Normally the actors creating new international hard law are states, though depending on the extent of the powers transferred, a state can even have decided to give up its sovereign right to regulate, which it normally executes exclusively. An example are the treaties forming the basis of the EU, establishing an international organization dedicated to regional integration, in which "regulatory cooperation takes place primarily through [harmonization] of rules" (Organisation for Economic Co-operation and Development (OECD), n.d.-a). While legislative acts of the EU can be referred to as "regional international law" (Abass, 2012, p. 10), they will be dealt with as supranational law in the chapter on the legislation of the EU; in this specific case, these acts can fall into the category of hard law. Specific multilateral agreements establishing environmental hard law will be explained towards the end of this chapter.

While the treaties establishing international organizations constitute as hard law, the acts they create usually do not, and are instead called "soft law": this is defined by the Organisation for Economic Co-operation and Development (OECD) as "co-operation based on instruments that are not legally binding" (OECD, n.d.-b). "They are not real law", Abass stated (2012, pp. 62-63), instead describing them as "a bundle of non-binding legally instruments, voluntarily assumed by States, on the expectation that the soft obligations that those instruments create will mature into hard law in the future". These instruments are often found in recommendations, declarations, action plans and guidelines designed to shape policy on international level or in the states that they are addressed to, leading to more uniform rules. A prominent example of an international organization active in this area, the OECD described itself as an "intergovernmental forum in which governments share experiences in various policy areas and develop consensus based policy recommendations (soft law)", thus an intergovernmental organization "promoting regulatory cooperation" (OECD, n.d.-c). As soft law can be seen as a precursor to hard law, this chapter will first review which actors creating which acts of soft law exist on the international level in the context with governance of hazardous additives in plastics.

2.2 Governance in form of soft law

A multitude of international organizations are active in the fields of development, health and the environment with regards to chemicals, and many can be found within a framework of the UN system. The UN is a "public international organization" as it "was founded under international law", and also a "public intergovernmental [organization] […] composed of states (represented by governments)" (Abass, 2012, pp. 194-195). Its purposes are, among others, to "achieve international co-operation in solving international problems of an economic, social, […] or humanitarian character" and "to be a centre for harmonizing the actions" (Article 1 paragraph 3 & 4 UN Charter, UN, n.d.-b). Additionally, the UN is to "promote […] solutions of international economic, social, health, and related problems" (Article 55 point b UN Charter, UN, n.d.-c); as the environment is not mentioned, one can deduct that, at the time of the Charter's creation in 1945, environmental concerns might not have been deemed to warrant a specific reference. While the UN Charter was amended five times until 1973 (UN, 2019), no amendment might have been desired later or it might not have been possible because of the aforementioned very high voting prerequisites, or deemed that the current UN Charter provides sufficient grounds for the UN's various activities in the area of the environment, such as the United Nations Environment Programme (UNEP).

The UN's "chief deliberative, policymaking and representative organ" is the United Nations General Assembly (UNGA)(Article 7, 9-22 Charter)(UN, n.d.-d). While the UN Charter constitutes hard law, the UNGA can only create soft law, as indicated in its wording it has competence to only issue "recommendations" (Article 10-14 UN Charter, UN, n.d.-e). It has the obligation to do so in order to "promot[e] international co-operation in the political field and encouraging the progressive development of international law and its codification" and to "promot[e] international co-operation in the economic, social, […] and health fields […]" (Article 13 paragraph 1 point a & b UN Charter, ibid.). The UNGA has also shaped the international organizational landscape since 1945 by "[bringing multiple international organizations] into relationship with the UN through negotiated agreements" (UN, n.d.-f). These organizations are then called "UN specialized agencies" and they "are autonomous organizations working with the [UN]" (see Article 57 & 63 UN Charter, ibid.).

One of them is the World Health Organization (WHO), tasked with working towards the "attainment […] of [all peoples'] highest possible level of health" (Article 1) by "tak[ing] all necessary action to attain [this] objective" (Article 2 point v) since its constitution

came into force in 1948 (Constitution of the World Health Organization, 1946, pp. 1-4). "All states" may become a member of it (Article 3)(ibid.). WHO is also instructed to promote the improvement of environmental hygiene" (Article 2 point i), and mandated to create regulations for standards and labelling of "biological, pharmaceutical and similar products moving in international commerce" (Article 2 point u, ibid.). Furthermore, it takes decisions on global health policy through its governing body the World Health Assembly (Articles 18, 19, 21, 22, & 23, ibid.).

Additional UN specialized agencies are the Food and Agriculture Organization of the United Nations (FAO) and the International Labour Organization (ILO), which are both intergovernmental organizations (World Health Assembly 32, 1979). Since their founding, the ILO operates on the subject of "occupational chemical hazards", while the FAO concerns itself with "food contaminants and additives, […] agricultural chemicals, [and their] ecological effects" (ibid.). Various inter-UN system collaborations were formed over the years, including the "Joint FAO/WHO Expert Committee on Food Additives and Contaminants [founded 1956], […] the Joint FAO/WHO meetings on pesticide residues in food [founded 1961]", or "the Joint ILO /WHO Committee on Occupational Health [with regards to] occupational exposure to air-borne toxic substances" (ibid.).

There is one more major player in the field of the environment within the UN system: the UNEP. It was founded in 1972 when the international community became "aware of the urgent need for a permanent institutional arrangement […] for the protection and improvement of the environment" (Governing Council of the United Nations Environment Programme (GC UNEP), 2013, p. 2).Unlike WHO, FAO or ILO, it is not an UN specialized agency as it is not an international organization, but rather, as the last word of its name "programme" indicates, a framework for various UN activities in the field of environment with a "subsidiary [organ]" of the UNGA, created with the authorization for the delegation of power of Article 22 UN Charter, at its core (UN, n.d.-e). The Governing Council of the United Nations Environment Programme (GC UNEP), set up by an UNGA decision, was to be "composed of fifty-eight members elected by the [UNGA]" (Resolution 2997 Part I paragraph 1) and "to promote international co-operation in the field of the environment and to recommend, as appropriate, policies to this end", as well as "to provide general policy guidance for the direction and co-ordination of environmental programmes within the [UN] system" (Resolution 2997 Part I paragraph 2 point a & b, GC UNEP, 2013). GC UNEP as a subsidiary organ of UNGA was to take over responsibility for these tasks from UNGA: As Petsonk (1990) wrote,

"the UNGA arguably drew on its own authority to encourage the progressive development of international law and promote solutions of international economic, health and related problems", referring to Article 13 paragraph 1 point a and Article 55 point b UN Charter, and that "thus, the [GC UNEP] received authority to encourage the progressive development of international environmental law and to promote solutions of international environmental problems".

UNEP and GC UNEP were the result of United Nations Conference on the Human Environment, held in Stockholm in 1972, which was the starting point for global coordinated action in the field of the environment (UN, 1972); as Abass (2012, pp. 621) explained, "there was no international organization specifically responsible for regulating [it prior to the conference]". It would be the first in a series of conferences over the next 50 years that continuously developed environmental principles, at least soft law so to say, as written down in the 26 principles of the Declaration of the United Nations Conference on the Human Environment (UN, 1972, p. 4). Of these principles, the following shall be mentioned: Principle 6 explicitly mentioned "the discharge of toxic substances" formulating a limitation on pollution, while Principle 13 called for environmental protection through "a more rational management of resources [... in the sense of] an integrated and co-ordinated approach to their development planning" (ibid.); thus, from the combination of the two principles, one could arrive at a management of chemicals in order to prevent pollution. Principle 24 referred to "co-operation through multilateral or bilateral arrangements or other appropriate means […] to effectively control, prevent, reduce and eliminate adverse environmental effects", which should be kept in mind when the international agreements formulating specific hard law matters in the area of chemicals and waste are being discussed later in this paper (UN, 1972, p. 5). Principle 22 prescribed "[further development of] the international law regarding liability and compensation for the victims of pollution" (ibid.) which eventually had led to the the-polluter-pays principle, which is also integral to EU law. Most noteworthy though is Principle 21, which declared that while "states have […] the sovereign right to exploit their own resources pursuant to their own environmental policies [they also have] the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction" (ibid.); thus, states have to take precautionary measures in order to cause no harm to the environment extraterritorially. This is "often […] considered to be the foundation of international environmental law" but also "to be thought of as an expression of an existing norm" (Abass, 2012, pp. 622-623). In the context of the Stockholm Conference, it should also be mentioned that the

EU started to undertake activities on the protection of the environment contained in its first Environmental Action Programme (EAP) in 1973, "under the premise that economic prosperity and environmental protection are interdependent" (Bourguignon, 2018); this will be further explored in a later chapter.

A starting point for chemical governance can be found in 1975, when UNEP's Governing Council decided to lay the basis for the International Register of Potentially Toxic Chemicals (IRPTC) in order to aid with "optimizing the use of chemicals for human well-being" (UN, 1975, p. 101). Because of its comprehensive approach, IRPTC was a premiere within the UN system. Soon after, in 1977, the World Health Assembly commissioned a study "[evaluating] the effects of chemicals on health", as environmental pollution and increasing exposure to chemicals potentially harmful to human health became a growing concern (World Health Assembly 30, 1977, p.1). The resolution also called for the exploration of the potential for international cooperation in this area (ibid.). This was the origin for the creation of the International Programme on Chemical Safety (IPCS). In the following year, the request for "a central [organizational] unit at [WHO's] headquarters" was added (World Health Assembly 31, 1978). A year later, WHO's Executive Board instructed its Director-General to achieve consensus on the program's future organizational structure, to secure funding and to integrate existing WHO activities in order to avoid duplication (Executive Board of the WHO, 1979). Additionally, collaboration and coordination with ILO, FAO, UNEP and other organizations was to be sought (ibid.). A detailed list of tasks for the programme to carry out and the expected output were defined; mainly, it was to conduct "risk assessment of chemicals" in nearly all aspects, including on industrial chemicals and on plastics, to "evaluat[e] specific toxicological effects", and to produce guidelines on exposure limits (World Health Assembly 32, 1979, p. 9). With the formal foundation of IPCS in 1980, WHO assumed the lead role as the "Executing Agency" (International Labour Organization (ILO), 2009). Additionally, IPCS was tasked with capacity building, the "response to chemical accidents and [the] technical co-operation relating to control of toxic chemicals" (UN, 1982, p. 26). While fulfilling these tasks, IPCS, acting as a part of the international organization WHO, was not able to address issues of intergovernmental nature, such as exchange of information, coordination and cooperation (International Institute for Sustainable Development (IISD), n.d.-a). In the run-up to the United Nations Conference on Environment and Development (UNCED) of 1992, the possibility "to establish an intergovernmental forum on chemical risk assessment and management" was assessed and a proposal describing its potential

tasks and duties was prepared (ibid.). Ultimately, "a recommendation [to establish such a forum] was [subsequently] forwarded to UNCED" (ibid.).

In 1992, UNCED then produced the Rio Declaration on Environment and Development, building on the Stockholm Conference's Principle 21 by integrating the issue of development and adapting it to the concept of sustainable development in Principle 2 of the Rio Declaration, but with a clear hierarchy in mind, described in Principle 3 & 4 of the Rio Declaration: As Abass (2012, pp. 624-625) noted, "a balance is to be struck between environmental considerations and developmental considerations, with the former forming an integral part of latter". The other outcome of UNCED was Agenda 21, "a comprehensive [globally, nationally and locally executable] plan for action to be taken […] in every area in which human impacts on the environment" (UN, n.d.-g). This action plan included a chapter on the "environmentally sound management of toxic chemicals, including prevention of illegal international traffic in toxic and dangerous products" (UN, 1992, p. 226). In it, it was pointed out that in order to use chemicals safely, "the broadest possible awareness of [their] risks" would be necessary, yet that at this moment neither enough "scientific information for the assessment of risks entailed by the use of a great number of chemicals" nor the "resources [needed] for assessment of chemicals [with sufficient scientific information]" would be available (ibid.). One could refer to this as a derivative of Principles 6 and 13 of the Stockholm Declaration, as discussed before in this chapter. Agenda 21 also proposed certain program areas: one was to "[expand] and [accelerate] international assessment of chemical risks" by conducting research on toxic chemicals and potential substitutes and by "[producing] guidelines for acceptable exposure for […] toxic chemicals" (ibid., pp. 227-228.); the second area was to establish "a globally harmonized hazard classification and compatible labelling system, including material safety data sheets and easily understandable symbols, by the year 2000" (ibid., p. 230), which ultimately led to the creation of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), adopted in 2002 and a not legally binding set of recommendations which will not be covered by this thesis as EU law does draw on it but ultimately has a different regime in place in this area with Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP); the third area was to increase "information exchange on toxic chemicals and chemical risks", referring to the Prior Informed Consent (PIC) procedure (ibid., pp. 231-232) that was subsequently implemented with the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, adopted in 1998; and another area was the "establishment of risk reduction

programmes (ibid., pp. 233-234). In Chapter 20, Agenda 21 also tried to promote the "environmentally sound management of hazardous wastes, including prevention of illegal international traffic in hazardous wastes", also entailing the "prevention and minimization of hazardous waste" and the aim for an "integrated cleaner production approach" in general, while it tried to "promot[e] and [strengthen] international cooperation in the management of transboundary movements of hazardous wastes" in reference to the back then very young Basel Convention, adopted in 1989 (ibid., pp. 241). Solid waste treatment was covered by Chapter 21, which called for "minimizing wastes" while "maximizing environmentally sound waste reuse and recycling" (ibid., pp. 254). It too touched upon management of chemicals in the context of environmental protection, the safeguarding of human health with regards to environmental degradation caused by air, water and soil pollution with toxic chemicals, and the protection of fresh water sources and aquifers (ibid., pp. 116). Additionally, it was called for the "[development of] applications to minimize the requirement for unsustainable synthetic chemical input" and of "processes to reduce waste generation, treat waste before disposal, [...] to recover energy, [and] to remove pollutants from the environment" (ibid.).

As mentioned before, the creation of an intergovernmental forum on chemical safety had been recommended and included in Agenda 21 (UN, 1992). Such a forum came to life in the Intergovernmental Forum on Chemical Safety (IFCS) in 1994 at the International Conference on Chemical Safety, organized by the UNEP, ILO and WHO (Intergovernmental Forum on Chemical Safety (IFCS), 1997). It was described as "a non-institutional arrangement whereby [government representatives met] with intergovernmental and non-governmental organizations" (ibid.). Its task was "to provide clear and consistent advice for cost-effective, integrated risk assessment and management of chemicals and to improve delineation and mutual understanding of roles, initiatives and activities both within and among governments and IGOs that have responsibility for chemical safety" (IISD, n.d.-a). In the "Bahia Declaration on Chemical Safety", the result of the forum's third session, "Priorities for Action Beyond 2000" were defined, which included export management of hazardous chemicals, their legacy issues and national action on these issues (ibid.).

Another outcome of 1992's UNCED was the launch of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) in 1995 (World Health Organization (WHO), n.d.-a). Its six founding members were the UNEP, OECD, ILO, FAO, WHO, and the United Nations Industrial Development Organization (UNIDO)

(ibid.).Today it counts nine members, including also the United Nations Institute for Training and Research (UNITAR), the World Bank and the United Nations Development Programme (UNDP)(ibid.). The IOMC has "the purpose of promoting coordination of the policies and activities, pursued, jointly or separately to achieve the sound management of chemicals in relation to human health and the environment" (WHO, n.d.-b). It has developed the so called IOMC Toolbox for Decision-Making in Chemicals Management, which provides countries access to relevant information on all "available tools", including "simple cost effective solutions to national chemicals management issues" (OECD, n.d.-d).

Eight Millennium Development Goals were announced in 2000, with a timeframe of at most fifteen years in which those goals should have been achieved (UN, n.d.-h). The seventh of them set out to "ensure environmental sustainability", and while it included the principle of sustainable development and aimed at "revers[ing] the loss of environmental resources", "reduc[ing] biodiversity loss" and securing safe water sources, it did not make any specific mention on policy for chemicals apart from the elimination of ozone-depleting substances (ibid.). Two years later, the World Summit on Sustainable Development took place in Johannesburg in 2002, where the assembly reassured its commitment to sustainable development in its three dimensions of economic development, social development and environmental protection, and to the implementation of Agenda 21 and the Millennium development goals, while drawing the connection path "from [the conference of] Stockholm to Rio de Janeiro to Johannesburg" (UN, 2004). The Johannesburg Plan of Implementation, adopted at this conference, called on states to commit to the GHS, which had recently been developed, so that chemicals would be more easily identifiable (IISD, n.d.-b). The plan also aimed to have states implement measures to reduce negative impacts the use of chemicals could have "on human health and environment" (ibid.). Furthermore, it recalled elements of "the Bahia Declaration and IFCS Priorities for Action Beyond 2000" when it stressed for a "strategic approach to international chemicals management" to be created until 2005 (ibid.).

From 1995 onwards, the need for such a strategic approach had continuously been recognized. Three preparatory meetings took place in between 2003 and 2005 before the first International Conference on Chemicals Management (ICCM), held 2006 in Dubai, at which the Strategic Approach to International Chemicals Management (SAICM) was introduced (IISD, n.d.-b). The conference was hosted mainly by the UNEP, together with the IOMC and the IFCS (United Nations Environment Programme

(UNEP), 2006). It was attended by national governmental and intergovernmental representatives (ibid.). SAICM is comprised of the Dubai Declaration on International Chemicals Management, the Overarching Policy Strategy and the Global Plan of Action (ibid.). The UNEP and the WHO administer this initiative (ibid.). SAICM is classified by the OECD as a "trans-governmental network", in which "co-operation [is] based on loosely-structured, peer to peer ties developed through frequent interaction rather than formal negotiation involving specialized domestic officials (typically regulators) directly interacting with each other" (OECD, n.d.-e). According to UNEP, it "provides a policy framework to guide efforts to achieve the Johannesburg Plan of Implementation goal that, by 2020, chemicals will be produced and used in ways that minimize significant adverse impacts on the environment and human health" (UNEP, 2006). The main objectives are to reduce risk, to create and distribute knowledge and information, to promote good governance, to combat illegal international trafficking, and to foster capacity building and technical cooperation (ibid.). With the formulation the UN Sustainable Development Goals (SDGs) in 2015 though, SAICM integrated these into its agenda, starting a phase of review and evaluation of SAICM in order to achieve sound management of chemicals and waste beyond 2020 (ibid.). SAICM is now also responsible for taking actions on matters of chemicals in products in general and specifically on dangerous substances in electric and electronic devices during their whole lifecycle (ibid.).

As various "international agreements are referenced in several different areas of the SAICM texts" and as their agendas overlap with that of SAICM, "clear and direct links to existing international chemicals and waste management instruments such as the Basel […] and Stockholm conventions" exist (Strategic Approach to International Chemicals Management (SAICM), 2018). The "conferences of the Parties to the three conventions [are said to have] requested the Secretariat to enhance cooperation and coordination with SAICM" (ibid.). There are also strong connections to IOMC's member organizations, which support SAICM on their own as well as with contributions to SAICM projects through IOMC (International Conference on Chemicals Management (ICCM), 2012), and it was said that "IOMC [would play] a key role in the implementation of government-mandated priorities agreed for SAICM" (WHO, n.d.-c). For example, the programme analyzed the progress on the GHS for the fourth session of ICCM (ibid.). At this point, IOMC's "co-ordinating function [was the means through which the members of the OECD co-operated]" (OECD Council, 2008). OECD was aware of the need for SAICM to address current challenges, and thus the "implementation of the SAICM objectives, as set out in the Overarching Policy Strategy, [was made] an integral part of

its Chemicals Programme" (ibid.). OECD also was to aid in the "successful and timely implementation of SAICM". (ibid.).

The intergovernmental OECD is another major player in the field of chemicals policy, external to the UN system. It was originally founded in 1948 as the Organisation for European Economic Cooperation, administering the Marshall Plan (OECD, n.d.-f). As its name indicates, co-operation is its core method for implementing and applying policy, and it has achieved this co-operation "by making individual governments [recognize] the interdependence of their economies"; today it includes 36 member states (ibid.). The organization has shaped policies and standards, among the nowadays generally accepted and applied environmental "the Polluter-Pays Principle", which enshrines that the legal entity which causes a certain, often environmental degradation is not only but also financially responsible for costs incurred by remedies to this degradation (OECD, 2019, p. 3). It has been included in various acts of legislation, among them the supranational treaties establishing and governing the EU (ibid.).

Since the early 1970s, "OECD has been concerned with chemicals" (World Health Assembly, 32, 1979, p. 14). It established the Environment, Health and Safety Programme, which mainly deals with "safety aspects of the production, processing and use of industrial chemicals", but also the "development co-operation and sound management of chemicals" (OECD, n.d.-g). Its core objectives are supporting its members "protect human health and the environment through improving chemical safety" and the "[prevention of] unnecessary distortions in the trade of chemicals [and] chemical products" (ibid.). Information generated through its activities is available to everyone (ibid.). In particular for information on additives in plastics, the OECD's Environment Directorate (2009, p. 7) has issued guidance material in form of an "emission scenario document" containing "information on the sources, use patterns and release pathways of chemicals used as additives in plastics to assist in the estimation of releases of chemicals to the environment" in 2009, which was updated in form of a supplement document with new information gathered in 2019 (OECD Environment Directorate, 2019, p. 6). Through the "Mutual Acceptance of Data" a collaborative approach to chemicals testing and subsequent data sharing is made possible, saving resources and time (OECD, n.d.-h). The OECD claims that this approach "saves more than EUR 309 million per year as well as tens of thousands of laboratory animals' lives "as "a chemical test performed in one country [would be] accepted in over 40 other countries" (OECD, 2019, p. 6). The quality of this data is secured by adherence to

OECD's Test Guidelines and Principles of Good Laboratory Practice (OECD, n.d.-h). Therefore, OECD also assists with developing and implementing standardized quality assurance measures (OECD, n.d.-i). Furthermore, OECD coordinates efforts to set standards for the assessment of hazard and exposure risks, and examination of chemicals in this respect (OECD, n.d.-j). Finally, the institution provides general guidance on risk management, and promotes uniform international classification and labelling rules and the substitution of hazardous chemicals (OECD, n.d.-k). As part of the organization's activities on risk management chemicals, it also develops and promotes the concept of sustainable chemistry "that seeks to improve the efficiency with which natural resources are used to meet human needs for chemical products and services [and which] encompasses the design, manufacture and use of efficient, effective, safe and more environmentally benign chemical products and processes" (OECD, n.d.-l). It thus tries to provide a solution to the use of hazardous additives by substituting them with safer alternatives while at the same time increasing resource efficiency through recycling. To this end, the OECD has initiated two projects: "The Economic Features of Chemical Leasing" and "Better Design of Plastics and Plastic Products" (ibid.).

With the establishment of ICCM as a key player and SAICM as the overarching framework on the international level, IFCS was faced with being sidelined (Kulovesi et al., 2008). At its sixth session in 2008, IFCS decided to propose ICCM at its next meeting to formally "integrate the [IFCS] into ICCM by establishing it as an ICCM advisory body", which were to be called the International Forum on Chemical Safety and have the objectives of information sharing and as an "independent and objective source of synthesized information about chemicals management issues" (ibid.). ICCM declined, and instead decided to create its own subsidiary body in the form of an open-ended working group on SAICM's "implementation, development and enhancement" (ICCM, 2009). This open ended working group has become the main body for the exchange of emerging policy issues and initiatives to be taken (ibid.).

At the third session of the ICCM, SAICM identified endocrine-disrupting chemicals as an emerging issue, similar to chemicals in products, and hazardous substances within the life cycle of electrical and electronic products, which it had identified at its second session (ICCM, 2012). SAICM subsequently adopted resolutions, which established programmes to address these issues (ibid.). The Chemicals in Products programme was to establish a definition of roles and responsibilities of stakeholders throughout product life cycles, the "development of guidance documents on information

exchange", to try out these documents in pilot projects, and to raise awareness of the issue (ibid.). The programme on "hazardous substances within the life cycle of electrical and electronic products" was to be continued and to further gather information on best practices while cooperating with international players in this field (ibid.). The programme on endocrine disrupting chemicals was to "provide up-to-date information and scientific expert advice to relevant stakeholders for the purpose of identifying and recommending potential measures that could contribute to reductions in exposure to or the effects of endocrine disrupting chemicals"; furthermore, it was to raise awareness of the issue (ibid.).

Follow-up publications are often the result of SAICM's programs: The programme for hazardous substances within the life-cycle of electrical and electronic products held a workshop already 2011, in which "recommendations on upstream, midstream and downstream issues" were developed and subsequently compiled together in reports, which SAICM disseminated to stakeholders (SAICM, 2011). In 2013, UNEP, WHO and SAICM published a "summary for decision-makers" on the "state of the science of endocrine disrupting chemicals", which also mentioned the hazardous additive group of PBDEs, which includes decaBDE (United Nations Environment Programme and the World Health Organization, 2013). In October 2015, SAICM published a guidance document "for stakeholders on exchanging chemicals in products information" as part of the aforementioned Chemicals in Products Programme (SAICM, 2015); the document contained a list of stakeholders during the product life cycle and explained how information should be disseminated (ibid.). It indicated that "legally restricted substances", such as hazardous additives, should be identified and communicated openly (ibid.).The guidance document also made reference to the GHS as a point of reference to identify substances (ibid.). As part of its objective to form a framework for policy on chemicals, SAICM produced a document called the "Overall Orientation and Guidance for Achieving the 2020 Goal", in which it laid out how it had contributed to the goal of a sound management of chemicals and waste and the objectives subordinated to this such as risk reduction and "strengthening national legislative and regulatory frameworks for chemicals and waste" (SAICM, 2020a). The document was endorsed at the fourth session of the ICCM, and set out what should be "core activity areas" of a future agenda to "enhance the responsibility of stakeholders; Establish and strengthen national legislative and regulatory frameworks for chemicals and waste; Mainstream the sound management of chemicals and waste in the sustainable development agenda; Increase risk reduction and information sharing efforts on emerging policy issues; Promote information access; [and] assess progress towards the 2020 goal of

minimizing the adverse effects of chemicals on human health and the environment" (ibid.).

Currently, SAICM finds itself in "the intersessional process", in which the review of the program takes place and recommendations are to be developed on how to proceed in order "to enable the ICCM at its fifth session to take an informed decision on future arrangements for the Strategic Approach and the sound management of chemicals and waste beyond 2020" (SAICM, 2020b). The fifth session of ICCM was scheduled to take place in 2020, but moved to 2021 due to the global COVID-19 outbreak (SAICM, 2020c).

In 2012, at the UN Conference on Sustainable Development, also called Rio+20, the parties to the conference shared a common vision for "an economically, socially and environmentally sustainable future" (United Nations General Assembly (UNGA), 2012, p. 1). They also renewed the pledge to uphold and fulfill on the promises and principles set up by past conferences and declarations such as the Stockholm Conference, the Rio Declaration, Agenda 21, the Johannesburg Plan of Implementation and the Johannesburg Declaration, and the Millennium Development Goals (ibid., pp. 2-3). On top of that, they saw need to "[strengthen the] institutional framework for sustainable development" (ibid., p.15): "a universal, intergovernmental, high-level political forum" (ibid., p.16) was created while UNEP was to be "upgraded" financially with new resources and politically by "[establishing] universal membership in the [GC UNEP]" so that not only 58 but all states could partake in decisions on environmental matters (ibid., p. 18). References to "the sound management of chemicals", to SAICM and to "the Basel Convention, the Rotterdam Convention and the Stockholm Convention", to the "importance of adopting a life-cycle approach and of further development and implementation of policies for resource efficiency and environmentally sound waste management" (ibid., pp. 41-42) were included; the Parties also specifically pointed to a "life-cycle assessment, public information, extended producer responsibility, research and development, sustainable design and knowledge-sharing" as means for scientific risk assessment, exposure reduction and substitution of hazardous chemicals, which they deemed "[important]" (ibid., pp. 42-43). All of this was part of Rio+20's "framework for action and follow-up" (UNGA, 2012); the forum working towards its implementation was called the "United Nations High-level Political Forum on Sustainable Development", which, "under the auspices of the Economic and Social Council", formulates "intergovernmentally negotiated political declarations" and continues to

meet every year since Rio+20 (UN, n.d.-i). It also led to the creation of the SDGs (UN, n.d.-j).

The proposals to strengthen UNEP and its Governing Council were adopted up by UNGA half a year later in the same year; UNGA also requested GC UNEP to propose a new name which would "reflect its universal character" (UNGA, 2013a, p. 3). In 2013, UNGA then renamed GC UNEP based on its proposal, and UNEP's supreme governing body was from then on the United Nations Environment Assembly (UNEA)(UNGA, 2013b), "the world's highest-level decision-making body on the environment" (UNEP, n.d.-a). At UNEA's first session in 2014, the assembly passed a resolution on chemicals and waste, in which it expressed that efforts should be stepped up on the "sound management of chemicals and waste" which it deemed to have "continued relevance […] beyond 2020" (United Nations Environment Assembly (UNEA), 2014, p. 12) as "an essential and integral cross-cutting element of sustainable development" (ibid., p. 13). The assembly also reiterated "the aim to achieve, by 2020, the sound management of chemicals throughout their life cycle and of hazardous waste in ways that lead to the minimization of significant adverse effects on human health and the environment" (ibid., p. 11).

In 2015, the UNGA passed a resolution entitled "Transforming our world: the 2030 Agenda for Sustainable Development", a comprehensive global plan for development, which included in total 17 SDGs, and 169 subordinated targets to "stimulate action over the next 15 years" (UNGA, 2015, p.1). It is worth noting that the goals were not legally binding, which is demonstrated by the choice of words stating "that each country has primary responsibility for its own economic and social development" (ibid., p.10), that "targets are […] aspirational and global", and that "each Government will also decide how these aspirational and global targets should be incorporated into national planning processes, policies and strategies" (ibid., p.13). Yet, as the International Court of Justice stated, "[UNGA] resolutions […] may sometimes have normative value [as] they can […] provide evidence […] for establishing the existence of a rule of law or the emergence of an opinio iuris", the belief or acceptance of something being law, and that "a series of resolutions may show the gradual evolution of the opinio iuris required for the establishment of a new rule" (Abass, 2012, p. 62). Many of the SDGs were actually evolutions or reiterations of principles declared at past conferences. As the resolution's name indicates, the theme of the goals is always to be seen under the aspect of sustainability and its dimensions economic, social and environmental. The various SDGs also touched upon human health, the environment, and economic

growth. As for the topic of this thesis, the agenda committed itself abstractly to "reduce the negative impacts of […] chemicals which are hazardous for human health and the environment, including through the environmentally sound management and safe use of chemicals, the reduction and recycling of waste" (ibid., p.9). This was also reflected more specifically in a number of targets. Target 3.9 requested states to take measures to "substantially reduce the number of deaths and illnesses from hazardous chemicals […]" (ibid., p.16); in the context of hazardous additives in plastic, this could mean that steps should be taken to avoid that humanity unintentionally comes in contact with such additives. Target 6.3 aimed at "[improving] water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals […] and substantially increasing recycling and safe reuse globally" (ibid., p.18), and thus, measures could be taken to keep hazardous additives out of water bodies and aquifers, and plastic could be recycled in a manner that diminishes or eliminates the risk posed by hazardous additives remaining in the recycled material. Target 8.4 partially set out "to decouple economic growth from environmental degradation" (ibid., p.19); therefore, steps could be taken to ensure that hazardous additives would not be emitted into the environment and their use at least reduced. Target 12.4 aspired to "achieve [by 2020] the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment" (ibid., p.22); this could require that hazardous additives are included in such frameworks and that policies would improve management of them which would then also reduce their emission and thus their impact on human health and the environment. Finally, target 12.5 requested to "substantially reduce waste generation through prevention, reduction, recycling and reuse (UNGA, 2015, p.22), therefore plastic recycling could be prescribed to be conducted in a manner that diminishes or eliminates the possibility of hazardous additives remaining in the recycled material increasing the potential for its use.

As of 2020, a brief review of the supplementary information to the progress report on the SDGs for the year 2018, 2019, and 2020 provided data for the indicators of the targets discussed in the paragraph above. For the target 3.9 to reduce the number of deaths and illness from hazardous chemicals, the indicators unfortunately do not provide much insight as they lack reference points for comparison also due to the nature of target itself, and because the source for the data does not provide annual updates (Secretary-General, 2018, p. 34); the data points contained in the documents are only from 2016 and the years before, thus currently making it impossible to attribute

any development to SDGs. Noteworthy though is that the mortality rate attributed to unintentional poisonings has been reduced by more than half in Europe and by third worldwide since the year 2000 (ibid.). For target 6.3, no indicator exists. For target 8.4, the material footprint per capita has increased globally from 11.8 to 12.2 tons from 2015 to 2017, while the material footprint per unit of GDP remained at US$1.16 (Secretary-General, 2019, p. 74). For target 12.4, the indicator measuring the compliance rate with multilateral environmental agreements exists with data for 2020, the target's target year; worldwide 50.3 percent of the party states complied with the Stockholm Convention, 60.7 percent with the Basel Convention, 75.2 percent with the Rotterdam Convention, and all with the Montreal Protocol (Secretary-General, 2020, pp. 123-125). A second indicator measuring electronic waste exists and it is also the indicator for target 12.5; electronic waste generated per capita increased globally from 6.6 to 7.3 kilograms from 2015 to 2019, in Europe from 15.4 to 16.2 kilograms; the proportion of electronically waste recycled in Europe and North America increased from 2010 to 2015 to 2019 from 27.9 to 30.3 to 31.8 percent, while globally only 15.7 percent, 17.4 percent , and 17.5 percent were recycled in the respective years (ibid.). Unfortunately, only the last indicator on electronic waste recycled allows gaining some insight into whether the SDGs have had any effect in relation to hazardous additives in plastic: first, that with the increased recycling quote also the amount of recycled plastic in absolute numbers ending up in new products has increased, which is of course not answering the question as to the fate of the additive itself because there is no indication of the treatment process and the potentially resulting contamination, leaving no indication whether less hazardous legacy additives are in circulation; and second, that with 68.2 percent still a majority of electronic waste is not being recycled, leaving the question whether it has been exported, landfilled, or incinerated and as a follow-up question whether the heat been recovered; in the case of export, the problem would only have been moved to another location, where it might be managed even less environmentally sound, and in the case of landfilling, the question arises whether the landfill is adequately suited for storing hazardous waste by having been sealed from the bottom, with a leachate collection system installed, as well as whether the substances contained in the collected leachate can be separated or inactivated during the leachate's treatment. The question also remains whether there are differences between Europe and North America, which in this data have been grouped together, and thus also different possibilities arise to where this waste could have been exported.

2.3 Governance in form of hard law

As mentioned before, a source for legally binding international law can be more narrowly themed more specific treaties. The field of chemicals, health and waste are covered by so called multilateral environmental agreements. The treaties relevant for the governance of the hazardous additive decaBDE in plastics to be discussed by this thesis are the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and the Stockholm Convention on Persistent Organic Pollutants. They provide a "framework for lifecycle management" (SAICM, 2018). Also mentioned should be the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, which sets up the rules for an important information exchange process but which ultimately is too specific to be covered by this thesis, and the Convention on Long-range Transboundary Air Pollution with its Protocol on Persistent Organic Pollutants, which includes provisions affecting tetra-, penta-, hexa-, and heptabromodiphenyl ether but not decaBDE and which instead will be covered indirectly by discussing the corresponding EU legislation. The aim of the Basel and Stockholm Conventions is "to manage and reduce the harmful impacts of hazardous chemicals and wastes on the environment and on human health" (Secretariat of the Basel, Rotterdam and Stockholm Conventions (BRS Secretariat), n.d.-a). They are independent international agreements with their own governing bodies, rules of procedure and decision-making rules, yet they are very much intertwined organizationally as for example their joint seat of the Secretariat provided by UNEP in Switzerland shows (ibid.) and the fact that the "meeting[s] of the ordinary conferences of the parties to the Basel, Rotterdam and Stockholm conventions [are] held [jointly since] 2013 (UNEA, 2014). These are indicators for the "enhance[d] cooperation and collaboration among the […] conventions" as a result of the "synergies process" decided upon by the conventions' Conferences of Parties (BRS Secretariat, n.d.-b) following the recommendations of the Ad hoc Joint Working Group on Enhancing Cooperation and Coordination Among the Basel, Rotterdam and Stockholm Conventions (2008); the process started in 2008 and continues until today (BRS Secretariat, n.d.-c).

They are described as "dynamic legal instruments" because of their structure (SAICM, 2018). For example, as "[their] lists of chemicals and wastes falling within their scope can be adjusted" and as they include regular reporting of information by and to the Parties, which thus can easily assess how the implementation of the conventions is

progressing and whether they are effective (ibid.). Before being at decided upon, these adjustments are discussed thoroughly as the Secretariat's "work plans" based upon "the programmes of work […] adopted by each Conference of the Parties" (BRS Secretariat, n.d.-d). Details are prepared by the BRS Secretariat, small intersessional working groups and relevant committees of each convention (ibid.). The relevant committee for the Stockholm Convention it is the POPs Review Committee (POPRC), for the Rotterdam Convention the Chemical Review Committee (CRC) (BRS Secretariat, n.d.-e) and for the Basel Convention it is the Open-ended Working Group (OEWG)(Secretariat of the Basel Convention (BC Secretariat), n.d.-a). These "technical bodies" also are to cooperate and coordinate among themselves, and "to develop guidance to assist parties to the Rotterdam Convention and the Chemical Review Committee in their work when a chemical under consideration is a persistent organic pollutant listed under the Stockholm Convention" while "the Persistent Organic Pollutants Review Committee to involve experts from the Basel Convention when discussing waste-related issues" (Conference of the Parties to the Basel Convention (BC COP), 2012). The POPRC and the CRC held a joint meeting in 2013 discussing these matters further (Chemical Review Committee and Persistent Organic Pollutants Review Committee, 2013).

The Conventions also support their implementation through guidance material providing on how to integrate the conventions' provision and decision taken according to it into national legislation to ultimately increase compliance with the conventions' provisions and aims. A comprehensive report setting out strategies for a "pollution-free planet", issued by UNEP (2017, p. 51), mentioned that, for PBDEs, to which also decaBDE belongs, coordinated efforts to decrease environmental exposure to the group of chemicals were already underway on the basis of treaties. It provided specific examples on which course of action states thus should follow: On the one hand, the states should "scale up implementation action (through, for example, identification of alternatives, financing, strengthening institutional and technical capacity, compliance assistance teams and industry support)", thus adopting national law to put in place rules that bind its subjects of law, while on the other hand, the states should "ensure full […] compliance with the [conventions]", therefore enforcing the before mentioned national law (ibid.).

As part of their mandate and in coherence with recommendations by international guidelines and approaches, the three conventions also foster international co-operation through interacting with and partaking in global action initiatives: The conventions'

Conferences of Parties aid the implementation of the SDGs by providing "written inputs" to the United Nations High-level Political Forum on Sustainable Development while the Secretariat of the conventions does so "by providing input into the Progress towards the Sustainable Development Goals by the UN Secretary-General" and by supplying the data for indicator 12.4.1 of SDG 12's target 12.4 (BRS Secretariat, n.d.-f). Further examples include the "Basel Convention Partnership Programme" and the Basel Convention's "Cooperation with the World Customs Organization on the Harmonized Commodity Description and Coding System" (BC COP, 2019a), the general cooperation of the BRS Secretariat with the SAICM and the Minamata Convention on Mercury (BC COP, 2012), as well as cooperation with UNEP, and "the Statistics Division of the Department of Economic and Social Affairs of the United Nations Secretariat" (Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants (SC COP), 2019, p. 72).

2.3.1 Stockholm Convention

The Stockholm Convention was the first international treaty to ban decaBDE by declaring it a persistent organic pollutant (POP) in 2017 (SC COP, 2017, pp. 63-64). The process of how it was listed and how the provisions of the convention apply to it will be listed throughout this chapter while discussing the different aspects of the treaty. As the Secretariat of the Stockholm Convention states, "[POPs] are carbon-based chemical substances" which feature properties such as longevity, thus persistence, wide dispersal after their discharge, bioaccumulation "in the fatty tissue of living organisms", and toxicity (SC Secretariat, n.d.-a). In total, 30 POPs are listed in Annexes A, B and C to the convention as of 2020 (SC Secretariat, n.d.-b).

The convention's development can first be traced back to the GC UNEP's 1995 decision to have persistent organic pollutants (POPs) analyze and their impact on human health and the environment assessed by the IFCS, which proposed "international action, including a global legally binding instrument" to tackle the issues states globally faced with POPs (SC Secretariat, n.d.-c). Subsequently, the GC UNEP mandated the UNEP in 1997 to begin negotiations (ibid.). An "intergovernmental negotiating committee" and the "Criteria Expert Group" laid the groundwork for the "Conference of Plenipotentiaries", gathered in Stockholm in 2001 (ibid.). The convention's adoption was in 2001, full entrance into force followed in 2004 (Secretariat of the Stockholm Convention (SC Secretariat), 2018, p. 4). The provisions of the Stockholm Convention are legally binding to the parties; „no reservations may be

made" (Article 27, SC Secretariat, 2018, p. 36). Currently 183 states and the EU are party to the convention, among them Austria which signed the treaty in 2001 and ratified it in 2002 (SC Secretariat, n.d.-d). The EU as a legal entity itself also signed the agreement in 2001 and approved it in 2004 (ibid.). It also implemented the obligations derived from the convention's provisions into Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (Regulation (EU) 2019/1021 on persistent organic pollutants (EU POPS), 2019a).

In the preamble of the convention, the Parties to the Stockholm Convention explained their motives for establishing the convention on the need for "[protection] of human health and the environment from the harmful impacts of [POPs]" (SC Secretariat, 2018, p. 8) and for "[prevention of] adverse effects caused by [POPs] at all stages of [the] life cycle" due to POPs' toxicology, longevity, bioaccumulation, and their dispersal and deposition over far distances, thus having "in particular impacts upon women and, through them, upon future generations" (ibid., p. 7); this is reflected in Article 1 which sets out the convention's objective (ibid., p. 8). The contracting parties recalled various legal principles: the precautionary principle (ibid., p. 6), embedded in Article 1 (ibid., p. 8), "the sovereign right [of states] to exploit their own resources [while bearing] the responsibility to [not cause negative externalities] to the environment of other states" (ibid., p. 7); the polluter-pays-principle in subordination to "international trade and investment" (ibid., p. 7); the right of the public to information (ibid., p. 7), to be found throughout the convention text in form of obligations for public disclosure, but specifically in Article 10; and the right to development for developing countries and the principle of "common but differentiated responsibilities", meaning that states must commit themselves depending on the level of their development status (ibid., p. 7), reflected for example in Article 4 paragraph 7 or in Article 13 (ibid., p. 12). They also mentioned the concepts of: the "internalization of environmental costs" (ibid., p. 7); producer responsibility (ibid., p. 7); and the substitution of hazardous chemicals (ibid., p. 8), which for example can be found applied in Article 5 paragraph c (ibid., p. 13). Furthermore, also in reference to the Charter of the United Nations, the Rio Declaration (ibid., p. 7), Agenda 21, the Basel and the Rotterdam convention (ibid., p. 6), the Parties based their action on the decision of GC UNEP to create a legally binding agreement (SC Secretariat, 2018, p. 7).

The organs are the SC Secretariat, the Conference of the Parties to the Stockholm Convention (SC COP) and the Persistent Organic Pollutants Review Committee

(POPRC). The SC Secretariat's functions are of administrative and coordinated nature (Article 20, SC Secretariat, 2018, pp. 31-32). The SC COP is the main governing body of the convention (Article 19, SC Secretariat, 2018, p. 29); it adopts its decisions at biannual ordinary meetings of the Conference of the Parties (BRS Secretariat, 2014, p. 43). It is to "cooperate […] with competent international organizations and intergovernmental and non-governmental bodies", to take any course of "action […] required for the achievement of the objectives", and to oversee the reporting, laid down in Article 15, and compliance of parties with the implementation of the convention (SC Secretariat, 2018, pp. 29-31); it may also create subsidiary bodies (Article 19 paragraph 5 point a), and was specifically obliged to do so with the POPRC (Article 19 paragraph 6), as it has roles assigned throughout the text of the convention, especially in connection with the listing of chemicals pursuant to the rules laid out in Article 8 (ibid.). The POPRC's voting procedures prescribe consensus, yet in lieu of it "recommendation shall […] be adopted by a two-thirds majority vote of the members present and voting" (SC Secretariat, 2018, pp. 30-31). It has 31 members who are "government-designated experts in chemical assessment or management" (SC Secretariat, n.d.-e).

The convention's parties are to produce a coherent approach on how to "[implement the] obligations under [the] convention", and then to report it to the SC COP as well as to "review and update" it accordingly, while additionally, they also have the duty to partake in international cooperation (Article 7, SC Secretariat, 2018, pp. 17-18). Furthermore, they also are to cooperate by sharing information on substitution alternatives, "including information relating to their risks as well as to their economic and social costs" (Article 9, SC Secretariat, 2018, p. 20). Austria's "Stockholm Convention National focal point" and the "Stockholm Convention Official contact point" are located within the Austrian ministry handling matters on the environment, currently the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (SC Secretariat, n.d.-f). Further duties of the parties include to raise the public's awareness to the issue of hazard and pollution of POPs, and to foster and perform research according to their capabilities, while also providing "technical assistance to developing countries" (SC Secretariat, 2018, pp. 21-24).

The process of how to add a chemical to the "Annexes A, B and C" is laid out in Article 8: According to it, the initiative lies with a party to the convention to suggest the listing of a new chemical to the SC Secretariat (2018, p. 18); in the case of decaBDE, this was done by Norway, already in 2013 (SC COP, 2016b, p. 4). Annex D puts in place

"minimum information requirements screening criteria" that such a proposal has to fulfill: to be included in detail are the substance's "chemical identity, […] persistence, […] bio-accumulation, […] potential for long-range environmental transport, […] and adverse effects"; to be mentioned are also "the reasons for concern" as well as any available additional data or information supporting the proposal's case is to be submitted (SC Secretariat, 2018, pp. 66-67). The SC Secretariat (2018, p. 18) is to receive the proposal and check its conformity. The next stop is the POPRC, which in the case of decaBDE concluded in 2014 that the chemical "is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and environmental effects, such that global action is warranted" (SC COP, 2016b, p. 4). The committee had thus decided "that the screening criteria [had] been fulfilled, disseminated "the proposal and the evaluation" to the parties, and set out to first "prepare a draft risk profile" and subsequently, together with "input from parties and observers […] complete the risk profile" as described in Annex E" (SC Secretariat, 2018, pp. 18-19), which puts in place the rules for the committee to build and expand on the information already contained in the proposal by adding information on "sources, […] hazard assessment, [the chemical's] environmental fate, […] monitoring data, […] risk evaluations [and] assessments, [and the] status of the chemical on the international conventions" (ibid., p. 68). The POPRC had set up "an ad hoc working group" to compile this information, and requested in 2015 "further information" on certain production and use activities, while receiving input from the convention's "parties and observers" (SC COP, 2016b, pp. 4-5) on "socio-economic considerations" in relation with the potential restriction or elimination, as required by Annex F, which lists "efficacy and efficiency of possible control measures in meeting risk reduction goals", the potential alternatives to replace the chemical for use and production activities, "impacts on society, […] waste and disposal implications", and other information (SC Secretariat, 2018, pp. 69-70). An intersessional working group also added further input (SC COP, 2016b, p. 1). The POPRC used this information to "prepare the risk management evaluation" including the information specified in the above mentioned Annex F. To reach a final decision, the committee is to assess the findings of the risk profile and the risk management evaluation, and then "recommend [to the SC COP] whether the chemical should be considered […] for listing" (SC Secretariat, 2018, pp. 19-20); the POPRC did so in 2016, upon which the SC Secretariat distributed the recommendation to the convention's parties (SC COP, 2016b, p. 2), which it is obliged to do at "least six months before the meeting" of the SC COP (Article 21 paragraph 2)(SC Secretariat, 2018, p. 32), at which the SC COP "show

the side, in the precautionary manner, whether to list the chemical" (Article 8 paragraph)(SC Secretariat, 2018, p. 18). Amendments are to be adopted firstly by consensus, in lieu of it "by a three fourths majority vote of the parties present and voting" (SC Secretariat, 2018, p. 32). The SC COP adopted decision SC-8/10 to list decaBDE in Annex A in 2017 (SC COP, 2017, pp. 63-64), the details of the decision will be discussed later on in this subchapter.

The general aim to "reduce or eliminate releases from intentional production and use" is to be achieved through "measures" prescribed in Article 3 (SC Secretariat, 2018, p. 9). Firstly, the "production and use of […] chemicals listed in Annex B" is to be "restricted" (Article 3 paragraph 1 point b), except for an "acceptable purpose[s] or specific exemption[s]" for both "activit[ies]" contained in the before mentioned Annex B (ibid.). "Trace contaminants in products and articles", as well as "chemical[s] as constituents of articles manufactured or already in use [upon] entry into force [of a restriction]", if notified up front, are not affected by this list (ibid.). Additionally "upon notification to the Secretariat" and if no exposure to humans or the environment is to be expected, Parties can "allow the production and use" of a "chemical [used] as a closed-system site-limited intermediate" to "manufacture […] other [non POPs] chemicals" (ibid.); the notification for the chemical is valid for 10 years, after which a new notification must be submitted which will be confirmed "unless the [SC COP] decides otherwise" (ibid.). Specific provisions may exist for each chemical on the list of Annex B (ibid., pp. 52-59). Secondly, the "production and use of […] chemicals listed in Annex A" are to be "prohibit[ed]" pursuant to the rules set up in Annex A (Article 3 paragraph 1 point a sub point I, ibid., p. 9): it will thus be taken off the market. In the same way as in Annex B, Annex A differentiates between specific exemptions for the activity of production or use, as does Annex A include the same rules for trace contaminants and chemicals in articles already manufactured and use as listed in Annex B while the rule on closed-system site-limited intermediates only applies for certain chemicals; other more specific rules an exclusions apply (ibid., pp. 38-51). Thirdly, "import[s] and export[s] of chemicals listed in Annex A" are subject to the following conditions (Article 3 paragraph 1 point a sub point ii): Once all specific exemptions for "a chemical [included] in Annex A" have expired for all Parties, exports of said chemical may only take place "for the purpose of environmentally sound disposal", for which specific criteria are defined in a separate article (Article 3 paragraph 2 point c, ibid., p. 10); its production and use have then been phased out and in order to prevent harm and to take it out of the circle, it may still be moved. A "chemical listed in Annex A for which any production or use specific exemption is in effect or a chemical listed in Annex

B for which any production or use specific exemption or acceptable purpose is in effect", thus a chemical with still a certain role to fulfil and a need to stay on the market, may always be exported if desired to be taken off the market and "dispos[ed]" in an "environmentally sound" manner, but also it may be exported "to a Party which is permitted to use that chemical under Annex A or Annex B", or to a non-Party state if "an annual certification" declaring the state's commitment in general to the principles contained in the Stockholm convention by the applying parts of its provisions and its own legislation aimed at the same goals, with "supporting documentation, such as legislation, regulatory instruments, or administrative or policy guidelines" to be included and the declaration to be sent to the SC Secretariat (ibid., pp. 9-10). For all of those exports the importing state and potential states of transit must be informed in advance and have consented to the movement of the chemical (Article 3 paragraph 2 point b, ibid., pp. 9-10). A chemical on the list of Annex A or B may also only be imported "for the purpose of [the defined] environmentally sound disposal", or "for a use or purpose which is permitted for that [specific] Party under Annex A or […] B" (Article 3 paragraph 2 point a, ibid., p. 9), thus the country must have a legitimate business reason for doing so. In summation, the approach is threefold: the domestic production and use of a chemical is either to be limited or ruled out, and imports and exports are to be ceased (ibid., p. 10). While the initial listing of a chemical in either Annex A or B already reduces its potential to be released into the environment as depending on which category falls into and which exemptions exist, the amount of possible applications is being reduced too, over the course of time less and less states will be able to make use of the chemical and ultimately the only course of action left will be the movement of the chemical for the environmentally sound disposal (ibid., p. 10). Additionally, legislation "preventing the production and use of […] new industrial chemicals" that might fall into the category of POPs as defined by "the criteria in paragraph 1 of Annex D" is to be introduced and include the aforementioned criteria in its assessment strategy of chemicals (Article 3 paragraph 3 & 4, ibid., p. 10); any intentional release of POPs in connection with exempted use or general purpose must be reduced to a minimum (Article 3 paragraph 6, ibid., p. 10).

Pursuant to the provisions described above, various specific exemptions can exist for multiple chemicals for multiple parties. The SC Secretariat is to keep a public database, simply called the Register, which can be found on the SC Secretariat's website (Article 4, SC Secretariat, 2018, pp. 11-12). It consists of three lists on "the types of specific exemptions [of] Annex A and Annex B", on which parties have applied for such exemptions, and on "the expiry dates for each registered specific exemption" (ibid.).

States may either "on becoming a Party, […] register for one or more types of specific exemptions" or when a substance is being listed (ibid.). As described before, the specific exemption cannot be registered for again if all parties have already withdrawn or had their registration expire (ibid.). When decaBDE was added to Annex A in order to be eliminated, specific exemptions for production were foreseen to be given to any party that had "notified the Secretariat of their intention to produce and/or use it in accordance with Article 4" (SC COP, 2017, p. 63). As of 2020, South Korea and Switzerland have done so, next to the EU, which apart from the exception for production also has applied for the exact same specific exceptions for the use activity (SC Secretariat, n.d.-g): "Parts for use in [vehicles that have ceased mass production]", including such parts as "insulation, wiring and harness under the hood", "fuel hoses, fuel tanks and fuel tanks under body", and component relating to airbags, all of which can be connected to fire hazard concerns; "aircraft [applied for] type approval […] before December 2018 and […] received before December 2022 and spare parts for those aircraft"; and furthermore, "additives in plastic housings and parts used for heating home appliances, irons, fans, immersion heaters that contain or are in direct contact with electrical parts or are required to comply with fire retardancy standards, at concentrations lower than 10 per cent by weight of the part" (ibid.). As written in Article 4 paragraph 4, the exemption for additives in specific plastic appliances "[expires] five years after the date of entry into force of" the amendment of the convention (SC Secretariat, 2018, pp. 11-12), while the exemption for "legacy vehicles" lasts until "the end of the service life of legacy vehicles or in 2036" (SC COP, 2017, p. 64). Other possible use exemptions would have been "textile products that require anti-flammable characteristics, excluding clothing and toys" and "polyurethane foam for building insulation", for which the European Union did not apply for (SC COP, 2017, p. 63).

In order to avoid "unintentional production", Article 5 dictates Parties to "minimiz[e] and […] ultimately eliminate" substances referred to in Annex C through measures suitable to attain this goal, including an action plan and implementation plan, substitution of the chemical, and through applying the "best available techniques and best environmental practices" (SC Secretariat, 2018, pp. 12-15). The chemicals listed in Annex C all contain chlorine as a common denominator which for example can be released when the matter containing it is being incinerated.

A norm very relevant to the topic of this thesis is Article 6 of the convention: It creates rules on the identification of potential sources for the release of chemicals listed in the annexes, so called "stockpiles", and "wastes, including products and articles upon

becoming wastes, consisting of, containing or contaminated with the chemical", and how they are supposed to be dealt with (SC Secretariat, 2018, pp. 15-17). Explicitly reiterated is the convention's objective that "a manner protective of human health and the environment" is to be applied, and that stockpiles containing chemicals are to be managed "in a safe, efficient and environmentally sound manner" (ibid.); the influence of various approaches of international soft law are clearly reflected in the wording. Furthermore, the application of best practices in waste management is being mandated as well as a connection to the Basel Convention is being established, with which the SC COP is to "cooperate closely" (ibid.): As Article 6 paragraph 1 point d sub point ii reads, "wastes, including products and articles upon becoming wastes" which contain POPs are to be treated in in one of two fashions: they are either to be "[disposed] of in such a way that the [POP] content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of [POPs]" or they are to be "disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low" (ibid.) Article 6 paragraph 1 point d sub point iii further prohibits the "recovery, recycling, reclamation, direct reuse or alternative uses of [POPs]" out of such wastes (ibid.). With regards to this, it is for SC COP and BC COP to agree upon the "levels of destruction and irreversible transformation necessary" for waste not to be considered to contain POPs anymore, upon which "methods […] constitute environmentally sound disposal", and upon the threshold "concentration levels" for POPs (Article 6 paragraph 2, ibid.); decisions have not been reached yet but the process is underway, as will be explained in the next chapter. While the convention's aim is to take POPs out of the resource cycle in general, very specific exemptions actually already exist for tetra-, penta-, hexa-, and heptabromodiphenyl ether in Annex A: If a Party has notified SC Secretariat and has measures in place to ensure the environmentally sound recycling and disposal, it can allow recycling of contaminated or potentially contaminated articles, as well as "the use and [even the] final disposal of articles manufactured from recycled materials" similarly suspected or indeed contaminated with PBDE except decaBDE (SC Secretariat, 2018, pp. 47-48). The European Union has taken advantage of this possibility until the end of 2019, when it notified the SC Secretariat that it would withdraw from the exemption (Helbig, 2019).

2.3.2 Basel Convention

The Basel Convention is considered "the primary global legal instrument for guiding the environmentally sound management" in the area of hazardous waste (BC COP, 2011).

This international agreement was adopted in 1989 by 53 signatories, and entered into force in 1992 (BC Secretariat, n.d.-b). It was negotiated from 1987 onwards (BC Secretariat, n.d.-c), and drew heavily on the Cairo Guidelines and Principles for the Environmentally Sound Management of Hazardous Wastes adopted in 1987, which provided a non-legally binding "framework for effective and environmentally sound hazardous waste management policies" in reference to principle 21 of the Stockholm Declaration on the Human Environment on the responsibility of states to not cause harm to other states' environment and with regards to the special situation in developing countries (UNEP, 1987). Other international sources for policy in this field were the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods, "formulated in 1957 and updated biennially" (BC Secretariat, 2020, p.5), and UNEP's "first Montevideo Programme on Environmental Law in 1981", in which "the management of hazardous wastes [was] one of three priority areas" (BC Secretariat, n.d.-c). Currently 185 countries and the EU are party to the Basel Convention (BC Secretariat, n.d.-b). The governing body of the convention is the Conference of the Parties (BC COP)(Article 15, BC Secretariat, 2020, pp. 22-28). It is to "[review and evaluate] the effective implementation of the Convention", to create "subsidiary bodies" as needed, and "to consider and adopt amendments [or protocols] to [the] convention" (ibid.). The BC COP's rules of procedure are passed by consensus, and it is aided by the BC Secretariat through fulfilling administrative duties and the production of reports (Article 16, ibid.). "[Taking into account] relevant scientific and technical considerations", the Convention itself can be amended by the Conference of the Parties, which first in good faith have to try to reach consensus, but in lieu of it may be passed "by a three-fourths majority vote of the Parties present and voting at the meeting"; amendments of protocols require two-thirds of votes of the Parties having adopted the protocol (Article 17, ibid.). Annexes may be adopted and amended in similar fashion, though Parties have the right to opt out (Article 18, ibid.).

As can be deducted from the first three preambles and the final one, the objective of the convention is to protect human health and the environment from negative effects that may be caused by what it classified as hazardous wastes and other wastes when these are being created, shipped internationally and disposed in a not environmentally sound manner (BC Secretariat, 2020, pp. 1-7). Thus, the convention's intent is to ensure an environmentally friendly, sound management of waste. The contracting states also held that the state which produces wastes is to be held accountable for doing so and should carry the cost and responsibility to "dispose of [them] in the [state] where they were generated", as this might create an "incentive for [the] environmentally

sound management and for the reduction of the volume of […] transboundary [waste] movement" (ibid.). General obligations listed in Article 4 paragraph 2 involve the minimization of the amount of hazardous wastes and other wastes produced, the disposal of waste within the party state it originates from, as well as the promotion and application of the environmentally sound management of wastes, and the prevention of pollution: "each [party is to] take the appropriate measures" (BC Secretariat, 2020, pp. 10-19). As "the [parties] consider […] illegal traffic in hazardous wastes and other wastes […] criminal" (Article 4 paragraph 3), they are to set up "measures to prevent and punish" it (Article 4 paragraph 4, also Article 9 paragraph 5, ibid.). Illegal traffic is defined in Article 9 as constituting shipment without notification, without obtainment of written consent or with "consent obtained from [states] […] through falsification, misrepresentation or fraud", discrepancies between the material and documentation, and transboundary movement "that results in deliberate disposal of hazardous wastes or other wastes in contravention of this [convention]" (ibid.). The convention also mandates licensing for waste transporters and disposers, proper documentation, packaging, clear labelling and transportation according to international standards (Article 4 paragraph 7, ibid.). Each party to the convention is allowed to enact stricter regulation "to [better] protect human health and the environment", provided that they comply with general international law and the rules provided in this convention (Article 4 paragraph 11, ibid.). International co-operation is to include capacity building and the creation of technical guidelines (Article 10, ibid.)

The convention also aims to protect developing countries specifically: firstly, in the preamble it mentions that developing countries' wish for a reduction in exported wastes to them and that such exports entail higher risk, also because of the limited waste management capabilities of developing countries (BC Secretariat, 2020, pp. 10-13); secondly, explicitly mentioned in Article 4 paragraph 2 point e are developing countries to which exports of hazardous wastes and other wastes are to be forbidden if there is "reason to believe that the wastes in question will not be managed in an environmentally sound manner" (ibid.); while thirdly, the convention prescribes states to only permit wastes as defined under the Convention to be moved transboundary if the exporting state "does not have the technical capacity and necessary facilities, capacity or suitable disposal sites" to comply with the standards of environmentally sound management of wastes (Article 4 paragraph 9 point a, ibid.).

Waste shipments are only to take place among the convention's parties (Article 4 paragraph 5), which may prohibit the import of hazardous wastes or other wastes for

disposal, but also must inform the other parties to the convention (BC Secretariat, 2020, pp. 10-14). They must forbid exports to other parties, which have notified them of such a ban, thus the burden to stop such an export from happening is on the state where the export would originate from (Article 4 paragraph 1 point a and b, ibid.). Before a shipment may take place, the importing state must first be informed of the intended movement, and its "consent in writing to the specific import" must be acquired (Article 4 paragraph 1 point c, ibid.). The aforementioned notifications are to be sent by or through, and to the "competent authority" in the party states involved in the movement (ibid.). Additionally to this "competent authority", each state is to set up a "focal point" (Article 5, ibid.). In Austria, both of them are located within the Austrian ministry handling matters on the environment, currently the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, and for the EU, they are to be found within the Directorate-General Environment (BC Secretariat, n.d.-d).

The duty to notify also applies on transits through non-party states (Article 7, BC Secretariat, 2020, p. 16). The provisions contained in Article 6 set up the procedure for these "transboundary movement[s] between parties" on the basis of the abovementioned notification and written consent (ibid.). The exporting state has the obligation to either "notify, or [delegate to] the generator or exporter to notify, in writing, through the channel of the [exporting state's] competent authority […] the competent authority of the States concerned of any proposed transboundary movement of hazardous wastes or other wastes" (BC Secretariat, 2020, pp. 14-16). A written reply either "consenting […] with or without conditions, denying permission […], or requesting additional information" is to be sent by the "state of import […] to the notifier" as well as "the competent [authorities]" (ibid.). Similarly, the consent of each state through which the movement would take place is first to be received (ibid.). In general, no movements must be allowed without the exporting state having written proof of the "[notifier's receipt] of the [importing state's] written consent" and of "[the notifier's receipt of the importing state's] confirmation of the existence of a contract between the exporter and the disposer specifying environmentally sound management of the wastes" (ibid.). The consent of the importing states may also enable the exporting state to allow multiple shipments of the "hazardous wastes or other wastes having the same physical and chemical characteristics" during the period of one year (ibid.). All "[parties must oblige] each person who takes charge of a transboundary movement of hazardous wastes or other wastes [to] sign the movement document either upon delivery or receipt of the wastes" (ibid.). Upon receipt and "completion of disposal", "the disposer [is to] inform both the exporter and the

[exporting state's] competent authority", otherwise the exporting state is to follow up and "notify the [state] of import" (ibid.). If only the exporting state considers the waste hazardous, the duties of the importing state described in the procedure above are for "the exporter and states of export" to fulfill and comply with the respective duties of the importing state and of "the importer or disposer", and similarly, if only the importing state considers the waste hazardous, it is for "the importer or disposer and states of import" with the duties of the "exporter and [exporting state]" explained above (ibid.).

For the reason of recycling or recovery, the transboundary movement of hazardous wastes and other wastes in general may be allowed to take place (Article 4 paragraphs 9 point b), though Article 4A paragraph 2 puts in place a restriction to this general rule (BC Secretariat, 2020, pp. 10-13). Article 4A is the result of the so called Ban Amendment passed in 1994 aimed at resolving "challenges faced by developing countries and countries with economies in transition in controlling imports of hazardous and other wastes they were unable to manage in an environmentally sound manner but continued to receive" (BC Secretariat, n.d.-e). As there was disagreement on the implementation of the amendment, it only entered into force at the end of 2019 after an agreement had been reached by the Parties (ibid.). Article 4A paragraph 1 deals with waste intended for disposal: it dictates that "[parties] and other [states] which are members of OECD, [EU], Liechtenstein", as listed in Annex VII (BC Secretariat, 2020, p.51), must rule out "transboundary movements of hazardous wastes" intended for "operations" (BC Secretariat, 2020, p. 13) which do not "lead to resource recovery, recycling reclamation, direct re-use or alternative uses", as listed in Annex IV part A (ibid., p.42), to parties, which are not Liechtenstein or members of OECD and EU. Article 4A paragraph 2, which was to enter into force delayed, prescribes the same rule but for operations listed in Annex IV B that actually "may lead to resource recovery, recycling reclamation, direct re-use or alternative uses" (ibid., p.43). In summation, this means that the members of the OECD and the EU plus Liechtenstein are only allowed to ship hazardous waste among themselves, even if the waste is intended for recycling.

The convention differentiates between hazardous wastes and other wastes by sorting them according to their source of generation, their characteristics or composition. Classified as hazardous wastes are any "wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III", and furthermore additionally waste that is classified so "by the domestic legislation of the [party] of export, import or transit" (Article 1 paragraph 1, BC Secretariat, 2020, pp. 7-10); the BC Secretariat maintains a list of national definitions of hazardous

wastes which party states have notified it of (Article 3, ibid.). Annex I distinguishes between 18 waste streams, which are "to be controlled", among them "clinical wastes", "wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives", and "wastes resulting from surface treatment of metals and plastics", as well as between "wastes having as constituents" any of 27 different substances, among them cadmium and mercury (ibid., pp. 34-36). The fourteen characteristics described in Annex III include among others poisonous, toxic and ecotoxic: while the first characteristic is meant to include acute harm to human health, the second characteristic refers to adverse "delayed or chronic effects [to human health], including carcinogenicity", and the third characteristic is to describe "immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems" (ibid., pp. 39-41). Yet, there are more derogation in form of Annex VIII List A and Annex IX List B: Wastes on List A are to be considered hazardous unless they have none of the characteristics described in Annex III, while wastes on List B are not hazardous "unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic" (ibid., p. 36). In relation to the governance of hazardous additives in plastic, while there are also entries for certain specific chemicals, "plastic waste, including mixtures of such waste, containing or contaminated with Annex I constituents, to an extent that it exhibits an Annex III characteristic" (A3210) can be found on List A of Annex VIII (ibid., pp. 55-56). List B in Annex IX includes a long entry on plastic waste (B3010), which soon will be replaced by entry B3011, mainly containing almost contamination free plastic waste intended for recycling and "mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes" (ibid., pp. 65-67). Entries A3210 and B3011 will take effect in 2021 (ibid., pp. 52-71). They could be described as ying and yang as to their opposite scope as plastic wastes falling under category B3011 "are presumed to not be hazardous and, as such, not subject to the [prior informed consent] procedure", and thus are outside of the scope of hazardous waste management, which should lower the barrier to recycling (BC Secretariat, n.d.-f). Classified as other wastes are those falling under the scope of Annex II, which, apart from household waste and waste from the incineration thereof, lists the category of plastic waste (Y48) but with various exceptions (BC Secretariat, 2020, pp.37-38). The entry of plastic waste will take effect starting in 2021, contracting parties may though "impose stricter requirements" (ibid.).

These entries in Annexes II, VIII and IX starting to take effect 2021 are due to the "plastic waste amendments" to the convention, which are already in force (BC COP, 2019b; BC Secretariat, n.d.-g). They were adopted by the BC COP in 2019 upon proposals of Norway and proposed changes by the EU, which also has accepted the amendment (ibid.). The conference furthermore decided to "initiate a partnership on plastic waste", to have technical and financial assistance provided as well as to take initiatives for capacity-building (BC COP, 2019c). It also adopted further actions to address plastic waste in its decision BC-14/13: while it "emphasize[d] the need to adopt a life-cycle approach", it too held that "prevention, minimization and environmentally sound management of plastic waste" is most important and that parties should increase their efforts in this field (ibid.). It also called upon parties to increase their "efforts to create new technologies and processes, or improve existing technologies to remove or reduce the use of hazardous constituents in the production of plastics and at any subsequent stage of their life cycle" (ibid.). The Conference also decided to update the technical guidelines on plastic waste management (ibid.), which exist since 2002, but while comprehensive are outdated (BC COP, 2002). The plastic waste amendments are also due to an increased international awareness to the importance of the issue, as has the link between the environment, chemicals, waste and human health. In the Bali Declaration on Waste Management for Human Health and Livelihood, the BC COP (2008) asked the Parties to "promote awareness-raising of [this] link" and to "improve cooperation between national authorities in the waste, chemicals and health sectors". The Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes picked up on this, stating that the "threat to human health and the environment […] is best addressed through the avoidance of the use of hazardous substances in products and processes as well as through production methods that prevent and minimize waste generation", while also holding that more "access to cleaner production methods as well as to information on less hazardous substitutes for hazardous chemicals and materials" is needed (BC COP, 2011). The BC COP also noted that "the ongoing synergy process in the Chemical and Waste Regime has delivered concrete and positive results, and that it can strongly contribute to improving waste prevention, minimization and recovery" (ibid.).

The Basel Convention covers aspects of electrical and electronic waste too, for which the Nairobi Declaration of 2006 on the environmentally sound management of electrical and electronic waste by the BC COP lays the groundwork (BC COP, 2006). Action in this area includes partnerships programs such as the Partnership for Action on

Computing Equipment (PACE), and the development of technical guidelines (ibid.). The BC COP called upon the parties to "promote clean technology and green design […] including the phase-out of hazardous substances used in production and included in components" as well as to aim for "extended producer responsibilities in the life-cycle management", and further to "improve waste management controls through the establishment of robust national policies, legislation and diligent enforcement, including producers' and traders' responsibilities as well as take-back and recycling schemes and their targets" (ibid.). In 2019, a decision was made to start a follow-up partnership to PACE to build on the progress made so far (BC COP, 2019b).

As Article 4 paragraph 4 of the convention prescribes and this thesis explained before, it is the duty of each party state "to implement and enforce the provisions of [the] convention" (BC Secretariat, 2020, p. 11); the states' enforcement activities are being reviewed by the "Implementation & Compliance Committee", a subsidiary body of the convention, which is "to assist [parties] to comply with their obligations under the [convention] and to facilitate, promote, monitor and aim to secure the implementation of and compliance with the obligations under the [convention]" in a "non-confrontational, transparent, […] non-binding" manner (BC Secretariat, n.d.-h). The most important subsidiary body is the Open-Ended Working Group (OEWG), as it performs all of the material work behind the decisions of the COP: Not only does it "prepare its work plan [to be adopted by the BC COP]", the OEWG is also "to assist the [BC COP] in developing and keeping under continuous review the implementation of the Convention's work plan, specific operational policies and decisions taken by the [BC COP] for the implementation of the Convention" as well as "to consider and advise the [BC COP] on issues relating to policy, technical, scientific, legal […] aspects of the implementation of the Convention" (BC Secretariat, n.d.-a). All committees as a subsidiary body are established on the basis of Article 15 paragraph 5 point e of the Basel Convention (BC Secretariat, 2020, p. 23), and operate on the basis of Rule 26 of the Rules of Procedure (BRS Secretariat, 2014, p. 12), created by consensus as defined in Article 15 paragraph 3 (BC Secretariat, 2020, p.23). Their meetings are in general public, except for "drafting informal working groups" (Rule 29); amendments to the convention must be received in writing and "circulated" on the day before a BC COP takes place (Rule 35)(BRS Secretariat, 2014, pp. 14-15). When a convention member state proposes an amendment of the convention with regards to regulating a specific aspect or type of waste, it normally does so by also providing background information on the reasons for said proposition, as for example Norway's proposal for replacing "entry B3010 unsullied plastic waste in Annex IX" with an updated version

showed (BC Secretariat, 2018). The proposed amendment was received by the BC Secretariat, which sent it to the convention's member states; additionally it was to be discussed within the OEWG, and parties were invited to comment on it; ultimately the matter was referred to be decided at and by the BC COP (BC Secretariat, n.d.-i).

The current work program of the OEWG contains a follow-up to the amendment in the section "scientific and technical matters" to explore further the "effectiveness of the measures" and the impact of plastic waste pollution (BC COP, 2019a). As part of the OEWG, the general technical guidelines on the environmentally sound management of wastes containing or contaminated with POPs are being updated (Twelfth meeting of the Open-ended Working Group of the Basel Convention (OEWG-12), 2020). The technical guidelines are in general "not legally-binding" but they set "a standard that is not less environmentally sound than that required by the Basel Convention" (BC Secretariat, n.d.-j). Contained in them are also the definitions asked for by Article 6 paragraph 1 & 2 Stockholm Convention, most importantly the "low POP content" which means the threshold level establishing whether waste is to be considered hazardous or not (OEWG-12, 2020, p. 15): newly added was decaBDE, for which a threshold of either 50, 500 or 1000 mg/kg as a sum of all the PBDEs was proposed to be set and decided upon at the next BC COP, while "the concentrations of POPs in waste should be determined in accordance with national or international methods and standards" (ibid., p. 14). The "levels of destruction and irreversible transformation", solid wastes that had contained POPs above the before mentioned threshold should have a POP content below the threshold after any processing, otherwise they are to be disposed of as hazardous waste as follows (ibid., p. 16): During the "environmentally sound disposal" of hazardous waste, "pre-treatment" is not to include "blending" or "mixing […] for the purpose of generating a mixture with a POP content below the defined low POP [threshold]" (ibid., pp. 31-33); and the "destruction and irreversible transformation methods" are restricted to the categories "D9: Physico-chemical treatment; […] D10: Incineration on land; [… and] R1: Use as a fuel (other than in direct incineration) or other means to generate energy" (ibid., p. 33). Wastes with a POP content below the threshold are to "be disposed of in an environmentally sound manner" according to processes allowed by national legislation (ibid., p. 53). Parts of these guidelines will be also found in measures of EU legislation on POPs in a later chapter.

3 Governance in the European Union

3.1 The Treaties as a basis for action

On supranational level, the thesis will first explore the legal foundation for European Union (EU) action in the areas relevant for the governance of hazardous additives in plastics as they not only form the basis for the lawfulness of any regulatory measures taken by the EU in these areas, but also set out the principles, guidelines and boundaries which such action is to include and adhere to. As laid out in the previous chapters, rules governing how hazardous additives in plastics are to be treated and policy on how to implement said rules can be and are created on the highest international level. Similarly, this can happen at a lower, while also international, but geographically limited, regional level. The EU, mainly an economical and nowadays also political integration zone, is a perfect example for this. Any action taken on so-called supranational level must be based on sovereign power transferred by the Member States of the EU to the EU. This principle of conferral is defined in Article 4 paragraph 1 and Article 5 of the Treaty on European Union (TEU, 2016), a treaty which, together with the Treaty on the Functioning of the European Union (TFEU), forms today's basis for the institutional framework of the EU and also dictates the EU's competences. Systematically throughout any piece of EU legislation or measure, reference is made to the relevant provision bestowing the EU and its acting institution, be it the European Commission (Commission), the Council of the European Union (the Council), the European Parliament, or ECHA and EFSA, with the legal power to propose, establish or apply said legislation or measure. First established in the European Communities treaties, these competences have been increased over the course of time as the need to address and regulate new issues arose, such as the demand for governance of chemicals due to their increased use and manifold properties. Therefore, a review of supranational law sources for regulating and devising policy will be given, in chronological order.

Historically first, the basis of the EU's competence in this matter can be found in the Treaty establishing the European Economic Community or Treaty of Rome (EEC Treaty), which established the Common Market in 1957 (Directorate-General for Communication, 2020). The Common Market created a joint and, to the extent possible, level playing field for goods (and later labor, capital and services) to be exchanged, as freely as possible, by market participants without custom duties and

tariffs (ibid.). In doing so, it created a free trade area, in which also common rules and policies had to be created and enforced (Article 2 & 3 EEC Treaty) on the goods traded (ibid.). In the 1970s legislation and measures aimed at environmental protection "introduce[d] the notion of 'the polluter pays' for the first time" (ibid.). As issues remained unsolved, leaving barriers to trade in between European Economic Community Member States, the Single European Act (SEA) of 1987 was passed, which changed the EEC Treaty in so far that its Article 13 SEA added Article 8a to the treaty, which mandated the creation of the internal market (nowadays referred to as single market) by the end of 1992, (Single European Act (SEA), 1986, p. 7). Thus, the EU's primary competence for shaping policy is its obligation for harmonization by "adopt[ing] measures for the approximation of the provisions laid down by law, regulation or administrative action in Member States which have as their object the establishment and functioning of the internal market", as written down in Article 18 SEA formulating Article 100a EEC Treaty, which prescribed that "the Council shall [adopt these measures with] a qualified majority on a proposal from the Commission in co-operation with the European Parliament and after consulting the Economic and Social Committee" (SEA, 1986, p. 8). More importantly though, this article also first mentioned that a high level of protection must be applied as the base for any proposed policy action by "the Commission […] concerning health, safety, environmental protection and consumer protection" (ibid.). Member states though still retained the right "to apply national provisions […] relating to protection of the environment" as long as they would not constitute "means of arbitrary discrimination or a disguised restriction on trade" (ibid.).

In Article 25 SEA (1986), Article 130r as part of Title VII Part Three EEC Treaty further defined details on policy to be taken in the area of the environment and its protection, which was also to be considered and included in any other field of policy from then on. Furthermore it elaborated that action undertaken in this area "shall have the […] objectives [firstly] to preserve, protect and improve the quality of the environment, [secondly] to contribute towards protecting human health, [and thirdly] to ensure a prudent and rational utilization of natural resources" (SEA, 1986, p. 11-12). It instituted the polluter pays principle as well as established "the principles that preventive action should be taken, and that environmental damage should as a priority be rectified at source" (ibid.). The creation of policy was bound to consider "available scientific and technical data, environmental conditions […], potential benefits and costs of action or of lack of action, [and] the economic and social development" (ibid.). Any action considered to be taken was restricted "to the extent to which the [above mentioned]

objectives [could] be attained better at [the supranational] level than at the level of the individual Member States" (ibid.). This restriction of the use of a competence conferred to the EU is today laid out in general in Article 5 TEU's principle of subsidiarity, and further defined in the Protocol on the application of the principles of subsidiarity and proportionality (TEU, 2016). Finally, it instituted an obligation for "cooperat[ion] with third countries and […] relevant international organizations" on these matters (SEA, 1986, p. 11-12). Subsequent Article 130s defined the decision taking rules, whereas Article 130t upheld the right of "any Member State [for] maintaining or introducing more stringent protective measures compatible with [the EEC Treaty]" (ibid.).

The Treaty of Maastricht (1992), which entered into force in 1993, converted the European Economic Community into the European Community (EC), subordinating it to the also established overarching [EU] as an "institutional framework". The EC was to now also "promote […] sustainable and non-inflationary growth respecting the environment" (Article 2 EC Treaty, ibid.), and it were to develop "a policy in the sphere of the environment" and "a contribution to the attainment of a high level of health protection" (Article 3 point k & point o EC Treaty, ibid.). Article 130r EC Treaty defining "Community policy on the environment" was expanded: as a new objective the promotion of "measures at international level to deal with regional or worldwide environmental problems" was added as well as the "aim at a high level of protection", and the precautionary principle was introduced (ibid.). Except for this one time mention, this principle was not further defined in supranational law, in contrast to international law, and, as the Commission put it in a communication in 2000, left it "for the [EU] decision-makers and ultimately the courts to flesh [it] out" (European Commission (Commission), 2000). According to this later communication, the precautionary principle is "a risk management strategy", to "be considered within a structured approach to the analysis of risk [comprised of the] three elements risk assessment, risk management, and risk communication" (ibid.). It required action or in-action if "preliminary objective scientific evaluation [provided] reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection" aimed for in Article 130r EC Treaty (ibid.).

The Treaty of Amsterdam (1997) entered into force in 1999. Among other things, in Article 1, it amended the TEU to include the principle of sustainable development in its Article B, and to explain in its recital seven that the EU would be "determined to promote economic and social progress [while] taking into account the principle of

sustainable development and within the context of the accomplishment of the internal market and of reinforced cohesion and environmental protection" (Treaty of Amsterdam, 1997). Amendments to the EC Treaty written down in Article 2 Treaty of Amsterdam added the following: Besides "[the promotion of] a high level of protection [the] improvement of the quality of the environment" was now a new task for the European Community (Article 2 EC Treaty, ibid.). Community policy and harmonization measures on health, safety, environmental protection and consumer protection were now to consider "any new development based on scientific facts" (ibid.). Procedural rules for a Member State "introduc[ing] national provisions based on new scientific evidence relating to the protection of the environment" despite action taken on supranational level were created (Article 100a EC Treaty, ibid.), as well as "a safeguard clause allowing Member States to take provisional measures" prescribed to be contained in any future Community measure (Article 130r para. 2, ibid.).

The Treaty of Nice (2001) mainly aimed at the resolution of institutional issues, but also included a declaration given by the Member States at the 2000 Nice Conference expressing the "determin[ation] to see the [EU] play a leading role in promoting environmental protection in the Union and in international efforts pursuing the same objective at global level", also through "the use of incentives and instruments which are market-oriented and intended to promote sustainable development".

Today, the EU's general competence to shape the governance of hazardous additives in plastic is to be found abstractly in the TEU, based on the Maastricht Treaty and as amended last by the Treaty of Lisbon in 2009, and in specific in the TFEU, developed as described above through continuous amendment of the EEC Treaty, last also by the Treaty of Lisbon, and both of them are primary sources of European Union law (TEU, 2016; TFEU, 2016), as is the Charter of Fundamental Rights of the European Union (EU Charter, 2016). In the EU Charter's Chapter IV on solidarity, the right to just working conditions, health care, protection of the environment, and consumer protection is defined, which since 2009, legally binds EU institutions as well as the Member States when they are transposing or applying supranational law (Publications Office, 2016). In detail, Article 35 on health care prescribes "a high level of human health protection [to] be ensured in the definition and implementation of all the Union's policies and activities" (EU Charter, 2016). Article 37 on environmental protection demands the same for "a high level of environmental protection and the improvement of the quality of the environment" in combination "with the principle of sustainable

development" (ibid.). Similarly, Article 38 mandates "a high level of consumer protection" (ibid.).

The TEU also connects with the rights enshrined in the EU Charter in its Articles 2 and 6 (TEU, 2016). In Article 3 paragraph 3 TEU (2016), the objective to "establish an internal market" and to enable the "sustainable development of Europe based on balanced economic growth [… and among others] a high level of protection and improvement of the quality of the environment". Article 5 TEU (2016) lists the principles of conferral and of subsidiarity, as explained before, as well as the principle of proportionality, which limits "the content and form of [EU] action [to] what is necessary to achieve the objectives of the Treaties". As mentioned before, the TFEU codifies the legal basis for the competences with which the EU may formulate and adopt policies and actions in certain specified areas (Article 1 TFEU, 2016); when doing so, "requirements linked to the promotion of [...] protection of human health" (Article 9 TFEU, 2016) and to consumer protection (Article 12 TFEU, 2016) must be observed and "environmental protection requirements must be integrated into the definition and implementation of these policies and activities" (Article 11 TFEU, 2016). In some areas the EU has exclusive competence, thus barring Member States from doing so unless "empowered by the Union or for the implementation of Union acts" (Article 2 paragraph 1 TFEU, 2016), and in other areas the competence is shared with the Member States, which "may legislate and adopt legally binding acts […] to the extent that the Union has not [or ceased to] exercised its competence" (Article 2 paragraph 2 TFEU, 2016). This division is the result of what is also described in the principle of conferral (Article 5 TEU, 2016): The EU can only act in so far as it has been given the power to do so by the sovereign Member States. Additionally, it is limited to act within the boundaries put in place by the principle of subsidiarity and the principle of proportionality (TEU, 2016).

Exclusive competence falls to the EU in the area of the customs union (Article 3 paragraph 1 points a TFEU, 2016), relating to the free movement of goods (Article 36 TFEU, 2016). Said customs union "shall cover all trade in goods" (Article 28 TFEU, 2016), banning all quantitative restrictions on imports (Article 34 TFEU, 2016) and on exports (Article 35 TFEU, 2016) or any "measures having equivalent effect" in between Member States, except for measures regarding "the protection of health and life of humans, animals or plants" as long as these measures do not "constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States" (ibid.). This means that under these provisions a Member State only could ban certain goods from its market if no supranational legal act has harmonized the Member State's

law on this good or the sector it belongs to on the basis of another EU competence area, such as for example the internal market and if the health and life of humans, animals or plants, is actually provably at risk. Both the area of the customs union and the internal market are relevant for the governance of hazardous additives in plastics as they are areas which encompass legislation of products and of chemicals and waste as a good. The "internal market; […] the environment; consumer protection; [and] common safety concerns in public health matters, for the aspects defined in [the TFEU]" are areas relevant to this paper, in which the EU and its Member States share the legislative competence (Article 4 paragraph 2 TFEU, 2016). The policy on the internal market, developed from the Common Market as described before, has the main objective that "an area without internal frontiers [is created] in which the free movement of goods, persons, services and capital is ensured" (TFEU, 2016); its proper functioning is to be achieved by the approximation of the EU's Member States (Article 26 TFEU, 2016). Through ordinary legislative procedure and after requesting the Economic and Social Committee's opinion, the European Parliament and the Council is to harmonize Member States' law establishing and enabling the functioning of the internal market (Article 114 TFEU, 2016). Action taken based on this article has in the past also been seen controversial, as it had allowed the Union to regulate a very many aspects of Member States' law, but as Manko (2015) points out, the European Court of Justice clarified in Case C-376/98 that "a genuine link between the adopted measure and the removal of existing obstacles in the internal market" must exist, therefore denying a "general competence to regulate any aspects of the functioning of the internal market" (ibid.). In any legislative endeavor the Commission, the European Parliament and the Council are to ensure a high level of protection regarding health, safety, environmental protection and consumer protection, while "taking account in particular of any new development based on scientific facts" (TFEU, 2016). Still, situations may arise where a Member State wishes to leave in place or even create new law in a harmonized area contradicting the supranational act: in the first case it may do so if it informs the Commission of its intention and the relevant reason which may be any of the "major needs referred to in Article 36 [TFEU (2016)], or relating to the protection of the environment"; in the second case, the Member State specifically must be facing a problem due to the harmonization measure, and its proposed legislation has to be "based on new scientific evidence relating to the protection of the environment or the working environment" TFEU, 2016). In neither case the Member State's "provisions [must not be] a means of arbitrary discrimination or a disguised restriction on trade between Member States and […] they shall [not] constitute an

obstacle to the functioning of the internal market" (ibid.). Both the Commission and any Member State may seek legal remedy against such action in front of the Court of Justice of the European Union (CJEU)(Article 114 TFEU, 2016).

Furthermore, other areas of shared competence are consumer protection (Article 169 TFEU) and specific aspects of public health (Article 168 TFEU). These are important to mention in the context of governance of hazardous additives in plastics as they are the basis for supranational legal acts for example on product safety regarding toys and on food safety which has specific provisions for recycled plastic as a food contact material. The policy area of consumer protection has the goals "to promote the interests of consumers and to ensure a high level of consumer protection" while it is to aim at adding "to protecting the health, safety and economic interests of consumers" as part of "measures adopted pursuant to Article 114 in the context of the completion of the internal market" (ibid.). Despite such measures, Member States may "[maintain or introduce] more stringent protective measures" as long as they are "compatible with the Treaties" and "the Commission [has been] notified" (ibid.). In the policy area of public health, the protection of it is to be ensured by "measures in the veterinary and phytosanitary fields" aimed at "improving public health, preventing physical and mental illness and diseases, and obviating sources of danger to physical and mental health", resulting in "a high level of human health protection" (ibid). Finally, cooperation with "competent international organisations [such as the WHO] in the sphere of public health" is mandated (TFEU, 2016).

Also an important area of competence shared between the EU and its Member States is the environment. In Article 191 TFEU (2016), the former Article 130r EC Treaty, the policy objectives are the "[preservation, protection and improvement] of the quality of the environment", the "[protection of] human health", the "prudent and rational [utilization] of natural resources", and the resolution of international environmental problems, explicitly mentioning "climate change". Again, "a high level of protection" is to be pursued, and, corresponding with the policy objectives, "the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source, and that the polluter should pay" provide general cornerstones of any policy action (TFEU, 2016). Considered in the policy should be "available scientific and technical data, environmental conditions in the various regions of the Union, the potential benefits and costs of action or lack of action, and the economic and social development of the Union as a whole and the balanced development of its regions" (ibid.). In the international

environmental context, "the [EU] and the Member States [have a duty to] cooperate with […] the competent international [organizations]", such as the UNEP. Article 192 paragraph 3 TFEU (2016) is the legal basis for the EU's Environmental Action Programmes (EAP), which are adopted with the formal legal act of a decision by the European Parliament and the Council in ordinary legislative procedure in combination with an opinion of the Economic and Social Committee and the Committee of the Regions; in the same manner, measures and actions in this policy area are to be adopted, with a few exceptions in cases of "provisions primarily of a fiscal nature, town and country planning, quantitative management of water resources, [...] land use, with the exception of waste management, [...] energy sources and [...] supply", where unanimity is required in the Council for an adoption, after consultation of the two committees mentioned before (Article 192 paragraph 1 & 2 TFEU, 2016). As the second sentence of Article 192 paragraph 3 TFEU (2016) reads, "measures necessary for the implementation of these [EAPs are to] be adopted under the [procedural rules described above]". Article 193 TFEU (2016) displays that in this policy area the EU chooses a minimum harmonization approach, similarly to the area of consumer protection, as "any Member State [may maintain or introduce] more stringent protective measures [if they are] compatible with the Treaties" following notification of the Commission.

The main driver of the Union's general interest is the Commission: It is to develop proposals for new legislation and is entirely independent in doing so (Article 17 TEU, 2016); often it takes said prescribed initiative by publishing either green or white papers. Green papers are meant to initiate a "discussion on given topics at [the] European level" with the relevant stakeholder, often in connection with a consultation process (Publications Office, n.d.-a). Input gathered in this way then finds its way into white papers in which the Commission proposes to take concrete action in a certain area. Similarly to green papers, white papers are to start a discussion but also include "the European Parliament and the Council in order to arrive at a political consensus" (Publications Office, n.d.-b). Based on this discussion, the Commission then produces a legislative proposal; it also has to decide which form of legal act is best suited to achieve the desired goals, with respect to the principle of subsidiarity and proportionality. These legal acts are delimited in Article 288 TFEU (2016): regulations, directives, decisions, recommendations and opinions, with regulations and directives being the most important form of secondary EU legislation. They will be discussed in detail in the chapter on the REACH regulation and on the RoHS2 directive. Another important form of legal act is written down in Article 290 TFEU (2016), which permits

the legislator to create legislation that delegates the adoption of non-legislative acts to the Commission. The regulation on chemicals, REACH, for example makes use of such delegations when it comes to adding new substances to various lists on certain aspects regulating of said substances, by adding to the regulation's annex. This power is limited to "acts of general application to supplement or amend certain non-essential elements of the legislative act" (TFEU, 2016). As the Publications Office (2018) describes in their summary on Article 290 TFEU, "the legislator can thus concentrate on policy direction and objectives without entering into overly detailed and often highly technical debates". A Commission's proposal is the first mandatory step in the legislative process for either regulation, directive or decision before the legislator may either decide to adopt, modify and adopt, or not adopt this legal act: Mainly, the legislators are the European Parliament and the Council of the European Union (the Council) acting jointly and adopting together pursuant to the ordinary legislative procedure (Article 289 paragraph 1 TFEU, 2016), which is laid out in Article 294 TFEU (2016), mandating "the Commission [to] submit a proposal to the European Parliament and the Council", followed by "the European Parliament [adopting] its position at first reading and [communicating] it to the Council", which then "approves the European Parliament's position [and adopts] the act concerned […] in the [European Parliament's position's] wording". Otherwise a second round of readings takes place, where further amendments may be made; if this round fails too, a third and last one in form of a Conciliation Committee will try to reach a common and final position on the proposed legislation; the process can also fail, with the act not being adopted. Alternatively, according to the special legislative procedure (Article 289 paragraph 2 TFEU, 2016), the legislator can also be "the European Parliament with the participation of the Council, or […] the latter with the participation of the European Parliament". Two other actors partake in the legislative process in certain policy areas on specific cases, though they have no legislative power of their own: the Economic and Social Committee Articles (Articles 301-304 TFEU, 2016) and the Committee of the Regions Articles (Articles 305-307 TFEU, 2016). Their role is to provide input in form of a founded opinion for the legislative process, either because they have been "consulted by the European Parliament, by the Council or by the Commission where the Treaties so provide" or when "these institutions consider[ed] it appropriate", or because the committee is acting "on its own initiative" (TFEU, 2016); the Committee of the Regions is automatically informed of any request to the Economic and Social Committee. Yet, as Article 288 TFEU (2016) states, opinions "have no binding force".

Lastly, the EU as an legal entity on its own (Article 47 TEU, 2016) "may conclude agreements with one or more States or international organizations" in the area of common foreign and security policy (Article 37 TEU, 2016), pursuing the objectives to "help develop international measures to preserve and improve the quality of the environment […] in order to ensure sustainable development" (Article 21 TEU in combination with Article 23 TEU, 2016). In Article 205 TFEU (2016), a connection is established with Article 21 TEU by outlining the external action of the EU. Article 216 TFEU (2016) reiterates Article 37 TEU, but also expands on it in so far as that the EU is competent to conclude an international agreement "binding [both] the institutions of the [EU] and […] its Member States" alike if it "is necessary in order to achieve, within the framework of the [EU]'s policies, one of the objectives referred to in the Treaties, or is provided for in a legally binding [EU] act". This is the legal basis for the EU being party to treaties such as the Basel, the Rotterdam and the Stockholm Convention. Similarly in Article 217 TFEU (2016), the EU can formally establish "reciprocal rights and obligations, common action and special procedure" with non-Member States or international organizations. Furthermore, Article 220 TFEU (2016) actually requires the EU to "establish all appropriate forms of cooperation with the organs of the [UN] and its [specialized] agencies, […] and the [OECD]". This explains why the EU partakes in processes in these organizations, shaping global policy as described in the previous chapters. As a result, EU policy is a result of its own domestic decisions as well as international ones; yet the decision on which topics to implement in legislation remains exclusively with the EU and the Member States. The next chapter will now elaborate on this domestic policy.

3.2 EU policy

3.2.1 Environmental Action Programme 7 & 8

As mentioned in Chapter 3.1., Article 192 paragraph 3 TFEU (2016) mandates the EU to formulate policy in the field of the environment. The result is presented in form of the Environmental Action Programme (EAP), of which seven have been adopted so far (Commission, 2020b), with a proposal for number eight having been only having been published recently in mid-October 2020 (Commission, 2020c). As an outcome of the first four of them during the timeframe of 1973 till 1992, "about 200 pieces of [environmental] legislation covering", among others, "safeguards in relation to chemicals" have been enacted (Council of the European Union, Representatives of the

Governments of the Member States, 1993). The most recent adopted one, the EAP7, was titled "Living well, within the limits of our planet" and was aimed at the timeframe from 2013 till 2020 (Commission, 2020b).

The seventh Environmental Action Programme (EAP7) drew a connection to the Johannesburg Plan of Implementation with regards to the governance of chemicals (The European Parliament & the Council, 2013, p. 8) and further legitimized its relevance with the Rio20+ decisions as well as makes direct reference to the "[aim] at a high level of protection, […]the precautionary principle, […] the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay" (ibid., p. 8). It's priority objectives included the focus on resource efficiency (ibid., p.13): The Commission had set out the goal "to turn the [EU] into resource efficient, green and competitive low-carbon economy" with a focus on "efficient, sustainable use of resources", described in the "Roadmap to a Resource Efficient Europe and the Roadmap for moving to a competitive low-carbon economy" (ibid., p. 39). Specific reference in this context was made to "rising resource prices, scarcity, raw material supply constraints and dependency on imports" (ibid., p. 40) while keeping in mind growth and sustainable economic development (ibid., p. 41). The concept of a "circular economy" in order to consider the "whole lifecycle" of articles in connection with "[environmental sustainability]" was to be fostered with measures on "Ecodesign" and "Ecolabel[ing]", and to create "green jobs and growth" (ibid., pp. 45-46). "Waste prevention and management" was to be stepped up, including "turning waste into resource" with measures laid out "in the Roadmap to a Resource Efficient Europe" (ibid., pp. 48-49). The EU was to begin "limiting energy recovery to non-recyclable materials [while] ensuring high quality recycling, [and] developing markets for secondary raw materials", as well as to increase its efforts on hazardous waste management (ibid., p. 49). Therefore, the "[EU's] waste legislation" was to be updated by "applying the waste hierarchy" and "internal market barriers for environmentally-sound recycling activities [to be] removed (ibid., p. 55), "and existing […] recycling [and] recovery […] targets reviewed" with the objective "to move towards a lifecycle-driven circular economy" (ibid., p. 49); furthermore, "environmentally sustainable products" were to be guaranteed through "reviewing product legislation"(ibid., p. 54). The result of this priority objective was the "Circular Economy Action Plan", including the "Circular Economy Package" with "EU Strategy for Plastics in the Circular Economy" (Commission, 2019; Commission, 2020d). Another priority objective was environmental and health protection from risk (The European Parliament & the Council, 2013, p.13):

this was to be achieved by stepping up efforts within REACH to tackle endocrine disruptors, and by developing "a comprehensive approach to [minimizing] exposure to hazardous substances, including chemicals in products" (ibid., p. 61); EAP7 also prescribed that "long-term actions with a view to reaching the objective of a non-toxic environment" were to be found (ibid., p. 63), which was to lead to a strategy for a non-toxic environment (ibid., p. 65), which was postponed (Commission, 2019) and later picked up again by the eighth Environmental Action Programme (EAP8).

The proposal for EAP8 has only been released recently (Commission, 2020c). The EAP8 is to run until 2030 and to include these, for this thesis thematically relevant, objectives: the EU is to"[advance] towards a regenerative growth model […], [to decouple] economic growth from resource use and environmental degradation, and [to accelerate] the transition to a circular economy" (ibid., p. 12); this is a follow up to the 2013 Circular Economy Action Plan. Also, the EU is to "[pursue] a zero-pollution ambition for a toxic free-environment" (ibid., p. 12), which is an updated version of the EAP7's objective to draw up a strategy for a non-toxic environment.

3.2.2 Circular Economy Action Plan & Plastic Strategy

The first "Circular Economy Action Plan" is the result of the Commission applying a holistic approach to with waste generation and resource efficiency. The Commission had intended to amend and update the entire waste legislation as it had laid out in the EAP7, until 2014 (Commission, 2020d). Instead, it presented "an EU action plan for the circular economy" to "[close] the loop" (Commission, 2015) by connecting through recycling the first and last stage resources take on the path during production, consumption, and waste. It defined out specific measures for each stage to ensure permeability for resources throughout the stages of the cycle (the author will limit the points mentioned to those relevant to hazardous additives in plastics): As a lot of problems arising at later stages are already caused by decisions on the design stage, "the […] recyclability of products" was to be increased as part of "the Ecodesign Directive" (ibid.). As part of actions to be taken on waste management, the Commission proposed to increase recycling targets for plastic waste, and to support compliance with regulation. The most important targets were set for "end-of-waste" stage: the Commission set out "to develop quality standards for secondary raw materials where they are needed, in particular for plastics", and to "develop analysis and propose options on the interface between chemicals, products and waste legislation, including on how to reduce the presence and improve the tracking of

chemicals of concern in products" (ibid.). As "the presence of hazardous chemical additives [could] pose technical difficulties" and in order to grow the amount recycled plastic, the new strategy was to be developed (ibid.); it was launched in 2018 as the "EU Strategy for Plastics in the Circular Economy" (Commission, 2018a). In this document, the Commission identified and proposed to take action on the "high dependence on virgin fossil feedstock, [the] low rate of recycling and reuse of plastics, and [the] significant leakage of plastics into the environment", summarizing the issues a circular resource flow was facing at that time (ibid.). It also justified to take action by referring to the negative effects POPs contained in plastic can cause if they "migrate into the environment" (ibid.). The issues that legacy additives can cause when not taken out of the waste stream were to be resolved by taking them into consideration already at the product design stage, and in this context, electrical and electronic equipment was singled out as not having done so in the past (ibid.). As another target, the Commission decided to evaluate how, when and for which substances waste defined as hazardous can actually be recycled in a way that produces safe secondary resources as the substance of concern has been eliminated or separated during the process (ibid.). To achieve this, the information missing to the recycler on the plastic's potential hazard contents was to be solved by increasing the "information flow [in the] supply chain" and the plastic's traceability (ibid.). In general, the hazardous additives in connection with products and waste were to be analyzed and a process to look into the "interface between chemicals, products and waste policy" to be started (ibid.). This process is to assess how the framework regulation on chemicals (REACH) and Waste Framework Directive (WFD) could be optimized so that waste can reenter the resource cycle after recycling more smoothly (Commission, 2018b). A Commission communication was issued in 2018, in which the Commission pointed out four specific issues that needed to be overcome to create circularity (ibid.): As information on the articles contained in the waste to be recycled is said to be missing or not available to the recycler, the Commission commissioned "a feasibility study" to look into possible applications of "information systems" (ibid.). Legacy additives contained in the waste were to be addressed with "a specific decision-making methodology to support decisions on the recyclability of waste containing substances of concern" (ibid.). The end-of-waste criteria were to be defined more concisely, and new guidance material was to be produced to assist in distinguishing which waste would be needed to be classified as hazardous (ibid.).

3.2.3 A new Circular Economy Action Plan & Chemicals Strategy for Sustainability

A new Commission took over in late 2019 after the European Parliament elections, and presented its political agenda soon after. In its "new Circular Economy Action Plan" announced in 2020, the Commission identified "key product value chains", in which it desired to propose measures to be taken (Commission, 2020e). Among them was electrical and electronic equipment, for which a "review of EU rules on restrictions of hazardous substances in electrical and electronic equipment and [the creation of] guidance [in order] to improve coherence with relevant legislation, including REACH and Ecodesign" were to be undertaken (ibid.). Furthermore, the risks of micro plastics were to be investigated (ibid.). As for "secondary raw materials" in the context of "chemicals policy and legislation", the circularity of materials was to be increased by "development of solutions for high-quality sorting and removing contaminants from waste [… and] of harmonised systems to track and manage information on substances", and "the classification and management of hazardous waste so as to maintain clean recycling streams [was to be improved]" (ibid.). Details on how to achieve this were to be disclosed in the "Chemicals Strategy for Sustainability" (ibid.), which was published in mid-October 2020 (Commission, 2020f). The Commission introduced it as its "new long-term vision for the EU's chemical policy" designed to lay down the policy to only "[produce] and use safe and sustainable chemicals" in the EU (ibid., p. 4). Similar to the waste pyramid, the Commission explained its strategy with a three tiered pyramid, aimed at both "[protecting] health and the environment" and fostering "innovation" (ibid., p. 5): At its top, thus to be applied first, is the rule to make use of "safe and sustainable chemicals" as this will protect human health and the environment the most while creating growth as a byproduct of the "development of [these] chemicals"; the second tier is the approach to "[minimize] and control" dangerous chemicals by applying "risk management measures" and "[promoting] modern production processes"; while at the bottom of the pyramid is the "elimination and remediation" of hazardous chemicals "in waste and secondary raw material", to be supported by the "[promotion of] chemical recycling, waste management technologies, [and] decontamination solutions" (ibid., p. 5). The Commission will aim to implement this strategy in its future proposals throughout product, chemicals and waste legislative.

3.3 Specific legislative acts

3.3.1 Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

The European Union Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) sets up a complex regime on how substances, mixtures and products are to be dealt with in four parts, which are the Registration of substances (Title II), Evaluation (Title VI), Authorization (Title VII), and in Title VIII Restriction (Regulation (EC) No 1907/2006 (REACH), 2020). If one of the above is listed in the category of Restriction, it may not be manufactured, used or be placed on the market at all (Article 3 paragraph 31, ibid.). Within the scope of the regulation, a substance is meant to be "a chemical element and its compounds […] including any additive necessary to preserve its stability" (Article 3 paragraph 1, ibid.); if a solvent is added, it becomes a mixture, "composed of two or more substances" (Article 3 paragraph 2, ibid.), and an article is "an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition" (Article 3 paragraph 3, ibid.). Not covered by the regulation are radioactive substances, "non-isolated intermediates", waste which is declared to be neither "a substance, mixture or article within the meaning of […] this regulation" as well as other substances which are covered by other EU legislation (Article 2 paragraph 1 point a & 2, ibid.). Various exemptions exist, for example exempted from the first three steps registration, evaluation and authorization are medical products, food and feedstuff, any substance listed in Annex 4 which includes very common elements such as sugars, water or nitrogen, while Title VIII on Restrictions applies though (Article 2 paragraph 5, ibid.). Furthermore, polymers are exempted from registration and evaluation (Article 2 paragraph 9, ibid.), and substances already registered if they are being recovered within the EU and only they are the product of the recovery process (Article 2 paragraph 7 point c, ibid.).

The initial spark for REACH was the Commission's White Paper on a strategy for a future chemicals policy in 2001, in which in force legislation was examined, and new scientific knowledge together with lessons learned were formed into proposals for new and updated acts, provisions and instruments. The main reason for this was the formulation of the "[European] Community's sustainable development strategy", which aimed at assuring economic prosperity and growth in a socially responsible way while protecting human health and the environment (Commission, 2003), and should be seen

in the context of the Rio Declaration and Agenda 21. Other reasons for the proposal of updated legislation were the "prevention of the fragmentation of the internal market, increased transparency, [and] integration with international efforts" (ibid.). Incentivizing spending on research and development and innovation were also reasons (ibid.). While existing substances registered under REACH's precursor Directive 67/548 made up nearly all "of the total volume of all substances on the market", they were not required to undergo the same tests and assessments "for possible risks to human health and the environment" as new substances were to before being able to be placed on the market (ibid.). The Commission thus wanted to close this gap in knowledge, and is also aimed at shifting the burden of responsibility: so far, "the public authorities [had been] responsible for the [risk] assessment instead of the enterprises that produce[d], import[ed] or use[d] the substances", making the "process […] slow and resource intense" (ibid.). Often though test results were available to provide proof that substances should be regulated (ibid.). Also the overall procedural rules under the old regime slowed down any decision-taking process (ibid.). The Commission stated that "final risk assessments […] therefore only [had] been completed for a small number of substances" (ibid.). The shift in the burden of proof in the form of the industry having to provide "information on the hazards, risks, and risk reduction measures for chemicals" showing that they do not pose a threat would solve the before mentioned issues (ibid.). As the Commission had chosen the legal instrument of a regulation, the question of subsidiarity had to be answered: while the old directive was not as extensive, the proposed regulation encompassed new areas (ibid.). The Commission reiterated the Council and the European Parliament's expectation "for a strong system of EU legislation in order to achieve a high level of protection of health and the environment while at the same time ensuring a level playing field for all economic actors in the Internal Market", and that due to chemicals potential harm to the environment if they cross the border they should be regulated uniformly Union wide (ibid.). Connecting the regulation to its legal basis, the Treaties, the proposal included references to the principles set out in the Treaties' defined policy areas, the environment, public health, customs union and internal market, by referencing the "high level of human health and environmental protection", "the precautionary principle" and the "free movement of substances" (ibid.), which are also included throughout the adopted and in force act, explicitly mentioned for example in Article 1 REACH, which further includes the aim to "[enhance competition] and innovation" (REACH, 2020). The Commission also directly drew the connection to events and global level by linking the regulation to the "goal of achieving sustainable development", to "Johannesburg World Summit on sustainable

development", and to "the Strategic Approach to International Chemical Management" (The Commission, 2003). Updating the legislation regulating chemicals was therefore also in part an act of bringing it in line with the current global consensus, which the Member States had helped shape.

As a regulation, REACH is part of secondary EU legislation, as described in Article 288 TFEU (former Article 249 EC Treaty after its amendment by the Nice Treaty), and thus REACH is "binding in its entirety and directly applicable in all Member States" (Article 141, REACH, 2020), and has general application, meaning that its provisions do not need to be transposed into national Member State law, unlike EU directives. National law should still be adapted to reflect a regulation's provisions, which supersede any national provisions in conflict with them while not putting those national provisions out of force. In the case of a conflicting national provision being enforced, legal remedy may be sought through court proceedings, if necessary ultimately ending at the European Court of Justice (TFEU, 2016). A regulation is the EU's choice for a more stringent consistent law within its application area and legal field, stronger than harmonization achieved by a directive (ibid.). As REACH was first drafted in 2003, the legal basis for the Commission's proposal for this regulation was Article 95 EC Treaty on "the approximation of the provisions laid down by law, regulation or administrative action in Member States which have as their object the establishment and functioning of the internal market" (The fifteen Member States: Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom, 2002). Moreover, Article 95 paragraph 3 EC Treaty required a high level of protection to be sought for proposals concerning health, safety, environmental and consumer protection (ibid.). REACH's legislative development took place in the form of the Co-decision procedure (Publications Office, n.d.-c) under Article 251 EC Treaty, which had been created with the Treaty of Maastricht in 1993 as Article 189b EC Treaty, further developed with the Treaty of Amsterdam in 1999 and amended by the Treaty of Nice in 2003 with the aim of strengthening the role of the European Parliament in legislative measures, and thus also indirectly strengthening the participation on lawmaking of the European Parliament's electorate, the citizens of the member states (The fifteen Member States: Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom, 2002). The Co-decision procedure was later transposed into Article 294 TFEU by the Treaty of Lisbon in 2009, now known as the ordinary legislative procedure, with which most of the EU's secondary law today is passed at first reading (89 percent of the acts proposed in the timeframe 2014-2019)(European

Parliament, n.d.). With 28 percent at 1st, 25 percent at early 2nd, 25 percent at 2nd, and 22 percent at 3rd reading, this was quite different in the timespan of 1999-2004 (ibid.), and as also REACH was only passed in late 2nd reading. The act passed all relevant legislative steps within three years, from October 29th 2003 until December 18th 2006 (Publications Office, n.d.-d). The European Parliament had proposed amendments on the second reading which subsequently the Commission adopted and the Council of the EU approved (ibid.). While it officially entered into force on June 1st 2007, major parts were first applicable from June 1st 2008 and June 1st 2009 on (Article 141, REACH, 2020).

The entrance into force of REACH on June 1 2007 (Article 141 paragraph 1) activated Article 75 and created the European Chemicals Agency (ECHA) as "a body of the Community" which enjoys legal personality (Article 100, REACH, 2020). Its precursor was the European Chemicals Bureau, which was established in March 1993 and had "five principal technical and scientific work areas: classification and labelling, new substances, testing methods, existing substances and import/export" (Commission, 1996). The ECHA has a Management Board, an Executive Director, a Committee for Risk Assessment, a Committee for Socioeconomic Analysis, a Member State Committee, a Forum For Exchange of Information on Enforcement, a Secretariat and a Board of Appeal (Article 76, REACH, 2020). The Management Board is to "adopt a general report for the [past] year, to develop a work program for the following year [and] a multi-annual work program" (ibid.). It is the governing body of ECHA and as such has the power to "appoint the members of the Agency's committees" and "the Board of appeal" (ibid.) and consists of a representative per Member State, who is to be "appointed by the Council", plus representatives of the Commission and the European Parliament (Article 79 & 81, ibid.). The Executive Director administers the agency "in the interests of the [EU]". He is appointed by the Management Board (Article 83 & 84, ibid.). The Secretariat of ECHA manages various databases established by REACH and the Regulation on classification, labelling and packaging of substances and mixtures (CLP), which hold information on the properties and the classification of chemicals as substances and mixtures (ibid.). Its main tasks are to fulfill its role in the registration, evaluation, authorization and restriction regime, and to "[provide] guidance" to the national authorities of Member States (Article 77 paragraph 2, ibid.). The Board of Appeal is staffed by three experienced experts in "the field of chemical, natural sciences or regulatory and judicial procedures", selected from "a list of candidates proposed by the [Commission]" and "adopted by the Management Board" (Article 89, ibid.). Appeals are permissible for the agency's rejection of the

submitted registration, for decisions on data sharing, and for decisions on dossiers (Article 91, ibid.). "The Board of Appeal may exercise any power which lies within the competence of the Agency or remit the case to the competent body of the Agency for further action" (Article 93, ibid.). Remedy to Board of Appeal decisions or inaction of the ECHA can be sought at the Court of first Instance or the European Court of Justice (Article 94, ibid.). The Member State Committee provides opinions to ECHA in the evaluation and authorization procedures (Article 44, 45, 51, 58, 59, 76, ibid.).

In the processes of restriction and granting an authorization, ECHA's Committee for Risk Assessment (RAC) and the Committee for Socio-economic Analysis (SEAC) are key players. The RAC is the ECHA expert body "relating to risks to human health or the environment", while the SEAC deals with "the socio-economic impact of possible legislative action on substances" (Article 76, REACH, 2020). Their members are selected by the Management Board from a list compiled by the Executive Director from candidates proposed by the Member States, which must at least be represented by one person on each of the committees; "a broad range of relevant expertise" is to ensure quality of the opinions produced (Article 85, ibid.). Their main role is to produce opinions of the Agency either on the "Executive Director's request" or as part of the evaluation, authorization and restriction procedure (Article 77, ibid.). They decide on these opinions either by consensus or majority in lieu of the first, in which case the opinion is to contain both the majority and minority positions (ibid.). For separation of work they can create working groups and assign tasks to them (Article 76 & 86, ibid.). The scientific and technical resources available to the committees are those available to the Member States, for their respective member; the Member States have a duty to assist (ibid.). A rapporteur takes the lead in the process resulting in the formulation of an opinion; they "shall […] act in the interests of the [EU]" (ibid.). The member states can nominate experts to support committee working groups (Article 87, ibid.). The committee members' names are public and they must disclose any prejudice or conflict of interest (Article 88, ibid.) to provide for maximum transparency and independency.

The Commission also has very active roles assigned throughout REACH. The legislators have given it the power to create delegated acts: for example, it is to decide on the height of the fees that are to be paid in connection with certain procedures of the regulation and adopt a Commission Regulation for it (Article 74, REACH, 2020). As the competent authority to guarantee the functioning of the internal market, it also has the obligation to take a decision whether the "provisional measures" taken by a Member State "to protect human health or the environment" are justified (Article 129): despite

complete harmonization by REACH, meaning that Member States must not legislate in this area unless explicitly allowed to do so in the supranational legislative act , they can act preemptively in case they have reason, based on scientific and technical information, to believe that a chemical is dangerous to life or the environment (ibid.). Furthermore and most importantly, it has also been delegated the power to amend the regulation: also with a Commission Regulation, it can decide upon test methods and standards and thus amend Annexes VIII through X (Article 13), and to add chemicals to the authorization and restriction lists by amending Annexes XIV (Article 58) and Annex XVII (Article 73, ibid.). For any such decision the Commission has to apply the procedure described in Article 133 paragraph 4 and has to consult a committee first before adopting its decision (ibid.). As explained in the beginning, REACH was formulated before the entry into force of the Lisbon Treaty. The article therefore refers to the in general out of force Council Decision 1999/468/EC, but as Article 12 of Regulation (EU) No 182/2011 states, Article 5a of Decision 1999/468/EC is still to be applied, while a "right of scrutiny [may be invoked by] the European Parliament and the Council" (Article 11) to have the Commission "review the draft implementing act" before deciding and communicating to the European Parliament and the Council how it will proceed (Regulation (EU) No 182/2011, 2011). The committee mentioned here is the "Committee established under the Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals" (Commission, n.d.). It is instituted permanently and also has duties assigned to it by the CLP regulation, the Regulation on POPs, and the Regulation concerning the export and import of hazardous chemicals (ibid.). For its role to deliberate on authorization and restriction it acts as a "Regulatory Procedure with Scrutiny Committee", as provided by Article 5a of Council Decision 1999/468/EC (1999). It is "composed of the representatives of the Member States", and passes its votes with a qualified majority (ibid.), "defined as at least 55% [of the Member States] comprising at least 65% of the [EU] population" with less than 4 negative votes (Article 16 TEU, 2016). After the committee takes a vote and thus formulates an opinion, either the Council or the European Parliament can halt and block the process before the Commission takes a decision (Council Decision 1999/468/EC, 1999). While formally the Commission has the final say in all of these processes involving authorization and restriction of a chemical, upon closer inspection it actually are indirectly the Member States and the European Parliament who decide whether such a measure will be adopted or not.

The Member States play a crucial role; they can propose restrictions and nominate the pool of experts out of which the committees' members will be drawn; they can exercise

power indirectly through the Commission's committee, and also directly in the Council during the scrutiny voting process where they can even veto decisions. On the other hand, their obligations are as follows: They are to set up a national, well-funded competent authority for the tasks assigned to it by REACH (2020). They are to make its resources available to their fellow nationals of the three committees and to ECHA. The Member States and the competent authorities are to cooperate and exchange information among each other. They have a duty to reporting and to "inform the general public about the risks arising from substances" (ibid.). National help desks are to be set up making available free guidance to the public. Furthermore, the Member States are in charge of enforcing the rules established by REACH and are to put in place "provisions on [effective, proportionate and dissuasive] penalties applicable for infringement" (ibid.).

One more player is important: the Competent Authorities for REACH and CLP, in short CARACAL. While it is comprised of the authorities of the Member States, various observers in form of trade and business associations, nongovernmental and international organizations have associated with it as it provides a forum for cooperation and information exchange. It also assists the Commission with legislative preparations and implementations (Commission, 2020g).

One of the regulation's aims is to place the responsibility for economic activity with those who are carrying it out, away from the authorities. The shift in the burden of is included in Article 1 paragraph 3, stating "that it is for manufacturers, importers and downstream users to ensure that they manufacture, place on the market or use [only safe] substances ", justifying the provisions with the precautionary principle (REACH, 2020). The definition for "placing on the market" for the purpose of the regulation includes "supplying or making available, whether in return for payment or free of charge, to a third party" (Article 3 paragraph 12, ibid.). In order to distribute responsibilities or obligations written down in the regulation, one has to distinguish between three different groups. The legislators decided to implement these groupings by defining each actor separately: the starting point is the definition of the downstream user, who can be "any natural or legal person established within the Community, other than the manufacturer or the importer, who uses a substance, either on its own or in a, in the course of his industrial or professional activities (ibid.). A distributor or a consumer is not a downstream user, while a re-importer exempted pursuant to Article 2(7)(c) shall be regarded as a downstream user" (Article 3 paragraph 13, ibid.). The definition of distributor is anyone "who only stores and places on the market a

substance, on its own or in a mixture, for third parties" and includes retailers (Article 3 paragraph 14, ibid.), while a manufacturer is "[anyone] established within the Community who manufactures a substance within the Community" (Article 3 paragraph 9, ibid.), and an importer is "[anyone] who is responsible for import" (Article 3 paragraph 11, ibid.). In conclusion, the first group includes manufacturers and importers, the second group consists of consumers and distributers including retailers and the third group are downstream users, who all share the responsibility to comply with the regulation before partaking in economic activity on the internal market. As mentioned before, the Commission had referenced the high level of protection and the free circulation on the internal market to answer the demands of the principle of subsidiarity, which is also reflected in Article 1 paragraph 1 & 3 (ibid.).

Another important definition is that of "actors in the supply chain, [which] means all manufacturers and/or importers and/or downstream users in a supply chain", thus excluding consumers (Article 3 paragraph 17, REACH, 2020). Information on substances must be exchanged within the supply chain (ibid.). For example, safety data sheets produced during the Registration process must be passed down along the supply chain, if a substance or mixture is hazardous according to the CLP regulation, or if "a substance is persistent, bioaccumulative and toxic or very persistent and very bioaccumulative", or if substance is subject to authorization (Article 31 paragraph 1, ibid.). For certain substances the safety data sheet is to be transmitted upon request (Article 31 paragraph 3, ibid.). The information contained on the safety data sheet is to encompass a variety of information including "fire-fighting measures; [...] exposure controls/personal protection; [...] and disposal"(Article 31 paragraph 6, ibid.). Apart from the duty to communicate information down the supply chain (Articles 32 & 33, ibid.), "new information on hazardous properties" and "any other information that might call into question the appropriateness of the risk management measures" are to be transmitted also up the supply chain to prevent potential hazards (Article 34, ibid.). If a downstream user uses substance or mixture for uses that they are not registered for, they have to draw up the chemical safety report (Article 37) on the basis of the steps described in Annex XII, including the "development of exposure scenarios" in combination with a "risk characterization" (ibid.), and they are also required to communicate this information to ECHA (Article 38, ibid.). All of these measures are aimed at increasing safety and preventing harm during economic activities.

As mentioned before, REACH regulates chemicals in tiered regime consisting of four parts. For them rules exist which build on top of each other are put in place by system

of referencing to the relevant annexes. The first part is the registration of substances, which is aimed at implementing the precautionary principle and at generating data on chemicals so to say automatically before an activity is to be carried out with it on the internal market: summarized under the principle of "no data, no market", registration is made mandatory for all substances, mixtures and articles if they are intended to be manufactured or placed on the market within the EU (Article 5, REACH, 2020). The rules on registration are laid down in Article 6, 7, and 21: substances or in mixtures must be registered if they are manufactured or imported in a "in quantities of one tonne may or per year" (ibid.); polymers below a quantity one ton per year and which "consists of 2 % weight by weight (w/w) or more of such monomer substance(s) or other substance(s) in the form of monomeric units and chemically bound substance(s)" are exempted (Article 6, ibid.). If a producer creates articles which contain a substance "intended to be released under normal or reasonably foreseeable conditions of use" in a quantity of more than one ton per year, the substance must be registered (Article 7 paragraph 1, ibid.). Under certain conditions including that a substance which "presents a risk to human health or the environment" is involved, a downstream user can be forced by the ECHA to register substance (Article 7 paragraph 5, ibid.). Substances are registered for specific use, for which only one initial registration is necessary (Article 7 paragraph 6, ibid.). The requirements on which information is to be submitted in a registration are distributed in Article 10, which references to the relevant annexes for the corresponding quantities: Annex VI is referenced for requirements that must be fulfilled for all quantities, Annex VII for quantities of 1 or more tons, Annex VIII for quantities of 10 or more tons, Annex IX for quantities of 100 or more tons, and Annex X for quantities of 1,000 tons or more (ibid.). The first requirement is the submission of a technical dossier, and depending on the amount of the substance that the registrant is producing or using, the dossier must contain study summaries or in certain cases robust study summaries (as defined by Annex I) which are to include "physicochemical, toxicological and ecotoxicological information" and to meet certain standards laid out in the Annexes VII to XI (ibid.). Also to be included is a "guidance on safe use of the substance" for substances of at least 100 tons or more per year per registrant (Article 10 & 12, ibid.) as well as a testing proposal, for which guidelines are set up in Annex XI (ibid.). The second requirement can be a chemical safety report (Article 10), if the substance quantity the registrant uses is above 10 tons or more per year (ibid.). A chemical safety assessment is to be performed which must consist of a "human health hazard assessment, […] physicochemical hazard assessment, […] environmental hazard assessment [and a] persistent, bioaccumulative and toxic (PBT) and very

persistent and very bioaccumulative (vPvB) assessment" (ibid.). Depending on the chemical's hazard classification, which is based upon the CLP regulation, additionally an exposure assessment and the risk characterization can be required as well (ibid.). As part of these assessments, "appropriate measures to adequately control the risks identified" are to be communicated in safety data sheets prepared according to Annex II (Article 14, ibid.). If an article contains substances subject to the authorization regime, the producer also has the responsibility to notify the agency if "the substance is present in quantities totaling over 1 ton per producer per year" and has "a concentration of [above] 0.1 % weight by weight", except if "exposure to humans or the environment during normal reasonable for foreseeable conditions of use including disposal" can be ruled out (Article 7 paragraph 2 & 3, ibid.). The notification must fulfill certain criteria, among them that it "shall include a brief description of the use(s) of the substance[s] in the article" (Article 7 paragraph 4, ibid.). ECHA is to review the registration request on its completeness, and to inform the EU "Member State within which the manufacture takes place or the importer is established (Article 20, ibid.). It is up to the registrant to keep the information on his registration up-to-date and to report any changes to the ECHA (Article 22, ibid.), reaffirming the concept that it is the registrant who bears the responsibility.

The second tier of REACH's regulatory regime is Evaluation. In this step, one of the ECHA's tasks is to review testing proposals that it has become aware of through registration or downstream user report; in reference to the CLP regulation, Article 40 defines which substances should be looked at first (REACH, 2020). In order to avoid the duplication of efforts and to receive input, the ECHA will inform stakeholders of its intention to have tests carried out (ibid.). The agency will then take a decision on the testing proposal, accepting, modifying or rejecting it, and inform the registrant until when they have time to carry out the testing (Article 40, ibid.). ECHA also has to carry out regular "compliance checks" on the adequacy for already existing registrations, the article actually requires it to have checked at least 20% by the end of 2027, a measure to ensure the quality of the information in the ECHA registration database (ibid.) On registrations being reviewed, a decision must be taken within a year whether they conform or not (Article 41, ibid.). The second major task for ECHA is substance evaluation: On substances selected based on the criteria hazard and exposure information as well as the overall amount of a substance being in use, the agency is implementing and carrying out a three-year "rolling action plan" considering an opinion of the Member State Committee and supporting a risk-based approach (Article 44, ibid.); this is the Community Rolling Action Plan (CoRAP). The respective authority of

the Member State in which the registrant operates, is to carry out the evaluation as the "competent authority", but it may delegate it to another body (Article 45, ibid.). ECHA relays any results to the Commission and the other stakeholders (Article 48, ibid) and disseminates them to the public (Article 54, ibid.).

Authorization is the third part of REACH's regime. As the name indicates, this process limits the use of chemicals and might disrupt the internal market; therefore, as mentioned before in the preamble of the Commission's proposal and in Article 1 of REACH, Article 55 again reiterates that, with respect to the principle of subsidiarity, the aim of the authorization process is to balance out economical with human health and environmental interests (REACH, 2020). Authorizations must not undermine restrictions. As a measure to reduce risk and hazard, the substitution of "substances of very high concern" is introduced, and "manufacturers, importers and downstream users applying for authorisations" are forced to compare alternatives the basis of "their risks, and the technical and economic feasibility" (Article 55, REACH, 2020). In order to implement this authorization process, a list of substances is presented in Annex XIV, which will be the point of reference for provisions of this part of the regime. Article 57 lays out which properties substances must present to be added to this list. This includes substances being classified and defined by regulation CLP as "carcinogenic category 1A or 1B"; "germ cell mutagenic category 1A or 1B"; "in the hazard class reproductive toxicity category 1A or 1B; adverse effects on sexual function and fertility or on development" (ibid.); or as persistent, bioaccumulative and toxic as defined by Annex XIII; very persistent and very bioaccumulative as defined by Annex XIII; and endocrine disruptors which, in reference to the precautionary principle and high-level protection for human health and the environment, "give rise to an equivalent level of concern to [substances with the other before mentioned criteria] and which are identified on a case-by-case basis in accordance with the procedure set out in Article 59" (Article 57, ibid.). The above-mentioned Annex XIII specifies in detail "criteria for the identification of persistent, bioaccumulative and toxic substances (PBT substances), and very persistent and very bioaccumulative substances (vPvB substances) as well as the information [to] be considered [when] assessing the P, B, and T properties of a substance" (REACH, 2020). Apart from Annex XIV, the Authorization List, there is also the Candidate List of Substances of Very High Concern for Authorization or SVHC list; it serves as "a candidate list for the eventual inclusion" in the Authorization List (Article 59 paragraph 1, ibid.). Substances to be examined are either designated by the Agency's work program or on request of the Commission. The first step is the preparation of a dossier on the substance which potentially fulfills the

criteria, as described above, of Article 57. This dossier is then sent to the Member States. Similarly, any Member State can initiate this process as well. ECHA then launches a public stakeholder consultation, while meanwhile the Member States or the Agency can issue discuss the proposal and provide input and insights. If no opinions are received, the substance is to be automatically included in the SVHC list; in any other case, the Member State Committee is to assess the proposal (ibid). In order to adopt the proposal and list the substance, unanimity is required in the committee; in lieu of it the matter is referred to the Commission which will decide on whether to include the substance, depending again on an opinion taken by its committee with qualified majority (REACH, 2020).

Article 58 puts in place the procedure to include a substance in the authorization list: ECHA first has to produce a list of so-called "priority substances" additionally to the SVHC list on the basis of the chemical's "PBT or vPvB properties or wide dispersive use or high volumes" (REACH, 2020); choosing one substance of this list, ECHA has to prepare a recommendation for authorization, which is to explain the proposal in detail: apart from information describing the chemical's properties, "transitional arrangements" such as entry into force or sunset clauses, and "uses or categories of uses" defining exemptions from the obligation to obtain an authorization first are to be included (REACH, 2020). ECHA then is to consult the Member State Committee. Furthermore, it shall then hold a public stakeholder consultation and "update its recommendation" accordingly, which it subsequently is to send to the Commission (ibid.). The decision on inclusion in the Annex XIV authorization list is ultimately taken by the Commission on the basis of an opinion of the REACH Committee acting as the Regulatory Procedure with Scrutiny Committee described earlier on in this chapter (Article 58, ibid.). Inclusion of a substance on its own in the list does not preclude it to be restricted as a substance in an article in form of a Annex XVII measure (Article 58 paragraph 6, ibid.). If "new scientific evidence" emerges and the substance loses its hazard classification which has put it in the scope of the criteria set out in Article 57, it is to be taken off the Authorization list, again by a decision of the Commission under the scrutiny procedure (Article 58 paragraph 8, ibid.). No substance shall be placed on the market unless an exempted use exists, an authorization has been granted specifically to the user or their immediate downstream user, or a sunset date has not yet expired (ibid.). Research and development are exempted from the scope of the authorization list, and furthermore "uses in plant protection products […], in biocidal products […], [as fuels in motors or combustion plants]" are allowed (ibid.). Uses in food contact materials are also exempted from the application of the Authorization list

as more specific legislation exists in form of Regulation (EC) No 1935/2004 (Article 56, ibid.).

The procedure for authorization decisions is as follows (Article 64, REACH, 2020): The ECHA receives the application. The RAC and SEAC check whether all formalities have been satisfied. The ECHA publishes broad information on the application and the intended use, launching a public consultation. The RAC and SEAC may request more information from the applicant and must considered input from third parties. The committees then form a draft opinion. The RAC has to consider the general risk potential, the proposed risk management, and risks of alternatives. The SEAC makes "an assessment of the socio-economic factors" and looks into the aspects of substitution (ibid.). The ECHA sends the drafts to the applicant, the Commission and the Member States. The applicant may comment on the drafts. The RAC and SEAC formulate their final positions, taking into account any input received. The ECHA again distributes them and publishes part of them. The Commission's committee adopts its opinion with a qualified majority, and the Commission takes a decision to grant or not grant an authorization (REACH, 2020). The Commission has to grant an authorization (Article 60 paragraph 1 & 2) if "the risk to human health or the environment from the use of a substance arising from the intrinsic properties" can be "adequately" managed and the probability of a major hazard "due to the physicochemical properties of the substance […] is negligible" and the RAC's opinion has been considered (REACH, 2020). "All discharges, emissions and losses, including risks arising from diffuse or dispersive uses" are to be considered too (ibid.). If a substance fulfills the more severe hazard criteria listed in Annex XIII "an authorization may only be granted if it is shown that socio-economic benefits outweigh the risk to human health or the environment arising from the use of the substance and if there are no suitable alternative substances or technologies". The Commission must respect the RAC's and SEAC's opinion and weigh various arguments against each other, including substitution alternatives. The formal criteria for an application for authorization are laid down in Article 62. "Authorisations may be reviewed at any time", but will be reviewed automatically after a certain amount of time (ibid.).

The fourth part of REACH's regulatory construct is the restriction process. A list of enacted restrictions can be found in Annex XVII. If a restriction is in place, it can limit the placing on the market or use of "a substance on its own, in a mixture or in an article" which must be complied with (Article 67, REACH, 2020). There are two tracks leading to a restriction: The first one is a restriction proposal issued by the Commission

for chemicals that fall into the severest "hazard classes carcinogenicity, germ cell mutagenicity or reproductive toxicity, category 1A and 1B" and if consumers are to be protected; the REACH Committee / Regulatory Procedure with Scrutiny Committee is to vote on its opinion with a qualified majority, and depending on the reaction to the vote by the Council and the European Parliament, the Commission will take a decision (ibid.) The second track leads through Article 69 to 73, if "unacceptable risk to human health or the environment, rising from the manufacture, use or placing on the market of substances, which needs to be addressed on a Community-wide basis" requires action in form of an restriction (REACH, 2020). The thesis will now follow the restriction of decaBDE through the five process steps.

In 2012, decaBDE was added to the "Candidate List of Substances of Very High Concern" (Commission, 2017). As discussed before in the chapter on the Stockholm Convention, Norway had submitted a proposal to eliminate decaBDE already in 2013 under the rules of the convention. The restriction process under REACH can either be initiated by a Member State or the Commission (Article 69, REACH, 2020). In this case, it was the latter who asked ECHA "to prepare a dossier", which it delivered in 2014 to the RAC and SEAC (Commission, 2017). If a Member State initiates the process, it would also have to prepare the dossier. The RAC and SEAC reviewed the dossier's compliance with the formal requirements and reported back to the initiator (REACH, 2020). During the next year, the RAC and SEAC weighed the pros and cons of an absolute ban; meanwhile the public consultation was underway, and the inputs led to various exemptions in the drafts (Commission, 2017). The RAC, considering the effects on "the risk to human health or the environment", was to deliver its opinion nine months later, while the SEAC had twelve months to assess the "socio-economic impact" (Articles 70 & 71, REACH, 2020). The RAC and SEAC adopted their opinions in close proximity in 2015, and ECHA passed them on to the Commission, which drew up a draft restriction for the REACH Committee / Regulatory Procedure with Scrutiny Committee (Article 73, Commission, 2017). In 2016, "26 member states voted in favour and two voted against the proposal" (Buxton, 2016). As neither the European Parliament nor the Council objected, the amendment to REACH's Annex XVII was adopted by the Commission on February 9th, 2017 (Commission, 2017).

As of March 2nd, 2019, decaBDE is generally restricted to "be manufactured or placed on the market as a substance", except for certain uses in the production of airplanes and motor vehicles, and their spare parts (Commission, 2017). More relevant for this thesis though is paragraph 2 point c stating that decaBDE must not "be used in the

production of, or placed the market in […] an article, or any part thereof, in a concentration equal to or greater than 0.1% by weight" in combination with paragraph 4 declaring that this does not apply to "electrical and electronic equipment within the scope of Directive 2011/65/EU", which is the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment, RoHS2 (ibid.). In conclusion, while the restriction for articles reduces the amount of decaBDE to 1,000 mg/kg or 0.1% by weight for any plastic within the scope of REACH, it does neither apply to electrical and electronic equipment where it has been used most in the past, nor to waste; though it should apply to recycled plastic resin in general when the recycled material leaves the waste stream and reenters the market as a secondary resource material.

3.3.2 Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures

The Regulation on classification, labelling and packaging of substances and mixtures (CLP) entered into force in 2009 and was first applied partially parallel to its predecessor, the Directive on the labeling of dangerous substances (Regulation (EC) No 1272/2008 (CLP), 2008a). Full application of CLP materialized in 2015 (ibid.). CLP also amended various parts of REACH and its annexes (CLP, 2008b). Similar to REACH, CLP's need for existence is justified with the aim to "ensure a high level of protection of human health and the environment as well as the free movement of chemical substances" (Article 1 paragraph 1, ibid.), establishing a connection to the objectives of the European Union in its treaties. In the context of "the efficient functioning of the internal market" and the principle of subsidiarity, CLP argues for harmonization of "the requirements applicable to [substances, mixtures and articles]" (ibid.). While on the international level the GHS provide a uniform guidance for classification and labeling, the EU decided to only partially integrate elements of GHS into CLP while adding its own "40 years of experience [in the area of] chemical legislation" (CLP, 2008a). The regulation can also be seen put into context of other global developments by the expressed mention of SAICM in the preamble (ibid.).

CLP's and REACH's approaches match as they place the burden for economic activity onto the chemical's manufacturer, importer or downstream user insofar as that it is them who must comply before they can take advantage of the benefits of the internal market (ibid.). As their obligation under CLP they must also "classify those substances not placed on the market that are subject to registration or notification under [REACH]"

(Article 1, CLP, 2008b). They are also to make their substance's or article's hazardousness easily visible and comprehensible by applying predefined labels to it on the packaging such as "hazard pictograms", "signal words", "hazard statements", and "precautionary statements" and by disseminating standardized information through the safety data sheets which they are obliged to create by the provisions of REACH (ibid.). CLP sets the rules on how those partaking in the internal market are to be made aware of a chemical's hazardousness (ibid.). As CLP is a regulation with direct effect in every EU Member State alike REACH and because of their respective aims, it is clearly visible that CLP is designed to complement REACH by adding the rules on how chemicals are to be classified regarding their hazardousness. In order to fulfill this objective, CLP creates "a list of substances with the harmonized classifications and labeling elements" and combines them with information on "classifications and label elements […] not […] submitted […] as part of the registration under [REACH]" which "manufacturers and importers of substances [are to notify the ECHA of]" in order to form a comprehensive "classification and labeling inventory of substances" (Article 1 paragraph 1 point c, d & e; Article 42, ibid.). Waste is outside of the scope of CLP (Article 1 paragraph 3, CLP, 2008b). An important definition is that of the "concentration limit [which] means a threshold of any classified impurity, additive or individual constituent in a substance or in a mixture that may trigger classification of the substance or the mixture, respectively" (ibid.). The regulation makes extensive use of its annexes to define the properties of a chemical to be classified. So called "cut-off values" are set up for classifying substances and mixtures "[containing] a substance classified as hazardous, whether as a component or in the form of an identified impurity or additive" by concentration levels (Article 11, ibid.). There is a differentiation between the physical, health or environmental hazard, separating chemicals into "hazard [classes]" (Article 3, Annex I, ibid.); furthermore, "within each hazard class, [criteria] specifying hazard severity" further separate them into different "hazard [categories]" (ibid.).

A derogation from the rule that the manufacturer or importer or downstream user has to perform the classification exists for "substances of the highest concern with regard to health and to the environment" (CLP, 2008a). Such substance fall onto the categories of "respiratory [sensitization], category 1", "germ cell mutagenicity, category 1A, 1B or 2", "carcinogenicity, category 1A, 1B or 2", "reproductive toxicity, category 1A, 1B or 2", and a general fallback clause category in order to address any emerging issues, in line with the precautionary approach principle (CLP, 2008b); they are further specified in Annex I (Article 36, ibid.). As Article 37 decrees, it is up to the initiative of a Member

State competent authority or manufacturer, importer or downstream user to suggest a "harmonized classification and labeling of [a] substance" (ibid.). Such a "proposal" is to be sent to the ECHA, where the Committee for Risk Assessment will form an opinion which the ECHA will hand on to the Commission (ibid.). A positive decision will lead to an amendment of CLP's Annex VI by a delegated act adopted by the Commission (ibid.).

3.3.3 Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

RoHS2 obliges EU Member States to keep electrical and electronic equipment with certain specific substances in a certain "maximum concentration value by weight" off the internal market (Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS2), 2011). While directives are binding to for one, and up to all, Member States, depending on who they are addressed at, they cannot establish direct effect as a regulation does. It first needs to go through a process of transposition which is the implementation of its norms into national acts of the Member States. They create harmonization only to the degree that their provisions prescribe (Article 288 TFEU, 2016).

The directive applies also to "chemical [and] waste management legislation" (Article 2, RoHS2, 2011). Electrical and electronic equipment is defined as "equipment dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields"; the exact devices governed by this directive are listed in Annex I (ibid.). The substances which are not to be placed on the market and articles are listed in Annex II of the directive: PBDE may make up a "maximum concentration value [of 0.1 %] by weight in homogeneous materials" which can be "one material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes" (ibid.). Under certain conditions reuse is allowed in "auditable closed loop business-to-business return systems". It is up to the member states to enforce the obligations created by the directive's provisions which distinguish between manufacturers, authorized representatives, importers and distributors who are to comply with the aim of the directive to keep electrical and electronic articles off the market (ibid.). The CE marking as the "declaration of conformity" must be applied while the conformity of the device is

presumed automatically; the obligation that the equipment actually fulfills the criteria of the CE marking such as creating and holding available technical documentation for the product is to be fulfilled by the actor who wishes to place the product on the market (ibid.). Penalties put in place by the member states are to thwart deception (ibid.). The list in Annex one contains among other things "large [and] small household appliances, IT and telecommunications equipment, [and] consumer equipment" (ibid.). The Commission, assisted by a committee, is in charge of the management of the list of restricted substances and has the power to create delegated acts to amend the annexes (ibid.).

3.3.4 Regulation (EU) 2019/1021 on persistent organic pollutants

The Regulation on persistent organic pollutants (EU POPS) is not only the EU's implementation of the Stockholm Convention, to which it is a party, but also of "the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants" (EU POPS, 2019b). As the Stockholm Convention's provisions create binding obligations to which the EU has to live up, it has chosen to transpose most of the norms of the convention and cast them into a regulation. The objective of the regulation is the same as those mentioned in the treaties: "the protection of human health and the environment", in connection with POPs and the precautionary principle (Article 1, EU POPS, 2019a). Linkages to other international agreements and declarations such as the Rio Declaration, the SAICM, the Sound Management of Chemicals and Waste Beyond 2020, the Rotterdam Convention, and the Basel Convention can be found in the preamble (EU POPS, 2019b). The main instrument of the Stockholm convention, the prohibition or restriction of "manufacturing, placing on the market and use of substances" is established in Article 3 in combination with Annex I and II, which set up the respective list (EU POPS, 2019a). No restrictions apply to the substances in articles that have been in use before the regulation entered into force (ibid.). The Convention's Article 8 listing process for "release reduction" is implemented in the regulation's Article 6 while the list is contained in Annex III (ibid.). DecaBDE are listed in Annex I: in substances it constitutes an allowed unintentional trace contaminant if "equal to or below 10mg/kg (0.001 % weight)", in mixtures or articles, "up to 500mg/kg" (0.05% weight) before "the manufacturing, placing on the market or use" of it is prohibited (ibid.). The other existing exceptions are of those also contained in the Stockholm Convention, but one entry sticks out: "electric and electronic equipment within the scope of Directive 2011/65/EU" RoHS2, subject to "Member

States [having] report[ed] to the Commission by December 2019 in accordance with the Convention" (Annex I) (EU POPS, 2019a).

Most of the definitions in Article 2 are referring directly to the definitions of the REACH and the Directive 2008/98/EC on waste (WFD) (ibid.). The regulation combines the convention's provisions on the management of POPs stockpiles with those of the EU's waste legislation. Article 5 declares any stockpile of a listed substance for which no more use exemption is foreseen to be treated as waste under the definition of the regulation's Article 7, while stockpiles above "50 kg, consisting of or containing [a listed] substance" with still permissible use applications must be reported every year to "the competent authority of the Member State" (ibid.). Furthermore, Article 3 paragraph 6 states that "waste consisting of, containing or contaminated by any substance listed in Annex IV is regulated by Article 7" (ibid.). In general, decaBDE is subject to Article 7 as the threshold value prescribed in it for PBDE including decaBDE is set at 1000mg/kg (0.1% weight) (ibid.). Valid "disposal and recovery" processes for waste having a higher content than 1% per weight of PBDE or decaBDE exclusively are "D9 Physico-chemical treatment", "D10 Incineration on land", and R1 energy recovery (ibid.). No recycling is allowed above that threshold. The exceptions of the list in Annex IV Part 2 do not apply for decaBDE in plastics as no valid classification options are listed nor is decaBDE on the list itself, while tetra-, penta-, hexa- and heptabromodiphenyl ether may have a maximum content of 10000mg/kg (1% weight) to apply for "permanent storage [which are considered to be] safe, deep, underground, hard rock formations, salt mines [or] landfill site for hazardous waste" (ibid.). The goal of waste prevention is mentioned in Article 7 as well (ibid.).

In conclusion, plastic waste with a decaBDE content of more than 1000mg/kg is considered hazardous waste, and must be incinerated, chemically recycled, or its energy recovered; below this threshold might be allowed to be recycled mechanically, other conditions might apply though.

3.3.5 Directive 2012/19/EU on waste electrical and electronic equipment, Directive 2008/98/EC on waste, and Commission Decision 2000/532/EC List of Waste

As these legislative acts are very much intertwined when it comes to the disposal of hazardous waste and recycling of plastics, they will be discussed together. All of them aim at the

Directive 2012/19/EU on waste electrical and electronic equipment (DWEEE) mandates Member States to install separate collection systems for waste electrical and electronic equipment (WEEE) in Article 5, thereby forcing the producers of the equipment to pay for the pollution caused by their product, and to "prohibit the disposal of separately collected WEEE which has not yet undergone the [proper] treatment" (Article 6 & 8), meaning that when not being "prepar[ed] for re-use, and recovery or recycling", "as a minimum [plastics containing brominated flame retardants] have to be removed from any separately collected WEEE" and that "these substances, mixtures and components shall be disposed of or recovered in compliance with Directive 2008/98/EC" (Annex VII, DWEEE, 2012).

The waste hierarchy set out in Article 4 of the WFD forces Member States to prioritize recycling over recovery and disposal (Directive 2008/98/EC (WFD), 2008). This is important to consider when dealing with plastics waste with decaBDE in an amount that puts in the scope of hazardous waste. The List of Waste described in Article 7 WFD and implemented by the Commission in form of Commission Decision 2000/532/EC is to "include hazardous waste" and is to "be binding as regards [to the] determination of the waste which is to be considered as hazardous waste" (ibid.). Furthermore, the article states that Member States are allowed to diverge on what to classify as hazardous waste, and that in general a "reclassification of hazardous waste as nonhazardous waste [is not to] be achieved by diluting or mixing the waste with the aim of lowering the initial concentrations of hazardous substances to a level below the threshold for defining waste as hazardous" is not allowed (ibid.). The definitions in the List of Waste state that a "hazardous substance" is to be understood in the context of the CLP regulation's classifications of Annex I parts 2 to 5 (Commission Decision 2000/532/EC (LoW), 2000). It refers back to the WFD's Annex III for "assessing the hazardous properties of waste", mentioning the concentration limits contained in it; among the different types of wastes on the List of Waste, there are 13 entries concerning plastics, but only one of them is marked as hazardous: entry "17 02 04* glass, plastic and wood containing or contaminated with hazardous substances" (ibid.). Article 18 WFD (2008) puts in place a "ban on the mixing of hazardous waste", which is to include the meaning of "the dilution of hazardous substances"; an exception exists though for when "best available techniques" are applied, "the protection of human health and the environment" is ensured, and "the mixing operation is carried out by an establishment" licensed to do so according to Article 23 (WFD, 2008). Article 10 WFD prescribes that "hazardous substances, mixtures and components from hazardous waste" are to be "removed", and treated accordingly (WFD, 2008).

3.3.6 Directive 94/62/EC on packaging and packaging waste

Directive 94/62/EC on packaging and packaging waste (2018) establishes recovery and recycling targets for different packaging waste categories (Article 6). In general, it defines "plastic [as] a polymer within the meaning of [REACH] to which additives may have been added" (Article 3, ibid.). As for waste it refers mainly to the WFD. While it sets maximum thresholds only for certain heavy metals in Article 11 (ibid.), in Article 9 paragraph 1 (ibid.), the directive mandates Member States to "ensure that [...] packaging may be placed on the market only if it complies with [the following] requirements": "Packaging shall be designed, produced and [commercialized] in such a way as to permit its reuse or recovery, including recycling, in line with the waste hierarchy, and to [minimize] its impact on the environment when packaging waste or residues from packaging waste management operations are disposed of", and that it is to "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" (Annex II, ibid.). It is therefore up to the Member States to put in place national legislation to regulate the amount of hazardous additives in plastic packaging in so far as that the Member States are able to meet their recycling quotas for plastic packaging waste. As the effectiveness of these provisions depends on the Member States cooperation, the Commission is empowered to "examine the feasibility of reinforcing [these] requirements [and to] submit a report to the European Parliament and to the Council, accompanied, if appropriate, by a legislative proposal" (Article 9 paragraph 5, ibid.).

4 Conclusion and outlook

4.1 Research question 1 - Which legislation and policy is there for additives in plastics?

There is legislation for additives in plastics on international level in form of the Basel and Stockholm Convention, and on supranational level in form of REACH in combination with CLP, RoHS2, and EU POPS, as well as legislation of waste with provisions of more general application for the definition of hazardous waste, such as Directive 2012/19/EU on waste electrical and electronic equipment, Directive 2008/98/EC on waste, and Directive 94/62/EC on packaging and packaging waste.

As for policy on international level, various instruments exist: Guidelines such as those produced by BC COP and SC COP and their subsidiary bodies; or those formulated within the UN system by UNEP, WHO, FAO, ILO, and joint committees, for example the GHS; furthermore guidelines produced by forums of cooperation such as IPCS and IFCS; various declarations by UNGA, GC UNEP, UNEA, BC COP, SC COP, and international conferences such as the 1972 Declaration of the United Nations Conference on the Human Environment, the 1992 Rio Declaration on Environment and Development with Agenda 21, the Millennium Development Goals, the World Summit on Sustainable Development with the Johannesburg Plan of Implementation, the Rio20+ conference, the 2030 Agenda with the SDGs; framework programs such as UNEP, IOMC, SAICM with the Sound Management of Chemicals and Waste and its Global Plan of Action including a Chemicals in Products program, activities on Hazardous Substances within the Life Cycle of Electrical and Electronic Products, as well as the program on Endocrine Disrupting Chemicals; guidance material by the OECD and its projects, such as Better Design of Plastics and Plastic Products.

The EU formulates policy in various forms. This thesis covered legally binding policy acts such as the 7th Environmental Action Programme and briefly the proposal for the 8th: they are the basis for reforms in waste legislation and more precise application and implementation of chemical legislation. The objective to formulate a strategy for a non-toxic environment was delivered upon delayed in 2020 in form of the Chemicals Strategy for Sustainability. The EU has also affected norms on the recycling of plastics with its Circular Economy Action Plan, including the Circular Economy Package with EU Strategy for Plastics in the Circular Economy; major adaptations of the waste

legislation were the result. A new Circular Economy Action Plan has been released in 2020, its interactions are yet to be seen.

4.2 Research question 2 - Who are the actors in the regulatory field?

On international level, the actors are states or group of states (EU) as members of international organizations or to treaties and conventions, taking decisions in bodies such as UN General Assembly, the Governing Council of the UNEP, UN Environment Assembly, the Conferences of the Parties to the Basel and Stockholm Conventions, the OECD, and if required ratifying the act; in the case of the EU as an international organization with supranational competences laid down in the TEU and TFEU, these actors are the EU Member States, which first have to reach consensus on treaty amendments in the European Council, each acting as a lone sovereign, and then proceed to ratify the amendment in line with their constitutional requirements (EU treaty amendments have not been covered by this thesis as the author considered it to be of too little relevance for the topic)

On supranational level, the actors, as described in the chapters on REACH and CLP, are: the ECHA with its Committee for Risk Assessment, Committee for Socio-economic Analysis, and Member State Committee; the CARACAL; and the Forum for Exchange of Information on Enforcement as a means for exchange; furthermore, additionally to their role as legislators establishing the regulatory environment, the European Commission with its REACH Committee, the Council of the European Union, and the European Parliament; and in cases of a legal dispute the European Court of Justice (which has not been covered by the thesis). It should be mentioned that in the area of waste many decisions are taken on domestic level by the competent national authorities and bodies of the EU Member States as this area has not (yet) been as strongly harmonized as the area of chemicals; this has not been covered by the thesis as it was outside of its scope.

While also outside of the thesis' scope and therefore not covered by this thesis, it is worth noting that non-governmental environmental interest representation organizations and industry interest representation associations are a major source of data and information input during the public consultation process and the evaluation of chemicals because of their research activities as part of the fulfillment of their

organizations' respective mandates; yet they have no say in the decision making process.

4.3 Research question 3 - What are the interactions between the different legal instruments?

Between organizations active in these areas on international level the UNGA, the GC UNEP / later UNEA of the UNEP, the WHO, and the OECD were identified, and their interaction was observed in forums such as IFCS and IOMC and the preparatory work for as well as the conferences themselves on environmental and development issues. Other examples for interlinkages are the cooperation between IFCS, IOMC and UNEP leading to the establishment of ICCM and the SAICM, and the IOMC as means of coordination for the OECD. Interactions between international instruments were pointed out between the SAICM and the SDGs, and between the SAICM and the Basel and Stockholm Convention.

Linkages between the international and supranational level included the effect of international norms, as part of the Stockholm and Basel Convention, on supranational legislation in form of the EU POPs regulation, in specific concerning decaBDE thresholds. Another easily observable parallel was the development of REACH and SAICM, which both came into effective existence in 2006, with both their development processes having started in the early 2000s. While REACH is only a specific piece of domestic legislation and SAICM a global overarching policy, both of them share the feature of a comprehensive approach on how to manage with chemicals. The same is true with elements of the GHS and CLP, even though they do not match completely in detail.

Supranational policy is designed to affect supranational legislation, as a result of the EAP7 and the Circular Economy Action Plan, the waste legislation was adapted and the EU POPS updated. REACH interacts with CLP when it comes to hazard assessment, for example during authorization, or regarding the safety data sheets, the chemical safety report, and the technical dossier, as the main objective of CLP is to determine a chemical's hazard characteristics and potential dangers to human health and the environment. While REACH forms the horizontal framework legislation for chemicals, more specific pieces of legislation govern particular fields or aspects: RoHS2 regulates specific substances in specific electric and electronic equipment, while EU POPS puts in place norms for specific chemicals, POPs.

4.4 Research question 4 - What is the regulatory status of decaBDE?

On international level, decaBDE is covered by the Stockholm Convention and in combination with it by the Basel Convention. Under the Stockholm Convention, decaBDE was designated as a POP based on its characteristics, and then listed for elimination to stop its intentional production. The EU has applied for an exemption for the production and the use of decaBDE: in certain parts of vehicles until 2036 the latest; in aircraft and their spare parts until the end of their service life; and as an additive in certain plastic parts of electrical equipment below a threshold of 100,000 mg/kg or 10% of the part's weight, an exemption which will expire in 2022, but can be renewed for a maximum of another five years. The convention also prescribes that out of waste, decaBDE itself must not be recovered or recycled as a chemical on its own; furthermore, the content of the POP in waste, defined as waste including articles and products at the end of their life, is to be removed by destruction or permanent transformation; if environmentally preferable options exist to the destruction or transformation of the POP or if the amount of the POP contained in the waste is below a certain threshold, the waste may be disposed in another manner as long as this manner is considered to be environmentally sound. The definition of destruction, transformation, environmentally sound disposal and threshold concentration level is delegated to be achieved jointly by the parties to the Basel and Stockholm Conventions, and work thereon is being carried out in the Basel Convention's OEWG. Its current proposal includes the threshold to be to set at 50, 500 or 1,000 mg/kg (0.005% / 0.05% / 0.1% weight), to be decided upon at the next BC COP. The implications are big: the lower the value, the less likely recycling of plastics with decaBDE content will be, resulting also in a decreased flow of decaBDE back onto the market. The Basel Convention in general allows for stricter domestic measures as long as they comply with the rules of international trade.

On supranational level, specific rules exist in REACH, RoHS2, and EU POPS. DecaBDE is indirectly regulated by provisions contained in CLP as it determines a chemical's hazard characteristics and potential dangers to human health and the environment, and by rules on the treatment of hazardous waste guide plastics contaminated with decaBDE through the waste legislation. REACH applies to chemicals as a substance, in a mixture or in an article during manufacture or placement on the European Economic Area market. Waste is excluded from REACH's scope. A general restriction exists for decaBDE as it was classified persistent,

bioaccumulative and toxic: as a substance on its own, as a constituent of a substance, and in a mixture it is banned nearly entirely, with a few exceptions for airplanes, vehicles, and their components; as an article or a part of it, decaBDE is limited to a content of 1,000 mg/kg or 0.1% weight, exceptions exist for again airplanes, vehicles, and their components, and for electrical and electronic equipment within the scope of RoHS2. The RoHS2 threshold for PBDEs is 1,000 mg/kg or 0.1% weight in homogeneous material. Under EU POPS, decaBDE is considered an allowed unintentional trace contaminant if equal to or below 10mg/kg or 0.001 % weight in substances, and in preparations or articles up to 500mg/kg" or 0.05% weight before its manufacture, market placement or use are prohibited. Plastic waste with a decaBDE content of more than 1000mg/kg is considered hazardous waste, and must be incinerated, chemically recycled, or its energy recovered; below this threshold might be allowed to be recycled mechanically, other conditions might apply though.

4.5 Outlook

A clear trend towards more hard law regulation has been observed in the EU as more and more international agreements or regional treaties have been concluded. Legacy additives such as decaBDE are already within the scope of legislation and subordinated regulations, and measures are in place to protect the European citizens' health and the environment which surrounds them. Quotas are in force to increase the amount of plastics recycled, in order to leave a smaller CO2 footprint on the environment while stimulating economic development, fostering research and development and increasing resource security. A conflict of interests exists when combining these goals: The threshold values for chemicals designated by chemicals legislation as a danger to human health or the environment, in combination with other definitions governed by waste legislation define whether plastic waste contaminated with before mentioned chemical will be considered hazardous waste and therefore will be incinerated or otherwise permanently transformed, or whether it will be recycled and become a secondary resource. The legislator needs to take a clear position in line with the treaties and principles governing the EU as otherwise this will not only disrupt the plastics recycling market, but also legal environmental action might be taken to have the CJEU resolve a political issue, which would not be a first time though in the history of the EU. On top of that, basic market forces dictate the course of action for producers: The low oil price renders uncontaminated virgin plastics extremely competitive compared to the costs of potentially contaminated recycled plastics.

Remedy might be available in form of measures ensuring the safety of recycled plastics and instruments to steer production such as for example a CO2 tax, if implemented economically sound without loopholes and generated revenue earmarked in advance for research, development, climate change adaptation measures and environmental protection. The European Union is already adapting its regulatory environment to this end, but socioeconomic considerations take precedence. The current crisis owed economic downturn might slow down the negotiations on policy and future legislation, but ultimately the onus will be on the Member States in form of the Council to weigh the economic objections against the potential benefits of a safe and cleaner, maybe eventually non-toxic environment.

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