

## COMMISSION INTERNAL

### DRAFT - A EUROPEAN STRATEGY FOR PLASTICS IN A CIRCULAR ECONOMY

In December 2015, the Commission adopted an EU action plan for a circular economy, setting out a series of actions to stimulate the transition towards a more circular economy. In the Action Plan, the Commission identified plastics as a key priority and thereby committed to *"prepare a strategy addressing the challenges posed by plastics throughout the value chain and taking into account their entire life-cycle"*. Earlier this year, in its 2017 letter of intent<sup>1</sup>, the Commission has also announced that such strategy *"will work towards all plastic packaging being recyclable by 2030"*.

The plastics industry is highly important for the European economy. Increasing its 'circularity' can bring new opportunities for innovation, competitiveness and job creation. Plastic materials can also help us face a number of future sustainability challenges. Yet, there is urgent need to address the environmental problems which today cast a long shadow over plastics use and consumption. The million tonnes of plastic litter ending up in the oceans every year are one of their most visible and alarming manifestation, and causing growing concerns among citizens.

Rethinking and improving the functioning of such a complex value chain requires efforts and greater cooperation by all its key players, from the petrochemical industry to recyclers. It also requires innovation and a common vision to drive investments in the right direction. These are the primary goals of this strategy.

The strategy brings together proposals for action at EU level. Yet, the private sector together with national and regional authorities, cities as well as individual citizens will also need to mobilise. Similarly, international engagement will be necessary to drive change outside Europe's borders. Through decisive and concerted efforts, Europe can turn challenges into an opportunity and set the example for resolute action at global level.

#### 1. PLASTICS TODAY: PROBLEMS AND OPPORTUNITIES

**Plastic is an important and ubiquitous material in our economy.** Global production of plastics has increased twentyfold since the 1960s, reaching 322 million tonnes in 2015, and is expected to double again over the next 20 years. In the EU, industry figures indicate that the plastics sector<sup>2</sup> employed 1.5 million people and generated a turnover of €340 billion in 2015. Plastics production in the EU has been stable in recent years, however as production grows in other parts of the world, the EU share of the global market is decreasing.

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<sup>1</sup> Add reference

<sup>2</sup> This includes raw material producers, product manufacturers and machinery producers.

[Infographic on key data on plastics: In 2015, European plastics demand amounted to around 49 million tonnes. The main uses were packaging (39.9%), building and construction (19.7%), automotive (8.9%) and electronics (5.8%)].

**Plastics have important functionalities, which help us address a number of societal challenges.** Light and innovative materials in cars or planes can save fuel and reduce CO<sub>2</sub> emissions. High-performance insulation materials help us save on our energy bills. 3D printing can revolutionise the way goods are manufactured and save human lives enabling medical innovation.

At the same time, the way plastics is currently produced, consumed and discarded induces **harmful environmental impacts and fails to capture the economic benefits of a more resource-efficient and circular approach.**

Reuse and recycling of end-of-life plastics remains very low, in particular when compared to other materials such as paper, glass or metals. **Around 25.8 million tonnes of post-consumer plastic waste are generated in Europe every year and of this less than 30% is collected for recycling.** In recent years, the EU plastic recycling sector has suffered from low commodity prices and uncertainties related to the demand for recycled plastics, today accounting for only 4% to 6% of plastics demand in Europe. Investments into new plastics recycling capacity have been held back by the sector's low profitability, whereas a significant share of plastic waste collected in the EU for recycling has been exported to third countries, with lower labour costs and less stringent environmental regimes.

[Infographic: plastics waste in Europe today - sources and treatment]

**In the EU, the potential of plastic waste is largely unexploited: landfilling and incineration rates of plastic waste remain high – 31% and 39%, respectively – and while landfilling of plastics has decreased over the past 10 years, incineration has grown.** According to estimates by the Ellen MacArthur Foundation, 95% of plastic packaging material value, i.e. between 70 and 105 billion euros annually, is lost to the economy after a very short first-use cycle.

Plastics production and the incineration of plastic waste give rise to approximately 400 million tonnes CO<sub>2</sub> per year (2012). In the long term, with the projected growth in plastic demand, **plastics dependence on virgin fossil fuel may create a problem of security of supply and of CO<sub>2</sub> footprint.** If current trends continue, by 2050 the plastics sector could account for 15% of the global annual carbon budget consistent with limiting global warming to 2°C. In addition to recycled plastics, alternative types of feedstock (e.g. bio-based plastics or plastics produced from carbon dioxide or methane) are being developed, but still represent a very small share of the market.

**Very large quantities of plastic waste are not captured by waste management infrastructures and leak into the environment,** from sources both on land and at sea, generating significant economic and environmental damage. Globally, **5 to 13 million tons of plastics leak into the environment every year.** The often quoted estimates by the Ellen MacArthur Foundation, according to which by 2050 there will be more plastic waste than fish in



the oceans, effectively illustrates the magnitude and importance of the challenge. UNEP estimates damage to marine environments to be at least 8 billion USD per year.

[Infographic: visualise quantities of plastics that end up in the oceans]

This phenomenon is exacerbated by the rising amount of plastic waste generated each year, also fuelled by an increasing consumption of so-called "single-use" plastics, i.e. packaging or other consumers' products that are thrown away after one brief use, are rarely recycled and/or are particularly prone to littering.

**New sources of plastic leakage, in the form of microplastics, are on the rise**, posing new potential threats to both the environment and human health. Scientists at Ghent University recently calculated that shellfish lovers are eating up to 11,000 plastic fragments in their seafood each year<sup>3</sup>. A recent study also suggests that microplastics are present in drinking water, with unknown impacts on health.

In addition, the increasing market shares of **plastics with biodegradable properties** raise a number of new questions. While it can be considered as a positive development in some respects, it also poses some risks. In the absence of clear technical standards sustainability framework, it could aggravate the existing plastics leakage problem, create problems for mechanical recycling, or confuse consumers.

As plastic value chains are increasingly cross-border, problems and opportunities linked to plastics should be seen in the light of international developments. There is also a growing awareness of the global nature of the associated challenges, as shown by recent initiatives in international fora on the issue of marine litter, such as the UN Global Partnership on Marine Litter<sup>4</sup>, and action plans put forward by G7 and G20<sup>5</sup>.

## 2. A VISION FOR A CIRCULAR PLASTICS ECONOMY

Evolving towards a more prosperous and sustainable plastics economy is no easy task and that is why Europe needs a strategic vision on what a more circular plastics economy looks like in the decades ahead. This vision needs to promote innovation and new opportunities; it should be ambitious but also credible, to ensure a wide spread buy-in. While the EU will put forward concrete action to fulfil this vision, making it a reality will require every actor to play their part. This includes the whole plastic value chain, from plastic producers and recyclers to designers, brands and retailers. Similarly, citizens, entrepreneurs and local authorities will have a decisive role to make a difference, by working together with regional and national governments to bring about positive change.

<sup>3</sup> <http://www.ecotox.ugent.be/microplastics-bivalves-cultured-human-consumption>

<sup>4</sup> <https://www.unep.org/goa/what-we-do/global-partnership-marine-litter>

<sup>5</sup> References



BOX: "A vision for Europe's new plastics economy".

**Pillar I: A dynamic and competitive recycling industry, truly embedded in the production chains for plastics, brings growth, jobs, and added value in Europe. It contributes to reducing the Union's greenhouse gas emissions and its dependence on imported fossil fuels.**

- Plastics and plastics products are designed in such a way it allows for much higher recycling rates and, where needed, greater durability and reusability. By 2030, all plastics packaging placed on the EU market are either reusable or easily recyclable.
- Changes in production and design enable higher plastics recycling rates for all key applications. By 2030, more than [half] of post-consumer plastics waste is recycled. Separate collection of plastics waste has reached very high levels. Recycling of plastics packaging waste [has doubled], reaching levels comparable to those of other materials.
- At the same time, EU's plastics recycling capacity is significantly extended and modernised. By 2025, the capacity for sorting and recycling has increased by [one third]<sup>6</sup>. This requires important investments, in the order of [1 billion euros a year] and leads to the creation [200.000] of new jobs, spread all across Europe. [for 2030: Eunomia's data???
- Thanks to improved separate collection as well as investments in innovation and capacity upscaling, export of poorly sorted plastics waste have declined sharply. Recycled plastics have become an increasingly valuable feedstock for industries, both at home and abroad. The plastics value-chain is much more integrated and the chemical industry works closely with plastics recyclers to help them find more and higher value applications for their output.
- The market for recycled plastics is successfully established, with clear growth perspectives as an increasing number of products incorporate some degree of recycled content. The demand for recycled plastics in Europe has increased by [x-fold], thus providing a stable flow of revenues and return on investment for the recycling sector. This also contributes to providing job security for the sector's growing number of workers.
- Higher recycling of plastics contributes to reducing Europe's dependence on imported fossil fuel and to cutting CO2 emissions, in line with commitments under the Paris Agreement [13mt a year = yearly GHG emission of Luxemburg]. Innovative materials and feedstocks for plastics production are developed within a clear sustainability framework, supporting Europe's efforts on decarbonisation and creating additional opportunities for growth.
- Europe confirms its leadership in sorting and recycling equipment and technologies. Exports rise as global demand for more sustainable solution to treat end-of-life plastics increase.

<sup>6</sup> Corresponding to approximately 500 new sorting and recycling plants (source: European Plastic Recyclers)



**Pillar II: In Europe, citizens, government and industry support more sustainable production and consumption patterns for plastics. This provides a fertile ground for social innovation and entrepreneurship, creating a wealth of opportunities for young Europeans.**

- Plastic waste generation is decoupled from growth. Consumers are aware of the need to avoid waste, and make choices accordingly. Smarter design, new business models and innovative products emerge that offer more sustainable consumption patterns.
- Many entrepreneurs see the need for more resolute action on plastics waste prevention as a business opportunity. New companies providing circular solutions, such as reverse logistics for packaging or alternatives to disposable plastics, are increasingly created, and benefit from the development of digitisation.
- At the same time, the leakage of plastics into the environment is drastically decreased. Effective waste collection systems, combined with incentives and awareness campaigns, avoid litter and ensure that collected waste finds its way towards adequate treatment. Sea-based sources of marine litter such as shipping, fishing and aquaculture are reduced to the minimum. Cleaner beaches and seas preserve activities such as tourism and fisheries, and avoid harming fragile ecosystems. Streets in all major European cities are much cleaner.
- Innovative solutions are developed to prevent microplastics from reaching the seas. Their origin, routes of travel, and effects on human health are better understood, and industry and public authorities are working together to make sure that they don't end up in our oceans, our drinking water and our plates.
- The EU is taking a leading role in a global dynamic, where countries engage and cooperate to make sure that the flow of plastics into the oceans is stopped, and that remedial action is taken against plastics already accumulated. Best practices are disseminated widely, citizens and consumers mobilise, innovators and scientists develop solutions that can apply globally.

### **3. THE WAY FORWARD: TURNING VISION INTO REALITY**

*Add short intro*

#### **3.1 Improving the economics and quality of plastics recycling**

Increasing plastic recycling could bring significant environmental and economic benefits. It is becoming increasingly clear that higher level of plastic recycling, comparable to those of other materials, will only be achieved by improving the way plastics and plastics articles are produced and designed and to increase cooperation across the value-chain: from the petrochemical industry, plastics manufacturers and converters to public and private waste management companies. More precisely, key players should work together to:

- Enhance recyclability of plastics and plastic products;
- Increase and improve the separate collection of plastic waste to ensure inputs to the recycling industry;
- Expand and modernise EU's sorting and recycling capacity;
- Create viable markets for recycled plastics.

*[Add here possible announcement of voluntary commitments by Plastics Europe]*

To support these developments, the Commission has already proposed new rules on waste management<sup>7</sup>. These include clearer obligations for Member States to step up separate collection, targets to stimulate investments in recycling capacity and avoid infrastructural overcapacity for the treatment of mixed waste (e.g. incineration) as well as more harmonised rules on the use of extended producer responsibility. Once adopted and implemented, new European legislation should greatly contribute to improving the current situation, driving public and private investments in the right direction. However, additional and more targeted action is needed to complement waste laws and remove barriers that are specific to the plastics sector.

#### *Design for recyclability*

Today, producers of plastics articles and packaging have little or no incentive to take into account the needs of recycling or reuse when they design their products. Plastics are made from different types of polymers and are highly customised with specific additives to meet the functionality and/or aesthetics requirements of each manufacturer. This diversity can complicate the recycling process, make it less economical, and affect the quality and value of the recycled plastic. Specific design choices, some of which are driven by marketing considerations (e.g. the use of very dark colours) can also negatively affect the value of recyclates.

*[infographic: how design choices can hamper recycling]*

Plastics packaging is a priority area when it comes to design for recyclability. It accounts today for about 60% of post-consumer plastic waste in the EU, and product design is one of the key elements that could increase its recycling levels. It was calculated that improvements in design have the potential of cutting by half the cost of recycling plastic packaging waste<sup>8</sup>. *[add reference to the proposed 2025 target]*.

To support improved design while preserving the internal market, more harmonisation at EU level is desirable. *[To achieve this, Commission will start working on a revision of the essential requirements for packaging with a view to ensuring that by 2030 all plastics packaging placed on the EU market are reusable or easily recyclable.<sup>9</sup>]* *[In this context, the Commission will also look into ways of maximising the impacts of new rules on Extended Producers Responsibility (EPR), in order to support the development of economic incentives rewarding the most sustainable design choices].* At the same time, *[the Commission will launch work to assess the potential for setting a 2030 recycling target for plastic packaging, similar to those already proposed for other materials].*

*[Add box on EPR]*

Construction, automotive and electronics are also important application for plastics use and source of plastics waste. The volumes potentially available for recycling are significant. As

<sup>7</sup> Reference to Commission proposal

<sup>8</sup> Ellen McArthur report 2017

<sup>9</sup> i.e. it can be recycled in a cost-effective manner



announced in the 2015 Circular Economy Action Plan, the Commission is developing product requirements under the Ecodesign Directive<sup>10</sup> that take into account circular economy aspects. This will facilitate the recycling of plastics for electronics. For example, the Commission has proposed mandatory product design and marking requirements to make it easier and safer to dismantle, reuse and recycle electronic displays (e.g. flat computer or television screens). [ENV/GROW: Input needed on design for recyclability in the construction and automotive sector]

### *Boosting demand for recycled plastics*

The weak demand for recycled plastics is another important obstacle to the transformation of the plastics value-chain. In the EU, uptake of recycled plastics in new products is small and often remains limited to low-value or niche applications (e.g. xxx). Uncertainties concerning market outlets are holding back investments necessary to scale up and modernise the EU plastics recycling capacity and boost innovation. [Add brief reference to reduced export routes (e.g. China) increasing the urgency of developing a European market]

One of the reasons for the low use of recycled plastics is the misgivings of many product brands and manufacturers, who fear that recycled plastics will not meet their needs for high volumes and constant quality specifications. Indeed, plastic recycling is often carried out by small and predominately regional companies and more scale and standardisation would support a smoother market operation. [With this in mind, the Commission will work with CEN and the industry to develop quality standards in particular for sorted plastic waste and recycled plastics].

A greater integration of recycling activities into the plastics value chain would also help, and could be supported by the chemical sectors. Their experience and technological expertise can contribute to reach the high quality standards (e.g. for food grade applications) and aggregate offer for recycled feedstock.

The chemical composition of recycled plastics, and its compatibility with intended uses, is also a barrier in some instances. For certain applications, the lack of information regarding the possible presence of contaminants or chemicals of concerns (e.g. flame retardants), and the associated uncertainties, can discourage the use of recycled plastics. [In the context of its work on the interface between chemicals, waste and product policy, the Commission is putting forward options to improve the traceability of chemicals and address the issue of legacy substances in recycled streams. The objective will be to facilitate treatment or removal of contaminants during recycling to ensure a high level of health and environmental protection and boost the uptake of safe recycled plastics].

As regard the use of recycled plastics in food-contact applications (e.g. bottles), the current regulatory regime needs to be re-examined to ensure that it is fit for the latest technological developments and can provide a reliable framework for investments, without hindering further innovation. [While ensuring that food safety is maintained, the Commission will assess together

<sup>10</sup> Directive 2009/125/EC this Directive covers all energy-related products.

*with EFSA options to improve the current system of authorisation of recycled plastics for food-contact uses*]. [The EU will also finance R&D on decontamination – ref in part 3.3].

Volumes and quality alone, however, do not fully explain the low market share of recycled plastics today. Resistance to change amongst products manufacturers and a lack of knowledge of the additional benefits of closed loop recycled plastics have also clearly emerged as barriers to the higher uptake of recycled content. In Europe, there are examples of successful commercial partnership between producers and plastics recyclers (e.g. in the automotive sectors) showing that quantity and quality issues can be overcome if the necessary investments are made. [To help address these barriers, and before considering regulatory action, the Commission calls on the industry to ... the objective will be to ensure that by X million tonnes of recycled find their way into new products on the EU market. Interested companies will have [six-twelve] months to come forward with their pledges on recycled content.] In addition to industry commitments, Member States can also do a lot through economic incentives and public procurement. [The French system "Orplast" and Italy's new rules on public procurement are two good examples of what can be done – add box?]

In order to further support the integration of recycled plastics in the market, the Commission will explore more targeted sectoral interventions. For instance, certain applications in the construction sector show a good potential for uptake of recycled content<sup>11</sup> (e.g. insulation materials).[In the context of on-going evaluation of EU rules on construction products, the Commission will look into concrete ways of promoting this]. [Using economic instruments to reward the use of recycled content in the packaging sector will also be examined in the context of future work on the Packaging and Packaging Waste Directive].

#### *Better and more harmonised separate collection and sorting*

Higher and better recycling of plastics is also hindered by insufficient volumes and quality of separate collection and sorting. National, regional and local authorities in cooperation with waste management operators have a key role to play in raising citizen awareness and ensuring high quality separate collection. This can be significantly helped by financial resources collected through the Extended Producer Responsibility schemes.

Reducing fragmentation and disparities in collection and sorting systems could significantly improve the economics of plastics recycling, saving around a hundred euros per tonne collected<sup>12</sup>. To encourage more harmonised and effective practices across the EU, [the Commission will issue a new guidance on separate collection and sorting of waste]. More importantly, the Commission [will strongly support the European Parliament in its bid to amend waste rules as to ensure better implementation of existing obligations for separate collection of plastics].

<sup>11</sup> Contrary to other applications, such as packaging, aesthetic requirements are less relevant and health and environmental exposure is usually lower. In addition, European Committee for Standardization has already developed assessment standards to identify hazardous substances which could be embedded in recycled materials.

<sup>12</sup> Ellen Mac Arthur 2017 p.39



#### EU Actions:

- Work towards new, harmonised rules to ensure that by 2030 all plastics packaging placed on the EU market can be reused or easily recycled and a higher plastic packaging recycling target for the same year
- Tackle issues of recyclability of plastics in electronics in eco-design measures
- [Actions on ELVs, construction]
- Develop quality standards for sorted plastics waste and recycled plastics
- Launch an EU wide pledging exercise to boost uptake of recycled content and complement it with incentives to reward first-movers (e.g. through the packaging and packaging waste directive)
- Work with EFSA to improve the current system of authorisation of recycled plastics for food-contact uses Issue new guidelines on separate collection and sorting of waste
- Ensure better implementation of existing obligations on separate collection

#### National and Regional authorities:

- Favour recyclable and recycled plastics in public procurement
- Make better use of taxation and other economic instruments to reward uptake of recycled plastics and favour recycling over landfilling and incineration of plastics
- Step-up separate collection of plastics waste
- Put in place well-designed EPR schemes in consultation with the relevant sectors

#### Industry:

- Take on voluntary commitments to increase recycled content of plastics in products
- Improve dialogue and cooperation across the value-chain

### 3.2 Curbing plastic waste and littering

While recycling is central to this strategy, the issue of growing plastic waste generation and its leakage into our environment must also be tackled in order to reach a truly circular lifecycle for plastics.

#### *Preventing plastic waste in our environment*

The growing use of plastics for a wide array of applications in our lives gives rise to large quantities of plastic waste (*add numbers*). A significant source of this waste comes from plastic items used only once, usually for a short duration, before they are thrown away – the so-called "single use plastics". These include e.g. small packaging, bags, disposable cups, lids, straws and cutlery, for which plastic is widely used due to its lightweight, low cost, and functionalities. Over-packaging – i.e. packaging going beyond what is necessary – also contributes to the rise in plastic waste.

Plastic items are often not recycled, and they can end up in our environment, including oceans and seas. This is particularly true for single use items, which can be difficult to recycle, are often consumed away from home and are prone to littering. These are among the items most commonly found on beaches<sup>13</sup>. In cases where the management of waste is sub-optimal, even plastic waste that has been collected can find its way to the environment. Plastic waste generated on boats, fishing gear, and plastics used in aquaculture, are also more likely to end up in the

<sup>13</sup> JRC (2017) report on most found items on the beaches (references to be added)

marine environment. There is a significant untapped potential for recycling plastics used in agriculture (such as films or greenhouses), whereas in some cases fragments end up in oceans. EPR schemes on plastics from agriculture have been effective in several Member States and regions.<sup>14</sup>

[Pie chart of most found items on beaches]

Once it has leaked into the environment, plastic accumulates and creates damage to the environment. In the oceans and seas, it can harm marine life, as well as damage economic activities such as tourism, fisheries and shipping<sup>15</sup>. It is estimated that every year in the EU 150 000 to 500 000 tonnes of plastic waste enter the oceans; since 1980 several million tonnes have accumulated.

Curbing the increase in plastic waste and its dispersion in the environment is complex because of the diffuse nature of the problem and the link with societal trends (such as the "on the go" culture) as well as individual behaviours. There is no clear incentive for consumers and producers to switch towards solutions that would generate less waste or litter.

The EU has already taken steps by setting requirements for Member States to adopt measures to cut the consumption of plastic bags<sup>16</sup> and to monitor and reduce marine litter<sup>17</sup>. EU funding is also currently deployed to understand and fight the rise of marine litter<sup>18</sup>, including by supporting national and regional action. EU rules supporting higher rate of recycling and better waste collection systems also play an important role. In order to go further, [economic] incentives can be set at the EU and national level to reduce the unnecessary generation of plastic waste, in particular stemming from single use items or over-packaging, and to encourage the reuse of packaging. The Commission will *[examine the issue of over-packaging in the context of a review of the essential requirements for packaging]* and *[initiate work towards a possible initiative on single use plastics – tbd]*.

Extended Producer Responsibility schemes at national level can play a role in financing action to curb plastic litter. Targeted deposit schemes can also help to reduce littering and increase recycling. Awareness campaigns and measures to prevent littering and clean up beaches can be set up by public authorities [link with European Solidarity Corps?]. It is also important to tackle specific sectors contributing to marine litter, such as fishing<sup>19</sup> and aquaculture: the Commission will *[put forward incentives to ensure a high level of collection and recycling of fishing gears, and take measures to limit to a minimum plastic losses from aquaculture]*. The Commission has also recently proposed new rules for port reception facilities that prevent marine litter by

<sup>14</sup> Add examples

<sup>15</sup> Potential cost for coastal and beach cleaning in the EU was assessed at almost €630 million per year - Source Areadis 2015 [to be completed]

<sup>16</sup> Plastic bags Directive (EU) 2015/720

<sup>17</sup> Marine Strategy Framework Directive 2008/56/EC

<sup>18</sup> Give a few examples of projects (Horizon, EMFF, LIFE)

<sup>19</sup> Lost fishing gear causes significant damage to the environment through "ghost fishing"



increasing delivery on land and adequate treatment of the waste generated on ships (including fishing vessels)<sup>20</sup>. The Commission will also work to improve understanding and measurement of marine litter, an essential but often neglected action to support effective prevention measures. Finally, as developed in section 3.4, international action will remain key to address the most significant sources of plastics litter in the oceans, i.e. insufficient waste management infrastructures in developing countries.

#### *Establishing a clear regulatory framework for biodegradable plastics*

In response to the high degree of plastic leakage into our environment and its harmful effects, solutions have been sought to design biodegradable and compostable plastics<sup>21</sup>. However, such plastics generally degrade under specific and controlled conditions difficult to find in the natural environment<sup>22</sup>. Plastics that are labelled "compostable" are not necessarily suitable for home composting and currently, there is no plastic on the market that can fully biodegrade in the marine environment.

This is confusing for consumers. If plastics marked "biodegradable" are littered, they can still cause harm to the ecosystems. In addition, if such plastics are mixed with conventional plastics, it can hamper the mechanical recycling process. Finally, some alternative design methods claiming biodegradability properties – for example the so-called "oxo-degradable plastics" – have been found to offer no proven environmental advantage compared to conventional plastics while causing concern over their rapid fragmentation into microplastics.<sup>23</sup>

It is therefore important to ensure correct information of consumers by clarifying which plastics can be labelled "compostable" or "biodegradable" and how to handle them after use. Applications for which compostability have clear environmental benefits should be identified to drive market developments in the right direction. To allow adequate sorting and avoid false environmental claims, [the Commission will propose harmonised rules for definition and marking of compostable and biodegradable plastics]. The Commission will also [develop lifecycle analysis to identify the conditions where the use of biodegradable or compostable plastics is beneficial, and criteria for such applications.] [Finally, work to restrict use of oxo-plastics will be initiated.]

#### *The rising problem of microplastics*

In recent years, research has shown that microplastics (small plastic fragments of less than 5 mm) accumulate in the sea where their small size facilitates their ingestion by marine life, thus causing harm to the environment. Microplastics also enter the food chain through seafood,

<sup>20</sup> Reference to revision of Port Reception Facility Directive

<sup>21</sup> In a biodegradation process, the material disintegrates and is decomposed by microorganisms into harmless natural elements such as CO<sub>2</sub> and water. In a composting process, the plastic once broken down becomes part of usable compost and provides the earth with nutrients.

<sup>22</sup> For example high temperatures found in industrial installations. Currently, the only existing European standard on this matter concerns biodegradability in industrial composting facilities

<sup>23</sup> See report on oxo-degradable plastics (reference), adopted together with this Strategy



potentially causing health risks to humans<sup>24</sup>; a recent study has shown their presence also in drinking water. While a large amount of microplastics results from the fragmentation of larger pieces of plastic waste, significant quantities also enter the environment directly, making it more challenging to track and prevent them. [Add estimates of amount of microplastics released yearly in the EU – input needed from ENV/GROW]

Microplastics are either intentionally added to certain products (such as cosmetics, detergents, paints), dispersed during the production, transport and use of plastic pellets, or generated through wear and tear of products such as tyres, paints and synthetic clothes. They are then transported by the wind, rain drainage, sewage and rivers, and can eventually reach the marine environment. [Add pie chart of sources of microplastics]

While microplastics intentionally added in products represent a relatively small share of the microplastics in the sea, they are relatively easy to prevent, and in response to public concern several countries have already taken action to prevent their use<sup>25</sup>, while the cosmetic industry has also taken voluntary action. Bans are considered or planned in several Member States, which reinforces the need to act at EU level in order to avoid multiple legislations for products that are sold across the single market. Therefore, [*the Commission will propose a restriction of the use of microplastics intentionally added in products*].

Other sources of microplastics are more complex to prevent, and solutions need to be developed for each of them. These can include measures to make sure that microplastics are better captured in waste water treatment plants (and removed from the sludge before its use in agriculture), as well as targeted measures for each source. [*The Commission will consider measures such as specific requirements for tyre durability, better information and minimum requirements on release of microfibrils from for textiles, as well as measures to reduce plastic pellet losses. Extended producer responsibility schemes can also be envisaged, where relevant, to cover the costs of remedial actions*]. Microplastics also need to be monitored in drinking water, where their impact on human health is still unknown [*link with Drinking water directive- ENV*].

Finally, more research is needed to better understand the sources and impacts of microplastics, as well as their impacts on the environment and on health, and to develop innovative solutions to prevent their dissemination (see section 3.3).

#### EU Actions:

- Initiate work towards a possible initiative on single use plastics
- Encourage the reuse of packaging through economic incentives (EPR), and propose

#### National, regional and local authorities:

- [Action on single use plastics – tbd]
- Consider deposit schemes and targeted extended producer responsibility schemes
- Raise awareness on littering and consider fines

<sup>24</sup> Reference to study on risk assessment of microplastics

<sup>25</sup> Bans on the use of microplastics in specific personal care products have been put in place in the United States and Canada; several EU Member States have also notified the Commission draft laws to ban microplastics in certain cosmetics. The Council has invited the Commission to take measures on microplastics in particular from cosmetics and detergents.



- requirements on over packaging
  - International cooperation on marine litter (see section on global action)
  - Reduce litter from activities at sea: port reception facility directive; action on fishing gear and aquaculture
  - Guidance to Member States on how to implement their marine litter plans under the Marine Strategy Framework Directive
  - Improved monitoring and mapping of marine litter (including microplastics) on the basis of EU harmonised methods.
  - Harmonised rules for definition and marking of biodegradable/compostable plastics, and analyse<sup>26</sup> where their use is more beneficial than conventional plastics. Restrict use of oxo plastics.
  - Restrict microplastics in cosmetics and detergents
  - Develop measures to minimise microplastics release from other sources, including:
    - Minimum requirements for tyre durability,
    - Methods to assess microplastic losses from clothes, combined with labelling/minimum requirements
    - Certification scheme along the plastic supply chain and/or BREF to ensure the application of best practices to reduce plastic pellet spillage
    - Improve knowledge on microplastics in waste water treatment plants
  - Require plastic producing plants to use best available techniques to prevent pellets spillage
  - Monitor microplastics in drinking water
- where they don't exist already
- Step up waste collection, particularly near the coasts and ensure that national authorities responsible for waste management, water and marine environment are acting in a joined up manner in designing national measures
  - Step up efforts to eradicate illegal landfills and improve management of existing landfills
  - Develop national monitoring of marine litter on the basis of harmonised EU methods
  - Engage in Regional seas conventions
  - Consider EPR for agricultural plastics
- Industry:**
- Promote replacements for single use plastics (e.g. in catering and take away), on the basis of lifecycle analysis
  - Limit plastic packaging where it is not necessary
  - Put in place measures to avoid spillage of plastic pellets
  - Develop technologies to capture microplastics in waste water treatment plants before they accumulate in sludge
- Civil society / consumers:**

### 3.3 Driving investments and innovation towards circular solutions

Achieving the objectives laid out in this strategy will require important investments, both in infrastructure and innovation. Meeting ambitious goals on plastics recycling alone will require an estimated **additional investment of between 8.4 and 16.6 billion euros**<sup>27</sup>. Creating the right incentives for public and private investment and innovation is at core of this strategy.

At present, private investment in sorting and recycling plants are held back by uncertainty on their profitability (e.g. because of low oil prices, lack of outlets, etc.). For instance, today in France only about two-thirds of the plastics recycling businesses are profitable<sup>28</sup>. As shown by

<sup>26</sup> Through lifecycle analysis

<sup>27</sup> Deloitte study

<sup>28</sup> Ademe study

the situation in other Member States<sup>29</sup>, modernising and scaling up the installations is important to ensure the economic viability of plastic recycling. Many of the actions put forward in section 3.1, for instance on recycled content, aim to boost investors' confidence.

Investments by public authorities in extended and improved separate collection also need to take place [ENV/GROW: numbers]. **Extended Producer Responsibility (EPR) schemes can play a key role to provide the necessary funding.** For instance, in some Member States with very high recycling rates, the bulk of separate collection and treatment costs for packaging waste are financed through contributions paid by the producers, based on the quantity and recyclability of the packaging they placed on the market.

**Extender Producer Responsibility, in addition to being a source of financing, can provide economic incentives for businesses to invest in more sustainable products.** If generalised and properly implemented across Europe, it can help improve the efficiency of the recycling process, foster design for recycling, reduce waste and littering and encourage greater dialogue between producers, local authorities and recyclers. In its proposed review of waste legislation, the Commission aims to promote this model and make it more effective through minimum common requirements, based on existing best practices. To ensure that these scheme are effective and support investments, the Commission will put forward [*guidance on the eco-modulation of EPR fees*] and/or [*more detailed rules for packaging to complement the revision of essential requirements for placing on the market*]. For instance, "eco-modulation" of fees paid by the producers can only produce results if it provides a meaningful financial reward to more sustainable product design choices.

**Member States decisions on taxation and procurement will also be fundamental in supporting the transition and steering investments.** In its proposed waste review, the Commission has placed emphasis on the use of economic instruments to prioritise waste prevention and recycling at national level. For instance, high or gradually increasing fees or taxes on landfilling and incineration can improve the economics of recycling by clearly internalising the environmental costs of alternatives.

EU structural funds also make a key contribution to the development of EU recycling capacity. [ENV/REGIO: Input needed on contribution of structural funds to recycling since 2014]. The European Fund for Strategic Investment (EFSI) can also play an important role, for instance by supporting greater integration of the value chain and projects for closed loop plastics recycling. The recently launched "*Circular Economy Finance Support Platform*" will also contribute to increase awareness and build confidence around the circular economy business logic among investors.

**Innovation can have tremendous impacts to address many of the challenges identified in the strategy.** It is a key enabler for the transformation of the plastics value chain: it can help reduce costs of existing solutions, provide new ones and amplify potential benefits beyond

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<sup>29</sup> Ibid.



Europe's borders. Innovative solutions on advanced sorting, chemical recycling and improved polymer design can have a powerful effect. For instance, scaling new technological solutions such as digital watermarking could allow much better sorting and traceability of materials with little retrofitting costs.

Research and innovation can also make a difference with regards to plastics waste prevention and microplastics pollution. Social innovation – in the form of e.g. the development of new business models, reverse logistics or design for sustainability – can greatly help minimise plastics waste at source while achieving further economic, environmental and societal benefits [add box with the example of concentrated detergents]. Finally, scientific research will also need to play a role in casting a light over the potential health impacts of microplastics and developing better monitoring tools.

**Alternative feedstocks**, including bio-based feedstocks as well as gaseous effluents (e.g. methane) can also be developed to replace virgin plastics and avoid the use of fossil resources. Currently, these feedstocks represent a very small but growing share of the market (GROW: figures?). Their cost can be an obstacle to a wider use; in the case of bio-based plastics it is also important to ensure that they result in genuine environmental benefits given in particular the possible land use impacts. To that effect, *[the Commission has launched dedicated work to better understand the lifecycle impacts of alternative feedstock used in plastics production, including biomass]*.

EU research funding will support all these efforts. So far, Horizon 2020 has provided more than 250 million euros to finance R&D in areas of direct relevance for the strategy. About half of this sum was used to support the development of alternative feedstocks. Until 2020, an additional [100 million euros] will be devoted to financing priority actions under this strategy, including on the development of smarter and more recyclable plastics materials, more efficient recycling processes and the removal of hazardous substances and contaminants from recycled plastics. *[The EU will also be launching a prize on...]*

*[Finally, when preparing its proposal for the post-2020 EU funding on research and innovation, the Commission will explore the possibility of addressing plastics littering and pollution through a dedicated R&I mission for 2030].*

**EU Actions (to be further developed):**

- ensure a strategic vision and a favourable regulatory framework for investments into the transformation of the plastics value chain
- provide financial support via EFSI and other EU funding instruments
- facilitate investment through the Circular Economy Finance Support Platform
- promote and fund research and innovation to

**National, regional and local authorities:**

- better use of economic instruments, in particular to raise costs of landfilling and incineration and promote plastics waste recycling and prevention
- make greater use of strategic public procurement ...



address gaps and reduce costs of potential solutions

### 3.4 Harnessing global action

Opportunities and challenges linked to plastics are increasingly global. While the consumption of plastics per inhabitant has stabilised in Europe, it is growing quickly in other parts of the world, notably in Asia<sup>30</sup>. Plastics value chains are developed across entire continents and plastic waste is traded internationally: in the EU about half of the plastic waste collected is sent abroad, where uncertainty remains over its treatment. More than 85% of the exported plastic waste is currently shipped to China<sup>31</sup>, a situation that will soon change following China's decision to ban the import of certain types of plastic waste<sup>32</sup>, thus creating opportunities for EU recyclers. Adequate collection and recycling facilities are needed in many parts of the world. At the same time, recycled plastics need to be integrated in plastics production, not only in the EU but also internationally.

Currently, between 20% and 40% of plastic waste worldwide is landfilled, and it is estimated that 5 to 13 million tonnes of plastic waste could end up in the oceans every year. Marine litter originating from one country can end up on the beaches of another one, and plastic fragments of all geographical origins accumulate over time in the oceans and seas, carried by marine currents. While the EU may generate a small proportion of marine litter compared to emerging economies, these end up in particularly vulnerable marine areas, such as the Mediterranean Sea and the Arctic. Recent studies show plastics accumulate in the Mediterranean Sea with a density comparable to the zones of highest plastic accumulation in the oceans.

International cooperation will be crucial to fight the accumulation of plastics in our oceans. Oceans and seas are a global good, and if the current trend is not reversed this could have legacy effect for future generations through degradation of marine ecosystems and threats to human health. Sound waste management systems in particular are key to prevent plastics from entering the sea. Many initiatives have been launched in international fora (such as G7 and G20 and the United Nations) and regional sea conventions. The EU will continue to engage to support international action, to promote best practices worldwide, and to use its external funding instruments to support improved waste management around the world, in order to tackle this threat and to meet the Sustainable Development Goal on marine litter<sup>33</sup>. The Commission will also launch in 2018 a dedicated project to reduce plastic waste and marine litter in East and South-East Asia, where this problem is growing fast<sup>34</sup> [tbc –action in the Mediterranean].

<sup>30</sup> Per capita plastic consumption has reached around 100 kg per year in Western Europe and North America; in Asia it is currently above 20 kg per year, a figure expected to grow rapidly

<sup>31</sup> Source: Global Waste Management Outlook 2015

<sup>32</sup> Reference to WTO notification

<sup>33</sup> SDG 14

<sup>34</sup> In the context of the Partnership instrument



On the other hand, there are also significant prospects for the development of an innovative and circular plastics industry worldwide. The EU can be at the forefront of these developments, by supporting in particular investments in modern recycling technologies, new materials better suited for recycling, and solutions to curb marine litter.

In order to better integrate plastics recycling globally, and thus create a circular value chain across borders, measures that increase the trust of operators and public authorities are needed. For instance, the Commission will engage to develop international standards to boost confidence of industry in the quality of recyclable or recycled plastics. In addition, it will be important to ensure that plastics sent abroad for recycling is treated in similar conditions as domestically, through a better implementation of EU rules on waste shipment, as well as the development of an EU certification scheme for recycling plants. A global industry effort is also needed to promote widespread use of recyclable and recycled plastics.

#### EU Actions:

- **Dedicated project to reduce plastic waste and marine litter in East and South-East Asia**
- **[Tbc – actions in the Mediterranean area]**
- **Support international action on plastics and the development of practical tools<sup>35</sup> through renewed engagement in fora such as UN, G7/G20, the Basel convention, and explore possibilities of an international legal framework to cover damage to the marine environment**
- **Promote a circular plastics economy in third countries** through trade dialogues and economic diplomacy and continue to support improved waste management through EU funds (including "Switch to Green" and the External Investment Plan)
- **Work towards international industry standards** on sorted plastic waste and recycled plastics
- **Step up the enforcement of the waste shipment regulation** in order to ensure that exported plastic waste is adequately treated

#### International partners:

- Engage in international fora to develop a global response to the rise in marine litter
- Act domestically to reduce the leakage of plastics in the environment and increase recycling

#### Industry

- Engage to support an integrated, cross-border circular plastics economy

<sup>35</sup> Including specific action on fishing and aquaculture

