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Comparing European and Swiss Strategies for the Regulation of Plastics

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List of abbreviations

ADWO: Ordinance on the Avoidance and the Disposal of Waste
APCE: Action Plan for the Circular Economy
ASL: Association pour la Sauvegarde du Léman
BCO: Ordinance on Beverage Containers
CEN: European Committee for Standardization
CFCs: Chlorofluorocarbons
ChemA: Federal Act on Protection against Dangerous Substances and Preparations
ChemO: Ordinance on Protection against Dangerous Substances and Preparations
CHF: Swiss francs
COM: European Commission
CPA: Circular Plastics Alliance
DETEC: Federal Department of the Environment, Transport, Energy and Communications
Dir (UE): Directive of the European Union
ECHA: European Chemicals Agency
EEA: European Environmental Agency
EPA: Environmental Protection Act
EPR: Extended Producer Responsibility
ESPEC-S: Committee on Environment, Spatial Planning and Energy of the Swiss Council of States
EU: European Union
FC: Federal Council
FCA: Federal Customs Administration
FOAG: Federal Office for Agriculture
FOEN: Federal Office for the Environment
FOPH: Federal Office of Public Health
FSA: Federal Act on Foodstuffs and Utility Articles
FSO: Ordinance on Foodstuffs and Utility Articles

HS: Harmonized System

IDHEAP: Swiss Graduate School of Public Administration

IG DHS: Interessengemeinschaft Detailhandel Schweiz

JRC: Joint Research Centre

LMW: DETEC Ordinance on Lists relating to Movements of Waste

MP: Member of the Parliament

MS: Member States

NCEAP: New Circular Economy Action Plan for a cleaner and more competitive Europe

NGO: Non-governmental organisation

OAPC: Ordinance on Air Pollution Control

OECD: Organisation for Economic Co-operation and Development

OEEE: Ordonnance sur les exigences relatives à l'efficacité énergétique

OFEV: Office fédéral de l'environnement

OFS: Office fédéral de la statistique

OIS: Ordinance relating to Impacts on the Soil

OMW: Ordinance on Movements of Waste

ORRChem: Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles

OVOC: Ordinance on the Incentive Tax on Volatile Organic Compounds

PCCP: Personal care and cosmetic products

PET: Polyethylene terephthalate

POPs: Persistent organic pollutants

PVC: Polyvinyl chloride

RTS: Radio Télévision Suisse

SPCE: European Strategy for Plastics in a Circular Economy

SRF: Swiss Retail Federation

VOC: Volatile organic compounds

WCO: World Customs Organization

WEF: World Economic Forum

WHO: World Health Organization

WPA: Federal Act on the Protection of Waters

WPO: Waters Protection Ordinance

EXECUTIVE SUMMARY

Plastic waste pollution is a growing concern all around the world. The European Union (EU) has addressed this challenge: In 2018, the EU Commission has elaborated the *'European Strategy for Plastics in a Circular Economy'* as part of its *'Action Plan for the Circular Economy'* launched in 2015. The European *'Green Deal'* was adopted in 2019 and then followed by the *'New Circular Economy Action Plan'* in 2020, which further develops the Strategy for Plastics. These plans and strategies not only encompass the plastic life cycle as a whole, but also the regulative framework surrounding the plastic system. In the context of these actions taken by the EU to address plastic pollution, the Federal Office for the Environment (FOEN) has mandated the Swiss Graduate School of Public Administration (IDHEAP) from the University of Lausanne to examine the overall set of measures on plastics management implemented by the EU as part of a research study. In addition, the study investigates how individual measures could possibly be implemented in Switzerland.

The objectives of this mandate are the following:

- Identify the main features and specificities of the Swiss plastic system, which should be considered when implementing measures for the sustainable management of plastics;
- Identify the policy instruments that are currently available in Switzerland and in the EU to manage the different aspects of the plastic life cycle;
- Identify the instruments developed within the EU Plastics Strategy, which could be relevant for a possible "Swiss plastic strategy";
- Discuss their compatibility within the Swiss legal context.

In order to achieve these objectives, the report is divided into three chapters.

The first chapter provides information on the main characteristics, specificities and challenges of the current Swiss plastic system. In this regard, the main findings are the following:

- The recycling of plastics faces different severe obstacles: (1) there is a high variety of plastic materials being used, the majority of them containing numerous additives that render recycling difficult or impossible, (2) plastic material cannot be recycled endlessly: The degradation of plastic products each time they are processed, which is usually called *downcycling*, implies that new raw material will continue to be necessary, even more so when there is an increasing demand for plastics, as is actually the case, (3) plastics recycling needs to be environmentally and financially sound.
- The annual domestic use of plastics in Switzerland is higher than in most of the other European countries.
- The Swiss plastic system is predominantly end-of-pipe oriented: While much attention goes to what to do with plastics at the final stage of their industrial life cycle, less consideration seems to be given to plastics entering, being used, reused, or recycled (with the exception of PET (polyethylene terephthalate) beverage bottles). This orientation focusing on waste management hinders the development of a circular plastic system. In particular, the promotion of reuse (when possible) appears to be a relevant complementary strategy for the circularisation of the plastic system.
- Primary and secondary microplastics are increasingly recognised as a significant driver of plastic pollution.
- Research about leakage of macro- and microplastics needs to be strengthened and data and knowledge obtained must be integrated in a comprehensive approach to govern plastics along the whole life cycle.

The second chapter carries out a comparison between the EU's Strategy for Plastics in a Circular Economy and the current Swiss policy for

dealing with plastics. Based on a systematic analysis of the policy instruments through which in both cases public authorities search to govern the different phases of the plastic system, this study identifies the convergences and divergences between the EU's Plastics Strategy and institutional arrangements of plastic management in Switzerland. The main findings resulting from this comparison are the following:

- While the EU is currently developing an integrated strategy for regulating the life cycle of plastics based on a circular economy approach, the Swiss approach is much more fragmented. Swiss policy instruments on plastics do not intend to manage the plastic system as such, but deal with specific plastic materials and products to the extent that they are touched upon in the context of other sectoral policies (for ex. water and soil protection, waste management, air pollution control).
- The EU strategy develops policy instruments for all the different processes of the plastics life cycle, focusing on the initial phases of the life cycle of plastics, since a majority of the new policy instruments concentrates on eco-design, (re)use and recycling objectives. The Swiss “plastic policy” remains for now mainly end-of-pipe oriented, since a majority of policy instruments is focusing on the waste management phase at the end of the lifecycle of plastics.
- The differences between the two regulatory frameworks are, on the one hand, due to the fact that the high efficiency in terms of (plastic) waste management and thermic valorisation render the change of paradigm towards a circular economy more complicated in the Swiss case.

- As market regulation is a core business of the EU, it has the legitimacy to act on these issues. This, on the other hand, explains the focus of the EU Plastics Strategy on measures for the phases of *Production-import* and *Use-reuse*, as well as the choice of interactive and proactive types of policy instruments.

Based on an analysis of all 35 policy instruments constitutive of the EU's Plastics Strategy *four specific EU measures* (i.e. sets of instruments) – *single-use plastics, oxo-degradable plastic regulations, eco-design and recycling* – have been considered as deserving a particular scrutiny in the light of a possible transfer to the Swiss setting. These measures and regulations concern aspects, which are currently rather limitedly dealt with in the context of the Swiss approach towards plastics. The results are the following:

- *Single-use plastics*: Policy measures taken by the EU on single-use plastics (e.g. single-use plastics ban, national consumption reduction targets, measures ensuring reusable alternatives, voluntary agreements, marketing restrictions, separate collection targets, etc.), not only are relevant to Switzerland, but would also be compatible with the existing Swiss plastic policy. They concern a problem indeed present in Switzerland and could readily be integrated within existing Swiss legislation without creating incoherence from a public policy perspective.
- *Oxo-degradable plastic regulations*¹: The European Strategy for Plastics in a Circular Economy seeks to restrict the use of oxo-plastics in the EU. In this perspective, it plans to prohibit the placing on the market for products made from oxo-degradable plastics. The use of oxo-degradable plastics is limited in Switzerland, though not absent. Considering the overall unanimity about the environmental problems related to this type of plastic, the prohibition proposed by the EU is

¹ A motion by Isabelle Chevalley (<https://www.parlament.ch/fr/ratsbetrieb/suche-curia-vista/geschaefi?AffairId=20194182>) to ban oxo-degradable plastics has been accepted by the parliament in June 2020. See motion 19.4182: "A quand une interdiction des plastiques "oxo"?"

relevant to Switzerland, and as such compatible with existing Swiss environmental policy.

- *Eco-design*: Eco-design measures to support the recyclability of plastics are an important pillar of the EU's Plastics Strategy. So far, however, no concrete eco-design measures to support the recyclability of plastics are in place or proposed. The European Commission is preparing a report on the matter; and on the initiative of the Commission, the public and private actors implied in the plastics value chain commit themselves "*to develop, update or revise design for recycling guidelines for all plastic products*²." Furthermore, Member States are invited to take appropriate measures to encourage improved product design. Thus, following EU measures on eco-design is both ecologically and economically relevant for Switzerland, as it helps plastic circularity, but also assures the continuing access of Swiss products and clean tech companies to the European market. Doing so would be in line with Swiss participation in similar EU actions on ecolabel and energy efficiency, and therefore seems both legally and practically compatible with existing Swiss policy.
- *Recycling*: Considering the overall limited recycling of plastics in Switzerland (with the exception of PET beverage bottles), the EU policy instruments (e.g. deposit-return schemes, qualitative and quantitative targets for reusable packaging, minimum rate of recycled plastics in the production of plastic packaging products, etc.) could certainly be relevant for reinforcing plastic circularity. While the compatibility of these instruments with the Swiss legal framework would not pose a major challenge, in practical terms, an upscaling of plastics recycling will have to take into account the system in place including its infrastructure. Therefore, in particular the EU's

² Declaration of the Circular Plastics Alliance (17.07.2019)
<https://ec.europa.eu/docsroom/documents/36361>

economic incentives to stimulate recycling could present interesting examples for action in the Swiss context.

Lastly, chapter 3 summarises the results and main findings from the different parts of the investigation.

One of the conclusions of the study is that *Switzerland, in contrast to the EU, focuses primarily on waste management and so lacks a comprehensive approach to plastics management taking into account the entire life cycle*. In response to these findings, increasing levels of recycling, enhancing eco-design and promoting re-use of products and packaging could be considered. In addition, the amount of single-use plastic products used could be addressed in a system of voluntary commitments (for ex. industry agreements) by businesses.

ZUSAMMENFASSUNG

Vergleich EU und Schweizer Strategien zur Regulierung von Kunststoffen

Die Belastung der Umwelt durch Kunststoffabfälle ist weltweit ein wachsendes Problem. Die Europäische Union (EU) ist diese Herausforderung angegangen: Im Jahr 2018 hat die EU Kommission die *'Europäische Strategie für Kunststoffe in der Kreislaufwirtschaft'* erarbeitet als Teil ihres 2015 lancierten *'Aktionsplans für die Kreislaufwirtschaft'*. Der *'Green Deal'* wurde 2019 verabschiedet, gefolgt vom *'Neuen Aktionsplan für die Kreislaufwirtschaft'* im Jahr 2020, welcher die Strategie für Kunststoffe weiterentwickelt. Diese Pläne und Strategien betrachten nicht nur den gesamten Lebenszyklus von Kunststoffen, sondern auch den regulatorischen Rahmen, der das Kunststoffsystem umgibt. Im Hinblick auf die in der EU ergriffenen Massnahmen zur Reduktion der Umweltbelastung durch Kunststoffe hat das Bundesamt für Umwelt (BAFU) das Hochschulinstitut für öffentliche Verwaltung (IDHEAP) der Universität Lausanne beauftragt, im Rahmen einer Forschungsstudie das EU-Massnahmenpaket im Bereich des Kunststoffmanagements zu untersuchen und eine allfällige Übertragbarkeit von einzelnen Massnahmen auf die Schweiz zu prüfen.

Mit der vorliegenden Studie werden folgende Ziele verfolgt:

- Aufzeigen der Hauptmerkmale und Besonderheiten des Schweizer Kunststoffsystems, die bei der Umsetzung von Massnahmen für einen nachhaltigen Umgang mit Kunststoffen berücksichtigt werden sollten;
- Aufzeigen der politischen Instrumente, die gegenwärtig in der Schweiz und der EU zur Verfügung stehen, um die verschiedenen Bereiche des Lebenszyklus von Kunststoffen steuern zu können;

- Aufzeigen der innerhalb der EU-Kunststoffstrategie entwickelten Instrumente, die für eine mögliche "Schweizer Kunststoffstrategie" relevant sein könnten;
- Diskussion inwiefern sich diese mit dem schweizerischen Rechtskontext vereinbaren lassen.

Im Hinblick auf diese Ziele ist die Studie in drei Kapitel eingeteilt.

Das erste Kapitel enthält Aussagen zu den Hauptmerkmalen, den Besonderheiten und Herausforderungen des gegenwärtigen Schweizer Kunststoffsystems. Die Haupteigenschaften sind:

- Das Recycling von Kunststoffen steht vor verschiedenen erheblichen Herausforderungen: (1) Es wird eine Vielzahl von Kunststoffarten verwendet, wobei die meisten davon zahlreiche Zusatzstoffe (sog. Additive) enthalten, die das Recycling erschweren oder gar verunmöglichen; (2) Kunststoffe können nicht endlos recycelt werden: Der Abbau von Kunststoffprodukten erfordert bei jedem Verarbeitungsprozess (sogenanntes *Downcycling*) den Einsatz von neuem Rohmaterial. Dies umso mehr, als dass die Nachfrage nach Kunststoffen steigt; (3) Kunststoffrecycling muss ökologisch und ökonomisch sinnvoll sein.
- Der jährliche Inlandverbrauch von Kunststoffen ist in der Schweiz höher als in den meisten anderen europäischen Ländern.
- Das Schweizer Kunststoffsystem ist hauptsächlich auf die Abfallentsorgung (sog. End-of-pipe-Lösungen) ausgerichtet: Im Zentrum steht die Verwertung von Kunststoffen am Ende ihres industriellen Lebenszyklus. Weniger wichtig scheint, wie Kunststoffe auf den Markt gelangen, verwendet, wiederverwendet oder recycelt werden (mit der Ausnahme von Getränkeflaschen aus PET (Polyethylenterephthalat)). Dieser Fokus auf die Abfallentsorgung erschwert die Entwicklung einer Kunststoff-Kreislaufwirtschaft. Insbesondere die Förderung der Wiederverwen-

dung (sofern möglich) könnte daher eine wichtige ergänzende Strategie für die Kreislaufschliessung des Kunststoffsystems zu sein.

- Primäres und sekundäres Mikroplastik werden zunehmend als wichtige Treiber der Umweltbelastung durch Kunststoffe anerkannt.
- Die Forschung über die Einträge von Makro- und Mikroplastik in die Umwelt muss vertieft und die gewonnenen Daten und Informationen müssen in einen umfassenden Ansatz integriert werden, um Kunststoffe entlang des ganzen Lebenszyklus bewirtschaften zu können.

Das zweite Kapitel enthält einen Vergleich der EU-Strategie für Kunststoffe in der Kreislaufwirtschaft mit der aktuellen Schweizer Politik im Umgang mit Kunststoffen. Basierend auf einer systematischen Analyse der politischen Instrumente der jeweiligen Behörden, identifiziert die Studie die Gemeinsamkeiten und Unterschiede zwischen der EU-Kunststoffstrategie und den institutionellen Regelungen des Kunststoffmanagements in der Schweiz. Die wichtigsten Erkenntnisse, die sich aus diesem Vergleich ergeben, sind die folgenden:

- Die EU ist zurzeit daran, eine ganzheitliche Strategie zur Regulierung des Lebenszyklus von Kunststoffen basierend auf einem Kreislaufwirtschafts-Ansatz zu entwickeln; dagegen ist der Ansatz der Schweiz noch weitgehend fragmentiert. Demzufolge zielen die Schweizer Instrumente nicht darauf ab, das Kunststoffsystem als Ganzes zu lenken, sondern sind nach einzelnen Kunststoffmaterialien und -produkten in diversen, sektoriellen Politiken (z.B. Gewässer- und Bodenschutz, Abfallmanagement, Luftreinhaltung) ausgerichtet.
- Die EU gibt im Rahmen ihrer Strategie politische Instrumente für alle verschiedenen Phasen des Kunststoff-Lebenszyklus vor, mit einem besonderen Fokus auf die ersten Phasen: Ein Grossteil der neuen Instrumente zielt auf Ökodesign, (Wieder-)Verwendung und Recycling ab. Die Schweizer "Kunststoff-Politik" ist dagegen noch hauptsächlich auf die Phase der Abfallentsorgung ausgerichtet, da die

meisten Politikinstrumente sich auf «End-of-pipe-Lösungen» am Ende des Lebenszyklus von Kunststoffen konzentrieren.

- Die Unterschiede dieser beiden Regelwerke sind einerseits der Tatsache geschuldet, dass die hohe Effizienz im Bereich des (Kunststoff-)Abfallmanagements und der thermischen Verwertung den Paradigmenwechsel in Richtung Kreislaufwirtschaft in der Schweiz erschwert.
- Da die Marktregulierung ein Kerngeschäft der EU ist, hat sie die Legitimation in diesen Fragen zu handeln. Dies erklärt andererseits den Fokus der EU-Kunststoffstrategie auf Massnahmen in den Phasen *Produktion-Import* und *Nutzung-Wiederverwendung* sowie die Wahl der interaktiven und proaktiven Instrumente.

Auf Grundlage einer Analyse aller 35 Politikinstrumente der EU-Kunststoffstrategie, wurden *vier spezifische EU-Massnahmen* (d.h. Instrumentengruppen) ausgewählt, welche sich im Hinblick auf eine mögliche Übertragung auf die Schweiz als besonders prüfenswert erweisen. Dies sind Massnahmen zum *Umgang mit Einwegkunststoffen*, *Regelungen zu oxo-abbaubaren Kunststoffen*, *zu Ökodesign* und *zum Recycling*. Diese Massnahmen und Regelungen kommen in der Schweiz noch begrenzt zur Anwendung. Die Ergebnisse dieser Analyse sind die folgenden:

- *Einwegkunststoffe*: Politische Massnahmen der EU zu Einwegkunststoffen (z.B. Verbot von Einwegkunststoffen, nationale Verbrauchsreduktionsziele, Förderung von wiederverwendbaren Alternativen, Selbstverpflichtungen, Vermarktungsbeschränkungen, Sammelziele für die getrennte Sammlung, etc.) sind nicht nur für die Schweiz relevant, sondern wären auch kompatibel mit der bestehenden Schweizer Kunststoff-Politik. Sie behandeln ein in der Schweiz tatsächlich vorhandenes Problem und könnten ohne weiteres in die bestehende Schweizer Gesetzgebung integriert werden, ohne dabei Widersprüche zu generieren.

- *Regelungen zu oxo-abbaubaren Kunststoffen*¹: Die europäische Strategie für Kunststoffe in der Kreislaufwirtschaft beabsichtigt die Verwendung von oxo-abbaubaren Kunststoffen in der EU zu beschränken. Das Inverkehrbringen von Produkten aus oxo-abbaubaren Kunststoffen soll verboten werden. In der Schweiz werden oxo-abbaubare Kunststoffe nur sehr begrenzt eingesetzt. In Anbetracht der allgemeinen Einigkeit bezüglich des Umweltproblems, die mit dieser Kunststoffart verbunden wird, ist das von der EU vorgeschlagene Verbot relevant für die Schweiz und als solches kompatibel mit der bestehenden Schweizer Umweltpolitik.
- *Ökodesign*: Massnahmen im Bereich Ökodesign zur Unterstützung der Rezyklierbarkeit von Kunststoffen sind ein wichtiger Bestandteil der EU-Kunststoffstrategie. Bislang sind jedoch noch keine konkreten Ökodesign-Massnahmen zur Unterstützung der Rezyklierbarkeit von Kunststoffen umgesetzt oder vorgeschlagen worden. Die Europäische Kommission bereitet zu diesem Thema einen Bericht vor. Zudem verpflichteten sich die in der Kunststoff-Wertschöpfungskette involvierten öffentlichen und privaten Akteure auf Initiative der Kommission, "*Design-for-Recycling-Richtlinien für alle Kunststoffprodukte zu entwickeln, zu aktualisieren oder zu überarbeiten*".² Zudem sind die Mitgliedstaaten dazu eingeladen, geeignete Massnahmen zur Förderung eines verbesserten Produktdesigns zu ergreifen. Die Berücksichtigung von EU-Massnahmen im Bereich Ökodesign ist somit für die Schweiz sowohl ökologisch als auch ökonomisch bedeutsam. Zum einen unterstützen solche Massnahmen die Kreislauffähigkeit von Kunststoffmaterialien, zum anderen gewährleisten sie den weiteren Zugang von Schweizer Produkten und Clean-Tech-Firmen auf dem europäischen

¹ Eine Motion von Isabelle Chevalley (<https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20194182>) zum Verbot von oxo-abbaubaren Kunststoffen wurde im Juni 2020 vom Parlament überwiesen. Siehe Motion 19.4182: "Wann werden oxo-abbaubare Kunststoffe verboten?"

² Declaration of the Circular Plastics Alliance (17.07.2019)
<https://ec.europa.eu/docsroom/documents/36361>

Markt. Die Schweiz beteiligt sich bereits an vergleichbaren EU-Initiativen wie z.B. Umweltlabels oder der Festlegung von Anforderungen an Produkte im Hinblick auf deren Energieeffizienz. Die Berücksichtigung von EU-Massnahmen im Bereich Kunststoff-Ökodesign dürfte daher sowohl rechtlich als auch in der Praxis mit der bestehenden Schweizer Politik vereinbar sein.

- *Recycling*: In Anbetracht des insgesamt begrenzten Recyclings von Kunststoffen in der Schweiz (mit Ausnahme von PET-Getränkeflaschen) sind die Instrumente der EU (z.B. Pfandsysteme, qualitative und quantitative Zielvorgaben für Mehrwegverpackungen, Mindestquote an rezyklierten Kunststoffen bei der Herstellung von Kunststoffverpackungen, etc.) sicherlich relevant, um die Kreislauffähigkeit von Kunststoffen zu stärken. Während die Vereinbarkeit dieser Instrumente mit dem schweizerischen Rechtsrahmen keine grosse Herausforderung darstellen würde, müsste in der Praxis eine Ausweitung des Kunststoffrecyclings das bestehende System sowie die Infrastruktur berücksichtigen. Daher könnten insbesondere die ökonomischen Anreize der EU zur Förderung des Recyclings interessante Beispiele für die Umsetzung von Massnahmen im Schweizer Kontext generieren.

Zum Abschluss werden in Kapitel 3 die Ergebnisse und wichtigsten Erkenntnisse aus den vorangehenden Kapiteln der Untersuchung zusammengefasst.

Eine der Schlussfolgerungen der Studie ist, *dass sich die Schweiz, im Gegensatz zur EU, auf die Abfallbewirtschaftung fokussiert und folglich ein umfassendes Management von Kunststoffen unter Berücksichtigung des gesamten Lebenszyklus fehlt*. Um dem entgegenzuwirken, könnte nebst der Förderung von Recycling und Ökodesign auch die Wiederverwendung von Produkten und Verpackungen vorangetrieben werden. Zudem könnte die verwendete Menge an Einwegprodukten aus Kunststoff durch Selbstverpflichtungen der Wirtschaft (z.B. über eine Branchenvereinbarung) reduziert werden.

RÉSUMÉ

Comparaison des stratégies de l'UE et de la Suisse pour la régulation des matières plastiques

La pollution de l'environnement par les déchets plastiques est un problème croissant dans la plupart des pays du monde. L'Union européenne (UE) a commencé à prendre en charge ce problème. Dans cette perspective, la Commission européenne a élaboré en 2018 la *'Stratégie européenne sur les matières plastiques dans l'économie circulaire'* dans le cadre de son *'Plan d'action de l'Union européenne en faveur de l'économie circulaire'* lancé en 2015. Plus récemment, le Pacte vert pour l'Europe (ou *'Green Deal'*) de l'UE a été adopté en 2019, suivi par le *'Nouveau plan d'action pour l'économie circulaire'* en 2020, qui développe la stratégie pour les matières plastiques. Ces plans et stratégies n'englobent pas seulement l'ensemble du cycle de vie des matières plastiques, mais aussi le cadre réglementaire entourant le système des plastiques. Dans ce contexte en évolution rapide au niveau européen, l'Office fédéral de l'environnement (OFEV) a décidé d'étudier de manière la plus exhaustive possible – par le biais d'une recherche académique – l'ensemble des mesures de l'UE existantes dans le domaine de la gestion des matières plastiques et de faire examiner comment celles-ci pourraient être éventuellement appliquées en Suisse. A ce titre, l'OFEV a mandaté l'Institut de hautes études en administration publique (IDHEAP) de l'Université de Lausanne afin de réaliser cette étude.

La présente étude poursuit les objectifs suivants :

- Décrire les principales caractéristiques et spécificités du système de gestion des matières plastiques en Suisse qui devraient être prises en compte lors de la réalisation de mesures pour la gestion durable des matières plastiques ;
- Identifier les instruments politiques actuellement disponibles en Suisse et dans l'UE pour gérer les différents aspects du cycle de vie des matières plastiques ;

- Evaluer les instruments développés dans le cadre de la stratégie européenne sur les matières plastiques qui pourraient être pertinents pour une éventuelle "stratégie suisse sur les matières plastiques" ;
- Discuter de leur compatibilité avec le contexte juridique suisse.

Pour atteindre ces objectifs, le rapport est organisé en trois chapitres.

Le premier chapitre fournit des informations sur les principales caractéristiques, spécificités et défis du système actuel de gestion des matières plastiques en Suisse. Dans ce contexte, les principaux résultats sont les suivants :

- Le recyclage des matières plastiques est confronté à plusieurs défis importants : (1) il existe une grande variété de matières plastiques utilisées et la majorité de ces plastiques contient de nombreux additifs qui rendent le recyclage difficile, voire impossible ; (2) le plastique ne peut pas être recyclé à l'infini : la dégradation de la qualité du plastique à chaque processus de transformation, dégradation généralement appelée "*downcycling*", nécessite l'introduction constante de nouvelles matières premières, ceci d'autant plus en période de demande croissante, ce qui est le cas actuellement ; (3) le recyclage des plastiques doit être judicieux sur le plan écologique et économique.
- La consommation domestique annuelle des matières plastiques est plus élevée en Suisse que dans la plupart des autres pays européens.
- Le système de gestion des matières plastiques en Suisse est principalement axé sur le traitement des déchets. Alors qu'une grande attention est accordée à la récupération des matières plastiques à la fin de leur cycle de vie industriel, il semble que l'on accorde moins d'attention à la manière dont les matières plastiques entrent sur le marché, sont utilisées, réutilisées ou recyclées ; ceci à l'exception des bouteilles de boisson en PET (polyéthylène téréphtalate). Cette focalisation sur l'élimination des déchets complique le développement d'une économie circulaire du plastique. Par conséquent, la promotion

de la réutilisation, lorsqu'elle est possible, semble être une stratégie complémentaire importante pour fermer le cycle de vie du système des matières plastiques.

- Les microplastiques primaires et secondaires sont de plus en plus reconnus comme des facteurs importants de la pollution de l'environnement par les matières plastiques.
- La recherche des phénomènes de pollution par les macro- et microplastiques dans l'environnement doit être renforcée et la documentation et la connaissance de ces phénomènes doivent être intégrées dans une approche globale de la gestion des matières plastiques tout au long de leur cycle de vie.

Le deuxième chapitre compare les stratégies de l'UE et de la Suisse en matière de régulation des matières plastiques. Cette étude identifie les similitudes et les différences entre la stratégie européenne et les dispositions institutionnelles de la gestion des matières plastiques en Suisse. Elle se base sur une analyse systématique des instruments politiques mis en œuvre par les autorités dans les deux cas (UE et Suisse) pour tenter de réglementer les différentes phases du système industriel des plastiques. Les principaux résultats de cette comparaison sont les suivants :

- L'UE élabore actuellement une stratégie globale pour réglementer le cycle de vie des matières plastiques, basée sur une approche d'économie circulaire. L'approche suisse est beaucoup plus fragmentée et sectorielle en régulant les usages des matériaux et produits plastiques cas par cas ainsi que lors qu'ils ont des effets sur des domaines régulés par d'autres politiques (protection des eaux et des sols, gestion des déchets, protection de l'air, etc.).
- L'UE développe des instruments politiques portant sur l'ensemble des différentes phases du cycle de vie des matières plastiques. Plus particulièrement, elle développe actuellement des politiques de type préventives qui se concentrent sur les premières étapes du cycle de vie

des matières plastiques, dans la mesure où une grande partie des nouveaux instruments politiques fixent des objectifs dans les domaines de l'écoconception, de la (ré)utilisation et du recyclage. Alors que l'approche helvétique en matière de gestion des matières plastiques reste principalement axée sur la gestion des déchets – la majorité des instruments politiques se concentrent sur la phase de traitement des déchets en fin du cycle de vie des matières plastiques (logique « end of pipe »).

- Cette différence entre les deux cadres réglementaires est en grande partie due au fait que le haut niveau d'efficacité atteint en termes de gestion des déchets (plastiques), à travers notamment la valorisation thermique et énergétique, rend difficile le changement de paradigme vers une économie circulaire des matières plastiques en Suisse.
- Finalement, la réglementation des marchés étant une prérogative essentielle de l'UE, celle-ci a la légitimité pour agir sur ces questions. Cela explique l'attention particulière accordée par la stratégie européenne aux phases de *production-importation* et *d'utilisation-réutilisation*, ainsi qu'aux instruments incitatifs de type économique utilisés pour réguler ces premières phases du cycle.

Sur la base d'une analyse de l'ensemble des 35 instruments politiques de la stratégie européenne sur les matières plastiques, *quatre mesures européennes* (i.e. groupes d'instruments) spécifiques se sont avérées particulièrement dignes d'intérêt dans la perspective d'un éventuel transfert vers la Suisse. Il s'agit des *mesures de régulation des plastiques à usage unique, de la réglementation sur les plastiques oxodégradables, ainsi que des mesures relatives à l'écoconception et au recyclage*. Ces mesures et régulations abordent des aspects qui sont actuellement traités de manière assez limitée dans le cadre de l'approche suisse de la gestion des matières plastiques. Les résultats sont les suivants :

- *Plastiques à usage unique* : les mesures politiques de l'UE concernant les plastiques à usage unique (par exemple l'interdiction des plastiques à usage unique, les objectifs nationaux de réduction de la

consommation, la promotion d'alternatives réutilisables, les engagements volontaires des acteurs économiques, les restrictions de commercialisation, les objectifs formulés pour la collecte séparée, etc.) sont non seulement pertinentes pour la Suisse mais seraient également compatibles avec la politique suisse existante en matière de plastiques. Ils abordent un problème qui existe réellement en Suisse et ils pourraient facilement être intégrés dans la législation suisse existante sans générer de contradictions du point de vue de la politique publique.

- *Réglementation sur les plastiques oxodégradables⁵* : La stratégie européenne prévoit d'interdire la mise sur le marché de produits fabriqués à base de plastiques oxodégradables. L'utilisation de plastiques oxodégradables est actuellement très limitée en Suisse, mais pas inexistante. Étant donné le consensus général sur le problème environnemental lié à ce type de plastique, l'interdiction proposée par l'UE est pertinente pour la Suisse et, à ce titre, compatible avec la politique environnementale suisse existante.
- *Écoconception* : les mesures dans le domaine de l'écoconception visant à favoriser la recyclabilité des matières plastiques constituent un domaine d'intervention important dans la stratégie européenne sur les matières plastiques. Cependant, aucune mesure concrète d'écoconception visant à favoriser la recyclabilité des plastiques n'a encore été mise en œuvre ou proposée. La Commission européenne prépare un rapport sur ce sujet. En plus, à l'initiative de la Commission, les parties prenantes publiques et privées impliquées dans la chaîne de valeur des matières plastiques s'engagent à « développer, mettre à jour ou réviser les directives de conception pour le recyclage de tous les produits en plastique⁶ ». Les États

⁵ Une motion d'Isabelle Chevalley (<https://www.parlament.ch/fr/ratsbetrieb/suche-curia-vista/geschaef?AffairId=20194182>) visant à interdire les plastiques oxodégradables a été acceptée par le Parlement en juin 2020. Voir la motion 19.4182 : « A quand une interdiction des plastiques "oxo" ? »

⁶ Declaration of the Circular Plastics Alliance (17.07.2019), <https://ec.europa.eu/docsroom/documents/36361>.

membres sont invités à prendre les mesures appropriées pour promouvoir une meilleure conception des produits. La prise en considération et l'observation attentive des mesures à venir de l'UE dans le domaine de l'écoconception est donc pertinente pour la Suisse, tant sur le plan écologique qu'économique. D'une part, cela favorise la recyclabilité des matières plastiques, et d'autre part, cela peut également garantir l'accès continu des produits et des entreprises suisses de « technologies propres » au marché européen. Cette démarche serait conforme à la participation de la Suisse à des mesures communautaires similaires en matière d'étiquetage écologique et d'efficacité énergétique et semble donc compatible avec la politique suisse existante, tant sur le plan juridique que dans la pratique.

- *Recyclage* : Compte tenu du niveau de recyclage globalement limité des plastiques en Suisse (à l'exception des bouteilles de boisson en PET), les instruments politiques de l'UE (par exemple les systèmes de consigne, les objectifs qualitatifs et quantitatifs pour les emballages réutilisables, le taux minimum de matières plastiques recyclées dans la production d'emballages en plastique, etc.) sont certainement pertinents pour renforcer la recyclabilité des matières plastiques. Bien que la compatibilité légale de ces instruments avec le cadre juridique suisse ne constituerait pas un défi majeur, en termes pratiques par contre, l'intensification du recyclage des matières plastiques devra tenir compte des caractéristiques du système et de l'infrastructure existante. Par conséquent, les incitations économiques de l'UE visant à promouvoir le recyclage pourraient constituer des exemples intéressants pour la mise en œuvre de telles mesures dans le contexte suisse.

Enfin, le troisième chapitre présente la synthèse des résultats et les principales conclusions des différentes parties de l'enquête.

Une des conclusions de l'étude est que *la Suisse, contrairement à l'UE, fonde sa stratégie sur l'élimination des déchets et qu'il manque*

actuellement une approche intégrée régulant l'ensemble des étapes du cycle de vie des produits plastiques. Pour y remédier, le recyclage et l'écoconception pourraient être encouragés, mais la réutilisation des produits et des emballages pourrait également être favorisée. En outre, la quantité utilisée de produits en plastique à usage unique pourrait éventuellement être réduite par des engagements volontaires (p. ex. accord de branches) de l'industrie.

INTRODUCTION

Over the last years, there is an increasing awareness of possible problems linked to the use of plastics. In particular, pollution of the environment, by both macro- and microplastics, receives growing attention around the world, including Switzerland. The emerging question therefore has become *how to sustainably manage plastic material flows throughout products' life cycles?*¹

In the context of this increasing awareness, the European Commission presented in January 2018 its '*European Strategy for Plastics in a Circular Economy*' (European Commission 2018b). Giving implementation to the EU's '*Action Plan for the Circular Economy*' (European Commission 2015), this strategy acknowledges that resources are limited and should be used in an efficient way, which is why the sustainable management of plastics cannot be attained within a plastic system that is linear in its conception (European Commission 2018a, 17). Therefore, this comprehensive initiative lays the foundations for a new plastics economy, embedded in the concept of circularity. A '*New Circular Economy Action Plan*' (NCEAP) was recently adopted (11th March 2020) (European Commission 2020). This action plan is one of the main building blocks of the '*European Green Deal*', which was previously adopted (11th December 2019²). This new version of the plan contains one section about plastics (section 3.4), which confirms the

¹ *From an environmental perspective, "sustainable use of plastics" seems to be non-sense, as using plastics needs a considerable amount of non-renewable resources and produces environmental damages. In this report, we will however use the term "sustainable" referring to the definition of "sustainable material growth" proposed by F. Grosse (2011): "We can summarise the three cardinal virtues of sustainable material growth, in other words, describe the profile of a sustainable economy which does not rely on a decrease in the need for raw materials:*

- *Material growth must be less, or even considerably less, than 1% per annum (growth rate of global production of each raw material, primary + recycled).*
- *The recycling efficiency rate must be greater than 60%, or even 80% (proportion of material contained in waste, which is actually recycled).*
- *The rate of addition to stocks must be less than 20%, meaning that the economy must discharge as waste at least 80% of the quantities of each material it consumes."*

² *The European Green Deal itself talks very little about plastics.*

objectives and orientations of the previous plan of 2015 as well as of the 2018 EU Strategy for Plastics, and specifies some sets of objectives and measures.

Such a circular approach searches to integrate the different processes of the industrial plastic system into a restorative and regenerative cycle³. This means that in accordance with this vision, the production, use and reintroduction of plastics are ideally organised in such a circular way that no material leaves the system, and hence no new material has to be introduced into the system. This contrasts with the traditional linear approach under which the system is considered to have a clear beginning and end, and managing the system is essentially conceived in terms of how to conveniently take care of waste. It follows that under the linear approach, the plastics value chain can only be maintained through the continuous introduction of new plastic material.

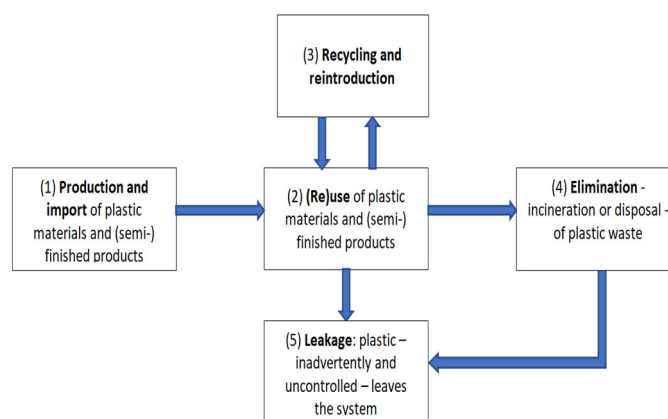
Like most industrial systems, the plastic industry (hereinafter “plastic system”) is composed of *five processes*, each dealing with a specific configuration of actors and activities (cf. Figure 1). These processes are the following:

1. *Production and import (1)* relate to the design, production, and introduction of plastics as raw material or (semi-)finished products. Involved are designers and producers, as well as importers and distributors of these products.
2. *Use and reuse (2)* concerns all kinds of usage – as well as reuse – of plastics as part of the consumption of marketed products. Actors in this process are essentially consumers, who are the end-users of plastic products, but also the various actors of the repair business.
3. *Recycling and reintroduction (3)* involve both waste pickers and sorting operators, who collect and sort out used plastic materials, as well as the recycling industry responsible for reintroducing plastic products (in principle by resale) into a new cycle of material use.

³ *Ellen MacArthur Foundation, Concept ellenmacarthurfoundation.org/circular-economy/concept (consulted 18 November 2019).*

4. Under the process of *elimination* (4), main actors are the incineration industry and operators of storage facilities (including landfills for stabilised waste).
5. In addition, it is crucial to recognise the presence of a last and often still disregarded process, namely the more or less unintentional withdrawal of plastics from the system. This *leakage process* (5) – typically connected to use and elimination – includes mismanaged waste (littering, failings in waste treatment), *primary microplastics* (microbeads intentionally added to products), as well as *secondary microplastics* (produced from the breakdown of larger plastics; including products traditionally not considered as part of the plastic system such as cigarette butts)⁴.

Figure 1: *The five processes of the plastic system*



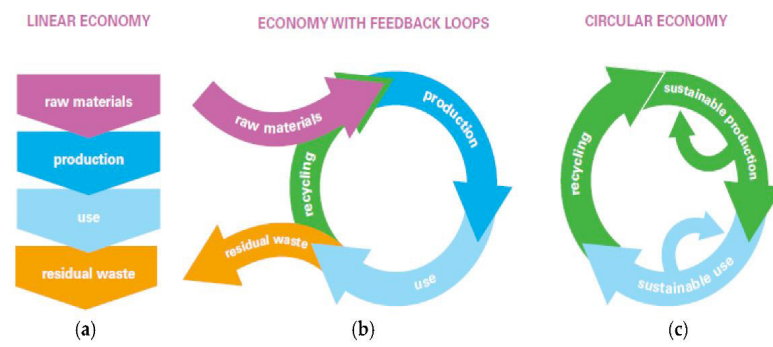
Essentially, we can discern three approaches to this plastic system (cf. Figure 2), each following out of, as well as giving expression to a different outlook on the economy. Under the *linear approach* ((a) in Figure 2), the

⁴ Regarding the distinction between primary and secondary microplastics, we opt here for the definitions used in other studies mandated by the FOEN (cf. Erny et al. 2020).

“system” has a clear beginning and end. At the end of the linear value-chain, the focus is on how to take care of waste through appropriate “end-of-pipe” elimination technologies. Next, there is the *feedback loops approach* ((b) in Figure 2). While under this model a reorientation towards recycling is introduced, the circle is not yet closed. Such an approach is often designated as a “recycling economy” approach (e.g. European Commission 2014; Rizos, Tuokko, Behrens 2017; MacArthur 2013). In the feedback loops approach, waste is still being *produced* and a continuous input of new raw materials is – be it to a lesser extent – still needed to keep the system going. Only under the last, *circular approach* ((c) in Figure 2), is the system fully closed and the different processes become phases in a restorative and regenerative value circle⁵. Under this model, the production, use and reintroduction of plastics is organised in such a way that no material leaves the system, and hence no new material has to be introduced. With its *Action Plan for the Circular Economy*, the EU has made this last approach into a baseline principle for its economy (European Commission 2015), including plastics (European Commission 2018a). According to Reike et al. (2018, 248-249), these three approaches can also be presented as the three general stages or phases of evolution in the perception of value-chains in a consumer society and how to deal with them: “Dealing with Waste” (1970 - 1990), “Connecting Input and Output in Strategies for Eco-Efficiency” (1990 – 2010) and “Maximizing Value Retention in the Age of Resource Depletion” (2010 +).

⁵ *Ellen MacArthur Foundation, Concept* ellenmacarthurfoundation.org/circular-economy/concept (consulted 18 November 2019).

Figure 2: *The three models of an economic system*



Source: Buren et al. 2016, 4

Following from the above, a plastic system's circularity essentially depends not only on how much it is oriented towards reuse, recycling and reintroduction instead of elimination, as well as of the extent of leakage, but also on how the system is considered as a whole and designed for recycling and reuse in the early production stages. Only when neither introduction of additional raw material nor leakage exists, is the system truly circular ((c) in Figure 2). It has to be understood that such complete circularity represents an ideal situation that can barely be attained. It may serve as a perspective to strive for, but it should be recognised that (for plastics), full circularity cannot (yet) be attained. The assumption that materials can be circularised indefinitely is a gross oversimplification, which disregards irreversible effects as well as technological and even physical limitations (Korhonen et al., 2018a; Winans et al., 2017): it is a fact that materials (and energy) are irretrievably lost during the lifetime of technical products. Hence, from a thermodynamic perspective, a circular economy aims at minimising entropy production at all life cycle steps, thus namely concentrating on "slow cycles" and "clean cycles" (see Desing et al. 2020 and reference cited). What is true for all materials, is particularly relevant for currently available plastic materials, which do not

allow for their continuous reapplication. In that sense, only model (b) seems to be reasonably achievable.

To investigate these issues, we have developed a *common conceptual framework*, which considers the industrial plastic system, following the above-mentioned *circular approach*, as essentially composed of these *five processes* – (1) production and/or import, (2) use and reuse, (3) recycling and reintroduction, (4) elimination, and (5) leakage, each dealing with a specific aspect of the product's life cycle. Each process brings together several (groups of) actors (i.e. stakeholders), and is governed through a regulatory regime composed of three sets of rules that are *public policy*, *private law*, and *self-organisation* (i.e. voluntary sectoral agreements between private actors), each set providing various types of *policy instruments* (Knoepfel, Nahrath, Varone 2007; Gerber et al. 2009) (Figure 3).

As pointed out before, such a plastic system can be more or less circular, depending on the principles, rules and policy instruments implemented by the regulatory regime and how they regulate the five different processes.

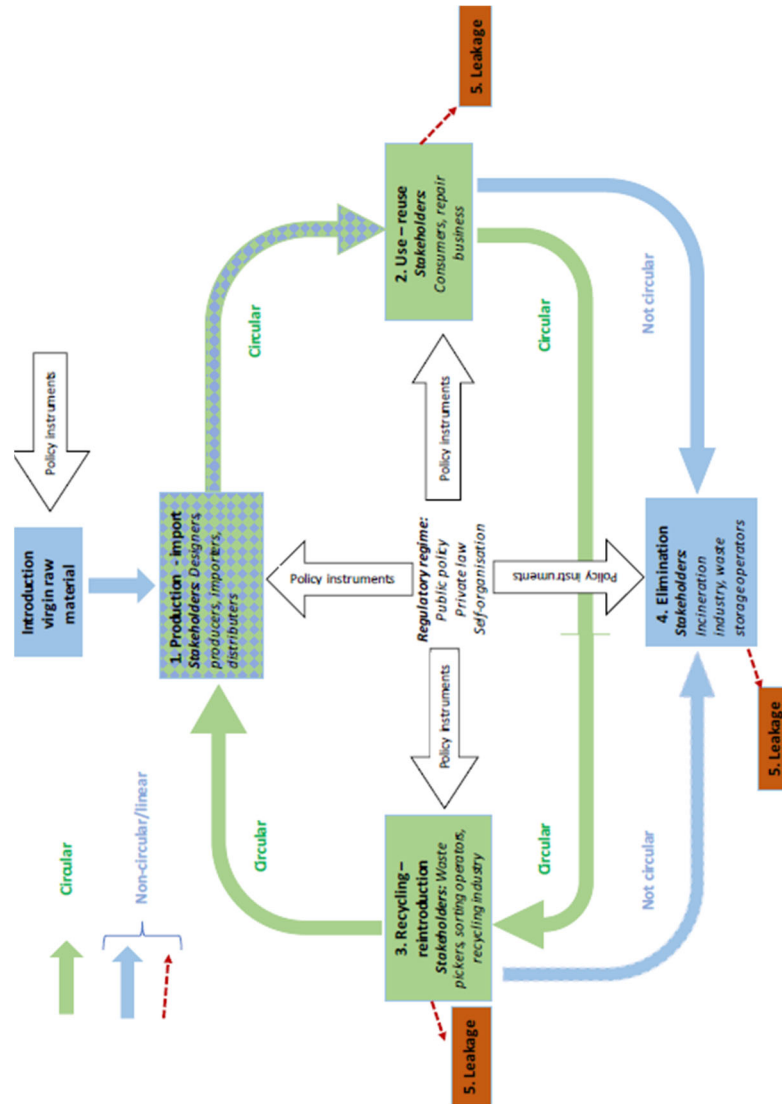
The main aim of the present study is to make a *comparative analysis of these principles, rules and policy instruments implemented by both the Swiss and EU regulatory regimes*.

Through the reinforcement of circularity, the '*European Strategy for Plastics in a Circular Economy*' (European Commission 2018b) aims to address three interrelated issues (European Commission 2018a, 3):

1. The EU's high dependence on virgin fossil feedstock,
2. The currently still low rate of recycling and reuse of plastics, and
3. The actually significant leakage of plastics into the environment.

To do so, multiple legislative initiatives have been implemented or are under way, providing, amongst others, a ban on certain single-use plastic products (European Union 2019), or an increased recycling rate of plastic material (European Union 2018).

Figure 3: Regulation of the five plastic system processes



Legend: green boxes and arrows stand for circular plastic flows (no introduction of new virgin raw material, reuse and/or recycling and reintroduction in the production system instead of elimination). Blue boxes and arrows stand for non-circular/linear plastic flows (introduction) of virgin raw material, no reuse or recycling and end-of-pipe elimination). Red dashed arrows stand for various types of plastic pollution. “Policy instruments” arrows indicate the various intervention points of the current EU and Swiss regulatory regimes within the industrial plastic system.

In Switzerland, following a number of parliamentary motions, postulates and questions⁶ – in particular on the Confederation’s position in relation to this emerging European strategy – the Federal Office for the Environment (FOEN) has been tasked with developing an in-depth reflection on the reform of the country’s plastic policy, in order to reinforce its sustainability. Thereby, a main issue is how Switzerland could be inspired by, and learn from, the recent developments in the EU, with a view to circularise the Swiss plastic system? More specifically, the challenge in this regard is to identify existing and forthcoming EU-measures that may be relevant to transfer to the Swiss setting, as well as those that seem to be less pertinent to Switzerland, because they do not address relevant issues, are too inconsistent with its actual plastic policy, or difficult to translate to the Swiss institutional, political, cultural and/or economic contexts.

It is in the context of this ongoing debate about the sustainability and circularity of plastics that the FOEN has mandated the Swiss Graduate School of Public Administration (IDHEAP) from the University of Lausanne to carry out a comparative study of Swiss and European strategies and measures in the field of plastics regulation. Such a study should contribute to the development of a possible “Swiss plastic strategy” for the Confederation’s sustainable management of plastics.

⁶ These concern, amongst others, the postulates by Adèle Thorens-Goumaz (18.3196) and Martina Munz (18.3496), the motions of Benjamin Roduit (18.3626) and the Environment, spatial planning and energy committee of the National Council (18.3712), as well as the questions by Ursula Schneider Schüttel (18.5249), and Regula Rytz (18.5270).

To do so, the study looks at a set of four interrelated questions:

1. *What are the characteristics of the Swiss plastic system, – in particular in terms of possible sources of pollution and the way it deals with plastics at the end of its initial life cycle – which could be taken into account when possibly formulating a “federal strategy” for the sustainable management of plastics?*
2. *What instruments are currently available in Switzerland and the EU to manage the different aspects of the plastic life cycle and possible challenges linked to it?*
3. *Which instruments developed within the framework of the EU strategy could be relevant for Switzerland?*
4. *To what extent are they compatible with the Swiss legal context? What are the main obstacles?*

Based on our conceptual framework (Figure 3), and in order to answer the four above-mentioned questions, the mandate was organised along *three work packages*, which correspond to *the three chapters* of this report:

Chapter 1 offers a synthesis of the current knowledge about the characteristics and the intensity of the problems generated by the use of plastics in Switzerland. Based on the collection, analysis, and synthesis of existing but dispersed information and data on plastics in Switzerland, as well as the scientific literature on the main problems and challenges related to plastic management, this part of the study discusses the current plastic system in Switzerland. Starting from this system’s main features, and building on the notion of circularity, it points out the main challenges regarding the circularisation of such a system. By subsequently elaborating on those elements that so far received less attention, the chapter then presents avenues for further reflection about how to make the Swiss plastic system more sustainable. Hence, this first work package contributes to answer question 1 presented above.

Chapter 2 turns to a comparative analysis of existing and future institutional strategies and arrangements in the EU and Switzerland intended to deal with the various public problems related to plastic

production, use, recycling, elimination and leakage. Looking at the interconnected processes, which together make up the plastic system in the EU and Switzerland, this analysis focuses on the different policy instruments and procedures through which these plastics strategies and regulatory regimes are seeking implementation. Therefore, it systematically identifies and analyses the relevant policy documents and legal acts that establish such instruments and procedures along the five processes of an industrial plastic system identified in the conceptual framework (cf. Figure 3 above): production-import, use-reuse, recycling-reintroduction, elimination, and leakage.

Going beyond a simple descriptive study, attention thereby goes to three dimensions:

1. The definition of the *public problem*: what are the similarities and the main differences between the EU and Switzerland in their definition of both the nature and the content of the public problems that are to be solved in relation to plastics?
2. The identification of relevant *rules* and *instruments* in place or under elaboration for the management of each of the five processes of the Swiss and EU plastic systems.
3. The *assessment* of these rules and instruments according to two evaluation criteria, which are *relevance* and *compatibility of EU instruments with the Swiss institutional setting*.

In doing so, this part of the study aims to identify the convergences and divergences between the EU's Plastic Strategy and current available policy instruments dealing with plastic management issues in Switzerland. Furthermore, it identifies EU-measures that may be relevant to strengthen the Swiss plastic policy and could be transferred to the Swiss setting. And, finally, it identifies divergences, or even incompatibilities, between the EU strategy and the actual Swiss plastic policy. Thus, this second work package answers questions 2 to 4.

Finally, Chapter 3 returns to the totality of the four interrelated questions formulated as the starting point of this study. Based on the information

and findings of the two previous work packages (i.e. chapters) it presents answers to these questions.

1 THE SWISS PLASTIC SYSTEM: PARTICULARITIES AND KNOWLEDGE GAPS – A STATE OF AFFAIRS

This chapter is pursuing the following *four objectives*: (1) to point out the main characteristics and specificities of the Swiss plastic system, (2) to identify the main public problems regarding plastic usage and pollution, as well as the main challenges regarding the circularisation of such a system, (3) to identify knowledge gaps within the existing but dispersed information and data on plastics in Switzerland, and, finally, (4) to present avenues for further reflection about how to make the Swiss plastic system more sustainable.

To do so, this chapter is structured as follows:

To start, section 1.1 looks at the current Swiss plastic system. Determining its specificities, it discusses how these hinder the introduction of circularity. Thereupon, section 1.2 focusses on knowledge gaps and yet lacking information about (parts of) the Swiss plastic system. As these gaps could both explain, as well as follow from the specificities of the system, closing them is crucial to a deliberate reflection on how to reorient that system towards circularity. General information is provided that could guide the FOEN in its endeavours to curb these lacunas and avenues for closing knowledge gaps. Finally, section 1.3, resumes the chapter's main findings. Additionally, it presents an overview of the different kinds of data that are needed to reinforce the circularity of the Swiss plastic system and reflections thereon.

1.1 THE SWISS PLASTIC SYSTEM

The FOEN's data about the plastic system in Switzerland mainly go back to 2010, when an estimation of the amount of plastic flowing through the industrial system was established (Schelker and Geisselhardt 2011, 12–

20)⁷. This overview states that in 2010, 1'000'000 tonnes of plastics were consumed in Switzerland. Approximately 430'000 tonnes (43%) thereof were used for less than a year before they became waste. The remaining 570'000 tonnes of plastic materials go into storage and their life span is longer than one year (57%) (for ex. window frames). However, regarding recycling and the reuse of plastic materials, the overview shows that these are rather limited. In 2010, 145'000 tonnes (19%) of plastic waste were subject to sorting, and just about 80'000 tonnes (10%) were actually recycled. This contrasts with the 700'000 tonnes of in total 780'000 tonnes of plastic waste (90%) that were energetically valorised in waste incineration plants or cement plants. In the work of Kawecki et al. (2018), the flows through the plastic system from production to elimination and recycling (incl. import/export) were mapped in more detail for the year 2014 in Switzerland. The results of this study serve as a basis for a detailed assessment of exposure pathways of plastics in the environment, which is introduced further on in this chapter.

Taking into account these studies, the Swiss plastic system is essentially linear. Most plastic waste does not flow back into a new cycle of use, but is eliminated through incineration. Recycling on the other hand is limited. While recent data on the matter are missing, there is no indication that this has structurally changed since. As the amount of incinerated waste has continued to increase since⁸, so has arguably the amount of incinerated plastics. Comparatively, in the EU in 2014, 30% of post-consumer plastic waste is said to be recycled (European Commission 2018b, 17).

While Switzerland indeed manages its plastic waste adequately, this management is essentially end-of-pipe oriented (Knoepfel et al. 2010). This situation can be explained by the fact that, so far, the environmental benefit of recycling is highest in the collection and recycling of unmixed

⁷ Cf. also FOEN, *Plastics*.

bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/plastics.html

⁸ OFEV, *Indicateur incinération des déchets*

bafu.admin.ch/bafu/fr/home/themes/dechets/en-bref.html#accordion_7653992041570542057196

and clean plastic waste. In the – most common – case of mixed and contaminated plastic waste, recycling no longer provides any significant environmental benefit compared to incineration and energy recovery in a modern incineration plant.

This also reveals itself through the mandated studies or the FOEN's own reports that are publicly available. Overall, these documents show an end-of-pipe focus. Plastics are discussed in terms of (their collection for) recycling, and most of all their (economic) value to produce energy (Conseil fédéral 2017; Dinkel et al. 2017; Schelker and Geisselhardt 2011; BAFU 2012; Dinkel et al. 2012). This focus on energy recovery goes together with a comparatively weak attention for – and knowledge about – other processes of the plastic system. The above-mentioned data from 2010, for instance, do not contain information on the origin of the plastic consumed in Switzerland, about which it only states that "*plastics are mainly produced abroad*". Furthermore, it considers the Swiss plastic system as if it were a neatly closed cycle. Comparing all the data, no *leakage* occurs. Everything that goes in and is used, somehow flows back or is taken care of otherwise. An increasing interest by the FOEN for the problem of pollution and leakage indeed can be noticed. Notably, Kawecki and Nowack (2019) mapped emissions of macro- and microplastics for seven polymers in Switzerland, showing that the main source of leakage is littering, but that also construction, agriculture, and pre- and post-consumer processes cause important emissions of microplastics into soils and waters. Another, very recent study (Erny et al. 2020, 52) also warns that the potential effects of plastics on people, animals and entire ecosystems are diverse, complex and, on the whole, still poorly understood, and need to be studied in more detail.

Yet, to fully grasp the main characteristics of the plastic system and what could be done to make it more circular, this all in all still limited knowledge (cf. 1.2.5 *infra*) should be integrated into an updated understanding of the Swiss plastic system as a whole.

1.2 FILLING UP KNOWLEDGE GAPS ABOUT THE SWISS PLASTIC SYSTEM

In the Introduction, we distinguished between the different processes, which together build up the industrial plastic system (Figure 1). The degree of circularity of such a system essentially depends on how much reintroduction is favoured over elimination and the introduction of virgin raw material⁹, as well as on the amount of leakage (Figure 2). Section 1.1 above then showed how the Swiss plastic system is (still) far off from circularity due to its preponderant focus on end-of-pipe elimination, both in practice and in consideration. To help address this, the present section (1.2) mainly turns to the other – so far under-exposed – processes.

As a general remark (valid for both the EU and Switzerland), it should be pointed out that, regarding the collection of data and information, the challenge is not only to find missing data, but also to find verifiable information. It is thus crucial to not get lost in the sometimes-confusing way information is used or presented (e.g. different terminology and definitions, various calculation methods of recycling rates¹⁰). In this regard, multiple examples come to mind. For instance, ‘*plastic waste*’ and ‘*plastic packaging waste*’ are not the same, yet the second is sometimes used as a proxy for the first (EEA 2019, 15). Subsequent communication thereon however can obfuscate this¹¹. Statements on the matter also can

⁹ Underlined words are listed alphabetically in the glossary at the end of the book.

¹⁰ It should be noted – as is discussed in section 1.2 *infra* – that this claim contradicts the statement from the *Plastics Strategy* itself that in Europe, less than 30% of [plastic waste] is collected for recycling. It should also be noted that recycling rates are often not well-defined and can describe various performance measures, e.g. collection rates (mass ratio of collected material to material initially consumed), intermediate recycling rates (mass ratio of sorted material to material initially consumed), and final recycling rates (mass ratio of mass in secondary products to material initially consumed) (primary source: Melanie Haupt, Stefanie Hellweg, *Measuring the environmental sustainability of a circular economy*, *Environmental and Sustainability Indicators*, Vol. 1–2, September 2019 100005, <https://doi.org/10.1016/j.indic.2019.100005>; with reference to Haupt, M., Vadenbo, C. and Hellweg, S. (2017), *Do We Have the Right Performance Indicators for the Circular Economy?: Insight into the Swiss Waste Management System*. *Journal of Industrial Ecology*, 21: 615-627. doi:10.1111/jiec.12506).

¹¹ As an example, the here mentioned EEA’s report, p. 15, states that “[i]n Europe, 27.1 million tonnes of plastic waste were collected for treatment in 2016”, while the European

have a certain declaratory character, depending on the source, or postulated without much possibility to check their accurateness. As an example, *Plastics Europe* gives a plastics recycling rate of about 24% for Switzerland in 2010, and puts the energy recovery rate at 76% (Plastics Europe 2011, 11). This recycling rate is more than twice as high, and the incineration rate markedly lower than what comes out of the FOEN's own data presented above. While these different results could follow from different standards of measurement (cf. EEA 2016, 14; Haupt et al. 2017), in this case, the precise reason is difficult to fathom, as Plastics Europe does not specify how precisely it arrives at these results or where they originate. Furthermore, we can come up against conflicting or incompatible statements, even from the same source. As mentioned earlier, “in the EU in 2014, 30% of post-consumer plastic waste was recycled”. This statement comes from the *Commission Staff Working Document Accompanying [...] A European Strategy for Plastics in a Circular Economy*, p. 17. Yet, at the same time, this Strategy itself, p. 2, states that “in Europe every year [l]ess than 30% of [plastic waste] is collected for recycling”. This is obviously not the same. Finally, even basic definitions can differ. Exemplary is the use of the concepts of “primary” and “secondary” microplastics. For reasons of coherence, we opt here for the definitions used in other studies mandated by the FOEN (cf. Erny et al. 2020), also applied by the European Chemicals Agency (ECHA 2019), according to which the distinction between both is based on their intentionality (cf. Glossary, *infra*). Yet, we should be aware that other interpretations distinguish between *primary* and *secondary* based on whether they enter the environment directly as microplastics, or on the contrary, result from the breakdown of larger pieces of plastic waste and debris (cf. Boucher and Friot 2017, 5).

Strategy for Plastics in a Circular Economy (European Commission 2018b, 2), cites “25.8 million tonnes of plastic waste [...] generated in Europe every year”. As to Eurostat, on the one hand you find on their news-page that “15.8 million tonnes of plastic packaging waste [is] generated in the EU in one year”, yet on the other hand their statistical data (Eurostat) mention 17.6 million tonnes of plastic waste, as well as 86.7 million tonnes of packaging waste. How all these data connect is difficult to see.

This complicates a clear outlook on possible problems and potential solutions, and should be kept in mind when dealing with such data and information.

1.2.1 PRODUCTION AND IMPORT

As noticed, the FOEN's data from 2010 do not include information on production or import of plastics. However, to grasp the Swiss plastic system comprehensively, detailed data about this first process is needed. The circularity of the system cannot be fully apprehended when it is not known how much plastic enters in the first place. Therefore, one needs to know the quantity of plastic material and products being produced in Switzerland, how much thereof is exported, and how much is imported.

Regarding *production* within Switzerland, this mainly concerns the production of plastic products. KUNSTSTOFF.swiss (formerly *Swiss Plastics*) (2018) – the branch organisation of plastic producers – mentions a total amount of 775'181 tonnes of plastics and 42'165 tonnes of rubber processed in 2018. Having slowly increased from about the same order of magnitude in 2004 to almost 1'000'000 tonnes in 2008, since 2012 the Swiss plastic production (incl. rubber) stabilised at its current level of a bit over eight hundred thousand tonnes annually (cf. Figure 4). This amount is processed by 421 firms, which together employ 27'432 people and generate an annual revenue of CHF 10.5 billion. With 63 companies, and a revenue of CHF 3.05 billion, the production of plastics raw materials is more limited in Switzerland.

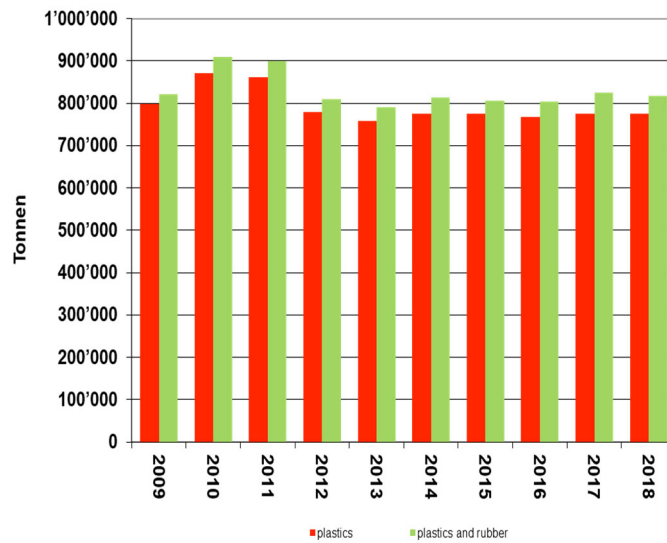
For *import* and *export*, information exists with the Federal Customs Administration (FCA), keeping track of all goods (in whatever form) crossing the border. For plastics, three main categories of goods are concerned. Based on the nature of goods¹², plastics essentially involve the following categories: 05.3.2 – '*finished products made from plastics*', 05.3.1 – '*semi-manufactures made from plastics*', and 06.1.2 – '*unformed*

¹² In the FCA's, *Swiss-Impex database gate.ezv.admin.ch/swissimpex/index.xhtml*, types of goods can be searched for according to different parameters. The most convenient parameter for easily obtaining overall data is '*nature of goods*'.

plastics (primary forms)'. Thus, in 2018, Switzerland imported 369'488 tonnes of *finished plastic products*, for a total value of CHF 2.6 billion and exported 202'596 tonnes, worth CHF 1.8 billion. While over the last 15 years export generally stabilised, import steadily increased to more than threefold of what it was at the beginning of the 1990ies (cf. Figure 5)¹³. For *semi-manufactured plastic products*, we see somewhat similar trends. In 2018, 410'494 tonnes (CHF 2.04 billion) of these were imported in Switzerland, while 258'214 tonnes (CHF 1.7 billion) went abroad. Where in this case export slightly decreased and then stabilised over the last ten years, import again went on increasing and more than doubled compared to the beginning of the 1990ies (cf. Figure 6). Finally, in 2018, Switzerland also imported 989'902 tonnes (CHF 2.3 billion) of *unformed plastics*, while having exported 569'571 tonnes (CHF 2.2 billion). Over the years, both import and export of unformed plastics show a generally increasing trend, yet export more than import (cf. Figure 7). Together, the goods of these three categories represent 3.4% of in total CHF 201.8 billion worth of import, and 2.5% of an overall worth of CHF 233.2 billion of exported goods. For each of the three categories, and this in both traffic directions, the EU is by far Switzerland's most important trading partner.

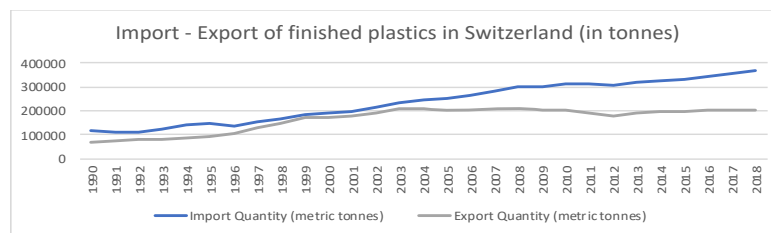
¹³ Data for Figures 5 to 9 are extracted from the FCA Swiss-Impex database www.gate.ezv.admin.ch/swissimpex/.

Figure 4: Amount of plastics and synthetic rubber processed in Switzerland (in tonnes)



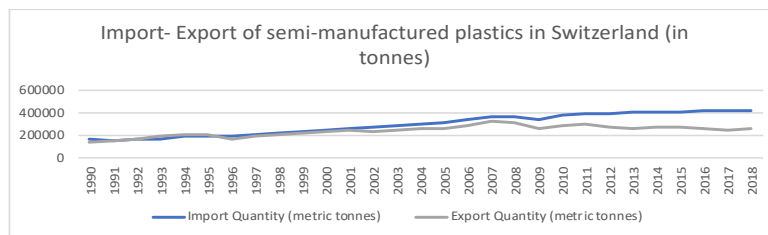
Source: Swiss Plastics 2018, 6

Figure 5: Import-export of finished plastics in Switzerland (in tonnes)



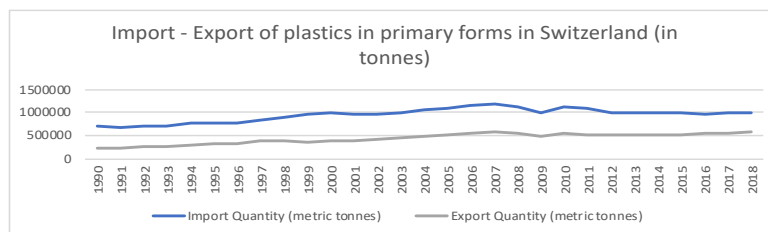
Source: FCA Swiss-Impex

Figure 6 : *Import-export of semi-manufactured plastics in Switzerland (in tonnes)*



Source: FCA Swiss-Impex

Figure 7: *Import-export of plastics in primary forms in Switzerland (in tonnes)*

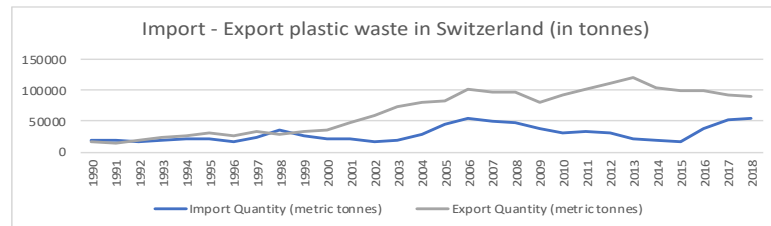


Source: FCA Swiss-Impex

About the last category of unformed plastics, it should be noted that it also includes plastic waste (tariff heading 3915). In 2018, Switzerland exported 90'814 tonnes of plastic waste while it imported 53'766 tonnes. The import of plastic waste shows considerable fluctuations over time, yet its export increased considerably over the last 30 years, being now more than 5 times what it was in 1990 (cf. Figure 8). While since 2001, we noticed a gradual increase in the export of plastic waste towards Asia (essentially Hong-Kong and China) to 15% of overall plastic waste export

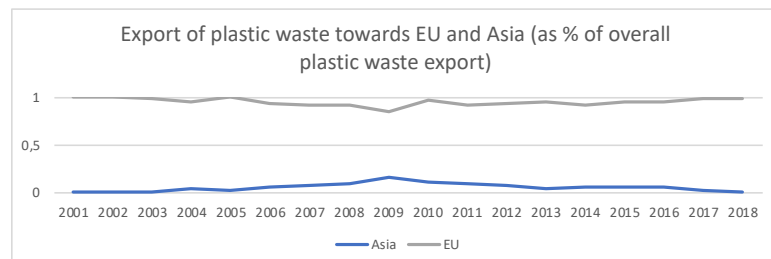
in 2009, this decreased again since. Plastic waste export to the EU (+ Norway) slowly decreased to 84.7% in 2009, but since then increased again to almost the totality of export (98.9%) in 2018 (cf. Figure 9). Imported plastic waste comes almost entirely from the EU + Norway. Except in 2015, when only 16'885 tonnes of plastic waste were imported of which "only" 96.3% came from the EU + Norway; since 2001, at least 98% of imported plastic waste came from Europe.

Figure 8: *Import-export of plastic waste in Switzerland (in tonnes)*



Source: FCA Swiss-Impex

Figure 9: *Export of plastic waste towards EU and Asia (as % of overall plastic waste export)*



Source: FCA Swiss-Impex

Since the production of plastics stayed about the same these last years, as did export, while import increased, it is sound to assume that the overall *net import of plastics in Switzerland has grown over time*. However, due to the scattered nature of the available information, obtaining a viable image of precise quantities is difficult. Especially given the absence of a more detailed view on the nature of Swiss production, one cannot see how all these data combine. For instance, how much Swiss production is based on either imported or 'home made' raw material, or what share of the production of finished products is based on imported semi-finished products, cannot be currently determined.

Besides, it should not be overlooked how the previously mentioned categories for import and export are part of a tariff nomenclature intended for the classification of traded products¹⁴. While these three categories arguably cover a considerable share of plastics going in or out of the country, they decidedly do not cover all of it – as category 05.3.2 (finished products) clearly points out by specifying that "*not included [are] clothes, shoes and hats*"¹⁵. Yet, as will be discussed hereafter (cf. 1.2.5, *infra*), precisely these objects can be linked with problems of unintended leakage. Therefore, not taking them into account when talking about import or production obscures part of the plastic system and hinders its full understanding.

To enhance awareness about what gets into the system, a more precise grasp of what quantities and kinds of plastics are produced in Switzerland, and how these relate to different types of imported material and products, is needed. As a first step, however, a comprehensive reflection is needed about what products are considered made from plastics and therefore must be included. In that regard, goods such as the above-mentioned clothes,

¹⁴ *The Swiss customs tariff, like most customs tariffs worldwide, is based on the international Harmonized System (HS), developed and maintained by the World Customs Organisation (WCO).*

¹⁵ *This list could actually be completed by a long series of other (commercial) goods containing plastics, like washing machines, electronic devices, cars, etc.*

shoes and hats, and all other products made of or containing synthetic polymers, should be looked at carefully.

1.2.2 USE AND REUSE

The 2010 data cite an estimated 1'000'000 tonnes of plastics consumed in Switzerland for that year. Compared to the residing population at the time¹⁶, this makes an average consumption of 127 kg of plastics/person¹⁷. Approximately 55 kg (43%) thereof was used for less than a year before it became waste¹⁸. More recent data are not available. Yet, considering the arguable increase of net import of plastics in Switzerland (cf. 1.2.1 *supra*), there is no indication that these numbers have diminished since then.

A comparative perspective helps to grasp the scale of this consumption. For 2012, worldwide plastic consumption was of the order of 270 million tonnes (Biron 2013, 27). With an estimated growth rate between 5% and 5.5% per year (*ibid.*), this has increased to a worldwide consumption of 362 million tonnes in 2018. Compared to the world population¹⁹, this makes an average consumption of 48 kg of plastic/person. For Western Europe in general, per capita plastic consumption is estimated to have reached 100 kg (European Commission 2018a, 5). Considering this, an up-to-date vision about how much plastics are consumed in Switzerland would provide important information to the FOEN, and can help to put data into international perspective.

¹⁶ = 7'870'134 persons (OFS, Population – 2010)

<https://www.bfs.admin.ch/bfs/fr/home/statistiques/population.html>

¹⁷ The FOEN's website mentions 125 kg.

([bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/plastics.html](https://www.bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/plastics.html)).

¹⁸ As mentioned before (cf. section 2 *supra*) Schelker and Geisselhardt (2011) cite 430'000 tonnes of plastics from consumption with a life span of less than a year ('Verweildauer < 1 Jahr').

¹⁹ The World Bank, Population Total data.worldbank.org/indicator/sp.pop.totl (= 7.594 billion people).

1.2.3 RECYCLING AND REINTRODUCTION

In our conceptual model, recycling and reintroduction have been put forward as crucial to the (reinforcement of) the plastic system's circularity. However, as shown in section 1.1, the Swiss plastic system is oriented towards incineration rather than recycling. Only a limited proportion of the global amount of plastics consumed in Switzerland is recycled. Based on the numbers of 2010 (Schelker and Geisselhardt 2011, 12–20), only 80'000 tonnes (= 10.3%) of the 780'000 tonnes of the annual amount of plastic waste ended up being recycled. This is clearly below the overall recycling rate of 52% we find in the Swiss waste statistics for 2018²⁰, also mentioned by Swiss Recycling²¹. Besides, recycled plastics consist for 38'000 tonnes²² (47.5%) of PET beverage bottles, for which an efficient collection and recycling system is in place. This means that only limited amounts of other plastics are recycled (e.g. PE-bottles with tops (polyethylene) collected in retail shops). PET beverage bottle recycling presents a promising example of a feedback loop, but is limited (5% of the 780'000 tonnes of plastic waste) compared to the overall amount of plastic flowing through the system²³.

²⁰ FOEN, *Waste statistics: Data for 2018*

bafu.admin.ch/bafu/en/home/topics/waste/state/data/abfallstatistiken-2018.html

²¹ According to Swiss Recycling, “[i]n European comparison, Switzerland is among the best in this discipline [and] [t]he population deserves to be congratulated for this performance”. This is repeated in the media^a. Yet, these numbers could be misleading. Where in 2018, the average Swiss produced 701 kg of municipal waste, 370 kg (indeed 52%) was recycled. However, of this total amount, 152 kg concerns ‘composting and digestion’^b – i.e. “used on land or for the production of growing media”. This is about the treatment of biowaste^c. ‘Material recycling’ lies at 216 kg/person. This represents 31% of the municipal waste produced for that year, and is but slightly above the European average of 30%. Even if composting is considered as recycling, this means that in Switzerland still 336 kg/person-year of municipal waste is not recycled compared to 161 kg/person-year in the EU. –^a Cf. *Arc Info* (23.01.19), *Suisse: chaque habitant produit 706 kilos de déchets par année [amount in 2017]* arcinfo.ch/articles/suisse/suisse-chaque-habitant-produit-706-kilos-de-dechets-par-annee-814912 –^b Eurostat, *Municipal waste by waste management operations* ec.europa.eu/eurostat/web/products-datasets/-/env_wasmunf *ibid.*, *Metadata and European Commission* (2008).

²² FOEN, *Waste statistics: Data for 2018*

bafu.admin.ch/bafu/en/home/topics/waste/state/data/abfallstatistiken-2018.html

²³ GreenBuzz Zürich, *The Circular Plastic Economy in Switzerland*

While extended recycling could help circularity, it is important to recognise possible challenges to such recycling. Apart from the Swiss specialty of the actual orientation towards incineration (cf. section 1.1 *supra*, and 1.2.4 hereafter), at least three more general problems for reinforced recycling should be considered.

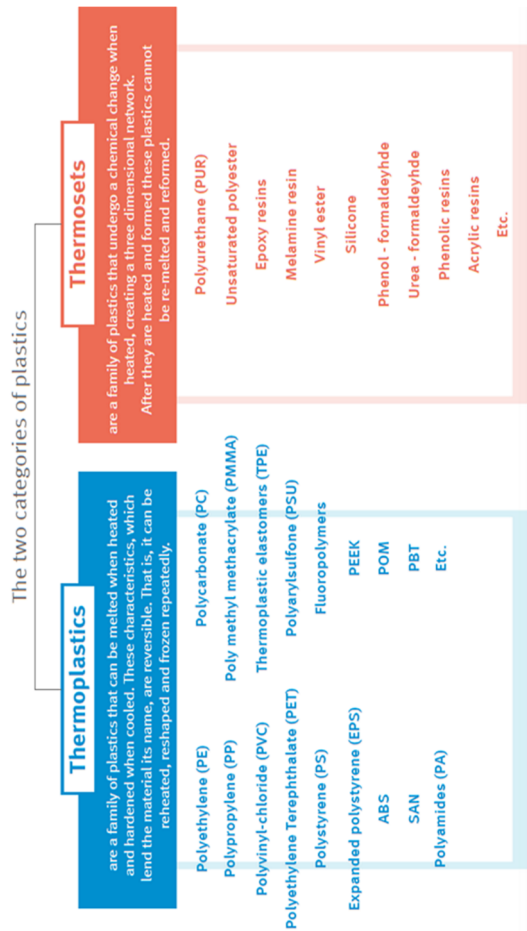
First, there is the high variety of actual plastic materials being used. Although “*plastics*” or “*plastic materials*” can be broken down into broad types (cf. Figure 10), these terms actually describe an extremely large family of different polymer types, each with its own characteristics, properties and uses (Plastics Europe 2018, 16). Many plastic products consist of more than one of these materials. Furthermore, as part of manufactured products, plastics are used in combination with numerous additives²⁴. These additives are essential to make plastics processable and to assure their end-use properties (Amos et al. 2009). Thus, a plastic, randomly chosen, will contain about 20 additives (van Oers et al. 2012, 140). While this renders plastic an extremely versatile material with a variety of specific properties (European Commission 2018a, 23), it also leads to a practically unaccountable number of basic materials, making recycling highly complex. The fact that little is known so far about possible hazardous properties of many additives²⁵, further complicates plastics recycling. Reinforcing recycling implies increased knowledge about what different types of plastics and additives are used in products produced or imported into Switzerland, how they combine and what their possible hazardous effects are. Linked to this, also the concrete design of plastic products and their possible integration into a product together with other materials (composite materials with metal, paper, wood etc.) can hinder recycling.

greenbuzz.global/zurich/2019/07/22/plastics-switzerland/.

²⁴ A joint project by ECHA and the plastics industry resulted in a list of over 400 functional additives or pigments used in plastics. Cf. ECHA, Mapping exercise – Plastic additives initiative echa.europa.eu/mapping-exercise-plastic-additives-initiative#table.

²⁵ While additives that were used in the past (e.g. certain phthalates and flame retardants...) have been phased out because of their hazardous nature, this does not mean that the possible dangerous effects on the environment or human health of those currently used are all well-known.

Figure 10: Different types of plastics²⁶



Source: Plastics Europe 2018, 17

²⁶ This figure from Plastics Europe does not include a third type of plastics, namely Elastomers, generally used as materials for tyres, rubber bands, sealing rings etc. (cf. Erny et al. 2020, 17-8).

Secondly, it should be recognised that *plastic material couldn't be recycled endlessly*. Not only does plastic material leak out during and after use (cf. 1.2.5 *infra*), but also does secondary raw material not always allow uses identical to those of virgin raw material. While recent research seems to have come up with a polymer-type that could be “*manufactured, used, recycled and re-used without losing value*” (Christensen et al. 2019), actually, “*recycled plastics are low-value commodities due to residual impurities and the degradation of polymer properties with each cycle of re-use (Ibid.)*”. This degradation of plastic products each time they are processed, which is usually called *downcycling*, implies – unlike aluminium or glass²⁷ – that new raw material will continue to be necessary, even more so when there is increasing demand for plastics, as is actually the case²⁸. This is also the case for PET plastics. It may be asserted that the “*simple process [of producing PET bottles using recycled material] can be repeated many times²⁹*”, subsequent reprocessing cycles gradually degrade its properties. This means that *reprocessing PET without the introduction of virgin polymer is not possible* (Mantia 2002, 160–62). Even if over the last years technological progress has allowed to improve the PET recycling process and to reduce the quality loss, as it became visible with the development of R-PET³⁰, which makes bottle-to-bottle recycling possible.

The third challenge in enhancing plastics recycling is that every recycling system put in place needs to be environmentally and financially sound. The collection, transport, handling, sorting and recycling of plastic materials uses, besides recycling plants, important amounts of water, energy and chemicals. The costs to run this system need to be securely funded as well as an environmental benefit in relation to the financial

²⁷ Mitte (18.07.18), *The truth about Recycling Plastic* [mitte.co/2018/07/18/truth-recycling-plastic/](https://www.mitte.co/2018/07/18/truth-recycling-plastic/)

²⁸ In this regard, Grosse (2014) estimates that with any consumption growth above 1% per year, even a recycling rate covering the quasi-totality of waste would have a futile effect.

²⁹ PET-Recycling Schweiz, *Cycle du PET* [pet recycling.ch/fr/savoir/cycle-du-pet](https://www.petrecycling.ch/fr/savoir/cycle-du-pet)

³⁰ PET-Recycling Schweiz, *R-PET: la matière première suisse*, <https://www.petrecycling.ch/fr/savoir/recycling-pet/r-pet-schweizer-rohstoff-kopie>

investment needs to occur. There are furthermore certain requirements, which have to apply to the system in order to gain a high quality secondary raw material. For instance, the purity and homogeneity of the collected material and a well-developed infrastructure (e.g. collection points, logistics etc.) are crucial to a successful plastics recycling (Dinkel et al. 2017). Regarding the recycling of PET beverage bottles, the transition from a linear to a circular system is promising, as the recycling process is established and the material flows are known. There exist, in Switzerland, a large number of public and private initiatives to collect and recycle mixed plastic waste from households. Therefore, it is important to study existing recycling systems and their success, but also the potential of new recycling systems. It is crucial that the requirements for an environmentally and financially sound plastics recycling system are considered³¹.

The above considerations make clear that recycling has its limits. To fully grasp the challenges related to recycling, the actual number of plastics *out there*, and the profusion of chemical substances involved deserve strong attention. Linked to the previously expressed need for a comprehensive reflection about what products are considered made from plastics (cf. 1.2.1 *supra*), an inventory of all plastic substances and additives used in plastic goods sold in Switzerland is of prime importance. In this regard, the *Clean Cycle project*, currently under way at the ETH Zürich and supported by the FOEN, is an important and promising endeavour, as creating such an inventory is precisely one of the tasks of this project³².

Furthermore, in the context of circularity, it is important to know how much virgin raw material will continue to be needed. Therefore, thoughts should be given to the quality of secondary raw material and how that affects the recycling process as well as to the development of strategies

³¹ For detailed considerations of the FOEN on this topic see:

<https://www.bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/plastics.html>

³² <https://esd.ifu.ethz.ch/research/research-and-theses/clean-cycle/clean-cycle-1.html>

that aim at reducing the consumption of primary raw material in absolute terms.

1.2.4 ELIMINATION

As shown before (section 1.1 *supra*), elimination through incineration is currently the key avenue for dealing with plastic waste in Switzerland. The debate on the *ecological rightness* of such a choice is ongoing. On the one hand, it is considered that under current conditions, the ecological advantages of increased recycling are to be comparatively weak (Dinkel et al. 2017, 2), and it is claimed that “*the process of energy recovery by incinerating plastic has immense environmental benefits*” (Al-Salem 2018, 59). On the other hand, such claims are rebuffed as myths, intended to *keep the plastic industry happy*³³.

Yet, whatever the position on the overall environmental impact, the non-circular character of incinerating plastic waste is difficult to ignore. SuisseEnergie classifies waste-incineration as a source of renewable energy³⁴, but regarding plastics, this is a questionable claim³⁵. 99% of plastics raw materials are produced from fossil fuels, and an estimated 4-8% of the world’s fossil resources are used in plastic production. Roughly, half of this is used as material feedstock and half as fuel for the production process (WEF 2016, 13; Hopewell et al. 2009). In this light, incinerating plastics equals incinerating fossil fuels – be it with some delay; and has nearly the same consequences. In 2019, the production and incineration of plastics will emit more than 850 million tonnes of greenhouse gases

³³ *Environmental defence* (25.07.19), *Mythbusting 4/5: Burning plastic for energy is a great solution to end plastic pollution*
environmentaldefence.ca/2019/07/25/myth-burning-plastic-solution/

³⁴ SuisseEnergie, *Usines d’incinération des ordures ménagères*
suisseenergie.ch/page/fr-ch/usines-dincineration-des-ordures-menageres.

³⁵ In this regard, the EU for instance only classifies waste as a source of renewable energy, when it is biowaste or the biodegradable fraction of waste, including industrial and municipal waste of biological origin, cf. Directive (EU)2018/2001, art. 2 (24), (29).

(CIEL 2019, 2). Considering the 37.1 billion tonnes of CO₂ emitted in 2018³⁶, this equals 2.30% of global emissions.

While choosing between elimination or recycling ultimately involves a political decision, it is a decision with a crucial impact on the circularity of the plastic system or its future reorientation in that direction.

Considering the heating value of plastics of 40 megajoule (MJ)/kg (Wasilewski and Siudyga 2013, 441) – making it comparable to conventional fuels (Al-Salem 2018, 39, also 56) – the 700'000 tonnes of incinerated plastics for 2010 produced an estimated 28'000 terajoule (TJ) of energy. This corresponds to 11.4% of the overall indigenous energy production of 245'340 TJ for that year (OFEN 2010, Table 4). With a gross inland energy consumption of 1'187'850 TJ (OFEN 2010, Table 10), this means that Switzerland is depending for at least 2.4% on the energy recovery from plastics. As this does not take into account imported waste, the actual share is arguably still higher. Considering for instance that 434'000 tonnes of combustible waste was imported in 2016, i.e. 11% of all the waste incinerated that year (Conseil fédéral 2017, 7) – and the plausible assumption that this imported waste contains a large share of high energy value plastics – the actual amount of Swiss energy based on incinerated plastics could be substantially higher.

1.2.5 LEAKAGE

When discussing the plastic system (cf. Introduction), it was pointed out that this last phase tends usually to be disregarded. As discussed in section 1.1, this is the case in Switzerland, as until recently, the system was considered being without leakage. Recent studies indeed demonstrate increasing attention to possible problems linked with plastics (Alencastro 2014; Kawecki and Nowack 2019; Erny et al. 2020). Yet, as pointed out by the last of these studies mentioned here, current estimations about their impact on aquatic life are still very uncertain, and so far, data on their

³⁶ *World Resource Institute (05.12.18), New Global CO2 Emissions Numbers Are In. They're Not Good*
wri.org/blog/2018/12/new-global-co2-emissions-numbers-are-they-re-not-good

impact on soil are largely missing (Erny et al. 2020, 53). What is more, so far, an update about plastic flows in Switzerland incorporating new knowledge about leakage within an integrated circular approach is currently missing (cf. 1.1 *supra*).

The prevailing focus on end-of-life elimination (cf. 1.1 *supra*), but without detailed data about the amount of plastic material flow inputs, could explain this tendency to overlook *leakage*. If it is known what comes out of the system, but not what gets in, it becomes difficult to know what share gets lost along the way. In order for Switzerland to develop a more comprehensive plastic management, which sustainably manages the challenges related to plastics while assuring its (economic) advantages, these factual lacunas need to be addressed. Without intending a complete and scientific in-depth analysis of all possible kinds of leakage, the following sections (1.2.5) discuss some main challenges. Thereby, the focus lies on key observations, which in this context, can be made for Switzerland.

1.2.5.1 MACRO- VS. MICROPLASTICS

Until recently, plastic pollution has been mainly understood in terms of visible garbage (macroplastics) ending up in streets, fields and waterways. Through continuous fragmentation over time, these larger pieces of plastics then would fall apart and produce secondary microplastics. This problem is recognised and dealt with in Switzerland in respect to littering – yet there are various other sources releasing macroplastics. Authorities at all levels work on the problem of littering and provide considerable budgets to do so. A city like Lausanne, for instance, spends CHF 16 million per year to clean its public space of about 1'700 tonnes of litter³⁷, and for the whole of Switzerland costs are estimated at CHF 200 million annually³⁸. While no overall data exist about the share of plastics within the total amount of public litter in Switzerland, it is supposedly

³⁷ *Ville de Lausanne, Ensemble contre le littering.*
[lausanne.ch/vie-pratique/dechets-recyclage/proprete/ensemble-contre-le-littering.html](https://www.lausanne.ch/vie-pratique/dechets-recyclage/proprete/ensemble-contre-le-littering.html)

³⁸ *OFEV (16.05.18), Déchets urbains: Offensive anti-littering*
[bafu.admin.ch/bafu/fr/home/themes/dechets/dossiers/offensive-anti-littering.html](https://www.bafu.admin.ch/bafu/fr/home/themes/dechets/dossiers/offensive-anti-littering.html)

considerable. Based on the last edition of Net'Léman (2018), an estimated 16.9% of all the litter on the shores of the lake were plastics. Per collection station, results however vary strongly, going as high as 40.6% (130 out of 320 kg of collected waste) in Bourg-en-Lavaux (cf. Table 1). Or, according to recent information from the *Association pour la sauvegarde du Léman*, on a total of about 50 tonnes of plastics yearly entering the Léman, an estimated 13.9 tonnes (27.8%) concern macroplastics of which 10 tonnes come from *traditional* littering³⁹. These results, however, are susceptible to be an underestimation. After all, according to the European Commission, “*Plastic material represents 84% of the total marine litter items found on European beaches in 2016*” (European Commission 2018c, 35), with single-use plastic items representing 50% (European Union 2019, § (5)). Also, a recent estimation in the UK found that plastics account for 60% of litter in English and Welsh canals⁴⁰.

It is clear from the above account that direct plastic pollution as a result of larger pieces of plastics being abandoned, is neither to be underestimated, nor to be minimised. Dealing with this problem will continue to be necessary.

New research, increasingly points to the central role of so-called *primary and secondary microplastics* as a driver of plastic pollution⁴¹. Being not directly visually retraceable in the environment, this kind of pollution cannot be dealt with in *traditional* ways such as clean-ups. What is more, it does not result from the likewise traditional problems of mismanaged waste or civic misbehaviour. Yet, it follows out of normal use of plastic goods and happens essentially unaware and involuntary to the user. In this regard, at least three sources (should) – amongst others – receive strong(er) attention as key plastic pollutants. These are (i) primary microplastics intentionally added to personal care products, and

³⁹ ASL (2019), ~ 50 Tonnes de plastiques entrent chaque année dans le lac
<https://asleman.org/sensibilisation/microplastique/>

⁴⁰ The Guardian (05.06.19), Plastic accounts for 60% of litter in English and Welsh canals
[theguardian.com/environment/2019/jun/05/plastic-litter-canals-england-and-wales](https://www.theguardian.com/environment/2019/jun/05/plastic-litter-canals-england-and-wales).

⁴¹ The term microplastics entered the scientific literature but 15 years ago, in Thompson et al. (2004).

secondary microplastics due to (ii) washing of synthetic textiles and (iii) tyre abrasion. Many other important sources of *primary and secondary microplastic pollution* exist⁴², and continuous efforts should be given to map these sources of microplastics and hence reduce their pollution.

Table 1: *Net Lemman 2018, main results*

Collection station	Total (in kg)	Plastics (in kg) (without PET)	Plastics share of total (%)	PET bottles (number)	Cigarette butts (number)
Coligny-la Tour Carré	564	175	31.03%	124	5500
Rade de Genève	517	120	23.21%	466	9500
Bellevue	200	24	12.00%	680	1667
Versoix	396	32	8.08%	231	1500
Nyon	646	79	12.23%	150	5952
Saint-Prex	156	4,5	2.88%	16	833
Lausanne	457	108	23.63%	394	4500
Bourg-en-Lavaux	320	130	40.63%	160	10714
Vevey	161	24	14.91%	131	1153
Territet	465	29	6.24%	120	800
Villeneuve	417	40	9.59%	/	1190
Le Bouveret	265	46	17.36%	172	345
<i>Evian (France)</i>	<i>802</i>	<i>96</i>	<i>11.97%</i>	<i>50</i>	<i>2900</i>
Total Lemman	5366	907,5	16.91%	2694	46554

Source: Net'Leman (2018)

Additionally, also cigarette butts arguably deserve increased attention. While technically, they are emitted into the environment through littering,

⁴² Such as road markings, building paint, automotive brake wear, artificial sports turf, degradation of agricultural and construction films etc.

fragment into secondary microplastics over time and are essentially the result of traditional civic misbehaviour, they too have been overlooked as an important source of plastic pollution. Just as for intentionally added microplastics, synthetic textiles and tyre abrasion, a stronger focus is recommendable as part of the comprehensive management of the plastic system. Nonetheless, we need to be aware of the fact that the leakage of plastics into the environment is complex and stems from various sources as was mapped for Switzerland in the recent study by Kawecki and Nowack (2019). Thus, this report just highlights a few sources of microplastics, which the authors have chosen to be relevant for Switzerland.

1.2.5.2 MICROBEADS: INTENTIONALLY ADDED MICROPLASTICS

Intentionally added microplastics belong to primary microplastics. They are added to a variety of *personal care and cosmetic products* (PCCP) such as toothpaste, shower gel, shampoo, eye shadow, deodorant, blush powders, makeup foundation, skin creams, hairspray, nail polish, liquid makeup, mascara, shaving cream, baby products, facial cleansers, bubble bath, lotions, hair colouring, insect repellents or sunscreen (Leslie 2014, 19). Microplastics are added to these products as an abrasive (i.e. exfoliating and polishing agents), but can also have other functions, such as controlling the viscosity, appearance, and stability of a product. They are also used as glitters⁴³.

Similar to tyre abrasion and fibre abrasion due to washing of synthetic textiles, the emission of microplastics by PCCP (still) happens largely unaware to the consumer. Nonetheless, they are intentional because the microplastics were deliberately manufactured and intentionally added to products for a specific purpose⁴⁴, and the product containing primary microplastics is poured on purpose into wastewater (Boucher and Friot 2017, 14). They end up in wastewater and enter the environment either by combined sewer overflows, the exfiltration from sewers or escaping

⁴³ ECHA, *Microplastics* echa.europa.eu/hot-topics/microplastics

⁴⁴ *Ibid.*

despite treatment from the wastewater treatment plants (Kawecki and Nowack, 2019).

As data on microplastics in general are still mainly rough estimates, showing large gaps between lower- and upper estimates, so are those on specific emission sources. One of the few comprehensive studies on the matter to date, carried out by *Eunomia* for the European Commission in 2016 (Sherrington et al. 2016, 237–38), estimates that the annual quantities of microplastics emitted in Europe lie between 80'000 and 219'000 tonnes. Of these, between 2'461 and 8'627 tonnes are thought to have their origin in PCCP⁴⁵. For Switzerland, Kawecki and Nowack (2019) estimate that about 73 tonnes of PCCP are released into wastewater, of which about 2.6 tonnes effectively end up in the environment (surface water and soils).

Of the four sources presented here, microbeads in PCCP represent the smallest share of the total amount of microplastics and seem the least problematic to deal with. Moreover, they are a pollution-source directly linked to a given mode of production for a given set of products. As such, the problem could be solved by technical measures regarding the products in question (cf. Bourg 2019, § 18). In that sense, the challenge here is comparable to that of the phasing out of ozone depleting chlorofluorocarbons (CFCs) – formalised in the 1987 Montreal Protocol,

⁴⁵ *Data on microbeads are exemplary for the often-confusing information out there (cf. section 4, introduction). While the numbers presented here come from the sole report referred to by EU authorities, very different, yet uncontrollable numbers are claimed. The European Environmental Bureau, a Brussels based NGO, for instance states that “[ECHA] says that 10,000 to 60,000 tonnes of microplastics intentionally added to products leak into the environment yearly” (eeb.org/eu-moves-to-ban-microplastics-in-most-products/). The trade organisation Cosmetics Europe, on the other hand declares that the 4'360 tonnes of microbeads used in cosmetic products across Europe in 2012, decreased with 97.6% by 2017 (cosmeticseurope.eu/news-events/over-97-plastic-microbeads-already-phased-out-cosmetics-cosmetics-europe-announces). It should be stressed that the amount of microbeads mentioned here covers the total amount used in cosmetic products, not what is considered to be emitted. This means that the total amount of microbeads used in 2017, as claimed by Cosmetics Europe, would be only 105 tonnes (2.4% of 4'360) – more than 23 times lower than the lower estimate of microbeads emission in the Eunomia report.*

leading to a gradual recovery of ozone levels since the beginning of the 2000s.

Supposedly, this *easiness* is why concrete actions against microplastics so far essentially concentrate on PCCP. As yet, 10 countries have introduced or notified legislation about microbeads in PCCP (Kentin and Kaarto 2018, 256). These vary from a manufacturing prohibition to a more comprehensive ban on both manufacturing and import as well as sale. While in South Korea and Taiwan, measures also concern dental care products (toothpaste) and in Italy they would also include detergents, current focus is mainly on so-called rinse-off products, i.e. products which are intended to be removed after application (European Union 2009). In Switzerland, in 2018, “*the Federal Council [did] not consider it advisable to lay down regulations concerning the use of microplastics in body care products before the EU [complete] its clarification work and the European Commission [adopts] measures to this end*”⁴⁶. This can be explained by the fact that the federal government usually carefully examines EU legislations (notably in the domain of chemicals legislation) before legislating on the same topic. The objective is then to harmonise Swiss legislation as much as possible with EU legislation in order to define comparable protection levels and to avoid barriers to trade. In January 2019, the European Chemicals Agency (ECHA) has proposed a restriction for intentional uses of microplastics in products on the EU/EEA market. The work on this restriction proposal by ECHA is still ongoing.⁴⁷

1.2.5.3 SYNTHETIC TEXTILES

The problem is not the washing of clothes as such, but the washing of clothes or other textiles made out of synthetic materials. According to a study carried out by *Eunomia* for the European Commission (Hann et al. 2018, 20), about 34% of European clothing sales are of synthetic fabric type. If viscose is included, this amounts to 45% of clothing made of man-

⁴⁶ Motion by Glättli Balthasar, 16.03.2018 (18.3327).

⁴⁷ <https://echa.europa.eu/de/hot-topics/microplastics>

made fibres. Washing these synthetic textiles in industrial laundries and households creates secondary microplastics through abrasion and shedding of fibres, which are then discharged into wastewater and potentially end up in the ocean (Boucher and Friot 2017, 15).

Based on the 2018 *Eunomia* study, a tentative estimation can be made for Switzerland. The range for microplastics generated from the washing of synthetic clothing in Europe (EU + NO + CH) is estimated at 18'430 to 46'175 tonnes per year (Hann et al. 2018, 144). Comparing the total number of washes per year in the EU (37'541'304'975) and Switzerland (590'146'920) (*ibid.*), while extrapolating the rates of microplastics *a ratio* of the total number of washes, this brings us to an estimated 290 to 726 tonnes of *Swiss laundry microplastics* created annually. Interestingly, Kawecki and Nowack (2019) did look at synthetic clothing in Switzerland. Their estimate is that about 80 tonnes of synthetic fibres (clothing and household textiles) are shed through washing and are thus released into wastewater, of which about 5 tons effectively end up in the surface water. These considerable differences show how data on microplastic pollution are still open to much interpretation and debate, and a lot has to be clarified.

Ways to deal with this could come from changes in water treatment understanding and efficiency, with attention for the presence of pollutants originating from synthetic fabrics. Besides, from a circular point of view, thoughts should also go to the design and manufacturing of clothes, aiming to avoid that they create microplastics in the first place. Furthermore, just as in the case of PCCP, solutions can also come from changing purchase behaviour by consumers (Boucher and Friot 2017, 29).

1.2.5.4 TYRE ABRASION

A still limited, but increasing body of research points to tyre abrasion as a major source of plastic pollution (cf. Sommer et al. 2018). While we think of tyres as being made from rubber, most are made from a mix of

synthetic plastic materials⁴⁸ including up to 60% of synthetic rubber⁴⁹. Throughout a tyre's life cycle a considerable amount of this material wears off. An ongoing study from the *Fraunhofer-Institut*⁵⁰ estimates that over its average life span of 50'000 km, a tyre loses about 1 to 1.5 kg of its weight. Hence, over 50'000 km, an average car has a total tyre-abrasion of about 4 to 6 kg. Similar estimates can be found in the 2018 *Eunomia* study (Hann et al. 2018, 159–61), mentioning 0.10 g/vehicle km (VhK) for passenger cars (= 5 kg/50'000 VhK).

Spread by wind or washed off the road by rain (Boucher and Friot 2017, 5), this material ends up in the environment in the form of secondary microplastics. While available data are mainly still first attempts to grasp the extent of the problem⁵¹, the *Eunomia* study, estimates that 554'314 tonnes of microplastics are released in Europe every year because of tyre abrasion (all vehicle types included). An estimated 20% subsequently enter surface water.

In Switzerland too, tyre wear is a main source of plastic pollution. According to *KUNSTSTOFF.swiss*⁵², an estimated 35% of microplastics found in Swiss water bodies emanate from abrasion. The crucial role of tyre abrasion in the dissemination of microplastics in the environment in Switzerland is confirmed by B. Nowack and D. Kawecki-Wenger (2020). In their study, they show that a vast majority of polymer micro-particles disseminated in the environment in general and in waterbodies in particular originates from tyre abrasion. For its part, the aforementioned *Association pour la sauvegarde du Léman* cites 30 tonnes of tyre wear

⁴⁸ *Water Briefing* (04.03.19), Tyre abrasion – the dark side of microplastics pollution
<https://www.waterbriefing.org/home/water-issues/item/15892-tyre-abrasion-%E2%80%93-the-dark-side-of-microplastics-pollution>

⁴⁹ Michelin, *Materials*, [thetiredigest.michelin.com/an-unknown-object-the-tire-materials](https://www.tiredigest.michelin.com/an-unknown-object-the-tire-materials)

⁵⁰ Fraunhofer UMSICHT, *TyreWearMapping: Reifenabrieb in Deutschland*
umsicht.fraunhofer.de/de/referenzen/tyrewearmapping.html

⁵¹ For an indicative literature review, see Hann et al. (2018), Appendix A.3.2.1 (p. 146).

⁵² *KUNSTSTOFF.swiss* (29.05.2020), *Woher kommt der Mikroplastik in den Gewässern?*
<https://kunststoff.swiss/Nachhaltigkeit/Infografiken/Mikroplastik>

ending up in the lake every year. This represents 60% of the yearly total of 50 tonnes (cf. *supra*)⁵³.

Using data from the *Eunomia* study, an indicative estimation can be made for Switzerland. For the EU, it mentions a total tyre abrasion of 554'314 tonnes/3'723'411 million VhK. Considering that in 2017, the total accumulated distance travelled on the Swiss road network was 60'900 million Vhk⁵⁴, this corresponds to 1.64% of EU VhK. Supposing that tyre abrasion shows the same ratio, this gives us an estimated 9'066 tonnes of tyre abrasion on Swiss roads in 2017. This goes in line with a recent study by Sieber et al. (2020) modelling tyre abrasion for Switzerland. According to this research, the emission of tyre abrasion amounts up to 10'600 tonnes of tyre wear every year in Switzerland, of which 1'800 tonnes end up in surface water and 6'300 tonnes in soils.

Considering the increasing amount of research pointing to tyre abrasion as a key factor of plastic pollution in soil and water bodies, and given the high concentrations of traffic volume along main Swiss water bodies (Arc lémanique, Rhône valley, Lac de Neuchâtel, and especially Zürichsee) (FEDRO 2018, 40–41), Switzerland indeed seems particularly prone to this problem. But also, in the absence of more data, particular attention should be given to the (potentially) most sensitive regions. Possible answers to this challenge could come from road and asphalt design to reduce abrasion and the development of appropriate water run-off collection (Boucher and Friot 2017, 29). However, again, from a circular point of view, also the design and manufacturing of tyres as such should be considered. And of course, finding ways to reduce motorised traffic would help to reduce microplastic emissions – as well as CO₂ emissions and noise.

But at the end of the day, a comprehensive answer to the problem will however not be evident. As the deputy director of the International Union

⁵³ ASL (2019), *op cit.*

⁵⁴ FSO, *Passenger transport performance – Kilometer performance*
bfs.admin.ch/bfs/en/home/statistics/mobility-transport/passenger-transport/performance.html#1137494308

for Conservation of Nature (IUCN), François Simard points out: where microbeads could simply be prohibited, and we can work on improving sewage treatment to intercept microplastics from laundry, for tyre abrasion “*we don't know how to do it [...] it's not just a question of political will*”⁵⁵.

1.2.5.5 CIGARETTE BUTTS

Just as for microbeads, laundry or tyre abrasion, the link between cigarette butts and pollution by microplastics has been overlooked for a long time. While, as pointed out, technically rather a source of secondary microplastics and traditional littering, the impact of cigarette butts goes further than their visual annoyance. Tossing a cigarette butt on the ground is one of the most accepted forms of littering. About two-thirds of butts are dumped irresponsibly (WHO 2017, 26). Contrary to a wide-spread belief that cigarette filters are biodegradable, they actually are made of non-biodegradable cellulose acetate from cutting, forming, and polishing sheets of plastic. Littered and disintegrating in the environment, they are a considerable source of plastic pollution. Thus, they are an unexpected form of leakage (cf. Introduction).

According to the *Plastic Pollution Coalition*, cigarette butts are the number one item collected in shoreline clean-ups worldwide, with approximately 2.4 million collected on the international coastal clean-up day in 2017⁵⁶. Similar results come from the *European Environmental Agency*. Of the reported 693'259 items collected through the Marine litter watch initiative over the years 2014 - 2017, 18% were cigarette butts⁵⁷.

⁵⁵ *Le Figaro* (22.02.17), *Comment nos vêtements et nos pneus sont devenus des polluants majeurs des océans*
lefigaro.fr/sciences/2017/02/22/01008-20170222ARTFIG00029-comment-nos-vetements-et-nos-pneus-sont-devenus-des-polluants-majeurs-des-océans.php

⁵⁶ *Plastic Pollution Coalition* (30.08.18), *Cigarette Butts are Plastic and Compound the Nicotine Health Risk from Smoking*
plasticpollutioncoalition.org/pfi/2018/8/6/cigarette-butts-are-plastic-and-compound-the-nicotine-health-risk-from-smoking

⁵⁷ *European Environment Agency* (08.06.18), *Citizens collect plastic and data to protect Europe's marine environment*

They are the second most found single-use plastic item on beaches in the EU (European Union 2019, § (16)).

For Switzerland too, clean-up actions reveal the omnipresence of cigarette butts in the environment. The final report of *NetLeman 2018*, for instance, mentions 46'554 cigarette butts collected on the shores of the lake (cf. Table 1 *supra*). A study carried out in the city of Geneva, for its part, has counted up to 476'000 cigarette butts *lying around* in the streets⁵⁸. Extrapolated to the whole of Switzerland, based on population, this results in 20'087'889 cigarette butts ending up improperly discarded.

Various solutions to deal with this particular problem are imaginable. However, within a circular approach, attention should lie with avoiding discarded cigarette butts in the first place. Possible avenues for action are increasing the awareness about the environmental impact of cigarette butts or reinforcing repressive actions focussing on cigarette littering, but also measures to decrease the number of smokers. Considering the health issues related to smoking – making it different from consumption patterns at the origin of the previous leakage problems – and given that one in four Swiss of 15 years or older smokes⁵⁹, this last avenue could prove a beneficial way to lastingly tackle this problem.

1.2.5.6 COCKTAIL EFFECT

Of the estimated 50 tonnes of plastics entering the Lemman yearly, only about 10% (= 5 tonnes) is believed to be evacuated via the Rhône⁶⁰. The rest is considered staying in the Lake, adding up to what could be about 600 tonnes of plastics (Boucher et al. 2019, 72). At the same time, an estimated amount of 50 tonnes of medicine residues and 12 tonnes of

eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/marine-litter-watch/briefing

⁵⁸ *Le temps* (24.09.2018), Genève s'attaque aux 476 000 mégots jetés quotidiennement dans ses rues letemps.ch/suisse/geneve-sattaque-aux-476-000-megots-jetes-quotidiennement-rues

⁵⁹ WHO, Tobacco smoking apps.who.int/gho/data/node.sdg.3-a-viz?lang=en

⁶⁰ ASL (2019), *op cit.*

pesticides are found in the lake⁶¹. Possible interactions between all these different chemicals and their impact on the environment, including human health are largely unknown⁶². “*The knowledge we have about the effects of various chemicals is based on studies of one chemical at a time, [yet] mixing different chemicals might alter their effect. This is commonly known as the cocktail effect and is the subject of increasing discussion among researchers*”⁶³. In a discussion about plastics and how to sustainably manage them, this potential interaction-problem should not be overlooked. While it does not present a specificity of the Swiss plastic system’s management as such, but rather of the overall outlook on chemical products, the actual debate about it does also concern Switzerland.

This possible cocktail problem goes to the heart of any discussion about the appropriate management of plastics; that is, what to include in the discussion? As said before, a too strong (economic) focus on what is dealt with in the elimination phase of the system hinders its circular governance. Yet, so is a too narrow understanding of what enters the system in the production and import phase, or what other factors could interplay with the system. In this regard, it has to be recognised that none of the microplastic-problems presented before follow from what are traditionally considered as plastics. None of these sources – PCCP, synthetic textiles, tyres, cigarettes – are for that matter included in the plastic categories as defined for import and export of goods. Customs category 05.3.2 – ‘*finished products made from plastics*’ in that sense clearly states that ‘*clothes, shoes and hats*’ (cf. 1.2.1 *supra*) are not included. The same goes for PCCP (category 06.2.5 – ‘*cosmetics and perfumery products*’), tyres (category 03.1.4.04 – ‘*tyre cords, tubing,*

⁶¹ Nathalie Chèvre (Alumni presentation, University of Lausanne, 26.04.18), *Notre poison quotidien: que faut-il savoir sur les micropolluants et les perturbateurs endocriniens?*

⁶² *Research on cocktail effects is new and still limited. Indicatively, of the 2’370 articles from a google scholar search on “chemical cocktail”, 846 were published in the last four years (since 2015).*

⁶³ Karolinska Institute (07.02.18), *Cocktail effect makes chemicals more toxic*
ki.se/en/research/cocktail-effect-makes-chemicals-more-toxic

conveyer belts’) and cigarettes (category 01.1.4 – ‘*tobacco*’). Adding to this, the cocktail problem shows how sustainably managing plastics does not stand on its own. It cannot be done disconnected from (the management of) other industrial systems. The combination of multiple chemical substances, originating from various sources – be it plastic production and use, agriculture, medicines, etc. – asks for consultation and coordination between different policies and services, such as the Federal Office for the Environment (FOEN), the Federal Office for Agriculture (FOAG), or the Federal Office of Public Health (FOPH).

1.3 DISCUSSION AND CONCLUSION

In 2018, the European Union adopted a *Strategy for Plastics in a Circular Economy* in which it lays out a ‘vision for a circular plastic economy’ (cf. Chapter 2). In Switzerland this triggered a debate about the way plastics are dealt with. Building on this notion of circularity, this chapter therefore assessed the Swiss overall plastic system and identified the main characteristics of that system hindering such circularity.

A common image of Switzerland is one of a country where plastics are well managed and have little impact on the environment⁶⁴; a country “*certainly better placed than many EU countries to achieve circularity*”⁶⁵, “*a model student in recycling*”⁶⁶ and a place where plastic leakage is only about 0,3%⁶⁷. Question is, if this common image matches reality?

Plastics are in Switzerland mainly incinerated after use, rather than recycled and reused. Plastics, and *how to deal with them*, are virtually put

⁶⁴ RTS (01.04.19)
[rts.ch/info/suisse/10332044--en-suisse-le-plastique-a-peu-d-impact-sur-l-environnement-on-sait-le-gerer-.html](https://www.rts.ch/info/suisse/10332044--en-suisse-le-plastique-a-peu-d-impact-sur-l-environnement-on-sait-le-gerer-.html)

⁶⁵ PET-Recycling (02.04.19)
petrecycling.ch/fr/decouvrir/detail/kreislaufwirtschaft-wo-steht-die-schweiz

⁶⁶ Economiesuisse (16.06.16)
economiesuisse.ch/fr/articles/positions-pour-les-votations-du-25-septembre-deux-fois-non-une-fois-oui

⁶⁷ *Le Temps* (2018), *Homo plasticus*
labs.letemps.ch/interactive/2018/longread-homo-plasticus/

to par with *how to deal with plastic waste*. In that sense, the Swiss plastic system is essentially linear (cf. section 1.1). Contrary to being well placed to achieve circularity, as the above cited statement contends, this current preference for incineration also presents a challenge to a possible reorientation of the Swiss plastic system towards such circularity.

While this system performs well in terms of waste control and thermic valorisation, less attention seems to be given to (problems related to) other processes (cf. section 1.1). Yet, the *knowledge gaps* about parts of the Swiss plastic system hinder comprehensive reflection about how to improve the system's circularity. To remedy this, more systematic information is needed on production/import, use and recycling, and leakage from the plastic system. This chapter looked for (avenues to obtain) such data and information (section 1.2).

Starting with the first process, it was pointed out that currently it is not known how much plastics come into the system through domestic production or import. Combining different sources (KUNSTSTOFF.swiss, Federal Customs Administration) the chapter searched to rectify this (cf. 1.2.1). In this regard it became clear that to obtain an accurate and complete view on this matter, a better grasp of how Swiss plastic production is linked with import and export of both raw material and semi-finished products is needed. Moreover, and even more importantly, the chapter showed that it has to be cleared out what precisely is considered as 'plastics'. Many (finished) products commonly not classified as such contain large shares of plastics too. Therefore, to fully grasp the plastic system and possible problems linked to it, it should be cleared out which products are considered.

Regarding the use of plastics, it was revealed how annual domestic consumption in Switzerland is comparatively high (cf. section 1.1). However, while the data used here go back to 2010, they probably do not provide an accurate, up-to-date image. New and more recent numbers about plastic consumption in Switzerland could straighten this out, and

give a better understanding of how much plastic annually flow through the Swiss plastic system.

On its website, the FOEN declares that “*In contrast to many other countries, Switzerland has not used landfill sites for combustible waste since the year 2000. Therefore, all plastic waste must be recycled or incinerated in an environmentally compatible manner.*”⁶⁸. This chapter showed how priority is given to the second of these two options (cf. section 1.1, and 1.2.4). In Switzerland, more than 80% of PET beverage bottles are recycled. Besides PET beverage bottles, the share of plastics being recycled is limited.

Plastics recycling consists for a considerable part of one type of plastic, namely PET. Regarding the possible recycling of other types of plastic to stimulate circularity, three challenges need consideration. First, the high variety of different plastics, and their combination with numerous additives as part of actual products, complicates recycling. In this regard, it is worth noting that Article 6 (1 d iii) of the 2001 Stockholm Convention⁶⁹ requires parties not to recycle plastics that contain persistent organic pollutants (POPs). This restriction has been implemented in article 7 of Regulation (EU) 2019/1021⁷⁰ on persistent organic pollutants. Therefore, increased knowledge about different types of plastic and additives is needed. Additionally, it is clear that a substantial increase of plastics recycling will not be possible without a drastic standardisation of the types of plastics, as well as of additives, which will be allowed in the future.

Furthermore, it has to be recognised that currently no plastic type can be recycled endlessly, meaning that new raw material will continue to be needed. In addition, the financial cost brought forward by the creation of new recycling channels of course will have to be considered. To make increased recycling attractive, it will also have to be assured that it is

⁶⁸ FOEN (2020), *Plastics*

bafu.admin.ch/bafu/en/home/topics/waste/guide-to-waste-a-z/plastics.html

⁶⁹ <http://www.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/>

⁷⁰ <https://eur-lex.europa.eu/eli/reg/2019/1021/oj>

economically sound. Finally, while an increased attention about possible problems resulting from the use of plastics can be noted, current discussions on the governance of plastics in Switzerland still tend to overlook the problem of leakage. In Switzerland, pollution through visible garbage including plastics is conveniently dealt with. Yet, as a still limited but increasing number of studies confirm, also in Switzerland the problem of plastic leakage goes further than the gradual degradation of large pieces of plastic in the environment. Plastics, directly entering the environment under the form of microplastics are increasingly recognised as the main origin of plastic pollution. Coming from sources as various as personal care and cosmetic products, synthetic clothes or tyres they cannot be dealt with in the traditional way of waste management. Also, newly recognised is plastic pollution through discarded cigarette butts. In addition, the potential interaction of synthetic chemicals entering the environment from different sources including plastics (the so-called cocktail effect), increasingly stirs discussion among researchers. None of these problems are typical for Switzerland. However, following from the high consumption of plastics and products containing plastics, they demand consideration when discussing sustainable management of plastics in Switzerland⁷¹.

⁷¹ *In this perspective, Annex 1 presents an overview of current data availability regarding plastics in Switzerland at the end of this report.*

2 COMPARING EUROPEAN AND SWISS POLICY INSTRUMENTS ON PLASTICS

Increasing awareness about possible problems linked to the use of plastics has led public authorities around the world to act. In particular, pollution of the environment by both macro- and microplastics is recognised as a challenge that needs to be dealt with.

In Switzerland too, plastic (pollution) has moved up the policy agenda, and via parliamentary initiatives, the question is asked how to make the Swiss plastic system more sustainable. Considering Switzerland's political and economic interconnectedness with its European neighbours, it could be instructive to any reflection on this matter, to look attentively at the recent steps taken by the European Union (EU), especially as the EU has decided to take ambitious action.

2.1 OBJECTIVE: A SWISS-EU COMPARISON – AND WHAT COULD WE LEARN FROM IT

Following its comprehensive '*Circular Economy Action Plan*' (European Commission 2015), the Commission in January 2018 presented a '*European Strategy for Plastics in a Circular Economy*' (European Commission 2018b). A second (revised) version of this action plan called '*A new Circular Economy Action Plan for a cleaner and more competitive Europe*' (NCEAP) (European Commission 2020) was adopted by the European Commission in March 2020. This revised version basically confirms the objectives and orientations of the previous plan, and specifies some sets of objectives and measures mentioned in the 2018 *EU Plastics Strategy*. Overall, this NCEAP is very comparable to the previous one: a declaration of intention, with numerous lines of future action. As far as possible, the new measures will be integrated in the analysis of the EU Plastics Strategy in the section 2.4 below.

As part of that strategy, multiple legislative initiatives have been implemented or are under way, providing i.a. for the prohibition of certain single-use plastic products (European Union 2019), or an increased recycling rate of plastic material (European Union 2018) (cf. 2.4.1 *infra*). A comprehensive analysis of these existing and new EU plastic measures, as well as the current Swiss policy approach towards plastics, enables a systematic comparison between them. Such a comparison makes it possible to identify convergences and divergences between the EU's Plastics Strategy and current plastic management in Switzerland. This can help to identify EU-measures (already in place or under way) that may be relevant to transfer to the Swiss setting, especially with regard to how to reinforce circularity of plastics in Switzerland. Along the same lines, it could also help discuss EU measures that turn out to be less pertinent for Switzerland, by being too inconsistent with its actual plastic policy, or difficult to translate to the Swiss context in general.

This chapter carries out such a comprehensive comparison. In particular, attention thereby goes to the concrete rules and instruments for the management of plastics, in place or under elaboration, in both the EU and Switzerland. In this regard, consideration goes beyond a simple enumeration and description, as an analytical assessment of these rules and instruments is carried out through their systematic classification and their evaluation according to criteria of *relevance* and *internal compatibility*. This analytical assessment enables a more systematic comparison (cf. section 2.3, *infra*).

2.2 STRUCTURE OF THE CHAPTER

Considering the objectives and basic dimensions of analysis lined out above, the chapter proceeds as follows: to start, section 2.3, presents the principal theoretical and methodological choices and key concepts underlying the comparative analysis. Section 2.4 then looks at the newly launched European Plastics Strategy. After sketching its larger context and development, we turn to an analysis of actual and pending measures.

These measures are then discussed according to both their status and the process on which they mainly focus, as well as the type of policy instrument they can be classified as. Thereupon, section 2.5, carries out a similar exercise for Switzerland. Subsequently, section 2.6, turns to a comparison of the previously discussed EU and Swiss measures. Finally, in section 2.7 attention goes to EU measures that appear particularly interesting for Switzerland. Using an *ex-ante* evaluation strategy, it discusses the relevance of these instruments, as well as their *compatibility* with already existing Swiss plastic measures and other Swiss policies in place. The chapter closes with a summary of key findings in section 2.8.

2.3 COMPARING PLASTIC POLICIES: OPERATING PROCEDURE AND KEY CONCEPTS

2.3.1 METHOD AND PROCEDURE

This inquiry is based on our analytical framework (cf. Figure 3 in the introduction) and analyses the European and Swiss plastic systems along the lines of their constitutive processes of (1) *production and import*, (2) *use and reuse*, (3) *recycling and reintroduction* or (4) *elimination*, and (5) *leakage*. In that context, its main interest lies with the different procedures and concrete policy instruments through which each of these processes is governed in the EU and Switzerland, and how this contributes to circularising their respective plastic system.

Through an analysis of relevant policy documents and legal acts, we aim to establish an overview of public procedures and actions on plastics for both cases. These policy instruments, then, are assessed according to their type and the phase of the plastic system they are concerned with. Furthermore, their current implementation status is determined.

This methodical appraisal of European and Swiss plastic policy instruments allows for a well-substantiated comparison and can help distinguish those elements from the new EU Strategy for Plastics that

could be of interest to Switzerland, or, on the contrary, would be more difficult or less relevant to transfer.

Before turning to these analyses and the comparison, the remainder of this section lines out and explains the classification categories and evaluation criteria to be used for the systematic assessment of the listed instruments.

2.3.2 CLASSIFYING POLICY INSTRUMENTS

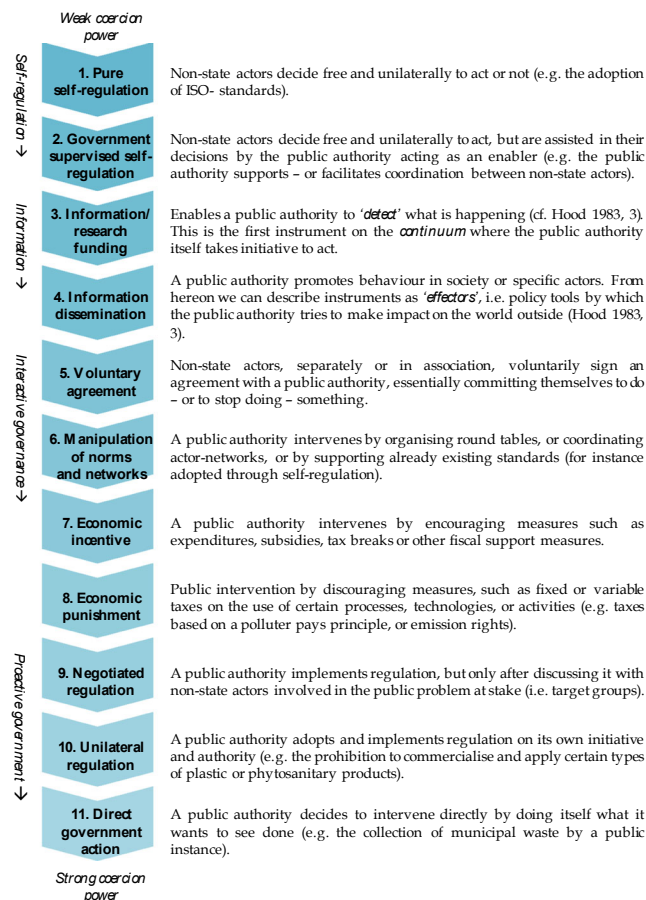
A main challenge when dealing with policy instruments is precisely the difficult comparison between such instruments (Varone 1998, 37). This follows from the fact that despite numerous attempts and ongoing debate on the matter, there is no agreement upon a generally accepted classification of policy instruments (Mercier et al. 2016, 96; Viallon 2017, 51), nor for that matter about what precisely defines a '*policy instrument*' or '*policy tool*' (Fobé, et al. 2014, 15).

On the most fundamental, functional level, however, *instruments* can be characterised as "[the] authoritative choices of means to accomplish a purpose (Elmore 1987, 175)". More comprehensively, policy instruments are "*the technical and social devices*" (Lascoumes and Galès 2010, 325) which are "*used by authorities to influence the behaviour of target groups*" (Viallon 2017, 53; also Knoepfel et al. 2007, 156; Varone 2000, 168), in order to "*address a public problem*" (Salamon and Elliott 2002, 19). Applied to the topic at stake, '*policy instruments*' hence are the devices used by EU or Swiss authorities to influence the behaviour of the actors involved in the processes of *production and import, use and reuse, recycling and reintroduction, elimination or leakage* of plastics to address possible problems related to these processes.

Building on the typology of policy instruments as *sticks* (regulations), *carrots* (economic means) and *sermons* (information) elaborated by Evert Vedung (2011, 30), instruments can be organised along a *continuum* from less to more compelling governance intervention. According to the degree of direct action by a public authority, instruments hence range from the least coercive (being pure self-regulation), to the most coercive (i.e. when

the public authority in question takes imperative action to realise a predefined objective). In sum we distinguish *11 categories of instruments* (cf. Tremblay-Racicot 2010, 29–31) (cf. Figure 11).

Figure 11: *Policy instruments on a coercivity continuum*



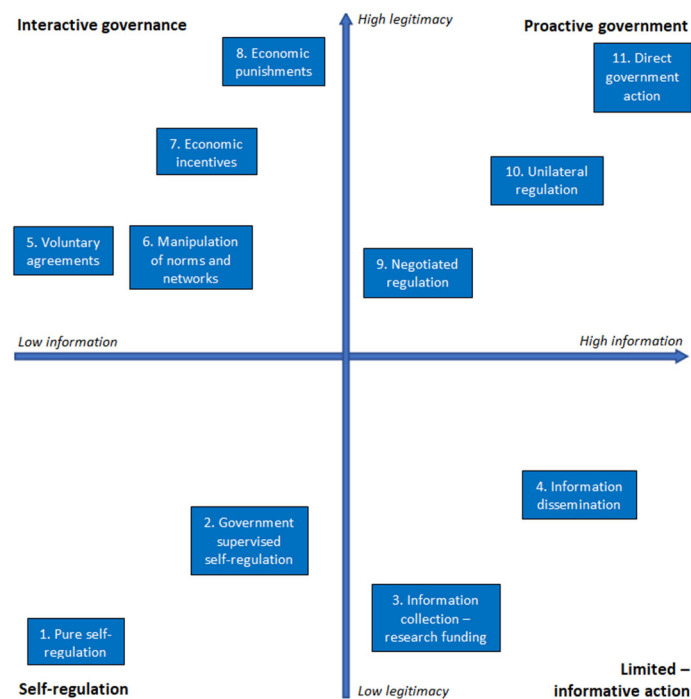
Source: Authors, based on Tremblay-Racicot 2010, 20. The numbering of instruments' types will be reused in following figures.

The choice of an instrument along this continuum can generally be understood as a variable of the public authority's political legitimacy combined with its in-house knowledge and technical knowhow. If the responsible public authority is considered – and considers itself – legitimate to act on the matter in question, and possesses the necessary knowledge needed to do so, then coercive action presents itself as an appropriate avenue for addressing a public problem. If, on the contrary, the public authority lacks both legitimacy and information, the best it could reasonably hope for is simple autoregulation by other, non-state actors. Concretely, we distinguish between:

1. *Instruments of self-regulation*: Both information and legitimacy of public authorities is low. Therefore, their possibility for action is strongly limited and they leave much of the policies to be determined by non-state actors. These instruments essentially concern *non-action* by the public authority, and therefore are somewhat different from the others, which all involve at least some degree of public activity – Instruments 1 and 2 of the coercivity *continuum*.
2. *Instruments of information*: While legitimacy of public authorities is low, their information disadvantage is smaller, or they actively search to decrease it. This induces limited, information-focussed public action – Instruments 3 and 4 of the coercivity *continuum*.
3. *Interactive governance instruments*: There is an asymmetry of information in favour of non-state actors, but the public authority nevertheless enjoys a strong legitimacy advantage. In this case, public authority intervenes, but indirectly, through flexible and participatory instruments – Instruments 5 to 8 of the coercivity *continuum*.
4. *Proactive government instruments*: The public authority has some advantage on both information and legitimacy *vis-à-vis* non-state actors. Based thereon it can decide to adopt proactive measures. Different from the *softer* governance instruments, which mainly search to persuade and influence, these hard government instruments aim to command and control (Wurzel, Zito, and Jordan 2013, 114–15) – Instruments 9 to 11 of the coercivity *continuum*.

These groups of instruments can be organised along a four-part matrix in which the level of legitimacy and the level of information are the independent variables, determining the dependent variable that is the level of coercion of the policy instrument (Mercier et al. 2016, 97) (cf. Figure 12). The advantage of this approach for this study lies in the fact that it enables us to understand why certain instruments are chosen in one setting, and not in another. Even more, in the context of a possible transfer of policy instruments from the EU to Switzerland, it can help understand which instruments could be expected to prove more convenient in that regard, and which not.

Figure 12: *Policy instruments on a legitimacy-information matrix*



Source: Authors, Based on Mercier et al. 2016, 97.

Overarching to these types of instruments, a transversal distinction should additionally be made between substantive and procedural policy instruments (Howlett 2000). Where the first ones “*are directly providing goods and services to members of the public or governments*”, the second ones “*are different [...] in that their impact on policy outcomes is less direct. Rather than affect the delivery of goods and services, their principle intent is to modify or alter the nature of policy processes at work in the implementation process*” (Howlett 2004, 12). Substantive *plastic instruments*, for instance, deal with the organisation of separate waste collection, the prohibition of plastic substances or products, or promoting actions of seashore clean-ups. Procedural instruments, on the other hand, i.a. concern the collection of relevant information by the authorities, or the internal (re)organisation of the competent administration to better deal with different challenges related to the use of plastic.

2.3.3 EVALUATING POLICY INSTRUMENTS

Considering this study’s focus on the possible EU-Swiss transfer, and the introduction of new policy instruments in Switzerland, two dimensions of evaluation seem particularly relevant. While the classification of instruments along the typology presented above helps us compare instruments between both cases, it is also important to evaluate an instrument’s suitability. That is, as a policy instrument is not always equally appropriate in one setting compared to another, potential new instruments need to be assessed regarding their *relevance*, and their *intra-policy* compatibility:

- Relevance concerns the link between an instrument’s objective(s), on the one hand, and the public problem that it seeks to resolve, on the other. Thus, a policy instrument can be described as relevant if the objectives it tries to realise are adapted to the problem to which resolution it intends to contribute (cf. Knoepfel et al. 2007, 234). In the context of this study, the question hence is about the *suitability of EU instruments for solving Swiss plastic public problems*.

- Intra-policy compatibility⁷² of EU instruments is about *whether policy instruments developed within EU plastic policy are consistent with – and adaptable to – the existing instruments of the Swiss plastic policy.*

We will apply the evaluation criteria above by using our results from the chapters 1 and 2. On the one hand, the first criterion captures whether the policy instruments' effects can contribute to the resolution of the public problems identified in the case of Switzerland. On the other hand, the intra-policy coherence is examined. In a nutshell, we will examine *which policy instruments from the EU are relevant to address the plastic problems in Switzerland and if they are consistent and compatible with the existing instruments currently implemented within the Swiss plastic policy?*

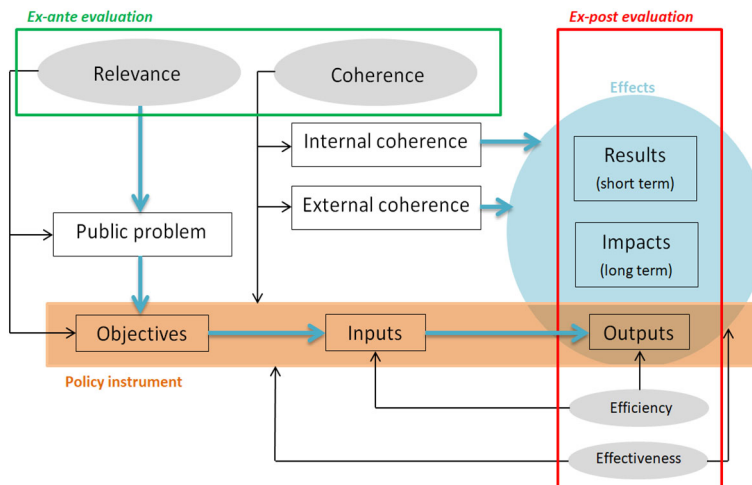
Other evaluation criteria indeed do exist (cf. Figure 13). However, these two are the most relevant for the issue at stake. Given the newness of the policy instruments under scrutiny and their still 'under development' character, the assessment carried out here is essentially *ex-ante* instead of *ex-post*. Therefore, questions about *results* (i.e. immediate changes; or short-term effects) and *impacts* (i.e. the middle- and long-term, direct and indirect, positive or negative effects); as well as *efficiency* (i.e. the resources invested in relation to the results achieved) and *effectiveness* (i.e. effects that actually occur by the implemented policy instrument), could not yet be answered meaningfully. Besides, both relevance and coherence are particularly important when the question is about transferring a policy instrument from one setting to another. In such a case, it is important to be sure that such a transfer is relevant in the first place. That is, one should be certain that the problem, to which the policy instrument intends to answer, indeed exists in the setting towards which it would be transferred⁷³. Also, compatibility has to be reflected on when

⁷² *Inter-policy coherence or external compatibility with other policies indeed could - and should - also be assessed ex-ante. Yet, as this essentially deserves an extensive legal assessment to be carried out once a specific policy instrument indeed is chosen, this goes beyond the scope of this work.*

⁷³ *For instance, given Switzerland's land-locked position, plastics directly ending up in the sea is not a primary concern. Therefore, it is doubtful that taking over EU measures for*

transferring an instrument to a new setting. That is, it should be assured that the new instruments are not at odds with the (objectives of) other policy instruments already in place. For instance, does an instrument intended to limit overall plastic consumption agree with a simultaneously expressed intention to upscale plastics recycling?

Figure 13: *Policy evaluation framework*



Source: adapted from Gorm and Rasmus 2016, 14.

In the first instance, the following sections, first about the EU, then about Switzerland, discuss the actual policies and instruments in place or under development. Thereby, attention goes in particular to the type of instruments (e.g. self-regulation, information collection, unilateral regulation, etc.) and the phase of the plastic system (e.g. production/import, recycling, etc.) they search to govern. Section 2.7 then turns to the *ex-ante evaluation* of specific EU instruments in view of their possible transfer to Switzerland.

the reduction, or the avoidance of plastic marine-litter would be useful to tackle the Swiss specific plastic challenges.

2.4 A EUROPEAN PLASTIC POLICY: A COMPREHENSIVE STRATEGY FOR CIRCULARITY

2.4.1 CONTEXT

2.4.1.1 FIRST EU ACTION PLAN FOR THE CIRCULAR ECONOMY (2015)

In December 2015, the European Commission adopted its so-called ‘*Action Plan for the Circular Economy*’ (APCE) (European Commission 2015). Aiming the transition to a more circular European economy, the plan presents a package of 54 actions covering the whole economic cycle from production and consumption to recycling and elimination. Thereby, the focus lies with five priority areas: *plastics, food waste, critical raw materials, construction and demolition, and biomass and bio-based products*.

Regarding the first of these priority areas, the APCE (p. 13) puts forward the following objectives:

- *Increasing plastics recycling* – as this is essential for the transition to a circular economy.
- *Prevent and significantly reduce marine pollution* of all kinds, including marine litter.
- *Develop smarter collection and certification schemes* for collectors and sorters – as these are critical to divert recyclable plastics away from landfills and incineration into recycling.
- *Innovation in plastics* – as this can counter difficulties posed by hazardous chemical additives, as well as can contribute to the circular economy by better preserving food, improving the recyclability of plastics or reducing the weight of materials used in vehicles.

2.4.1.2 2.4.1.2 EUROPEAN STRATEGY FOR PLASTICS IN A CIRCULAR ECONOMY (2018)

To give content to these objectives, the Commission, in January 2018, publishes the ‘*European Strategy for Plastics in a Circular Economy*’

(SPCE) (European Commission 2018b). In elaboration on previous publications (cf. European Commission 2013) and punctual legislative initiatives, such as the 2015 directive on '*reducing the consumption of lightweight plastic carrier bags*' (European Union 2015), the strategy presents key commitments for action in the EU. In addition, it points out that the private sector, together with national, regional and local authorities and citizens, will also need to mobilise, and that international engagement will be necessary to drive change outside Europe's borders. More concretely, the SPCE lays out in section 3 a '*vision for a circular plastics economy*' composed of two sets of overall objectives.

First, *nine goals* are formulated for '*a smart, innovative and sustainable plastics industry*':

- By 2030, all plastics packaging on the EU market is reusable or can be recycled.
- By 2030, more than half of plastics waste generated in Europe is recycled.
- By 2030, sorting and recycling capacity has increased fourfold since 2015.
- Export of poorly sorted plastics waste is phased out.
- The plastics value chain becomes more integrated, and substances hampering recycling processes are replaced or phased out.
- More products incorporate recycled content. Demand for recycled plastics grows fourfold (since 2015).
- More plastics recycling helps reduce Europe's dependence on imported fossil fuel and cut CO₂ emissions.
- Innovative material and alternative feedstock support efforts on decarbonisation and create additional opportunities for growth.
- Europe confirms leadership in sorting and recycling equipment and technologies.

Second, *five goals* deal with *production and consumption* in particular:

- Plastic waste generation is decoupled from growth.

- Resolute action on plastics waste prevention offers business opportunities.
- Leakage of plastics into the environment decreases drastically.
- Innovative solutions prevent microplastics from reaching the seas.
- The EU takes a leading role in a global dynamic.

The final purpose of all this, is to address *three interrelated problems* (European Commission 2018a, 3): Europe's high dependency on virgin fossil feedstock, Europe's low rate of recycling and reuse of plastics, and the significant leakage of plastics into the environment in Europe.

2.4.1.3 SECOND EU ACTION PLAN FOR THE CIRCULAR ECONOMY (2020)

In March 2020, the European Commission adopted a second (revised) version of this plan (European Commission 2020). Regarding plastics, the latest developments are the following:

- Increasing recycled plastic content. Mandatory requirements on minimal recycled plastic content will be suggested in areas such as packaging (all plastic packaging should be reusable or recyclable by 2030), construction materials and vehicles.
- Microplastics:
 - Restrictions on intentionally added microplastics.
 - Further development and harmonisation of measurement methods.
 - Pursuing labelling, certification and regulatory measures.
 - Consider measures to increase the capture of microplastics in wastewater.
- Clear policy framework regarding (labelling of) biodegradable and bio-based plastics in order to avoid the diffusion of misleading information to the public.
- Implementation of the new Directive on single-use plastic products.
- Support to bilateral and multilateral initiatives on plastics (e.g. restrictions on waste trade).

2.4.2 FROM A STRATEGY TO POLICY INSTRUMENTS FOR MANAGING PLASTICS

To turn the vision of a circular plastic economy into reality and to solve the problems currently linked to the use of plastics, the strategy proposes a comprehensive package of in total *41 EU measures* (cf. European Commission 2018b, Section 4 [pp. 6-17], and Annex I), also called “actions”, organised along four main categories and 13 sub-categories (cf. Table 2). In addition, it also presents a list of measures recommended to national authorities and industry (cf. European Commission 2018b, Annex II).

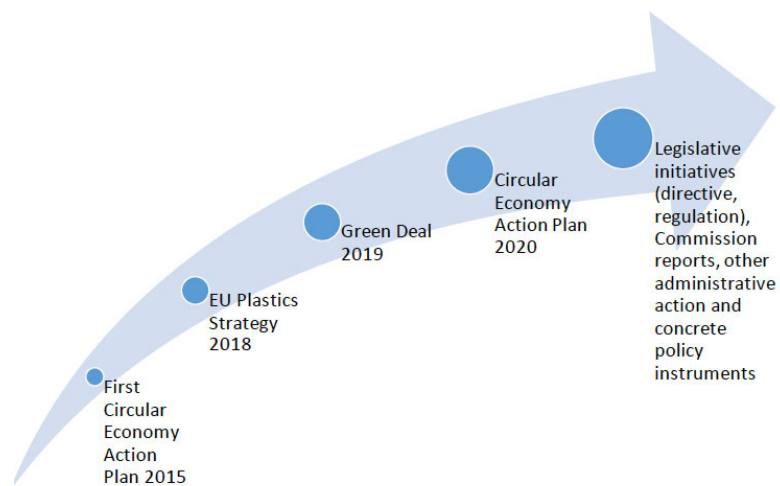
Table 2: *List of EU measures to implement the Plastics Strategy - number of measures*

Improving the economics and quality of plastics recycling	
Actions to improve product design	3
Actions to boost recycled content	7
Actions to improve separate collection of plastic waste	2
Curbing plastic waste and littering	
Actions to reduce single-use plastics	1
Actions to tackle sea-based sources of marine litter	3
Actions to monitor and curb marine litter more effectively	2
Actions on compostable and biodegradable plastics	3
Actions to curb microplastics pollution	4
Driving investment and innovation towards circular solutions	
Actions to promote investment and innovation in the value chain	6

Harnessing global action	
Actions focusing on key regions	3
Actions in support of multilateral initiatives on plastic	2
Actions relating to bilateral cooperation with non-EU countries	2
Actions relating to international trade	3

To materialise these measures, different legislative initiatives have been taken or are under way – mainly under the form of directives to be transposed into national legislation. Also, other documents, such as Commission reports, are issued, and meetings are organised. It is through these legislative and other initiatives that concrete policy instruments are proposed (cf. Figure 14).

Figure 14: *From EU action plan to policy instruments*



2.4.3 ASSESSING EUROPEAN POLICY INSTRUMENTS FOR DEALING WITH PLASTICS

As we see in Table 2, measures are proposed that are directed towards global action beyond the EU's borders. However, in this study, focus is on the measures and instruments dealing with plastics at the internal level, i.e. those that concern the management of the EU's own plastic system, as those are the most relevant regarding a possible *transfer* to the Swiss case (cf. Table 3 below).

Looking at these EU measures and the instruments they present, we note how together they cover the overall processes of the plastic system: from production and import, over use/reuse, and recycling, to waste-management and leakage. In this way, there indeed exists – not only in form, but also in practice – a comprehensive EU plastic policy (cf. Table 3). For each of these processes of the plastic system, concrete instruments are already in force, or under discussion. These instruments range from *pure self-regulation* – such as the cross-industry agreement by the textile industry to *unilateral regulation* - for instance to reduce single-use plastics and restrict the use of oxo-degradable plastics. Therefore, they essentially include the whole spectre of instruments (cf. 2.3.2. *supra*). At the same time, a certain variation is noticeable between the phases of the plastic system regarding the instruments that are used. Notable is how *Leakage* indeed shows itself as a new issue. For the moment, the EU relies on voluntary agreements to deal with this issue, and its own effort about this process is still limited to the ban of single-use plastics. However, the 2020 new Circular Economy Action Plan proposes one further set of measures, which is “Restriction of intentionally added microplastics and measures on unintentional release of microplastics” (production/import phase).

This contrasts with the more *traditional* processes of the plastic system, for which more compelling instruments are proposed. Certainly, *for Production-import and Use-reuse we see a more active governance intervention*. Not only are 20 out of the 31 policy instruments in place or forthcoming about these processes, but also does a large share thereof

(14/20) concern economic incentives or punishment, and negotiated and unilateral regulation (cf. Table 3). This contrasts with the later three processes of the plastic system, for which only half of the instruments (7/13) involve interactive governance or proactive government action. Considering the long-standing importance of the single-market as a cornerstone of European integration and the key competences entrusted to the European level in this regard, this regulatory focus on production and consumption should not surprise.

In line with this, the EU's institutional set-up should not be overlooked when assessing concrete policy instruments. As a supranational level and a traditional regulatory state (cf. Majone 1996; King 2007), it should be understood how the actual implementation of the instruments depends for a considerable part on the Member States. As indeed can be noted at multiple occasions, different instruments are presented as examples amongst which a Member State can choose to obtain the initial goals of the Strategy. For instance, to reduce single-use plastics, the revised *packaging and packaging waste directive ((EU) 2018/852)*, art. 5 declares that “*Member States shall take measures to encourage the increase in the share of reusable packaging placed on the market and of systems to reuse packaging in an environmentally sound manner*”. Yet, how to do this, they essentially decide themselves. They can put in place “*deposit return schemes*” (economic incentive), set up “*qualitative or quantitative targets*” (through negotiated or unilateral regulation), decide to launch “*economic incentives*”, or set up “*a minimum percentage of reusable packaging placed on the market*” (through negotiated or unilateral regulation). Or, they could opt for a combination of those. Also, when one specific instrument is more straightforwardly determined at EU-level, the Member States are again the ones who often will do the work. This is for instance the case for two of the instruments to reduce single-use plastics. On the one hand, to reduce the production or import of single-use plastics, Member States are ordered to “*prohibit the placing on the market of the single-use plastic products listed in Part B of the Annex and of products made from oxo-degradable plastic*” (unilateral regulation). On the other

hand, to reduce their use, they are tasked to “take [awareness raising] measures to inform consumers and to incentivise responsible consumer behaviour, in order to reduce litter [...] [and] to inform consumers of the single-use plastic products listed in Part G of the Annex [...]”.

The examples presented above can all be defined as *substantive*, as they search to directly impact target groups and policy outcomes. As they search to actively *increase* reusable packaging, to *prohibit* single-use plastics, or to *incentivise* responsible behaviour, they are meant to realise concrete, on-the-field changes. *Procedural instruments*, on the other hand oblige the EU’s own administration, or that of the Member States. This is the case where the EU commits itself to “*examine*” and to “*submit a report*”, asks others to carry out research, or charges Member States to provide data (cf. Table 3). For instance, to *improve product design* of plastics, the European Commission, in directive (EU) 2018/852, art. 9 § 5, is tasked to “*examine the feasibility of reinforcing the essential requirements with a view to, inter alia, improving design for reuse and promoting high quality recycling*”, and to “*submit a report to the European Parliament and to the Council [by 31 December 2020]*”. Directive (EU) 2019/905, art. 13 (1d), on the other hand orders Member States to *monitor and curb marine litter more effectively* by “*report[ing] to the Commission [for each calendar year] data on fishing gear containing plastic placed on the market and on waste fishing gear collected in the Member State*”. In addition, the EU’s public procurement criteria for recycled plastics, are procedural in the sense that they essentially concern Europe’s public authorities own purchasing behaviour. At the same time, this indirectly can have a substantive, incentivising effect on other, non-state actors. As “*Europe’s public authorities are major consumers [and] by using their purchasing power to choose environmentally friendly goods, services and works, they can make an important contribution to sustainable consumption and production*”⁷⁴.

⁷⁴ European Commission - Environment, Green Public Procurement

Except for these various, both substantial and procedural instruments, the EU at some occasions just relies on self-regulated action by concerned parties. This is most notably the case for the *cross-industry agreement for the prevention of microplastic release from the washing of synthetic textiles*, concluded between different industry associations. Concluded just a few days before the publication of the SPCE, this agreement indeed is endorsed by this last one, but is formally independent of it.

Table 3: *EU Plastics' Strategy policy instruments*⁷⁵

	Production - import	Use - reuse	Recycling	Waste	Leakage
1. Pure self-regulation	-	-	-	-	Cross Industry Agreement on microplastics from synthetic textiles
2. Government supervised self-regulation	-	-	-	-	-
3. Information collection/re-search funding	<p><i>COM report on eco-design requirements for reuse and recycling (EU 2018/852)</i></p> <p><i>EU's JRC carries out life cycle assessment on alternative feedstock for plastics production</i></p>	<p><i>COM report on the impact of oxo-degradable plastic bags (EU 2015/720)</i></p> <p><i>COM report on improving design for reuse and promoting high quality recycling (Dir. (EU) 2018/852).</i></p>	-	-	<i>MS report on waste from fishing gear (EU 2019/904)</i>

ec.europa.eu/environment/gpp/index_en.htm

⁷⁵ A more detailed presentation of these EU policy instruments can be found in Annex 2 "EU policy instruments per process" at the end of this report. Table 3 and Annex 2 were last updated in March 2020.

	Production - import	Use - reuse	Recycling	Waste	Leakage
4. Information dissemination	Clear policy framework regarding (labelling of) biodegradable and bio-based plastics in order to avoid the diffusion of misleading information to the public (2 nd EU Circular Economy Action Plan 2020)	MS inform consumers on (plastic waste and) single-use plastics (EU 2019/904)	-	MS inform consumers on plastic waste (and single-use plastics) (EU 2019/904)	-
5. Voluntary agreement	-	-	20.09.19: Circular Plastics Alliance commitment for increased recycling ⁷⁶	-	-
6. Manipulation of norms and networks	-	-	4 new CEN standards on recycled plastics are under drafting; or waiting for approval	-	-

⁷⁶ The Circular Plastics Alliance is an initiative under the 2018 European Strategy for Plastics, in particular under Annex III related to voluntary pledges by industry. The European Commission launched the Circular Plastics Alliance in December 2018 to help plastics value chains boost the EU market for recycled plastics to 10 million tonnes by 2025: https://ec.europa.eu/growth/industry/policy/circular-plastics-alliance_en

	Production - import	Use - reuse	Recycling	Waste	Leakage
7. Economic incentive	<p>Horizon 2020: € 350 million to make plastics circular</p> <p>EU LIFE: € 100 million for resource efficiency of plastics</p> <p>EPR: MS may encourage the development, production and marketing of products suitable for multiple use, safe recovery and environmentally compatible disposal (2008/98/EC)</p>	<p>To increase reusable packaging, MS can use deposit-return schemes or economic incentives (EU 2018/852)</p>	<p><i>Green Public Procurement criteria for recycled plastics</i></p>	<p>To ensure separate collection for recycling, MS can establish deposit-refund schemes (EU 2019/904)</p>	-
8. Economic punishment	-	<p>To reduce single-use plastics, MS can charge the sale of such products (EU 2019/904)</p> <p>In case of non-respect of rules on prohibition of single-use plastics, MS can levy penalties (EU 2019/904)</p>	-	-	-

	Production - import	Use - reuse	Recycling	Waste	Leakage
9. Negotiated regulation	30.01.19: ECHA restriction of intentionally added microplastics (ECHA/PR/19/03)	To increase reusable packaging, MS can set qualitative or quantitative targets, or minimum percentages (EU 2018/852) To reduce single-use plastics, MS can develop rules in agreement with the plastic sector (EU 2019/904)	-	-	-
10. Unilateral regulation	MS shall prohibit the placing on the market of certain single-use plastic products and products made from oxo-degradable plastics (EU 2019/904) Restrictions on intentionally added microplastics (2 nd EU Circular Economy Action Plan 2020)	To increase reusable packaging, MS can set qualitative or quantitative targets, or minimum percentages (EU 2018/852) (idem negotiated regulation supra) To reduce single-use plastics, MS may impose marketing restrictions (EU 2019/904)	Mandatory requirements on minimal recycled plastic content will be suggested in areas such as packaging, construction materials and vehicles (2 nd EU Circular Economy Action Plan 2020) Minimum recycling targets: 50% of plastic material contained in packaging waste by the end of 2025, and 55% by	EPR: MS can oblige economic actors to accept return of products and waste, to bear financial responsibility and provide information on a product's re-use and recycling (2008/98/EC) MS may establish separate collection targets for plastics (EU 2019/904)	-

	Production - import	Use - reuse	Recycling	Waste	Leakage
			the end of 2030. (EU) 2018/852 amending Directive 94/62/EC on packaging and packaging waste		
		<p>EPR: MS can oblige economic actors to accept return of products and waste, to bear financial responsibility and provide information on a product's re-use and recycling (2008/98/EC)</p> <p>All plastic packaging should be reusable or recyclable by 2030 (2nd EU Circular Economy Action Plan 2020)</p>			
11. Direct government action	-	-	-	-	-

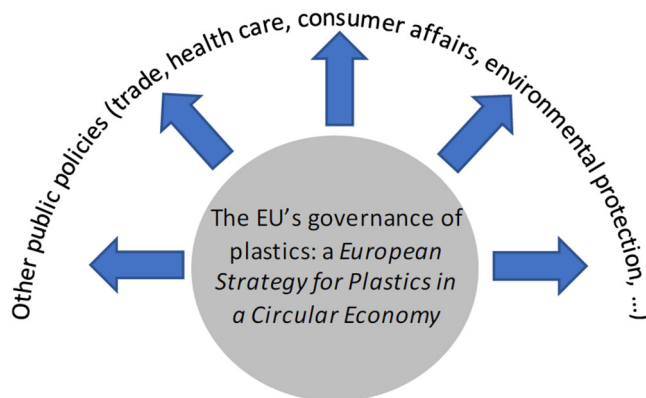
Green = instrument in force – Red = under discussion and/or proposed in the 2nd Circular Economy Action Plan 2020 – *In italic are instruments of a more procedural nature*

Legend of abbreviations: COM = Commission; MS = Member States; ECHA = European Chemicals Agency; CEN = European Committee for Standardization; JRC = Joint Research Centre; EPR = Extended Producer Responsibility

To summarise, European policy instruments follow out of a comprehensive strategy, as part of which they interrelatedly work towards a set of clearly outlined goals; and this with the aim to tackle a set of precisely defined public problems related to plastics. A coherent European plastic policy does exist, which, based on its own action programme containing multiple concrete policy instruments, interacts with as well as impacts on other EU policies (cf. Figure 15). In that sense, the plastic system is obviously considered in its totality, yet variation exists regarding the coercive character of the instruments used to deal with the different phases of the plastic system.

In reference to the four general categories of policy instruments (cf. 2.3.2 *supra*), we note that instruments exist for each of them; but that depending on the phase of the plastic system, preference seems to be given to different instruments (cf. Figure 16).

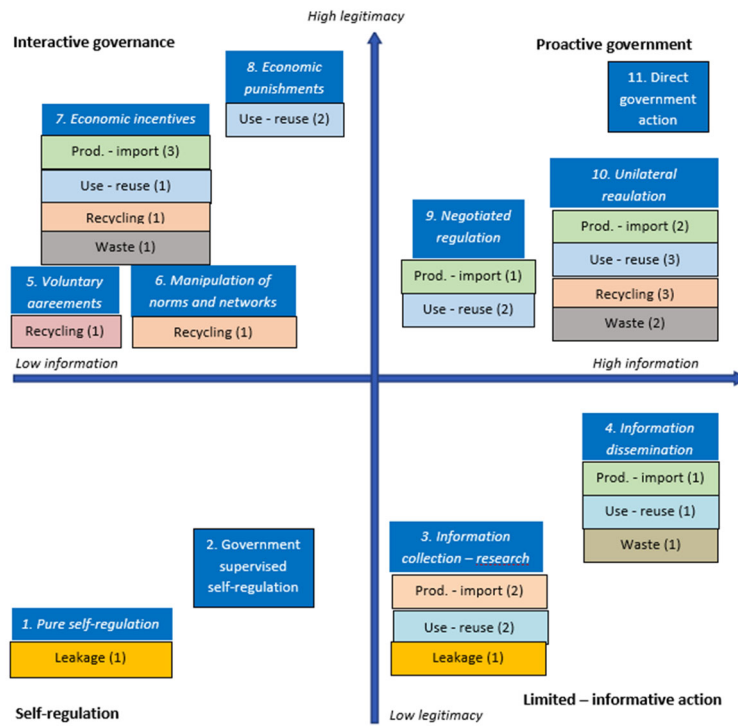
Figure 15: *EU plastics policy and other EU policies*



2.5 THE SWISS PLASTIC POLICY

2.5.1 CONTEXT

As Switzerland is not a coastal country, it is not confronted with the striking reality of marine pollution in the same way as many EU Member States. While the country's lakes and rivers certainly are not spared from plastic pollution (cf. Chapter 1), the problem seemed more discreet and the impact on public opinion more anecdotal. Therefore, as Switzerland appeared less concerned, *how to deal with plastics* has been mainly equated with *how to deal with plastic waste*. Only recently, an increasing awareness has emerged in Switzerland too, about how the country is indeed not free from problems related to the use of plastics. In this regard, it seems that also the recent developments in the EU (cf. 2.4.1 *supra*) have contributed to triggering a stronger debate.

Figure 16: *EU policy instruments along the legitimacy-information matrix*


Legend: The numbers in brackets correspond to the number of policy instruments listed in table 3 above.

2.5.2 SELECTING A SWISS BODY OF PLASTIC RELATED MEASURES

Defining the overall corpus of relevant legislation and other possible sources of concrete policy instruments proves to be less straightforward for Switzerland, compared to the EU. For the latter, a comprehensive set of pertinent policy instruments could be selected step by step, based on the Plastics Strategy (cf. 2.4.1.2, *supra*). In Switzerland, the Federal Act on the Protection of the Environment of 7 October 1983 forms the legal basis for dealing with plastic waste. *However, a specific plastic policy does not (yet) exist.* In 2013, the Federal Council presented an action plan on green economy (Conseil fédéral 2013), but this plan says little about plastics. This action plan only mentions plastics twice, in section 7.2 on ‘waste and raw materials’. First, this section’s introduction states that “*more secondary raw materials (in particular with regard to plastics and construction waste) [has to be used to] reduce the need for raw materials and reduce the volume of waste produced*”. Second, measure 14 just obliges retailers to take back consumer packaging, including plastic films and beverage packaging. This measure has been implemented since with a voluntary system introduced by retailers collecting PE bottles with tops for recycling (BAFU 2016). However, currently, there does not exist any law within Swiss federal legislation, which concerns explicitly the management of plastic materials or products (except for PET beverage bottles). This implies that measures and policy instruments are to be found in various legislations and cannot be deduced from a well-structured body of legal and administrative texts.

Therefore, a different procedure has been followed to identify possibly pertinent legislation to assess the Swiss situation (Knoepfel et al. 2010). This identification process is based on a key-word search in the French version of the ‘Classified compilation’⁷⁷. The following words were used: *plastique* (33 results), *pollution* (88 results), *déchets* (133 results), *emballage* (164 results), and *recyclage* (59 results). Subsequently,

⁷⁷ Conseil fédéral, *Recueil systématique du droit fédéral (RS)*
www.admin.ch/gov/fr/accueil/droit-federal/recueil-systematique.html – *Recueil de droit > interne – En vigueur? > oui.*

doubles were deleted, and the total body of documents was scrutinised manually to remove documents that proved from the outset to have no relevance for the issue at stake. This resulted in a selected body of 17 documents (cf. Table 4).

Table 4: *Selected body of Swiss legislation*

Federal Act on the Protection of the Environment of 7 October 1983 (Environmental Protection Act, EPA)	RS 814.01
Ordinance on the Incentive Tax on Volatile Organic Compounds of 12 November 1997 (OVOC)	RS 814.018
Ordinance relating to Impacts on the Soil of 1 July 1998 (OIS)	RS 814.12
Ordinance on Air Pollution Control of 16 December 1985 (OAPC)	RS 814.318.142.1
Ordinance on the Avoidance and the Disposal of Waste of 4 December 2015 (Waste Ordinance, ADWO)	RS 814.600
Ordinance on Movements of Waste of 22 June 2005 (OMW)	RS 814.610
DETEC Ordinance on Lists relating to Movements of Waste of 18 October 2005 (LMW)	RS 814.610.1
Ordinance on Beverage Containers of 5 July 2000 (Beverage Container Ordinance, BCO)	RS 814.621
Federal Act on Protection against Dangerous Substances and Preparations of 15 December 2000 (Chemicals Act, ChemA)	RS 813.1
Ordinance on Protection against Dangerous Substances and Preparations of 5 June 2015 (Chemicals Ordinance, ChemO)	RS 813.11
Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles of 18 May 2005 (ORRChem)	RS 814.81

Federal Act on the Protection of Waters of 24 January 1991 (Waters Protection Act, WPA)	RS 814.20
Waters Protection Ordinance of 28 October 1998 (WPO)	RS 814.201
Federal Act on Foodstuffs and Utility Articles of 20 June 2014 (Foodstuffs Act, FSA)	RS 817.0
Ordinance on Foodstuffs and Utility Articles of 16 December 2016 (FSO)	RS 817.02
Ordinance of the FDHA on materials and articles intended to come into contact with foodstuffs of 16 December 2016 (Materials and articles ordinance)	RS 817.023.21
Ordinance of the FDHA on articles and materials intended to come into contact with mucous membranes, the skin, or the hair, and on matches, lighters and articles for pranks and jokes of 23 November 2005 (Ordinance on materials to enter in contact with the human body)	RS 817.023.41

2.5.3 ASSESSING SWISS POLICY INSTRUMENTS FOR DEALING WITH PLASTICS FROM A PUBLIC POLICY PERSPECTIVE

As already mentioned, none of the selected legislative acts is specifically about plastics. Some of these acts do not even explicitly refer to plastics (or polymers or synthetics). Yet, they contain general rules and instruments aiming at the protection of the environment, which arguably could apply to plastics. This is first of all the case for the Environmental Protection Act (EPA) to the degree that plastic materials are “*substances [composed of] manufactured chemical elements and their compounds [or] preparations (mixtures, blends and solutions) and articles containing such substances*” (EPA, art. 7 (5)) that could present “*harmful effects or nuisances [for] people, animals and plants, their biological communities and habitats, [or for] the natural foundations of life sustainably, in particular biological diversity and the fertility of the soil*” (EPA, art. 1). This law arguably applies to plastics too. The same goes for the other laws of the selected legislative corpus. Neither the Chemicals Act (ChemA), nor the Waters Protection Act (WPA), nor the Foodstuffs Act (FSA)

mentions *plastics* (or again, *polymers* or *synthetics*). Yet, each of these laws arguably applies to plastics. Like the EPA, ChemA for its part intends “to protect the lives and health of human beings against harmful effects arising from substances⁷⁸ and preparations⁷⁹” (ChemA, art. 1). Obviously, plastics contain substances and preparations. Similarly, the WPA searches “to protect waters against harmful effects” (WPA, art. 1) by prohibiting “to introduce into a body of water, either directly or indirectly any substances which may pollute it” (WPA, art. 6). The FSA finally, is relevant for plastics in the sense that it wishes “to protect the health of consumers from [...] utility articles⁸⁰ that are unsafe” (FSA, Art. 1 (a)). Many of such utility articles indeed are made from plastics.

To know, however, if and how these laws apply to plastics not only as general principles, but also in terms of their more practical implications, they must be assessed in relation to the different policy instruments they directly propose, as well as the ordinances through which they are executed.

To start with, the Environmental Protection Act indeed contains multiple possible policy instruments. First of all, it installs an obligation for “the authorities to inform the public adequately about environmental protection and levels of environmental pollution” (EPA, art. 10e) (information dissemination), and for “the Federal Council [to] assess the state of the environment in Switzerland at least every four years and [to] submit a report on the results to the Federal Assembly” (EPA, art. 10f; also art. 51) (information collection). Furthermore, the EPA tasks the Federal Council to “[stipulate] by ordinance the ambient limit values for assessing harmful effects or nuisances” (EPA, art. 13; also art. 29), essentially “so that [...] pollution below these levels does not endanger people, animals or plants, their biological communities and habitats [nor] affect the well-being of the population [...] harm soil fertility,

⁷⁸ I.e. “chemical elements and their compounds in the natural state or obtained by any production process” (ChemA, art. 4.1 (a)).

⁷⁹ I.e. “mixtures or solutions composed of two or more substances” (ChemA, art. 4.1 (c)).

⁸⁰ Such utility articles involve i.e. cosmetics, clothing, toys, etc.

vegetation or waters” (EPA, art. 14) (unilateral regulation). It also “[prohibits] the putting into circulation of substances for uses where, when handled correctly, they, their derivatives or waste may present a danger to the environment or indirectly endanger people. To this end, the manufacturer or importer is responsible for their own self-regulation [but] the Federal Council issues regulations on the nature, extent and supervision of [such] self-regulation” (EPA, art. 26); (...) “any person who puts substances into circulation must inform recipients about their environment-related properties [and] provide [them] with instructions [about how to handle them]” (EPA, art. 27) (government supervised self-regulation). Finally, starting from the principle that “the production of waste should be avoided [and] recovered wherever possible” (EPA, art. 30), this law allows the Federal Council to “prohibit [the] placing [on the market of] products intended for once-only, short-term use [...]; to prohibit the use of substances and organisms that considerably hamper disposal or the disposal of which may represent a danger to the environment; [and] require manufacturers to avoid production waste where there is no known environmentally compatible process for its disposal”, and to “require certain types of waste that are suitable for recovery or that need special treatment to be handed over separately for disposal” (EPA, art. 30a, b; also 30d) (unilateral regulation).

The two first articles mentioned here, art. 10e and 10f EPA, apply directly. Since these were added in 2014 following the Swiss ratification of the Aarhus Convention (Federal Council 2018, 13), reports have been published in 2015 and 2018. So far, they said very little about plastics, except for the admission that “separate collection in Switzerland could be further optimised in certain areas, such as [...] plastics [...]” (Federal Council 2018, 164), and the observation that “Switzerland’s current patterns of production and consumption must become more efficient and place fewer demands on resources [which requires action] [...] to recover valuable materials and substances (e.g. plastics, phosphorous) [...]” (Federal Council 2015a, 13). As to the other possible instruments,

they all need further specification. In that sense, multiple other legislative documents come into play (cf. Table 4).

First, in line with art. 13 EPA, limit values are set by the Federal Council in the Ordinance on Air Pollution Control (OAPC). It covers all Particulate Matter with an aerodynamic diameter of less than 10 micrometres (PM10). However, the term "plastics" is not used in this Ordinance. The OAPC, like the EPA, protects the population, ecosystems and materials from harmful effects of certain pollutants, but does not protect the air as such (Moor, Favre and Flückiger 2010). Since plastics - in the form of airborne microplastics - are currently covered by Particulate Matter as far as they are smaller than 10 micrometres (PM10), this regulation implicitly applies to plastics as well.

The same goes for the Ordinance relating to the Impacts on the Soil (OIS). In reference to art. 29 EPA, *"the aim of this ordinance is to guarantee long-term soil fertility by regulating the observation, monitoring and evaluation of chemical, biological and physical harm to soil"* (art. 1 (a), own translation – o.t.). *"By 'chemical harm', [the OIS means] deterioration of the soil by natural or artificial substances (pollutants)"* (art. 2 (2), o.t.). In this sense, this ordinance implicitly applies to chemical harm to the soil due to plastic pollution. The assessment of harm to the soil is based on guide values, trigger values and clean-up values listed in the ordinance's annexes (art. 5 (1)) (see SAEFL 2001). If no such values are specified, assessment should be carried out on a case-by-case basis, based on the criteria listed in art. 2 (1)). As the annexes contain no trigger or clean-up values for polymers, harm to the soil by microplastics is neither observed, nor systematically evaluated⁸¹.

Based on art. 9 of the Federal Act on the Protection of Waters, the Waters Protection Ordinance (WPA), for its part, *"specifies the water quality requirements for surface and underground waters [and ordains] regulations [thereon]"* (WPA, art. 9). The WPA aims *"to protect waters*

⁸¹ Only certain pollutants that are sometimes used in the production of plastics are concerned, such as lead for example, but not polymers as such.

against harmful effects” (art. 1), thus making it arguably applicable to plastics (cf. *supra*). Nevertheless, like the previous ordinances, the WPO implementing this law currently does not set any immission limit for plastics in water (in whatever form or state) (cf. Appia 2019, 57). As microplastics may cause *harmful effects or nuisances*, the general prohibition of pollution in the water legislation do apply to it. However, no harmful effects or nuisances due to microplastic pollutions are currently known, there is no need for action to adapt the legal basis.

Plastics, on the other hand, are mentioned in the Ordinance on the Incentive Tax on Volatile Organic Compounds (OVOC). Based on art. 35a and c of the EPA, this ordinance installs an incentive tax to be paid by “*any person who imports volatile organic compounds⁸² or any person who, as a manufacturer, puts such compounds into circulation or uses them himself*” (EPA, art. 35a) (economic incentive). Numerous polymers are among the VOC’s subject to the tax. Yet, the importance for the overall management of plastics is dubious. The OVOC only considers plastics as part of VOC’s contributing to the excessive formation of ground-level ozone⁸³. Therefore, the aim of this instrument is to reduce VOC emissions, not to reduce plastic emissions⁸⁴.

On the face of it, art. 26 and 27 of the EPA seem especially promising for the governance of plastic flows, in particular for the production and import phase. The more so, because, in line with art. 29 (1)a, “[*the Federal Council may enact regulations on*] *substances or their derivatives that can accumulate in the environment*”. Yet, to know if this applies to plastic materials, the question is whether these are considered

⁸² For the purpose of this Ordinance, volatile organic compounds (VOCs) are organic compounds with a vapour pressure of at least 0.1 mbar at 20 °C or a boiling point of maximum 240 °C at 1013.25 mbar (OVOC, art. 1).

⁸³ Federal Customs Administration, *Incentive fee on volatile organic compounds (VOC)* ezv.admin.ch/ezv/en/home/information-companies/taxes-and-duties/importation-into-switzerland/incentive-fee-on-volatile-organic-compounds--voc-.html

⁸⁴ With Directive 2010/75/EC on industrial emissions, in the EU too legislation exists about VOC’s. But, in our previous assessment of the EU’s plastic policy, this act was not considered, precisely because it only very indirectly concerns plastic substances and is not considered in the context of the EU Strategy on Plastics in a Circular Economy.

“[to present] a danger to the environment or to indirectly endanger people”. In this context, it is not the EPA, but the Chemicals Act and its ordinances that are decisive. While the Chemicals Act itself, just as EPA, does not mention plastics (cf. *supra*), the Chemical Ordinance, *“by way of clarification of the definitions given in the Chemicals Act”*, does consider polymers to be a substance (ChemO, art. 2 (2)g). Nevertheless, in line with its art. 3, it does not consider them as dangerous. Therefore, this ordinance does not apply to plastics. For its part, the Chemical Risk Reduction Ordinance regulates *“the restrictions and prohibitions on the use of specific substances, preparations and articles”* (ORRChem, art. 3). In particular, it prohibits the manufacturing and/or placing on the market of plastic articles containing certain additives (unilateral regulation)⁸⁵. In addition, a maximum content of plastics in fertilizers is defined in annex 2.6.

So far, the key denominator of the legal acts is their focus on substances in relation to possible environmental concerns. A second part of the *corpus* that can be distinguished is about waste. As nothing explicitly states otherwise, provisions on waste found in chapter 4 (art. 30 *ff.*) of the EPA apply to plastic waste. These articles not only emphasise the prevention and reduction of waste⁸⁶ but also establish an order of priority between the various principles applying to it⁸⁷. Said otherwise, they are not merely concerned with the treatment or disposal of waste, but with its management at large (Flückiger 1996). Thus, they are particularly relevant for the sustainable management of the plastic system. Yet, again,

⁸⁵ Hexabromocyclododecane, brominated diphenyl ethers, hexabrombiphenyl (Annex 1.1); decabromodiphenyl ether (Annex 1.9); phthalates (Annex 1.18); fertilizers (content of plastics must not exceed 0.1% of the mass of the dry matter) (Annex 2.6); heavy metals in packaging (Annex 2.16); substances in electrical and electronic equipment (compliant to RoHS Directive) (Annex 2.18). Annex 2.9 also prohibits the manufacturing or placing on the market of “cadmium-containing plastics” (art. 2 (1)a), as well as “articles which consist entirely or in part of plastics, which contain more than 1 mg of a polycyclic aromatic hydrocarbon” (art. 2 (1)ebis).

⁸⁶ FF 1993 II 1378.

⁸⁷ FF 1993 II 1381.

to find concrete policy instruments, the executing ordinances must be considered.

Primarily, this concerns the Waste Ordinance. Governing waste at large, it generally applies to plastic waste too. The revision in 2015 of the former waste ordinance from 1990 had been initiated in parallel to the partial revision of the EPA, which ended up to be rejected, in order to streamline the efforts toward a green economy. The strategic approach adopted in the new Waste Ordinance consists in “considering waste as sources of primary material and, therefore, primary resources in a high-quality cycle” (OFEV 2019, avant-propos). Chapter 3 is specifying the EPA dispositions regarding the *avoidance, recovery and deposit of waste*. First, art. 7 (1) tasks “*the environmental protection agencies [to] inform and advise private individuals and authorities on how to avoid producing waste and to dispose of waste*” (information dissemination). Subsequently, art. 10 imposes that “[*combustible*] *waste must be incinerated in appropriate facilities, unless their constituents may be recovered*” (unilateral regulation). In that way, this article consecrates the ban on the landfill of plastic waste. This is affirmed by art. 25 (as plastic waste does not meet the landfill requirements of Annex 5). Art. 11 (1) then stipulates that “*the FOEN and the cantons shall encourage the avoidance of waste through appropriate measures such as raising the awareness of and providing information to the public and businesses. In doing so, they shall work with the private sector organisations concerned*” (information dissemination). Furthermore, art. 17 determines that “*in the case of construction work, special waste must be separated and disposed of separately from other waste*” (unilateral regulation). In this regard, plastics are mentioned as “*recyclable waste*”. In contrast, art. 13 on *municipal waste* asks “*the cantons [to] ensure that the recoverable parts of municipal waste [...] are if possible collected separately and recycled*”, but in this context does not mention plastics. It only speaks of “*waste such as glass, paper, cardboard, metals, garden waste and textiles*”. Finally, also important is art. 24 on the *recovery of waste in the production of cement and concrete*, including plastics as waste that may

be used as heating fuel in the production of cement clinker (unilateral regulation).

Pertaining to art. 12 of the Waste Ordinance, which specifies art. 30d EPA, “*waste must be recycled or recovered for energy provided recovery does less harm to the environment than: (a) any other form of disposal; and (b) the manufacture of new products or the acquisition of other heating fuels*”, and that “[*such*] recovery must be carried out according to the state of the art”. The “state of the art” of recovery procedures is defined as “*the latest stage of development of procedures, installations and operating methods which (1) have been successfully tested in comparable facilities or activities in Switzerland or abroad, or have been used successfully in trials and may be used in other facilities or activities in accordance with the rules of the technology; and (2) is economically viable in a medium-sized and economically sound enterprise in the relevant industry*” (art. 3 (m) ADWO). Hence, in cases where recycling plastics is more environment-friendly than incineration, but economically not viable (Dinkel et al. 2017), under the current regulation, a material valorisation cannot be imposed upon the holder.

Where it concerns the other waste related ordinances, scrutiny teaches that they have little added value for the management of plastics. The Ordinance on Movements of Waste, which executes the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, regulates the movements of special waste and other waste subject to control within Switzerland (art. 1. (.2)a), the cross-border movements of waste (art. 1. (2)b), and the movements of special waste between third countries, insofar as a Swiss company organises or participates in these movements (art. 1. (2)c). All other plastic waste is considered ordinary waste and may be exported without authorisation of the FOEN. Thus, these ordinances played until now only a very secondary role in regulating the sustainable management of plastics. Their role should however be significantly reinforced in the near future, as the participants of the last Conference of the Parties to the Basel Convention decided, in May 2019, to make mixed plastic waste subject to control from

1 January 2021 onwards. Thus, in future, all the countries involved (export, transit and import countries) have to give their consent to the planned transboundary movements in advance. Switzerland will in order to introduce this measure shortly adjust its text on the Basel Convention.⁸⁸

Also relevant is the Beverage Container Ordinance (BCO) “*regulat[ing] the supply and take-back of beverage containers used within Switzerland*” (BCO, art. 1). Since nowadays almost all beverage bottles are made from PET (Hawkins, Potter, and Race 2018), the provisions for PVC beverage packaging (art. 6) essentially lost pertinence, while those on PET (arts. 7 and 8) became all the more relevant. Except for rules on *composition* (art. 3), and *labelling* (art. 4), this ordinance obliges “*dealers, manufacturers and importers that supply beverages in refillable containers to consumers to charge a deposit [and to] take back refillable containers of all the products they stock and refund the deposit*” (art. 5(1)). “*The deposit shall be not less than CHF 0.30 for any beverage container*” (art. 5. (3) (economic incentive). These two articles, in practice, only apply to glass containers. It also requires “*dealers, manufacturers and importers who supply beverages in non-refillable PET or metal containers to consumers and who do not ensure the disposal of all containers they supply through financial contributions to a private organisation, [to] (a) take back such non-refillable containers [...]; (b) pass such non-refillable containers on for recycling at their own expense; and (c) indicate clearly in easily visible places at the points of sale that they accept the return of these types of non-refillable containers*” (art. 7. (1)) (economic incentive). Finally, of particular importance is the obligation that “*the recycling level for*

⁸⁸ Concerning the export of mixed plastic waste, as decided during the last COP of the Basel Convention, starting on the 1st of January 2021, mixed plastic waste (excepted mixture of PE, PP and PET; like PET-drinking bottles) will be placed on the Annex II (Y48) of the Basel Convention. This means that mixed plastic waste will be subject to the control procedure of the Basel Convention, with prior notification of the export, transit and import competent authorities. Export from Switzerland of waste listed on the Annex II of the Basel Convention is only allowed to countries member of the European Union or of the OECD. Consequently, the export of mixed plastic waste to countries not members of the European Union or of the OECD will be forbidden starting from the 1st of January 2021. The export of pure plastic waste (one sort, B3011) for material recycling is still allowed and may be exported without authorisation of the FOEN.

beverage containers made from glass, PET and aluminium shall be a minimum of 75% for each material” (art. 8. (1)), and that “if the target is not achieved, DETEC may require that dealers, manufacturers and importers (a) charge a minimum deposit on non-refillable containers of the material concerned; (b) accept the return of such containers and refund the deposit; and (c) pass returned containers on for recycling at their own expense” (art. 8. (2)) (unilateral regulation).

A third part of the selected corpus concerns substances in relation to human consumption and health. This is the case for the Foodstuffs Act (FSA) and its ordinances. These acts talk about plastics, insofar these are used in utility articles. While the FSA itself does mention plastics (cf. *supra*), its ordinances contain some plastics related dispositions. First, the Ordinance on Foodstuffs and Utility Articles, which “*regulates the manufacturing, processing, storage, transportation and placing on the market of foodstuffs and utility articles*” (art. 1. (1)a, *o.t.*) contains three articles (art. 50-52) on the *recycling of plastics for objects and materials that come into contact with food*. These rules concern the authorisation procedure for plastics in the production of utility articles (unilateral regulation). Thus, *they do not intend to manage an aspect of the plastic system, but only to manage plastics in its contact with food*. In that sense, these provisions are comparable to the OVOC discussed before. The same goes for the other two ordinances. The Materials and articles ordinance “*specifies the materials and articles intended to come into contact with foodstuffs and determines requirements thereon*” (art. 1. (1), *o.t.*), including *materials and articles made of plastic* (Section 5), and *materials and articles made of recycled plastic* (Section 6) (unilateral regulation). While this may well be about the use of plastics, the interest lies not with plastics *in se*. These provisions only concern plastics to the extent that they enter in contact with food, but again not with the more overall public management of plastics. Finally, the Ordinance on materials to enter in contact with the human body, mentions plastics under art. 14 on *requirements applying to childcare articles* (unilateral regulation). Here

too, the article has no intention of managing plastics, but to manage childcare articles.

In Chapter 1, we observed how the Swiss plastic system is considerably end-of-pipe oriented, with waste-control as the main avenue for dealing with plastics at the end of their initial life cycle. Looking at the foregoing discussion of (potential) plastic-related policy instruments in Switzerland, we note how this corresponds with existing policy-instruments, which indeed do set considerably on waste management. *Of the 11 plastic-relevant policy instruments actually in place, 4 are about waste* (cf. Table 5). While in this regard, the authorities also inform the public about the avoidance of waste, emphasis obviously lies on the unilateral regulation of such waste (3 of the 4 waste related instruments in place). Where it concerns other phases of the plastic cycle, the BCO installs a mandatory deposit for refillable containers and an obligation to take back such containers, as well as the minimum recycling level of 75% for PET beverage bottles (cf. Table 5). While these policy instruments involve active government action (cf. 2.3.2 *supra*), it is important not to forget that they concern but one type of plastic, namely PET. The leakage-relevant legislation composed of multiple ordinances (OAPC, OIS, WPO, OVOC), on the other hand, shows little interest in plastics as a possible pollutant. As to the consumer related legislation incorporated into the corpus, it contains some dispositions about plastics. Yet, this legislation (apart from WPO) primarily searches to assure that human consumption of food and their use of utility articles can happen under healthy conditions. Moreover, although in that regard these acts contain dispositions on plastics, these do not consider themselves with the management of such plastics.

Table 5: (Direct and indirect) Swiss policy instruments about plastics

	Production - import	Use - reuse	Recycling	Waste	Leakage
1. Pure self-regulation	-	-	-	-	-
2. Government supervised self-regulation	Manufacturers/ importers control the toxicity of their own products and inform consumers (EPA)	-	-	-	-
3. Information collection/research funding	-	-	-	-	FC assesses the state of the environment (EPA)
4. Information dissemination	-	-	-	Authorities inform and raise awareness on how to avoid and dispose of waste (ADWO)	Authorities inform public on pollution (EPA)
5. Voluntary agreement	-	SRF/IG DHS voluntary agreement on the reduction of 70%-80% of single-use plastic bags by 2025	-	-	-
6. Manipulation of norms and networks	-	-	-	-	-
7. Economic incentive	-	-	Deposit-scheme for PET beverage bottles (BCO)	-	-

	Production - import	Use - reuse	Recycling	Waste	Leakage
8. Economic punishment	Tax on volatile organic compounds, including certain plastic substances (OVOC)	-	-	-	-
9. Negotiated regulation	-	-	-	-	-
10. Unilateral regulation	<p>To limit waste, the FC could prohibit the placing on the market of single-use products (EPA)</p> <p>FC could regulate substances that accumulate in the environment (EPA)</p> <p>Producing/ placing on the market of cadmium-containing plastics is prohibited (ORRChem)</p>	<p>Authorisation procedures for the use of plastics in utility articles (FSO), foodstuff contact material (Materials and articles ordinance), and childcare products (Ordinance on materials to enter in contact with the human body)</p>	<p>Recycling target of 75% for PET beverage bottles (BCO)</p>	<p>Combustible waste has to be incinerated in appropriate facilities, unless it can be recovered (ADWO)</p> <p>Construction waste, including plastics must be disposed of separately (ADWO)</p> <p>Plastic waste may be used as heating fuel in cement plants (ADWO)</p>	<p>FC could set limit values for pollution (EPA)</p> <p>Maximum content of plastics in fertilizers (ORRChem)</p>
11. Direct government action	-	-	-	-	-

Green = instrument in force – Red = indirect – *In italic are instruments of a more procedural nature*

Legend of abbreviations: EPA = Environmental Protection Act; FC = Federal Council; ADWO = Waste Ordinance; BCO = Beverage Container Ordinance; OVOC = Ordinance on the Incentive Tax on Volatile Organic Compounds; FSO = Ordinance on Foodstuffs and Utility Articles; ORRChem= Ordinance on the Reduction of Risks relating to the Use of

Certain Particularly Dangerous Substances; SRF = Swiss Retail Federation; IG DHS = Interessengemeinschaft Detailhandel Schweiz.

The last point raised here brings us back to our initial observation on the absence of a demarcated Swiss plastic policy. Contrary to the EU, where an integrated plastic policy exists, and works through and impacts on other policies (cf. Figure 15 *supra*), in Switzerland no separated plastic policy does exist so far. Plastics are dealt with through the combination of rules and actions developed within the context of other policies (cf. Figure 17). For those instruments in place that can be considered to apply directly to plastics, we see that Switzerland mostly works through proactive and interactive instruments. This concerns 8 out of 11 instruments (cf. Figure 18).

Figure 17: *Swiss plastic policy and other Swiss policies*

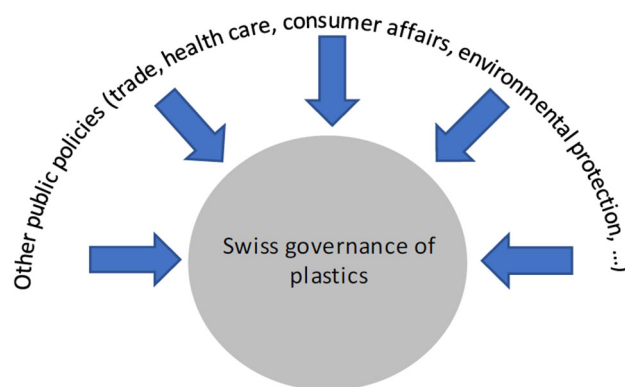
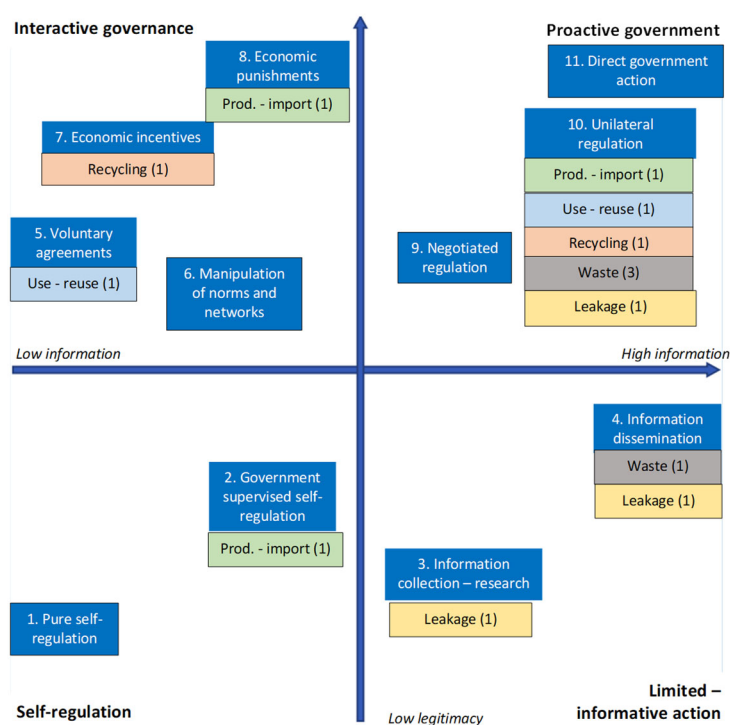


Figure 18: Swiss policy instruments along the legitimacy-information matrix



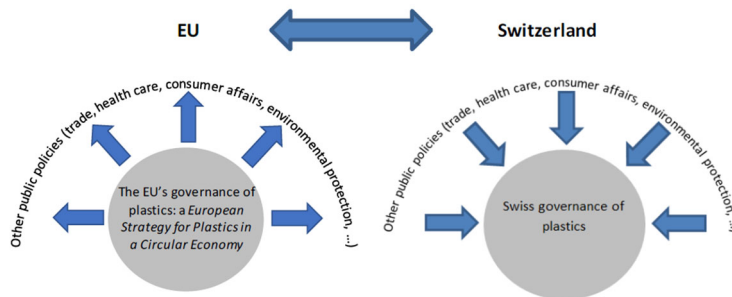
Legend: the numbers in brackets correspond to the number of policy instruments listed in table 5 above.

2.6 COMPARING EU AND SWITZERLAND

The first thing that is noticeable when comparing the EU and Switzerland, is how for the EU, the available legislation and the policy instruments put forward are part of an (integrated) overall policy. Multiple legislative acts do exist that explicitly concern plastics. Among others, directive (EU) 2019/904 of 5 June 2019 “on the reduction of the impact of certain plastic products on the environment”, and directive (EU) 2015/720 of 29 April

2015 “on reducing the consumption of lightweight plastic carrier bags”, but also regulation (EU) 10/2011 of 14 January 2011 “on plastic materials and articles intended to come into contact with food”, have plastics as their sole focus. For Switzerland, this is not the case. Plastic-relevant policy instruments are (potentially) available in Switzerland, but as such only emerge from other policies. In that way, *Swiss policy instruments on plastics do not intend to manage the plastic system as such, but concern plastic materials and products to the extent that they are touched upon in the context of other policies*; be it for instance consumer protection, or waste management in general (cf. Figure 19). It should not be overlooked how this fact has led to a different method for selecting the respective legislative corpuses. This complicates their systematic comparison. For Switzerland, for instance, we among others retained the *Ordinance on the Incentive Tax on Volatile Organic Compounds* as part of the corpus. Yet, for the EU, VOC-related legislations exist too⁸⁹, but they are not considered here, as they are not mentioned in the context of the EU’s *Strategy for Plastics in a Circular Economy*.

Figure 19: EU Plastics Strategy vs Swiss plastics policy in relation to other policies



Unambiguous comparison is further complicated by the institutional setting of the EU. That is, in most cases, EU policy instruments only

⁸⁹ Cf. Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions.

present *inter alia examples* of policy instruments among which Member States can choose to realise the objectives of the directive in question. Thus, most EU policy instruments are *instruments that are possibly, but not per se in place at Member State level* (cf. 2.4.3 *supra*). While in Switzerland too, actual enforcement generally happens by the cantons (EPA, art. 36; ChemA, art. 31; WPA, art. 45; FSA, art. 47), compared to the EU Member States, they generally have less leeway regarding the concrete policy instruments by which they do so. While this, of course, has little to do with plastics as such and simply follows from the different institutional setups of both political systems, it should obviously be kept in mind when pondering about the possible transfer of EU plastic instruments to Switzerland.

When we look at policy instruments as such (cf. Figures 20 and 21), we first of all see how for both the EU and Switzerland, *Leakage* presents itself as a new issue about which authorities seem to be in demand of knowledge. Policy efforts therefore essentially consist of limited informative action⁹⁰.

When turning to the other phases of the plastic system, the EU sets strongly on *Production and Import*; and *Use and Reuse*. For both phases, the EU not only relies on *limited informative action*, but also acts through both *interactive governance* (economic incentives, economic punishments) and *proactive government* (negotiated and/or unilateral regulation). Switzerland, in contrast, has very few policy instruments that actually search to govern these phases as part of the overall management of the plastic system. Only punctual measures are taken regarding the production or use of very specific types of plastic, such as cadmium-containing plastics.

⁹⁰ Both the EU (cf. Table 3) and Switzerland (cf. Chapter 1) recently ordered multiple studies on the issue. However, in the context of this analysis of policy instruments, we only consider information collection and research funding that is formally determined by a legal measure ordering for the collection of information. Other research, funded or carried out by EU or Swiss public authorities we take not into account here because a complete image of such studies is difficult to obtain; and therefore, a comparison would be incomplete and possibly biased.

As to *Recycling*, there is *pro-active governance* action in both cases, with the public authorities unilaterally setting minimum recycling targets. An obvious difference, however, is that the EU again considers plastics in general, while Switzerland in this case essentially focuses on PET. Besides, by stimulating the voluntary *Circular Plastics Alliance* and setting new standards and public procurement criteria for plastics recycling, the EU also uses a set of other *interactive governance* instruments to reinforce plastics recycling.

Where finally *Waste* is concerned, the main difference lies in the focus of the instruments. Both actors, first of all, deal with it through *limited informative governance*. However, the EU does so by disseminating information that specifically concerns plastics, while Switzerland sets on information about waste in general. Notably, both also take *proactive action* on (plastic) waste. Yet, in the case of Switzerland, unilateral regulation essentially governs the elimination of such waste, while in the EU such regulation focuses on the return and collection of plastic waste and the financial responsibility therefore. Furthermore, as pointed out before, 4 of the 11 Swiss instruments relate to waste; that is one out of three. For the EU, the 4 waste instruments represent less than 1 out of 6 instruments (cf. Figure 21). More generally, this comparison confirms how Switzerland has a strong end-of-pipe focus (cf. Figure 20). For Switzerland, half of the instruments concern waste or recycling, while in the EU, almost 4 out of 6 policy instruments (16 out of 26) are about the first phases of the system.

Figure 20: *EU vs Swiss policy instruments on plastics, a different focus*

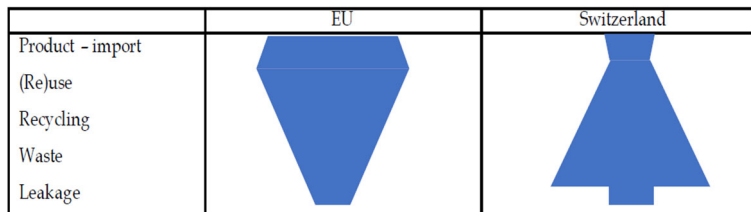


Table 6 synthesises the main findings of this section 2.6 concerning the characteristics and differences between EU and Swiss plastics strategies and sets of policy instruments.

Table 6: *Main characteristics and differences between EU and Swiss plastics strategies and sets of policy instruments*

Switzerland	EU
Mainly linear approach	Emerging circular approach
Limited number of instruments (11) mostly end-of-pipe	Large number of instruments (26) all along the plastic cycle
Weak self-regulations on production and import Weak economic incentives on recycling Strong unilateral regulation on waste	Strong economic incentives and punishment as well as unilateral and negotiated regulations all along the plastic cycle
Weak eco-design excepted for beverage containers	Emerging strategy on eco-design Single-use plastics ban
Weak separate collection except for PET beverage bottles and PE-bottles with tops	Separate collection strategy for plastics
Recycling focusses on PET beverage bottles	Broader approach of reuse and recycling, including other kinds of plastics, e.g. bottling (i.e. non PET plastic bottles)
Weak reuse strategy	Minimum percentages of recycled plastics and reusable packaging
Strong thermic valorisation	Less thermic valorisation
No landfilling of combustible waste	Landfilling still an elimination pathway
Limited public research funding	Emerging research funding and information/dissemination strategy
Strong implementation of the federal and cantonal laws at the local level	Weak/partial implementation of EU laws at the MS national and local levels

2.7 EX-ANTE EVALUATION

Based on a careful analysis of all the 35 policy instruments constitutive of the EU Plastics Strategy (cf. Table 3) *four specific EU measures* (i.e. sets of instruments) have been considered as deserving a particular scrutiny in the light of a possible transfer to the Swiss setting. A central criterion for this selection is the fact that these instruments are dealing with *four issues*, which are of particular importance to the circularisation of plastics. On the one hand, these are *single-use plastics* and *oxo-degradable plastics* regulations, which are emblematic for the new EU Plastics Strategy. On the other hand, we also look at instruments on *eco-design* and *recycling*.

These instruments concern aspects, which are currently rather limitedly dealt with in the context of the Swiss approach towards plastics. Of course, as the objectives of the EU Plastics Strategy are not mutually exclusive, an instrument can fulfil different purposes. Hence, it can appear under different issues. This is for instance the case with the instruments on separate collection (dir. (EU) 2019/904), which both intend to increase recycling, as well as to deal with waste management.

Tables 7 to 10 present in a synthetic manner the way the various instruments involved in each of the four measures are distributed along the various phases of the regulation of the plastic system⁹¹. For each instrument, we also specify its type, expected effects as well as its target group(s).

2.7.1 SINGLE-USE PLASTICS

The most visible and emblematic measures proposed under the EU's Plastics Strategy are those about single-use plastics. Concretely, single-use plastics are now dealt with through directive 2019/904 of 5 June 2019.

⁹¹ *Leakage is not part of the phases we have looked at in tables 7 to 10, because this issue is mainly indirectly addressed through the instruments implemented at the previous regulations' phases, direct attention going so far essentially to information collection and dissemination.*

In this legal act we can discern 9 different policy instruments intended “to prevent and reduce the impact of certain plastic products on the environment [...] as well as to promote the transition to a circular economy” (dir. 2019/904, art. 1), which apply to single-use plastics (cf. Table 7).

Table 7: *EU policy-instruments on single-use plastics*

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
Production -import	Dir. 2019/904, art. 5 – Restrictions on placing on the market: MS prohibit the placing on the market of the single-use plastic products listed in Part B of the Annex and of products made from oxo-degradable plastics (single-use plastics ban)	Unilateral regulation	Less single-use plastics put on the market	Producers/importers of single-use plastic products
	Dir. 2019/904, art. 4 (1) - Consumption reduction; MS take the necessary measures to achieve an ambitious and sustained reduction in the consumption of the single-use plastic products listed in Part A of the Annex, [...] Measures may include:			
Use - reuse	National consumption reduction targets for single-use plastics	Negotiated/ Unilateral regulation	Less single-use plastics being used	Merchants/retailers offering single-use plastics to end-consumer
	Measures ensuring that reusable alternatives to the prohibited single-use plastic products are available	Various instruments are possible (unilateral regulation, economic punishment, economic incentive, etc.)	Less single-use plastics being used	Producers/importers developing and producing alternatives. Merchants/retailers offering alternatives to consumers

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
	Economic instruments ensuring that single-use plastic products are not provided free of charge	Economic incentive, economic punishment	Less single-use plastics being used	Merchants/retailers offering single-use plastics to the end-consumer. End-consumer purchasing single-use plastics
	Voluntary agreements	Voluntary agreement	Less single-use plastics put on the market - less single-use plastics being used	Producers/importers of single-use plastic products. Merchants/retailers offering single-use plastics to end-consumer
	Marketing restrictions to prevent single-use plastic products from becoming litter as to ensure that they are substituted with alternatives that are reusable or do not contain plastics	Unilateral regulation	Less single-use plastics put on the market	Producers/importers of single-use plastic products
Waste management	Dir. 2019/904, art. 10 – Awareness raising measures: <i>MS take measures to inform consumers and to incentivise responsible consumer behaviour</i>	Information dissemination	Less single-use plastics being used	End consumers
	Dir. 2019/904, art. 9 – Separate collection: MS take the necessary measures to ensure the separate collection for recycling [of listed single-use plastic products] (with increasing targets over time). To achieve that objective, MS may:			
	Establish deposit-refund schemes	Economic incentive	More single-use plastics being collected for reuse or recycling - less ending up in the environment	End-consumer

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
	Establish separate collection targets for relevant extended producer responsibility schemes	Negotiated/ Unilateral regulation	More single-use plastics that can be recycled	Producers/importers of single-use plastic products

Legend: In *italic* are instruments of a procedural nature

In Switzerland, of the 125 kg of plastics used per person/year, 55 kg becomes waste within a year (cf. Chapter 1). Considering this high consumption of plastics and its impact on the country's environment, the Federal Council "*highlights the need to take action with regard to plastic products and their consumption [and] to the sustainable management of plastic waste [...]*"⁹² and has tasked the FOEN to reflect on the reinforcement of the country's plastic policy's sustainability (cf. Introduction). In this regard, taking measures to *limit single-use plastics* in the country presents itself as a sound approach. That is, given the objectives of these instruments as presented in art. 1 of the EU directive (cf. *supra*), and the positive impact their realisation would have on the creation of circularity, they are certainly relevant to the Swiss case.

Under the Environmental Protection Act, art. 30a (a), the Federal Council would be able to "*prohibit [the] placing [on the market of] products intended for once-only, short-term use [...]*". In that sense, *prohibiting the placing on the market of specific single-use plastic products*, as provided by art. 5 of EU directive 2019/904, would be possible, as the public interest at stake (protection of environment and health) justifies a restriction of other fundamental rights (in that case economic freedom) and appears to be proportionate (cf. art. 36 Cst.⁹³; Epiney 2015). At local and cantonal level initiatives indeed have been launched in that sense. Yet, as the Federal Council considers that "*it is up to the economic sectors concerned to take voluntary measures to reduce the use of single-use*

⁹² Postulate by Adèle Thorens Goumaz (18.3196): Statement of the Federal Council of 09/05/2018. (o.t.)

⁹³ Federal Constitution of 18 April 1999 of the Swiss Confederation (RS 101).

*plastic articles, [and] it is only if the latter prove to be ineffective or insufficient that it will examine the advisability of introducing regulatory measures*⁹⁴, so far, no country-wide measures exist to limit the use of single-use plastics in Switzerland. (cf. 2.5.3, supra). Yet, even without taking regulative action to proactively prohibit certain plastic products, Switzerland can be inspired by the EU instruments on single-use plastics; especially so as some among these clearly go in the direction of what already is provided in Swiss law, or is put forward by the Federal Council as the preferred road for action. Regarding this last point, it could for instance be instructive to look at voluntary agreements, which EU Member States would put in place “*to achieve an ambitious and sustained reduction in the consumption of the single-use plastic products*”. In that regard, it can help to look at which Swiss companies are already participating in such voluntary agreements in other countries. Also measures “*to inform consumers and to incentivise responsible consumer behaviour*”, taken by EU Member States are worth following-up. A similar policy instrument is already provided in general terms under art. 11. (1) of the Waste Ordinance. The concrete implementation given to such information dissemination on single-use plastics by other European States could help to concretise this further. Finally, also economic incentives could be compatible with the Swiss context. Already in place for one single-use plastic item, namely PET beverage bottles (BCO, art. 7), they could help reduce the use of single-use plastic items and increase their collection for reuse and recycling in the absence of more stringent regulatory measures.

In conclusion, *policy measures taken by the EU on single-use plastics not only are relevant to Switzerland, but would also be compatible with the existing Swiss plastic policy*. They concern a problem indeed present in Switzerland – being the substantial use of single-use plastics – and if wished for could readily be integrated within existing Swiss legislation without creating incoherence from a public policy perspective. The main

⁹⁴ Postulate by Marco Romano (19.3567): Statement of the Federal Council of 04/09/2019. (o.t.)

issue seems thus to be the *political acceptability*, which can influence the proportionality assessment, when weighting the different interests at stake.

2.7.2 RECYCLING

A second set of EU instruments of interest are those dealing with recycling. Such policy instruments exist in two directives (dir. (EU) 2018/852, and dir. (EU) 2019/904) as well as by means of two further initiatives⁹⁵. Noticeable is how they do not only concern the act of recycling in itself, but also deal with production requirements facilitating such recycling, as well the overall management of waste in order to increase the share of recyclable material (cf. Table 8).

Table 8: *EU policy-instruments on recycling*

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
Production -import	Dir. (EU) 2018/852, art. 9 § 5: COM examines the feasibility of, and publishes a report about improving design for reuse and promoting high quality recycling, as well as strengthening their enforcement	Information collection/ research	Better knowledge about design for reuse and recycling	Does not apply
Use - reuse	Dir. (EU) 2018/852, art. 5 – Reuse: MS shall take measures to encourage the increase in the share of reusable packaging placed on the market and of systems to reuse packaging in an environmentally sound manner [...], without compromising food hygiene or the safety of consumers; the final objective being that all plastic packaging should be reusable or recyclable by 2030 (2 nd EU Circular Economy Action Plan 2020). Such measures may include, i.a.:			
	Deposit-return schemes	Economic incentive	Increase the share of reusable packaging	End-consumer

⁹⁵ (1) *Circular Plastics Alliance*, and (2) *Criteria for recycled plastics in Public Procurements: Criteria for Food Catering Services and Vending Machines* (published: 2019, SWD (2019) 366 final).

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
	Qualitative and/or quantitative targets for reusable packaging	Negotiated/ Unilateral regulation	Increase the share of reusable packaging	Producers - importers of plastic packaging, recyclers
	Minimum percentage of reusable packaging placed on the market every year for each packaging stream	Unilateral regulation	Increase the share of reusable packaging	Producers - importers of plastic packaging
Recycling	To help bridge the gap between the supply and demand for recycled plastics, COM launched the Circular Plastics Alliance (CPA)	Voluntary agreement	Increase the share of recycled plastics in the production of plastic products	Producers - importers of plastic materials and products. Recyclers
	Minimum rate of recycled plastics in the production of plastic packaging products (EU) 2018/852 amending Directive 94/62/EC on packaging and packaging waste; as well as in the domain of construction materials and vehicles (2 nd EU Circular Economy Action Plan 2020)	Negotiated/ Unilateral regulation	Increase the share of recycled plastics in the production of plastic packaging products	Producers - importers of plastic packaging. Merchants/retailers using plastic packaging. End-consumer using plastic packaging
	Criteria for recycled plastics in Public Procurements: Criteria for Food Catering Services and Vending Machines (published: 2019, SWD (2019) 366 final)	Economic incentive	Increase the share of recycled plastics in products procured by EU's public authorities, thus stimulating the market for recycled plastics	The EU's own administration
Waste management	Dir. (EU) 2019/904, art. 9 – Separate collection: MS shall take measures to ensure the separate collection for recycling [of listed plastic products] (with increasing targets over time). To achieve that objective, MS may i.a.:			

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
	Establish deposit-refund schemes	Economic incentive	More plastics being collected for reuse or recycling - less ending up in the environment	End-consumer. Merchants/retailers. Waste collectors
	Separate collection targets for relevant extended producer responsibility schemes	Negotiated/Unilateral regulation	More plastics that can be recycled	Producers - importers of plastic products. Waste collectors

Currently, in Switzerland, the amount of plastics being recycled is limited. And what is recycled, consists for a considerable part of PET beverage bottles (cf. Chapter 1). This goes together with a legal framework, which indeed does say little about recycling, except for PET beverage bottles (cf. 2.5.3 *supra*). On the other hand, the Federal Council, in its action plan on green economy, recognises that in particular regarding plastics “*the need for raw materials and [...] the volume of waste produced*” has to be reduced. (cf. 2.5.2 *supra*). Also, more generally, the federal authorities declare to be committed to the principle of circularity⁹⁶. Considering the current situation, and how it is at odds with these principled commitments, an important challenge for Switzerland precisely lies with prompting plastics recycling. Hence, the relevance of the EU-instruments on recycling for Switzerland lies in the fact that they address a real challenge present in the country.

However, while the relevance of (increased) plastics recycling may be clear, things become more ambiguous when the question is about the compatibility of the EU policy instruments on recycling with the Swiss plastic system in place and the rules applying to it.

With the Beverage Container Ordinance, deposit-return schemes and enforceable recycling targets, as well as separate collection structures do

⁹⁶ FOEN, *Circular economy*
[bafu.admin.ch/bafu/en/home/topics/economy-consumption/info-specialists/kreislaufwirtschaft.html#-300938974](https://www.bafu.admin.ch/bafu/en/home/topics/economy-consumption/info-specialists/kreislaufwirtschaft.html#-300938974)

exist for plastic materials in Switzerland and function well. Similarly, the possibility for the Confederation and the cantons to promote sectoral agreements by setting quantitative targets and deadlines for meeting them, provided under art. 40a EPA, agrees with the voluntary agreement installed by the EU through the Circular Plastics Alliance. An alliance of which also Swiss companies such as Nestlé are a signatory.

So, the question here is not so much about the *intra-policy compatibility* of the EU policy instruments on recycling, but rather about their *practical compatibility*. As discussed in Chapter 1, the current Swiss plastic system is strongly oriented towards the incineration of plastic waste at the end of its life cycle. To impose additional recycling targets and establish collection streams for multiple other plastic materials could prove difficult to reconcile with this, at least in the short term. To tackle this existing trade-off between ecological and economic considerations (cf. Dinkel et al. 2017), the EU's interactive governance instruments from the above table could present themselves as interesting examples. If Switzerland indeed is committed to the principle of circularity, making recycling economically more attractive could offer a way forward, which is compatible with the economic constraints resulting from the specificities of the current plastic system. By stimulating the demand for recycled plastics through economic incentives, including public procurement criteria for producers, processors and waste collectors of plastic materials, a critical juncture could be reached where separate collection streams for plastics would become economically viable. Deposit-return schemes then can help these collection streams to develop. At the same time, in the case of Switzerland, alternatives will have to be developed for the current energy production strongly depending on waste incineration. In that sense, we recall that choosing between the incineration or the recycling of plastics, ultimately involves a political decision about how circular we want the plastic system to be (cf. Chapter 1).

Considering the overall limited recycling of plastics in Switzerland, the EU policy instruments could certainly be relevant for reinforcing plastic

circularity. While the compatibility of these instruments would not pose a major challenge, in practical terms, an upscaling of plastics recycling will have to take into account the system in place. Therefore, in particular the EU's economic incentives to stimulate recycling could present interesting examples for action.

2.7.3 ECO-DESIGN

Eco-design measures to support the recyclability of plastics are an important working field of the EU's Plastics Strategy. So far, however, no concrete eco-design measures to support the recyclability of plastics are in place or proposed (cf. Table 3). The European Commission is preparing a report on the matter; and on the initiative of the Commission, the public and private actors implied in the plastics value chain commit themselves *"to develop, update or revise design for recycling guidelines for all plastic products"*⁹⁷. Finally, Member States are invited to take appropriate measures to encourage improved product design (cf. Table 9).

Table 9: *EU policy-instruments on eco-design*

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
Production - import	Dir. (EU) 2018/852, art. 9 § 5: COM examines the feasibility of, and publishes a report about, improving design for reuse and promoting high quality recycling, as well as strengthening their enforcement	Information collection/research	Better knowledge about design for reuse and recycling	Does not apply
	Restrictions on intentionally added microplastics (2 nd EU Circular Economy Action Plan 2020)	Negotiated/ Unilateral regulation	Reduction of microplastics pollutions	Producers - importers of products containing microplastics

⁹⁷ Declaration of the Circular Plastics Alliance (17.07.2019)
<https://ec.europa.eu/docsroom/documents/36361>

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
Use-reuse Recycling	All plastic packaging should be reusable or recyclable by 2030 (2 nd EU Circular Economy Action Plan 2020)	Negotiated/ Unilateral regulation	Reduction of primary plastics demand and plastic waste	Producers - importers of plastic packaging
Recycling	To help bridge the gap between the supply and demand for recycled plastics, COM launched the Circular Plastics Alliance (CPA)	Voluntary agreement	Increase the share of recycled plastics in the production of plastic products	Producers - importers of plastic packaging
Waste management	Dir. 2008/98/EC, art. 8 – Extended producer responsibility: “MS take appropriate measures to encourage the design of products in order to reduce their environmental impacts and the generation of waste in the course of the production and subsequent use of products [...] measures may encourage, i.a., the development, production and marketing of products that are suitable for multiple use, that are technically durable and that are, after having become waste, suitable for proper and safe recovery and environmentally compatible disposal”	Various instruments are possible (unilateral regulation, economic punishment, economic incentive, etc.)	Limit the environmental impact of the production and use of plastic products	Producers - importers of plastic products

The relevance of these dispositions for Switzerland is double. As accurately observed by the FOEN, “*apart from the common interest of Switzerland and the EU in ensuring the sustainable management of resources, it may be wise to monitor the conditions surrounding competition between Swiss and EU companies, the opening up of the*

*market for Swiss cleantech, and joint support for innovation*⁹⁸. In short, the adoption of a consistent approach to the harmonisation of the ecological rules associated with products, not only is environmentally sound, but also economically judicious. With this in mind, Switzerland should follow closely what happens in the EU in the field of eco-design. The Commission report, expected to be submitted to the European Parliament and the Council by end 2020, should be instructive in this regard. Given the close commercial ties between Switzerland and the EU, it is advisable that the same production standards apply to Swiss and other European companies regarding the recyclability of plastics. In line with the decision not to create its own ecolabel but to participate in the European ecolabel scheme⁹⁹ and to follow EU requirements on energy efficiency¹⁰⁰, Switzerland could opt to do so too for new eco-design measures to support the recyclability of plastics, once proposed. As mentioned before (section 2.7.2 *supra*), Swiss companies are already signatories of the Circular Plastics Alliance. These companies could serve as additional points of information for the Swiss authorities about ongoing developments on eco-design measures for the recyclability of plastics.

Following EU measures on eco-design is both ecologically and economically relevant for Switzerland, as it helps plastic circularity, but also assures the continuing access of Swiss products and cleantech companies to the European market. Doing so is in line with Swiss participation in similar EU actions on ecolabel and energy efficiency, and thus seems both legally and practically compatible with existing Swiss policy.

⁹⁸ FOEN, *Relations between Switzerland and the EU in the area of the environment*
[bafu.admin.ch/bafu/en/home/topics/international-affairs/organisations/relations-between-switzerland-and-the-eu-in-the-area-of-the-envi.html](https://www.bafu.admin.ch/bafu/en/home/topics/international-affairs/organisations/relations-between-switzerland-and-the-eu-in-the-area-of-the-envi.html)

⁹⁹ *Ibid.*

¹⁰⁰ *Ordonnance sur les exigences relatives à l'efficacité énergétique, OEEE (RO 2017 6951), 01.01.2018*
<https://www.admin.ch/opc/fr/classified-compilation/20162950/index.html>

2.7.4 OXO-DEGRADABLE PLASTICS BAN

On 18 February 2020, the Committee on Environment, Spatial Planning and Energy of the Swiss Council of States (ESPEC-S) unanimously adopted a motion on the interdiction of oxo-degradable plastics¹⁰¹. In that regard, it explicitly states that “*there is an urgent need [for Switzerland] to align [itself] with EU decisions on "oxo" plastics*”¹⁰². On 3 June 2020, the Swiss Council of States unanimously followed the proposal of its Committee. Since the National Council had previously adopted the motion on 20 December 2019, the Federal Council is asked to prepare a proposal for implementing a ban. The European Strategy for Plastics in a Circular Economy indeed has “*the intention to restrict the use of oxo-plastics in the EU*” (European Commission 2018b, 13). Two concrete policy-instruments can be distinguished in that sense (cf. Table 10).

Table 10: *EU policy-instruments on oxo-degradable plastics*

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
Production - import	Clear policy framework regarding (labelling of) biodegradable and bio-based plastics in order to avoid the diffusion of misleading information to the public (2 nd EU Circular Economy Action Plan 2020)			
Production - import	Dir. 2019/904, art. 5 – Restrictions on placing on the market; MS prohibit the placing on the market of the single-use plastic products listed in Part B of the Annex and of products made from oxo-degradable plastics.	Unilateral regulation	Less single-use plastics put on the market	Producers/importers of single-use plastic products

¹⁰¹ *Le Parlement suisse – Communiqué de presse, Éviter les déchets et mieux les valoriser*
<https://www.parlament.ch/press-releases/Pages/mm-urek-s-2020-02-18.aspx>

¹⁰² *Motion by Isabelle Chevalley, 26.09.2019 (19.4182).*

Phase	Policy instrument	Type of instrument	Expected effect	Target group(s)
Use - reuse	Dir. (EU) 2015/720, art. 20 a (2) – Reporting on plastic carrier bags; COM present a report [...] examining the impact of the use of oxo-degradable plastics carrier bags on the environment [...].	Information collection /research	Better knowledge about design for reuse and recycling	Does not apply

As “a wide range of scientists, international and governmental institutions, testing laboratories, trade associations of plastics manufacturers, recyclers and other experts have [...] come to the conclusion that oxo-degradable plastics are not a solution for the environment and that oxo-degradable plastic is not suited for long-term use, recycling or composting” (European Commission 2018c, 7), the question about *relevance* is essentially about how big the oxo-degradable plastics challenge in Switzerland is. Recently, a study mandated by the FOEN has been finalised at the ETH regarding the use of oxo-degradable plastics in Switzerland¹⁰³. They estimate that oxo-degradable plastics are not used in large amounts in Switzerland. Europe as a whole is a small market for oxo-degradable plastics compared to other regions of the world (e.g. the Middle East and South America). Yet, this does not mean that they are not used at all. Especially in agriculture, it is not possible to exclude the use of oxo-degradable plastic products, even unknown to the distributor or the farmer. Furthermore, also some other products sold in Switzerland contain oxo-degradable plastics. It follows from this account that measures on oxo-plastics, while not the most urgent, are not useless either.

Both instruments currently used by the EU fit the Swiss case. However, taking into account the largely undisputed claim against the use of oxo-

¹⁰³ ETH Zürich, *The Use of Oxo-Degradable Plastics in Switzerland*
<https://esd.ifu.ethz.ch/research/research-and-theses/oxo-degradable-plastics.html>

degradable plastics¹⁰⁴, it can be asked if there is still much need for further information collection and research. The question raised is thus about the actual prohibition of placing such products on the market. Such a prohibition of oxo-degradable plastics indeed seems compatible with existing Swiss policy instruments applying to plastics. Considering the Environmental Protection Act, art. 30a (b), allowing the Federal Council “to prohibit the use of substances and organisms that considerably hamper disposal or the disposal of which may represent a danger to the environment”. This would also be possible for oxo-degradable plastics within the limits of weighting the different interests. Besides, given the rather limited use of this plastic material in Switzerland we mentioned before, such a prohibition could be carried out with little impact on other dimensions or objectives of the Swiss plastic system’s governance. Even more, given the fact that this material is anyway not suited for recycling and negatively affects the quality of recycled plastics (European Commission 2018c, 6–7), its prohibition would have positive effects beyond simply ending its degeneration into microplastics in the environment.

The use of oxo-degradable plastics is limited in Switzerland, though not absent. Considering the overall unanimity about the environmental problems related to this type of plastic, the prohibition proposed by the EU is relevant to Switzerland, and as such compatible with existing Swiss environmental policy.

¹⁰⁴ Several professional associations support restrictions of oxo-degradable plastics. In a 2015 note, Plastics Europe declare that they “would support a legislative proposal limiting the use of so-called “oxo-degradable” plastics in Europe since independent studies have shown that the fragmentation process is often inadequate and that the chemicals used are detrimental to the recycling process. We look forward to the Commission’s report on the issue due in 2017.

<https://www.plasticseurope.org/application/files/8215/1310/3722/march-2015-plastic-bag.pdf>

Also European Bioplastics supports the restriction of oxo-degradable plastics which they declare not to be biodegradable.

<https://www.european-bioplastics.org/eu-takes-action-against-oxo-degradable-plastics/>

2.8 CONCLUSION

This chapter carried out a comparison between the policy instruments from the EU's *Strategy for Plastics in a Circular Economy*, and the current governance of the plastic system in Switzerland.

First and foremost, it showed how *Switzerland, in contrast with the EU, does not have a comprehensive approach towards plastics*. The EU, as part of its *Action Plan for the Circular Economy* developed a Plastics Strategy, which considers the plastic system comprehensively. Following this strategy, multiple policy instruments are proposed for dealing with the different processes of that system in an interconnected, circular way. In Switzerland, except for PET beverage bottles, this is not the case. Policy instruments indeed are available that (could) apply to plastics, but they are not part of an overall integrated plastic policy. This brings with it a different logic in which the EU is developing plastic-specific instruments, which are implemented through a series of specific sectoral public policies (health care, trade, environmental protection, consumer affairs, etc.), while for Switzerland measures developed within other policies (can) apply to plastics too (cf. Figure 19). It is important to recognise how this different logic complicates a coherent and systematic comparison of policy instruments between both cases. In that regard, also the different institutional set-up should be kept in mind.

Looking at the policy instruments that are in place or forthcoming, we saw how in both cases leakage presents itself as a new issue about which attention so far essentially goes to information collection and dissemination. Regarding the other processes of the plastic system, however, the study revealed clear differences between the EU and Switzerland. First, both have policy instruments in place about the recycling of plastics. Yet, in Switzerland these are essentially limited to one plastic product, namely PET beverage bottles. In the EU on the other hand, they are more about plastics in general. Furthermore, while the EU puts in place multiple instruments for governing the production and use of plastics, Swiss action is more oriented towards end-of-pipe waste

treatment. Besides, in Switzerland, these measures are more about waste in general, and specifically about its elimination and thermic valorisation (Knoepfel et al. 2010). In the EU, more plastic-specific waste related policy instruments do exist.

Regarding policy instruments in Switzerland, this chapter also showed that it is not just a matter of introducing new instruments. Certainly, under environmental law, policy instruments do exist that could apply to plastics, yet currently not do so. Thus, *in Switzerland, potential policy instruments are available, but so far are not used in order to govern plastics.*

In this context, different measures presented in the EU Plastics Strategy could inspire Switzerland as to how to use these potential policy instruments to increase the circular governance of plastics. The EU proposes numerous policy instruments to limit the use of single-use plastics, to increase recycling, to enhance the eco-design of plastic products and to prohibit oxo-degradable plastics. Among these, many instruments could help Switzerland act on plastic products and their consumption and to sustainably manage plastic waste. Additional voluntary agreements similar to the EU's Circular Plastics Alliance, and economic incentives to limit single-use plastic products, could be introduced in Switzerland by activating already existing legal dispositions. As to the creation of recycling streams for additional plastics, the EU policy instruments again offer interesting ideas. However, when implementing these instruments in Switzerland, it will have to be taken into consideration how currently plastics in Switzerland are an important source of energy production (cf. Chapter 1). Therefore, measures will be needed to accompany the decreasing share of plastics in incinerated waste. Finally, with regard to oxo-degradable plastics, it has been shown how the EU decision to prohibit this type of plastic could be implemented in Switzerland. As the legal basis to do so is already present, and the use of oxo-degradable plastics is already limited in the country, while its environmental hazardousness is undisputed, banning it from

production and use obviously contributes to a more sustainable management of plastics.

3 ANSWERS TO THE QUESTIONS FROM THE FOEN

In this last chapter, we summarise the results and main findings from the different parts of the investigation (Chapters 1 and 2). Building on these results, we answer the four questions asked by the FOEN.

Question 1: What are the characteristics of the Swiss plastic system, – in particular in terms of possible sources of pollution and the way it deals with plastics at the end of its initial life cycle – which could be taken into account when possibly formulating a “federal strategy” for the sustainable management of plastics?

Chapter 1 turned to the plastic system in place in Switzerland. More particularly, it assessed the plastic system as a whole, to find out how well that system meets the demands of circularity. It elaborated on the main challenges of the plastic system hampering such circularity, looking at those elements, which so far received less attention.

It follows from this assessment that *currently, the Swiss plastic system is not circular*. The *focal point* about plastics in Switzerland lies with how to take care of plastic waste at the end of the material’s initial life cycle. While plastic waste is indeed well dealt with, this strong focus on waste elimination tends to be detrimental to a more integrated, circular approach. To make possible a more circular approach, plastics should be considered comprehensively from production and import over use and reuse to recycling, waste-management and the avoidance of leakage.

This needs strong knowledge on all of these phases. Actually, *such knowledge seems partially missing* in Switzerland. Especially about the first phases of the plastic system. Estimates about how much plastics yearly flow through the system not only date back to 2010, but do not contain data on how much plastics is imported or produced in Switzerland. This incomplete knowledge on the beginning of the cycle hinders a clear understanding of the amount of plastics involuntarily

leaking out of the system. Indeed, if it is not known how much enters the system in the first place, it is difficult to grasp what gets lost along the way.

Related to this, it is currently unclear what exactly plastic products entail and what materials and additives are included in these products. This needs to be cleared out.¹⁰⁵ This is not only important in view of strengthening recycling, but also because many of the sources of microplastics are currently not taken into consideration when talking about plastics.

Obviously, changing the current linear system towards more circularity is not easy and will require effort. The main *structural limits* linked to the specificities of the (Swiss) plastic system are the following:

The system in place has set strongly on *incineration* of plastic waste. While this assures an effective waste control and contributes to the production of energy, this previous choice in favour of plastic incineration hinders a rapid reorientation towards more circularity, if wished so.

It should also not be overlooked how *recycling has its limits* and therefore cannot be the only road towards circularity. Not only does the very high variety of plastic materials and additives complicate recycling, but also plastics cannot be recycled indefinitely. Besides, the organisation of new recycling streams does bring considerable costs with it that will have to be taken into account.

To fully grasp plastics in a circular way, strong attention has to go to *leakage*. Recently, Swiss authorities have indeed given proof of an increased attention for this issue. Yet, much has still to be learned (in Switzerland and abroad). This knowledge about leakage needs to be integrated as part of a comprehensive discussion about the governance of plastics along the whole cycle.

¹⁰⁵ See the Clean Cycle Project of the ETH Zürich:
<https://esd.ifu.ethz.ch/research/research-and-theses/clean-cycle/clean-cycle-1.html>

Adding to this, it should of course not be overlooked how multiple (groups of) actors are involved in this plastic system. First, many stakeholders are involved in the different processes of the industrial plastic system. These range from producers, importers, and distributors (production/import and retail) over consumer associations (use and reuse) to storage facilities, sorting operators or the incineration industry (recycling, or elimination). Second, also other types of actors are involved, representing the public sector, interest groups, NGOs, energy associations, research centres, and political parties.

Question 2: What instruments are currently available in Switzerland and the EU to manage the different aspects of the plastic life cycle and possible challenges linked to it?

Based on a systematic classification of policy instruments according to their coercive character and level of government implication, *chapter 2* assessed for both cases existing and forthcoming instruments. In that regard, particular attention has been given to instruments on four issues especially relevant for the circularisation of plastics: *single-use plastics, recycling, eco-design, and oxo-degradable plastics.*

This assessment first of all showed, how, contrary to the EU, *Switzerland currently does not have an integrated approach towards plastics.* In 2018, the EU launched its Strategy for Plastics in a Circular Economy, which proposes an integrated outlook on the governance of plastics. The multiple instruments proposed by the EU, for a considerable part, exist of possibilities among which Member States can choose to implement the strategy. Contrary to the EU, Swiss legislation does not present a comprehensive management of plastics throughout its life cycle. Some legislation indeed does exist, which implicitly applies to plastics or entails legal provisions which could be used as legal basis for further concretisation that would explicitly target plastics. Considering the previous observations, a different logic of selection was needed in both cases to find plastics-relevant legislation, which implies that a *clear-cut*

comparison between plastic policies in the EU and Switzerland is difficult.

The comparison between the EU Plastics Strategy and the Swiss policy instruments has shown the following:

In the *EU*, given that attention goes to the plastic system as a whole, *policy instruments do exist for each phase of the cycle*. Thus, there are existing and forthcoming instruments that deal with production and import, use and reuse, recycling, and waste, as well as leakage.

In contrast, *a considerable amount of attention goes to waste management in Switzerland, while so far little is put in place about the production and import of plastics*.

Regarding this first phase of the cycle, the rules in Switzerland focus on some very specific plastic additives or substances, but nothing about plastics in general.

Also, for the other phases, differences are noticeable, essentially with regard to the instruments' focus.

For *recycling of plastics*, instruments are available in both cases, but in Switzerland they mainly concern PET beverage bottles, while in the EU they do look at plastics more generally.

Policy instruments about *waste in Switzerland* essentially concern waste in general and are mainly about how to eliminate waste. In the EU on the other hand, they deal more specifically with plastics and also concern separate collection and the limitation of plastic waste by stimulating reuse.

Question 3: Which instruments developed within the framework of the EU strategy could be relevant for Switzerland?

Question 4: To what extent are they compatible with the Swiss legal context? What are the main obstacles?

On the basis of a careful analysis of all the 35 policy instruments constitutive of the EU Plastics Strategy (cf. Table 3) *four specific EU regulations* (i.e. sets of instruments) have been considered as deserving a particular scrutiny in the light of a possible transfer to the Swiss setting (cf. Chapter 2, section 2.7).

A central criterion for this selection is the fact that these instruments are dealing with *four issues*, which are of particular importance to the circularisation of plastics. On the one hand, these are *single-use plastics* and *oxo-degradable plastics regulations*, which are emblematic for the new EU strategy. On the other hand, we also looked at instruments on *eco-design* and *recycling*. These instruments concern aspects, which are currently rather limitedly dealt with in the context of the Swiss approach towards plastics.

Thus, section 2.7 (notably tables 7 to 10), consisting of an *ex-ante evaluation* of these four specific EU instruments, has provided a first answer to these two last questions. We thus briefly summarise the main findings of this evaluation:

1. Single-use plastics measures

This is the most visible and emblematic set of measures proposed under the EU's Plastics Strategy. It pursues the *five main objectives*, which are: (1) less single-use plastics put on the market, (2) less single-use plastics being used, (3) more single-use plastics being collected for reuse or recycling, (4) more single-use plastics that can be effectively recycled, (5) less single-use plastics ending up in the environment.

In order to achieve these five objectives, the EU strategy is based on *seven possible instruments*, which are: (1) the *ban of various types of single-use plastics* (single-use plastic cutlery, single-use plastic plates, plastic straws, cotton bud sticks made of plastic, plastic balloon sticks, oxo-degradable plastics and food containers and expanded polystyrene cups); (2) *national consumption reduction targets* for the various types of single-use plastics; (3) *support of reusable alternatives* to reduce single-use

plastics; (4) *negative economic incentives* (i.e. taxes) on non-prohibited single-use plastics; (5) *marketing restrictions* on non-reusable single-use plastic products; (6) *deposit-refund schemes* on single-use plastics; (7) specific *collection targets* linked to extended producer responsibility schemes.

Policy measures taken by the EU on *single-use plastics* would be *compatible* with the existing Swiss plastic policy. They concern a problem indeed present in Switzerland – being the substantial use of single-use plastics – and if wished for could readily be integrated within existing Swiss legislation.

2. Recycling

This second set of measures constitutes also a central pillar of the EU Plastics Strategy. It pursues *five objectives*, which are: (1) to improve knowledge about products' eco-design principles allowing for the enhancement of reuse and recycling opportunities, (2) to increase the share of reusable packaging, (3) to increase the amount of plastics collected for reuse and recycling, (4) to stimulate the market for recycled plastics, and finally, (5) to increase the total amount of recycled plastics involved in the composition of marketed products.

In order to achieve these five objectives, the EU strategy is based on the following *five possible instruments*: (1) *support research and development on eco-design* solutions allowing an increase of plastic reuse and recycling rates; (2) *qualitative and quantitative targets* for reusable packaging (e.g. minimum percentage of reusable packaging placed on the market every year for each packaging stream); (3) *minimum rate of recycled plastics* in the production of plastic packaging products; (4) *deposit-refund schemes*, (5) *separate collection targets* for relevant extended producer responsibility schemes.

Considering the overall limited recycling of plastics in Switzerland, the *EU policy instruments could be relevant to reinforce plastic circularity*. While the legal compatibility of these instruments would not pose a major

challenge, in practical terms, an upscaling of plastics recycling will have to take into account the system in place. Therefore, in particular the EU's economic incentives to stimulate recycling could present interesting examples for action.

3. Eco-design

The EU Plastics Strategy clearly states the necessity of encouraging eco-design of products, as a consequence of the extended producer responsibility (see Dir 2008/98/EC, art. 8 – Table 8). The Directive suggests various possible instruments and options to the Member States and has not imposed any coercive measures so far. A voluntary agreement has been entered by members of the Circular Plastics Alliance, and more information is collected in order to take appropriate decisions to improve design for reuse and promotion of high-quality recycling (see Dir EU 2018/852 art. 9 § 5).

This strategy pursues for now *3 objectives*, which are: (1) to support research and development on eco-design solutions allowing an increase of plastic reuse and recycling rates, (2) to bridge the gap between supply and demand for recycled plastics and increase the share of recycled plastics in the production of plastic products, (3) to limit the environmental impact of the production and use of plastic products. These objectives are closely related to reuse and recycling objectives.

In order to achieve these three objectives, the EU strategy is based on the following *two emerging instruments*: (1) to *support research and development on eco-design* solutions allowing an increase of plastic reuse and recycling rates (2); *encourage products designs allowing to reduce their environmental impacts and the generation of waste* in the course of the production and subsequent use of products (i.e. products that are suitable for multiple use, that are technically durable and that are, after having become waste, suitable for proper and safe recovery and environmentally compatible disposal). These instruments are partially the same as the ones developed for achieving recycling goals. It is important

to note that most of them are still emerging and will need to be developed in the future by the Member States (and Switzerland).

Following *EU measures on eco-design* is both environmentally and economically *relevant* for Switzerland, as it helps plastic circularity, but also assures the continuing access of Swiss products to the European market. Doing so is in line with Swiss participation in similar EU actions on ecolabel and energy efficiency, and thus seems both legally and practically *compatible* with existing Swiss policy.

4. Oxo-degradable plastics ban

The EU Commission endorsed the conclusions of a majority of scientists and experts who consider nowadays that oxo-degradable plastics do not constitute a relevant solution for reducing environmental damages caused by plastics (European Commission 2018c).

Thus, the main objective pursued in the European strategy regarding oxo-degradable plastics is to drastically reduce the quantities of such types of single-use plastics put on the European market. In order to achieve this objective, the main *instrument* of the EU strategy consists of a ban by the Member States on placing on the market of products made from oxo-degradable plastics.

The use of oxo-degradable plastics is limited in Switzerland, though not absent. Considering the overall unanimity about the environmental problems related to this type of plastic, the prohibition proposed by the EU is *relevant* to Switzerland, and as such *compatible* with existing Swiss environmental policy.

Given the rather limited use of this plastic material in Switzerland, such a prohibition could be carried out with little impact on other dimensions or objectives of the Swiss plastic system's governance. The unanimous acceptance of the parliamentary motion of MP Isabelle Chevalley (19.4182) by the Swiss National Council and the Council of States shows that the *political acceptability* of such a ban seems to be high in Switzerland.

GLOSSARY

The **cocktail effect** is the combined effect of several individual chemicals on humans and wildlife. It originates from the possibility that mixing different chemicals might alter their effect, making their combined toxicity different from that of the individual substances. This may be due to different chemicals having either the same or the opposite effect, or to a chemical being able to influence how another chemical is absorbed, spread or eliminated in the body or the environment.

Macroplastics are large items of plastic litter, which are greater than 5 mm in size. (cf. Lusher et al. 2017, 24)

Microplastics are plastic particles in the size range between 0.1 micrometres to 5'000 micrometres (μm) in their longest dimension. Nanoplastics: plastic particles of size ranging from 1 to 100 nanometres (nm) ($0.001 \mu\text{m} - 0.1 \mu\text{m}$). (cf. Lusher et al. 2017, 24)

Within the larger economy, the **plastic system** consists of the totality of processes and actors involved in the *production, import, and consumption* of plastic materials in primary form or as part of marketable, (semi-)finished products; as well as the *recycling, or elimination* of such products after initial use. To fully grasp the material flowing through this system, also *leakage* has to be considered. The system can be considered to be circular to the degree that it opts for recycling and reintroduction instead of elimination to deal with plastics at the end of its life cycle, and limits leakage.

Primary microplastics are directly released into the environment as small plastic particles (< 5 mm size). They are produced as microplastics and are intentionally added to products such as scrubbing agents in personal care products. (ECHA, 2019)

Secondary microplastics originate mostly from the abrasion of large plastic objects during use or elimination and the degradation of plastic waste and products into smaller plastic fragments once exposed to environmental conditions. (ECHA, 2019)

Secondary raw materials are materials and products, which, after complete initial use, are used in production as starting material.

Tyre abrasion is the unavoidable surface loss of material that occurs during rolling and sliding contact of tyres with road tracks. (cf. Klüppel 2015)

Virgin raw materials are materials that have not been previously used or consumed, or subjected to processing other than for its original production. Different from primary raw materials, which are naturally occurring substances that have not been subjected to chemical changes after being recovered (in case of plastics mainly petroleum), virgin plastics are the resins produced directly from the primary feed-stock which has never been used or processed before.

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ANNEXES

ANNEX 1 – PLASTICS DATA AVAILABILITY

(Last updated in March 2020)

This table presents an overview of both available and missing data for the different processes of the plastic system, and where or how additional information could be found.

	Ideal ⁽¹⁾	Data FOEN ⁽²⁾	Elsewhere ⁽³⁾	Missing ⁽⁴⁾
The plastic system (overall)	A clear idea about what 'plastics' are: which goods available on the Swiss market are considered when talking about plastics?	The FOEN does not express a clear view on the totality of products concerned when talking about plastics in general.	Possible starting points to develop such a view: <i>KUNSTSTOFF.swiss</i> ; Federal Customs Administration; Plastics Europe.	Such reflections seem to be missing, not only in CH. The EU neither defines comprehensively the products included when talking about plastics.
Production - import	Following the delimitation of goods considered as 'plastics'; a detailed view of both their domestic production (export), as well as their import.	The most recent estimate about plastic-flows in Switzerland, mentioned by the FOEN, dates from 2010 (Schelker and Geisselhardt 2011), but does not contain data about production or import.	<i>KUNSTSTOFF.swiss</i> ; <i>Federal Customs Administration</i> ; <i>Plastics Europe</i> ; manufactures of other products containing plastics (including clothing industry, tyre manufacturers, etc.).	Data on the import of synthetic textiles, hats and shoes.
Use and reuse	Annually updated data on plastic consumption. Data on plastic consumption in other countries, enabling comparison.	Not up-to-date: from 2010 (Schelker and Geisselhardt 2011). Numbers are mentioned, but not clear whereon they are based.	<i>KUNSTSTOFF.swiss</i> ; <i>other branch organisations</i> ; <i>retailers</i> ; relevant NGO's, etc. For comparison: UNEP, OECD, EU, etc.	

	Ideal ⁽¹⁾	Data FOEN ⁽²⁾	Elsewhere ⁽³⁾	Missing ⁽⁴⁾
Recycling and reintroduction	Annual quantities of plastics being recycled, types of plastic being recycled.	The FOEN has in-house knowledge on this. Multiple studies are executed or ordered, that are dealing with this process. Cf. Dinkel et al. 2017; BAFU 2012; Dinkel et al. 2012; Schelker and Geisselhardt 2011.	<i>Swiss Recycling; Verein PRS PET-Recycling Schweiz; Allianz Design for Recycling Plastics</i>	Lack of information on the recyclability of all the various plastic materials on the market and their additives. ETHZ Clean Cycle project (https://esd.ifu.ethz.ch/research/research-and-theses/clean-cycle.html) will soon provide first valuable insights in this perspective.
Elimination	Annual quantities of plastics being incinerated, types of plastics being incinerated, amount of energy produced.	The FOEN has strong in-house knowledge on this. Multiple studies are executed or ordered, that are dealing with this process. Cf. Conseil fédéral 2017; Dinkel et al. 2017; BAFU 2012; Dinkel et al. 2012; Schelker and Geisselhardt 2011.	<i>SuisseEnergie.</i>	
Leakage	Comprehensive overview of all possible sources of plastic leakage, both of macro- and microplastics.	The FOEN recently ordered multiple studies on this (Kawecki and Nowack 2019, Sieber et al. 2020 (follow-up study as a Master thesis), Erny et al. 2020.	Leakage sources: EUNOMIA, UNEP, scientific literature Quantities of macroplastics: local authorities, environmental organisations Quantities of microplastics: scientific literature	

Legend: (1) What (types of) data would ideally be needed to manage this process of the plastic system as part of a circular approach?

(2) What data does the FOEN already have?

(3) What data possibly exist elsewhere, in Switzerland (public and private), or abroad?

(4) What important data is missing?

Bold: information already known by the FOEN – *italic:* Information possibly available within Switzerland; could be obtained by the FOEN without considerable effort –

underlined: information will be difficult to obtain, or does not yet exist.

ANNEX 2 – EU POLICY INSTRUMENTS PER PROCESS – NATURE OF INSTRUMENTS – STATUS OF IMPLEMENTATION

(Last updated in March 2020)

PRODUCTION – IMPORT

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
Actions to improve product design	1. Revision Packaging and Packaging waste directive (PPW): Commission to initiate work on new harmonised rules to ensure that by 2030 all plastics packaging placed on the	Dir. (EU) 2018/852 (30.05.18). → This directive involves multiple instruments; cf. points 5, 15, 20, and 27 <i>infra</i> .	In art. 9 , a new § 5 is added: “By 31 December 2020, the Commission shall examine the feasibility of reinforcing the essential requirements with a view to, inter alia, improving design for reuse and promoting high quality recycling, as well as strengthening their enforcement. To that end, the Commission shall submit a report to the European Parliament and to	Information collection/research	In force

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	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
	<i>EU market can be reused or recycled in a cost-effective manner</i>		<i>the Council, accompanied, if appropriate, by a legislative proposal”.</i>		
	2. Follow-up COM (2018) 32 (16.01.18): <i>Improve the traceability of chemicals and address the issue of legacy substances in recycled streams</i>	So far (January 2020), <i>no document, and no legislative procedure is based on this document.</i> The document is mentioned by 10 other documents, none of which is relevant for further implementation of concrete measures.			<i>No concrete action so far</i>

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
	3. New eco-design measures: <i>consider requirements to support the recyclability of plastics</i>	Eco-design legislation in place: dir. 2009/125/EC → Plastic mentioned in <i>Part 1. Eco-design parameters for products</i> : “coding standards [are needed] for the identification of components and materials suitable for reuse and recycling (including marking of plastic parts in accordance with ISO standards). → No document based on this document concerns plastic. Neither			Under discussion

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	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
		eco-design and energy labelling regulations, nor voluntary agreements, nor harmonised standards for eco-design and energy labelling contain plastic-criteria.			

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
		In line with art. 16 of the directive, the Commission so far has presented 3 working plans, setting out <i>“a list of products that are a priority for implementing measures”</i> . → WP 2009-2011, and WP 2012-2014, do not mention plastic. WP 2016-2019 (COM (2016) 773) mentions plastic twice; yet does not contain specific measures for plastic. → So far (January 2020), <i>no document</i> , and			

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
		<i>no legislative procedure is based on this document. None of the documents mentioning this document is about eco-design for plastic products. → So far, no new eco-design measures to support the recyclability of plastics are in place or proposed.</i>			

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
Actions to reduce single-use plastics	4. Analytical work, including the launch of a public consultation, to determine the scope of a legislative initiative on single-use plastics	This legislative initiative has been materialised in dir. (EU) 2019/904 (05.06.19). → This initiative involves multiple instruments; cf. points 7, 16, 27, 29, and 31 <i>infra</i> .	<u>Art. 5 - Restrictions on placing on the market:</u> “Member States shall <i>prohibit the placing on the market of the single-use plastic products listed in Part B of the Annex and of products made from oxodegradable plastic</i> ”.	Unilateral regulation	In force
Actions to improve separate collection of	5. Better implementation of existing obligations on separate collection, including	PPW dir. (EU) 2018/852	§ (20): “ <i>As the amount and type of packaging used generally depends on choices made by the producer rather than the consumer, extended producer responsibility schemes should be established. Effective extended producer re-</i>	(proposed inter alia) Unilateral regulation -economic incentive - economic	In force

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	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
plastic waste	ing through ongoing review of waste legislation		<p><i>sponsibility schemes can have a positive environmental impact by reducing the generation of packaging waste and increasing its separate collection and recycling [...]</i> <i>The rules on extended producer responsibility laid down in Directive 2008/98/EC should therefore apply to extended producer responsibility schemes for producers of packaging”.</i></p> <p>→ Henceforth, dir. 2008/98/EC, art. 8 - Extended producer responsibility also applies to plastic packaging waste: <i>(2) Member States may take appropriate measures to encourage the design of products in order to reduce their environmental impacts and the generation of waste in the course of the production and subsequent use of products [...]</i><i>Such measures may</i></p>	punishment – voluntary agreement - ...	

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
			<i>encourage, inter alia, the development, production and marketing of products that are suitable for multiple use, that are technically durable and that are, after having become waste, suitable for proper and safe recovery and environmentally compatible disposal".</i>		
Actions on compostable and biodegradable plastics	6. Develop harmonised rules on defining and labelling compostable and biodegradable plastics	So far (January 2020), "research is ongoing to support the development of a framework on biodegradability of plastics" (E-002257/2019(ASW)) Clear policy framework regarding (labelling of) biodegradable and bio-based plastics			Under discussion

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
		in order to avoid the diffusion of misleading information to the public (2 nd EU Circular Economy Action Plan 2020)			
	7. Restrict the use of oxo-degradable plastics	Dir. (EU) 2019/904	§ 11: <i>“Single-use plastic products can be manufactured from a wide range of plastics. Plastics are usually defined as polymeric materials to which additives may have been added. However, that definition would cover certain natural polymers. Unmodified natural polymers, within the meaning of the definition of ‘not chemically modified substances’ in point 40 of Art. 3 of Reg. (EC) 1907/2006 of the European Parlia-</i>	Unilateral regulation	In force

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
			<i>ment and of the Council, should not be covered by this Directive as they occur naturally in the environment. Therefore, for the purposes of this Directive, the definition of polymer in point 5 of Article 3 of Regulation (EC) No 1907/2006 should be adapted and a separate definition should be introduced. Plastics manufactured with modified natural polymers, or plastics manufactured from bio-based, fossil or synthetic starting substances are not naturally occurring and should therefore be addressed by this Directive. The adapted definition of plastics should therefore cover polymer-based rubber items and bio-based and biodegradable plastics regardless of whether they are derived from biomass</i>		

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
			<p><i>or are intended to biodegrade over time. Paints, inks and adhesives should not be addressed by this Directive and therefore these polymeric materials should not be covered by the definition”.</i></p> <p>§ 15: <i>“The restrictions on placing on the market introduced in this Directive should also cover products made from oxo-degradable plastic, as that type of plastic does not properly biodegrade and thus contributes to microplastic pollution in the environment, is not compostable, negatively affects the recycling of conventional plastic and fails to deliver a proven environmental benefit”.</i></p>		

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
			→ <u>Art. 5 - Restrictions on placing on the market</u> : “ <i>Member States shall prohibit the placing on the market of the single-use plastic products listed in Part B of the Annex and of products made from oxo-degradable plastic</i> ”. (same instrument as under point 4, supra)		
Actions to curb micro-plastic pollution	8. Restrict the intentional addition of micro-plastics to products	On 30.01.19, ECHA has submitted a restriction proposal for micro-plastic particles that are intentionally added (ECHA/PR/19/03). The restriction is expected to enter into force some time in 2021	Currently under discussion. Once the restriction will be adopted, industry (including manufacturers, importers, distributors, downstream users and retailers must comply). Member States will be responsible for enforcing the restriction.	Negotiated regulation	Under discussion

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
		(cf. ECHA Q&A, q. 1.3).	Policy objective confirmed by the 2 nd EU Circular Economy Action Plan of March 2020		
Actions to promote investment and innovation in the value chain	9. Commission guidance on the eco-modulation of EPR fees	Legislation in place regarding eco-design is Dir. 2009/125/EC . <i>For references on the matter, see Expert Talk</i>	Concrete guidance does not seem to be presented yet. It is mentioned by different sources as 'upcoming, but does not seem to exist yet.		<i>No concrete action so far</i>
	10. Recommendations by the Circular Economy Finance Support Platform'	So far, two meetings of the expert group have taken place	Not formulated any recommendations yet		Under discussion

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
	11. Examine the feasibility of a private-led investment fund to finance investments in innovative solutions and new technologies	Except in the Strategy itself, so far, no mention of this investment fund exists		(Economic incentive)	<i>No concrete action so far</i>
	12. Direct financial support for infrastructure and innovation through the European Fund for Strategic Investment and other EU funding.		In the context of Horizon 2020 until 2018, EUR 350 million were allocated to making plastics circular - The EU programme for the environment and climate (LIFE) invested more than EUR 100 million in resource efficiency including plastics and will be reinforced in the next financial framework - The structural Funds and the European	Economic incentive	In force

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
			Fund for Strategic Investments also provided support for this transition in the framework of the regional and national Smart Specialization Strategies and will continue to do so in the next financial framework .		
	13. Pursue work on life cycle impacts of alternative feedstocks for plastics production	The Joint Research Centre (JRC) is entrusted by DG GROW to carry out a study to elaborate a consistent and appropriate Life Cycle Assessment (LCA) based method.	First results are expected for the second half of 2019.	Information collection/ research	Under discussion

	Proposed measures → Based on Annex I of the European Strategy for Plastics EPS	Result so far → Legal / administrative action	Result so far → Concrete policy instruments	Type of instrument	Implementation status
	14. Development of a Strategic Research Innovation Agenda on plastics to guide future funding decisions	Except in the Strategy itself, so far, no mention of this agenda exists.		(Information collection/research)	<i>No concrete action so far</i>

USE – REUSE

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
Actions to boost recycling content	15. [Assessment of regulatory or economic incentives for the uptake of recycled content, in particular (a)] Revision Packaging and Packaging waste Directive (cf. point 1 supra)	Dir. (EU) 2018/852 (30.05.18)	§ (4): “[...] Member States take appropriate measures to encourage the increase in the share of reusable packaging placed on the market and the reuse of packaging. Such measures can include the use of deposit-return schemes and other incentives, such as setting quantitative targets, taking reuse into account for the attainment of recycling targets, and differentiated financial contributions for reusable packaging under extended producer responsibility schemes for packaging. Member States should take measures to incentivise the take-up of reusable packaging and to achieve a reduction in consumption of packaging that is not recyclable and of excessive packaging.”	(proposed inter alia) Economic incentive – negotiated/ unilateral regulation	In force

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p>§ (6): "Member States should put in place adequate incentives for the application of the waste hierarchy including economic instruments and other measures."</p> <p>→ Art. 5 - Reuse: "[...] Member States shall take measures to encourage the increase in the share of reusable packaging placed on the market and of systems to reuse packaging in an environmentally sound manner [...], without compromising food hygiene or the safety of consumers. Such measures may include, inter alia: (a) the use of deposit-return schemes; (b) the setting of qualitative or quantitative targets; (c) the use of economic incentives; (d) the setting up of a minimum percentage of reusable packaging placed on the market every year for each packaging stream".</p>		

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			Policy objective confirmed by the 2 nd EU Circular Economy Action Plan of March 2020: All plastic packaging should be reusable or recyclable by 2030 (2 nd EU Circular Economy Action Plan 2020)		
Actions to reduce single-use plastics	16. Analytical work, including the launch of a public consultation, to determine the scope of a legislative initiative on single-use plastics (cf. point 4 supra)	This legislative initiative has been materialised in dir. (EU) 2019/904 (05.06.19).	<u>Art. 4 (1) - Consumption reduction:</u> "Member States shall take the necessary measures to achieve an ambitious and sustained reduction in the consumption of the single-use plastic products listed in Part A of the Annex, [...] leading to a substantial reversal of increasing consumption trends. Those measures shall achieve a measurable quantitative reduction in the consumption of the single-use plastic products listed in Part A of the Annex on the territory of the Member State by 2026 compared to 2022."	(proposed inter alia) Unilateral regulation – economic punishment – negotiated regulation	In force

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p><i>By 3 July 2021, Member States shall prepare a description of the measures which they have adopted pursuant to the first subparagraph, notify the description to the Commission and make it publicly available. [...]</i></p> <p><i>The measures may include national consumption reduction targets, measures ensuring that re-usable alternatives to the single-use plastic products listed in Part A of the Annex are made available at the point of sale to the final consumer, economic instruments such as instruments ensuring that those single-use plastic products are not provided free of charge at the point of sale to the final consumer and agreements as referred to in Article 17(3). Member States may impose marketing restrictions in derogation from</i></p>		

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p>Article 18 of Directive 94/62/EC [on packaging and packaging waste] for the purposes of preventing such products from becoming litter in order to ensure that they are substituted with alternatives that are re-usable or do not contain plastic. [...]"</p> <p>→ The original dir. 94/62/EC (20.12.94) declares that "Member States shall take the necessary measures to attain the following targets covering the whole of their territory".</p> <p>The EU itself does not take concrete action to obtain these minimum recycling target, but proposes measures to bring MS do to so. In its <i>Proposal for a Council Decision on the system of Own Resources of the EU</i> (SWD(2018) 172 final), of 02.05.18, the Commission proposes "A</p>		

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p><i>Plastic Packaging Waste based-Own Resource</i>". It would be based on "a national contribution calculated on the amount of non-recycled plastic packaging waste", and "would be directly proportional to the quantity of non-recycled plastic packaging waste generated in each Member State [as] reported to Eurostat". "The contribution [would] therefore provide an incentive for the MS to reduce these waste streams". → This proposal is currently under discussion in the EP</p>		
			<p>§ 28: "[...] it is necessary for consumers of single-use plastic products and users of fishing gear containing plastic to be properly informed [...] MS should therefore be required to take awareness raising measures ensuring that such information is provided to those consumers and users. The</p>	Dissemination of information	In force

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p><i>information should not contain any promotional content encouraging the use of single-use plastic products. MS should be able to choose the measures which are the most appropriate based on the nature of the product or its use. Producers of single-use plastic products and fishing gear containing plastic should cover the costs of the awareness raising measures as part of their EPR obligations".</i></p> <p>→ <u>Art. 10 - Awareness raising measures:</u> <i>"Member States shall take measures to inform consumers and to incentivise responsible consumer behaviour, in order to reduce litter from products covered by this Directive, and shall take measures to inform consumers of the single-use plastic products listed in Part G of the Annex and users of fishing</i></p>		

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			gear containing plastic about the following [...]”		
			<p>§ 31: “MS should lay down rules on penalties applicable to infringements of national provisions adopted pursuant to this Directive and should take all measures necessary to ensure that they are implemented. The penalties provided for should be effective, proportionate and dissuasive”.</p> <p>→ <u>Art. 14 - Penalties</u>: “Member States shall lay down the rules on penalties applicable to infringements of national provisions adopted pursuant to this Directive and shall take all measures necessary to ensure that they are implemented. The penalties provided for shall be effective, proportionate and dissuasive. Member States shall, by 3 July 2021, notify the Commission of those rules and those</p>	Economic punishment	In force

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<i>measures and shall notify it of any subsequent amendment affecting them."</i>		
			§ 34: <i>"It is appropriate to allow MS to choose to implement certain provisions of this Directive by means of agreements between the competent authorities and the economic sectors concerned, provided that certain requirements are met"</i>	Voluntary agreement	In force
Actions on compostable and bio-	17. Conduct a life cycle assessment to identify conditions where their use is beneficial, and criteria for such application	No information exists, indicating that such a life cycle assessment already started.			<i>No concrete action so far</i>

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
de-gradable plastics	18. Restrict the use of oxo-degradable plastics (cf. point 7 supra)	(Already before the Plastics Strategy) Dir. (EU) 2015/720 (29.04.15) on reducing the consumption of lightweight plastic carrier bags	<u>Art. 20 a (2) – Reporting on plastic carrier bags:</u> “By 27 May 2017, the Commission shall present a report to the European Parliament and to the Council, examining the impact of the use of oxo-degradable plastic carrier bags on the environment [...]”. → Commission report COM (2018) 35 on the impact of the use of oxo-degradable plastic, including oxo-degradable plastic carrier bags, on the environment, pp. 7-8: “oxo-degradable plastics are not a solution for the environment and that oxo-degradable plastic is not suited for long-term use, recycling or composting. [...] Therefore, in the context of the European plastics strategy, a process to restrict the use of oxo-plastics in the EU will be started”.	Information collection/ research	In force

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	19. Clear policy framework regarding (labelling of) biodegradable and bio-based plastics in order to avoid the diffusion of misleading information to the public (2 nd EU Circular Economy Action Plan 2020)				Under discussion

RECYCLING

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
Actions for a circular plastic packaging	20. All plastic packaging should be reusable or recyclable by 2030 (2 nd EU Circular Economy Action Plan 2020)				Under discussion
Actions to boost recycling content	21. Launching EU-wide pledging campaign targeting industry and public authorities → Objective: <i>ensure that by 2025 10 mio t. of recycled plastic finds their way into new products on the EU market. (If the</i>	Pledging campaign is launched in Annex III of the Plastics Strategy. → Deadline for pledges: 30.06.18. On 04.03.19 (<i>foreseen in Annex III for 31.10.18</i>) the Commission presents an assessment report of the voluntary	05.02.19: 1 st meeting of the CPA 20.09.19: the CPA presents its declaration , reaffirming their commitment for 10 mio t. by 2025. They also commit themselves “to develop, update or revise design for recycling guidelines for all plastic products”, for which a work plan has	Voluntary agreement	In force

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	<i>result should be deemed insufficient, COM will start work on next steps, including regulatory action)</i>	<p><u>pledges</u> received by end 2018.</p> <p>By end 2018, 70 <u>pledges</u> have been submitted.</p> <p>→ Conclusion of the report: "Pledges received from suppliers of recycled plastics, if delivered as expected, are sufficient to meet the target of 10 mio t. of recycled plastics [...] by 2025. However, buyers of recycled plastics (such as plastics converters and brand owners, i.e. "the demand side") pledge to use in their products approximately</p>	to be agreed by 01.03.20. The declaration presents also other objectives (in addition to the 10 mio t. target).		

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		<p>6.4 mio t. of recycled plastics in the EU by 2025 [So] more efforts are necessary to reach 10 mio t. in 2025".</p> <p>→ To help bridge the gap between the supply and demand for recycled plastics, the Commission on 11.12.18 launched the Circular Plastics Alliance (CPA), "[gathering] public and private stakeholders in the plastics value chains to promote voluntary actions and commitments for more recycled plastics".</p>			

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	22. <i>[Assessment of regulatory or economic incentives for the uptake of recycled content, in particular (a)]</i> Revision Packaging and Packaging waste Directive (cf. point 1, and 15 supra)	Dir. (EU) 2018/852 (30.05.18)	Art. 6 - Recovery and recycling is amended, issuing minimum recycling targets of 50% of plastic material contained in packaging waste by the end 2025, and 55% by the end of 2030. Policy objective confirmed by the 2 nd EU Circular Economy Action Plan of March 2020: Mandatory requirements on minimal recycled plastic content will be suggested in areas such as packaging, construction materials and vehicles.	Unilateral regulation	In force
	23. <i>[Assessment of regulatory or economic incentives for the uptake of recycled content, in particular (b)]</i>	Reg. (EU) 305/2011 (09.03.11) lays down harmonised rules for	Review process is ongoing, so far, no amendments or other changes are proposed.		Under discussion

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	Evaluation/review of the Construction Products Regulation (CPR)	<p>the marketing of construction products in the EU.</p> <p>→ Already in July 2016, following the publication of the implementation report, the Communication Clean Energy for all Europeans announced a possible revision of the Construction Products Regulation in November 2016.</p> <p>→ In the context of this revision, an open public consultation took</p>			

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		place between January and April 2018. → An evaluation report is published by the Commission in October 2019 (SWD(2019)1770 final)			
	24. <i>[Assessment of regulatory or economic incentives for the uptake of recycled content, in particular (c)]</i> Evaluation/review of End-of-life Vehicles Directive (EVL)	Dir. 2000/53/EC (18.09.00); mentions plastic once, in Annex I, § 4: "Treatment operations in order to promote recycling: [...] – removal of tyres and large plastic components (bumpers, dashboard, fluid containers, etc), if these materials are not	So far, nothing new regarding plastic.		Under discussion

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		<p><i>segregated in the shredding process in such a way that they can be effectively recycled as materials"</i></p> <p>→ Currently, public consultation is underway about the EVL. → Adoption of evaluation by the Commission expected for 2nd quarter 2020</p>			
	25. Food-contact materials (FCM): finalisation of pending authorisation procedures for plas-	General requirements for FCM's are laid down in Framework Reg. EC 1935/2004 . In addition, further regu-	So far, nothing new regarding plastic.		Under discussion

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	tics recycling processes, better characterisation of contaminants and introduction of monitoring system	lations deal with specific materials, including plastic (Reg. (EU) 10/2011) and recycled plastic (Reg. (EC) 282/2008). → An evaluation of the EU legislative framework for FCM is underway.			
26.	Development of quality standards for sorted plastics waste and recycled plastics in cooperation with the	11 standards on plastics recycling were already published by the CEN before the Plastics Strategy was launched (CEN/TC 249/WG 11 Published Standards)	Since the launch of the Strategy, 4 new standards are forthcoming (under drafting/ approval) (CEN/TC 249/WG 11 Work programme)	Manipulation of norms and networks	Under discussion

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	European Standardisation Committee (CEN)				
	27. Ecolabel and Green Public Procurement (GPP): Further incentivise the use of recycled plastics, including by developing adequate verification means	<p><u>Ecolabel</u>: Under Reg. (EC) 66/2010, the EU has created an ecolabel. Currently, this regulation is not under review.</p> <p>Currently, plastic is not included in the EU Ecolabel product catalogue.</p>			<i>No concrete action so far</i>
		(GPP): Currently, there are 19 product groups for which there	Since the Plastics Strategy, one further GPP product group, includes criteria	Economic incentive	In force

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal / administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		are EU GPP criteria . Among these, one contained criteria for recycled plastic previous to the Plastics Strategy: <i>Criteria for Computers and Monitors</i> (published: 2016, SWD(2016) 346 final)	for recycled plastic: <i>Criteria for Food Catering Services and Vending Machines</i> (published: 2019, SWD(2019) 366 final)		

WASTE MANAGEMENT

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
Actions to improve separate collection of plastic waste	28. New guidelines on separate collection and sorting of waste	Waste Framework directive 2008/98/EC (WFD) → So far, no review of this directive is happening.			<i>No concrete action so far</i>
	29. Better implementation of existing obligations on separate collection, including through ongoing review of waste legislation (cf. point 5, supra)	PPW dir. (EU) 2018/852	§ (20): <i>“As the amount and type of packaging used generally depends on choices made by the producer rather than the consumer, extended producer responsibility schemes should be established. Effective extended producer responsibility schemes can have a positive environmental impact by reducing the generation of packaging waste and increasing its separate collection and recycling [...] The rules on extended producer responsibility laid down in Directive</i>	(proposed inter alia) Unilateral regulation – economic incentive – economic punishment – voluntary	In force

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p><i>2008/98/EC should therefore apply to extended producer responsibility schemes for producers of packaging”.</i></p> <p>→ Henceforth, dir. 2008/98/EC, art. 8 - <u>Extended producer responsibility</u> also applies to plastic packaging waste: <i>“(1) [...] Member States may take legislative or non-legislative measures to ensure that any natural or legal person who professionally develops, manufactures, processes, treats, sells or imports products [...] has extended producer responsibility. Such measures may include an acceptance of returned products and of the waste that remains after those products have been used, as well as the subsequent management of the waste and financial responsibility for such activities. These measures may include the obligation to provide publicly available</i></p>	agreement - ...	

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<i>information as to the extent to which the product is re-usable and recyclable.</i>		
		Dir. (EU) 2019/904	§ (27): “a minimum separate collection target should be established for beverage bottles that are single-use plastic products” [...] The setting of the separate collection target should be based on the amount of single-use plastic beverage bottles placed on the market in a MS or alternatively on the amount of waste single-use plastic beverage bottles generated in a MS [...] MS should be able to achieve that minimum target by setting separate collection targets for beverage bottles that are single-use plastic products in the framework of the EPR schemes, by establishing deposit-refund schemes or by any other measure that they find appropriate”.	(proposed inter alia) Economic incentive/ Unilateral regulation - ...	In force

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<p>→ <u>Art. 9 – Separate collection</u>: “Member States shall take the necessary measures to ensure the separate collection for recycling: (a) by 2025, of an amount of waste single-use plastic products listed in Part F of the Annex equal to 77 % of such single-use plastic products placed on the market in a given year by weight; (b) by 2029, of an amount of waste single-use plastic products listed in Part F of the Annex equal to 90 % of such single-use plastic products placed on the market in a given year by weight. Single-use plastic products listed in Part F of the Annex placed on the market in a Member State may be deemed to be equal to the amount of waste generated from such products, including as litter, in the same year in that Member State. In order to achieve that objective, Member States may inter alia: (a) establish deposit-refund schemes; (b) establish</p>		

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
			<i>separate collection targets for relevant extended producer responsibility schemes".</i>		
Actions to tackle sea-based resources of marine litter	30. Adoption of a legislative proposal on port reception facilities for the delivery of waste from ships	Dir. 2019/883 (17.04.19) → About marine waste in general: except in introduction, it does not mention plastic	<i>(Given Switzerland's landlocked position, this is of little relevance to Switzerland.)</i>		

LEAKAGE

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
Actions to tackle sea-based resources of marine litter	31. Measures to reduce loss or abandonment at sea of fishing gear	Dir. (EU) 2019/904	Art. 2 (2) – Scope: “This Directive applies to the single-use plastic products listed in the Annex, to products made from oxo-degradable plastic and to fishing gear containing plastic. ”	cf. instruments already discussed for this directive	In force
	32. Development of measures to limit plastic loss from aquaculture	No information exists, indicating that a process in this regard already started	(But the EU funded a report on the topic: Knowledge wave on marine litter from aquaculture sources (VLIZ, 2019))		
Actions to monitor and curb marine litter	33. Improved monitoring and mapping of marine litter, including microplastics	Dir. (EU) 2019/904	§ (30): “It is important to monitor the levels of marine litter in the Union in order to assess the implementation of this Directive. In accordance with Directive 2008/56/EC, MS are required to regularly monitor the properties and quantities of	Information collection/ research	In force

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
rine litter more effectively			<p><i>marine litter, including plastic marine litter. That monitoring data is also to be communicated to the Commission”.</i></p> <p>→ <u>Art. 13 (1d) - Information systems and reporting</u>: “Member States shall, for each calendar year, report to the Commission [...] data on fishing gear containing plastic placed on the market and on waste fishing gear collected in the Member State each year”.</p>		
	34. Support to Member States on the implementation of their programmes of measures on marine litter under the Marine Strategy	Dir. (EU) 2017/845 (17.05.17) → Neither this, nor the directive 2008/56/EC it is amending, does mention plastic. → Currently, no review of			<i>No concrete action so far</i>

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	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
	Framework Directive	this directive is under-way.			
Actions to curb micro-plastic pollution	35. Examination of policy options for reducing unintentional release of microplastics from tyres , textiles and paint	Tyres: Current reg. (EC) No 1222/2009 does not mention plastic → Procedure to repeal this regulation is under way (2018/0148(COD)). The legislative proposal (COM(2018)0296) proposes an update of tyre labelling rules, allowing i.a. <i>“the future inclusion of mileage and abrasion , if appropriate, as a parameter for the label [...] [considering</i>	Concrete labelling measures still have to be defined		Under discussion

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		<i>that] Tyre abrasion is a major source of microplastics released into the environment".</i>			
		Textile: →	(Commission, DG Environment ordered a report on the topic. February 2018: Eunomia study 'Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products')		
		Textile: Cross Industry Agreement for the prevention of microplastic release into the aquatic environment during the washing of synthetic textiles signed on 16.01.18 by	"The signatories agree to support finding effective and economically feasible solutions by: - Contributing to the development of international standardised test methods to identify and quantify microplastic present in water and the environment	Pure self-regulation	In force

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		five industry associations: AISE, CIRFS, EOG, EURATEX and FESI, and formally endorsed by the European Commission (as announced in the Plastics Strategy, p. 13).	<p>- <i>Sharing information on progress of research, knowledge gaps, options and priorities</i></p> <p>- <i>Support and participate in industrial research for feasible and effective solutions"</i></p>		
		<p>Paint: Current dir. 2004/42/CE (21.04.04) .→ Currently, no review of this directive is underway.</p>			<i>No concrete action so far</i>
	36. Development of measures to reduce plastic pellet spillage	<p>Relevant legislation: Industrial emissions directive (dir. 2010/75/EU, 24.11.10). → Currently,</p>			<i>No concrete action so far</i>

	Proposed measures → Based on Annex I of the EPS	Result so far → Legal/ administrative action	Result so far → Concrete instruments/ actions	Type of instrument	Implementation status
		no review of this directive is underway.			
	37. Evaluation of the Urban Waste Water Treatment Directive : assessing effectiveness as regards microplastics capture and removal	Current directive 91/271/EEC , does not mention plastic. → An evaluation has been launched on 12.10.17 and is still ongoing	So far, nothing new regarding plastic.		Under discussion

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