

## **Toward a Regulatory Approach to Plastic Pellet Loss**

This briefing has been developed by the Environmental Investigation Agency (EIA), with support from Fauna & Flora International (FFI) and Fidra. It is intended to provide guidance and technical support to policymakers engaged in implementing the public commitment from the European Commission’s *European Strategy for Plastics in a Circular Economy* to develop measures to reduce plastic pellet losses across the supply chain, which was published in January 2018. This briefing will also help other stakeholders supporting the development of regional, national or local measures as well as case studies exploring how the measures can be applied in practice.

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### **INTRODUCTION**

The *Strategy for Plastics in a Circular Economy* commits the European Union (EU) to consider “measures to reduce plastic pellet losses.”<sup>1</sup> In particular, the Commission commits to, in its list of future EU measures to implement the *Strategy for Plastics in a Circular Economy* under actions to curb microplastic pollution, the “development of measures to reduce plastic pellet spillage,” identifying a “certification scheme along the plastic supply chain” as a primary policy option.<sup>2</sup> For the reasons discussed below, preparing the groundwork for the adoption of an EU regulation setting out a supply-chain approach to prevent pellet loss should be a priority during the final months of the current Commission, something that would then allow the next Commission to address the issue early in its tenure.

As the second largest source of primary microplastic emissions to the environment, tackling plastic pellet losses is a key priority in eliminating plastic pollution. The supply-chain approach has the potential to reduce 600,000 tonnes of plastic pollution through 2035, equivalent to a 95% reduction in pellet emissions, representing a major step forward in tackling this issue high on the political and public agenda.

### **BACKGROUND ON PELLETS**

Pre-production pellets, flakes and powders (hereinafter referred to simply as pellets) are the feedstock of plastic material that are melted and molded by manufacturing companies into plastic products.<sup>3</sup> Given their small size, pellets are easily and often spilt during production, storage, loading and unloading, transport, conversion and handling, with pellet loss (spillage) occurring at each stage along the pellet supply chain.

The quantities of pellets being lost each year are significant. Up to 167,431 tonnes of plastic pellets are lost annually in the EU,<sup>4</sup> with up to 78,000 of those tonnes thereafter entering our oceans.<sup>5</sup> Pellets are the second largest source of primary microplastic pollution in the marine environment, behind tyre dust (up to 136,000 tonnes entering the ocean annually) and ahead of textiles (up to 23,000 tonnes entering the ocean

annually).<sup>6</sup> Pellets have been recorded on the coastline of every European country monitored,<sup>7</sup> negatively impacting marine life and degrading habitats.<sup>8</sup> Despite this significant contribution to marine plastic pollution, policymakers have been slow to assess effectiveness of voluntary efforts and propose regulatory solutions to address pellet loss.

The pellet supply chain can generally be characterized as follows:<sup>9</sup>

**Producers.** Those creating the virgin pellets from oil, gas and other raw materials. Pellets are also produced from plastic waste by recyclers for conversion into new plastic products.

**Intermediary Handlers.** Those handling the pellets between the producer and converter, including transporters, compounders and masterbatch makers (specialist mixers of plastics and additives), distributors, storage facilities, shipping companies and logistics providers.

**Converters.** Those melting and molding the pellets into manufactured plastic products. Many converters are small- and medium-sized enterprises.<sup>10</sup>

Reducing pellet loss is not rocket science. It involves implementing best practices to minimize the risk of pellet losses, including remedial measures to clean-up and dispose of pellets where spillage does occur, at each point along pellet supply chain.<sup>11</sup> Fortunately, many best practices have already been developed in the form of Operation Clean Sweep (OCS), a voluntary scheme pioneered by industry over 25 years ago that, with some improvements, such as additional emphasis on transport and independent verification and auditing, could serve the basis for regulation.<sup>12</sup> OCS is essentially a toolkit that highlights best practices that are designed to prevent or mitigate pellet loss during routine operations. However, the one-off sign-up to OCS as opposed to annual memberships, the low uptake across different actors in the supply chain, the lack of independent auditing or reporting on implementation of the OCS guidelines and lack of monitoring of the measures taken, means that little is known about the effectiveness of OCS across the plastic industry as a whole. It is clear that these notable limitations have resulted in ongoing pellet loss becoming the second largest direct source of marine microplastic pollution. Other voluntary measures also exist.<sup>13</sup>

The magnitude of pellet emissions to the environment, however, is a clear indication that the voluntary approach has not been adequately implemented across all actors in the supply chain and that regulation is needed to provide the necessary framework to eliminate this major source of microplastic pollution.

## POTENTIAL REGULATORY APPROACHES

Producers, intermediary handlers and converters currently have few incentives to prevent pellet loss. On the legal side, no legal obligations require them to implement best practices, significantly contributing to the low rate of sign-up and implementation of voluntary schemes such as OCS.<sup>14</sup> On the financial side, given the value of pellets, financial incentives to implement best practices to prevent residual losses or undergo the effort to recover pellets once spilt are non-existent (although for worker-safety reasons spilt pellets are often cleared away to avoid slipping).<sup>15</sup> On the reputational side, given that pellet loss is not evident in the final product, consumers are insufficiently aware to demand action, unlike microbeads in rinse-off cosmetics, which have garnered significant attention despite their much lower contribution to marine plastic pollution in the EU (up to 373 tonnes per year as compared to up to 78,000 tonner per year for pellets, as noted above).<sup>16</sup> Hence, despite OCS having been in place for over 25 years, plastic pellets remain the second largest source of primary microplastic emissions. In short, current legal, financial and reputational incentives are insufficient to address this major source of pollution.<sup>17</sup>

In 2018, as part of the *European Strategy for Plastics in a Circular Economy*, the Commission funded a report assessing various measures and policy options to reduce pellet pollution. The report *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitted by (But Not Intentionally Added In) Products* reviewed four specific EU measures that could be taken to address pellet loss:<sup>18</sup>

**Measure 1 – Amending the Polymer Production BREF on Pellet Producers.** This measure would amend the Best Available Technique Reference Document (BREF) under the

Industrial Emissions Directive to require Member States to require pellet producers to implement best practices to prevent pellet losses as part of their environmental permit during production.

**Measure 2 – Adopting a Regulation on the Transport of Pellets.** This measure would adopt a new regulation requiring transporters to implement best practices to prevent pellet losses during transport to and from producers and converters.

**Measure 3 – Adopting a Regulation on Plastic Converters.** This measure would adopt a new regulation requiring converters to implement best practices to prevent pellet losses at their facilities during the manufacture of the final plastic product.

**Measure 4 – Adopting a Regulation Requiring Supply-Chain Accreditation of Best Practices.** This measure would adopt a new regulation requiring those placing plastic products on the market (focusing on larger companies in key sectors in the first instance) to ensure that best practices to reduce pellet spillage are implemented throughout the supply chain, *i.e.* producers, intermediary handlers and converters, demonstrated through the use of private accreditation bodies to certify adherence subject to independent audits and verification.

These four measures were then combined into two policy options and compared, representing the two primary regulatory approaches to prevent pellet loss available to policymakers:

**Policy Option 1.** This policy option consists of measures 1, 2 and 3, collectively referred to as the “horizontal measures” because they each tackle only one pre-identified part of the pellet supply chain (here producers, transporters, converters).<sup>19</sup>

**Policy Option 2.** This policy option consists of measure 4, referred to simply as “supply-chain accreditation” and aims to ensure vertical integration among producers, transporters and converters as well as other intermediary handlers.<sup>20</sup>

Following a detailed analysis, the Commission-funded report found that policy option 2 (supply-chain accreditation) was far superior to policy option 1 (horizontal measures) for several reasons.

**First,** supply-chain accreditation is more effective. Once implemented, supply-chain accreditation will result in a 95% reduction in pellet emissions.<sup>21</sup> This compares to only a 65% reduction for the horizontal measures.<sup>22</sup> A primary reason for this effectiveness is that it ensures vertical integration, identified by stakeholders as essential to prevent pellet loss,<sup>23</sup> in particular at the critical hand-over points along the entire supply chain.<sup>24</sup> In contrast, the horizontal measures attempt to address the problem in regulatory silos, resulting in low vertical integration and risking inconsistent adoption and implementation (in addition to limiting its scope only to pre-identified actors, *i.e.* producers, transporters and converters but not other intermediary handlers).<sup>25</sup> Horizontal measures may also hamper clean-up efforts where spills do occur as the focus would be on attribution of liability rather than timely and comprehensive clean-up.<sup>26</sup>

**Second,** supply-chain accreditation is more cost-effective.<sup>27</sup>

**Table 1: Total Annualized Cost Per Tonne Prevented**

	Supply-Chain Accreditation	Horizontal Measures
Implementation	€411	€601
Inspection and Verification	€543	€793
<b>TOTAL</b>	<b>€954</b>	<b>€1,394</b>

It also avoid costs associated with plastic pellet pollution, including those on ecosystems and coastal clean-ups, for example.<sup>28</sup>

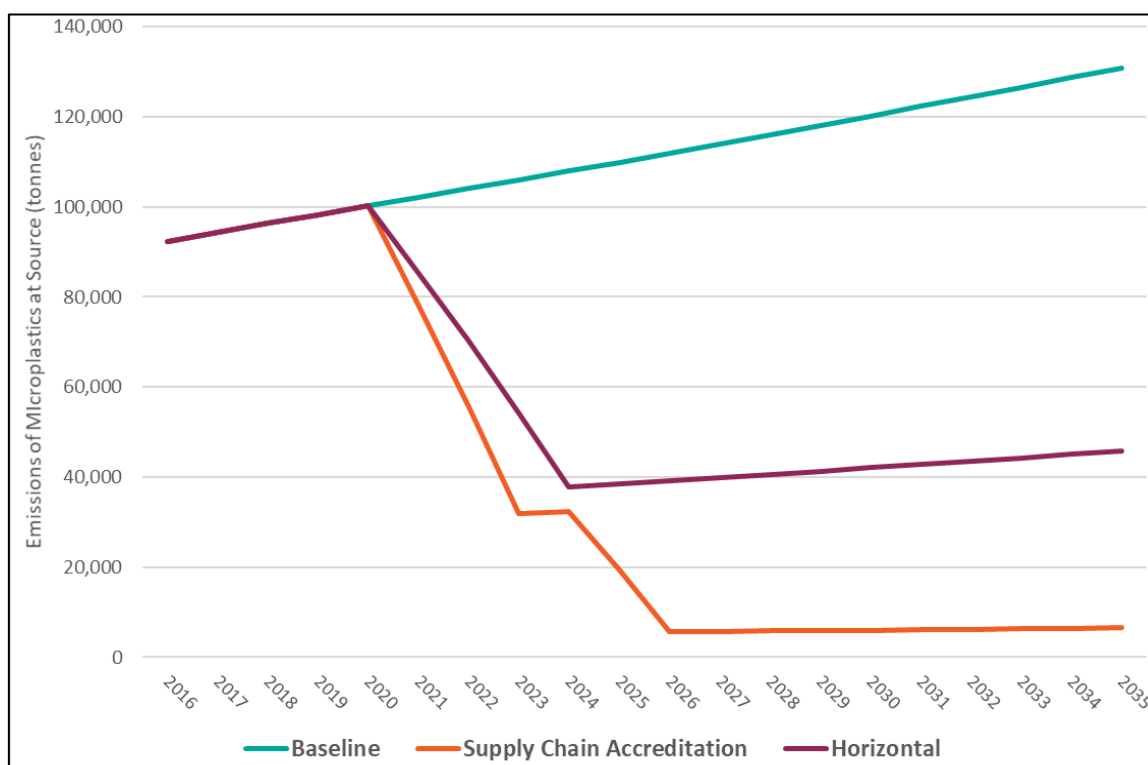
**Third**, supply-chain accreditation is less administratively burdensome. The use of private accreditation bodies and independent auditors means that competent authorities in Member States are not tasked with visiting the facilities themselves to ensure best practices are implemented, instead they oversee a more limited number of private accreditation bodies with occasional spot checks.<sup>29</sup>

**Fourth**, supply-chain approaches are familiar for larger companies and their suppliers who often must ensure product quality based on their customer’s requirements, and in this way makes clever use of the power of the purse string to promote responsible behavior throughout the supply chain.<sup>30</sup>

**Fifth**, supply-chain accreditation ensures a level playing field for EU producers, intermediary handlers and converters relative to their non-EU counterparts since the obligation to implement best practices applies throughout the supply chain regardless of where the company is located, thus ensuring no disadvantage to EU-based companies.<sup>31</sup>

**Sixth**, and relatedly, supply-chain accreditation has significant extra-territorial benefits. By focusing on plastic products placed on the EU market, regardless of where they are made, the regulation will incorporate supply chains outside the EU and thus help reduce plastic pellet pollution beyond EU borders, compelling industry-wide transformation as producers, intermediary handlers and converters often provide their services to other sectors as well.<sup>32</sup>

The below figure shows the anticipated reduction potential of supply-chain accreditation, compared against the three horizontal measures combined.<sup>33</sup>



## TOWARD SUPPLY-CHAIN ACCREDITATION

Establishing the legal framework for supply-chain accreditation is quite straight-forward. Examples already exist, the most salient one being *Regulation (EU) No 995/2010 laying down the obligations on operators who place timber and timber products on the market* – also referred to as the “EU Timber Regulation.”<sup>34</sup>

The main features of any “EU Pellet Regulation” could be as follows:

**Obligation:** Economic operators placing plastic pellets (flakes and powders included) or plastic-containing products and packaging on the EU market must ensure best practice management systems are in place and applied throughout the supply chain to prevent plastic pellet spillage. An alternative could be to place the obligation on major retailers.

**Best Practice Management Systems:** Best practice management systems shall constitute a series of best practices and controls to prevent plastic pellet loss, containing the following minimum elements:

- (i) traceability of suppliers of plastic pellets or plastic-containing products and packaging throughout the supply chain from plastic pellet production to placement on the EU market, including transportation, storage and conversion;
- (ii) measures and procedures representing best practice are implemented to prevent the risk of plastic pellet spillage throughout the supply chain, including remedial measures to clean-up and dispose of pellets in case of spillage;
- (iii) regular assessment of spillage risk and critical evaluation of best practice management system;
- (iv) reporting on plastic pellet spillage and implementation of best practice management system; and
- (v) periodic and independent external auditing and verification.

Further detailed rules necessary to ensure uniform implementation shall be adopted, and should be informed by the development of harmonised European criteria and standards for best practices and controls to prevent plastic pellet loss, including the required measures and procedures for compliance.\*

**Monitoring Organisations:** In order to facilitate implementation, operators may rely upon for implementing best practice management systems developed by monitoring organisations formally recognized by the Commission that meet certain requirements, including:

- (i) maintain and regularly evaluate its best practice management system to ensure compliance with the minimum elements identified above and grant operators the right to use it;
- (ii) verify the proper use of its best practice management system by such operators, including periodic third-party verification and auditing; and
- (iii) take appropriate action in the event of failure by an operator to properly use its best practice management system, including notification of competent authorities in the event of significant or repeated failure by an operator.

Existing schemes that can meet the above requirements may seek formal recognition as a monitoring organisation, such as Operation Clean Sweep (OCS) and other schemes when modified to meet the above requirements. Additionally, new schemes may be established to fulfill the function of a monitoring organisation.

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\* Existing schemes could serve as the basis for the development of criteria and standards on measures and procedures representing best practice, where appropriate.

**Compliance and Enforcement:** Competent authorities shall carry out checks at regular intervals on operators to ensure compliance and on monitoring organisations to verify continued fulfillment of their function.

## CONCLUSION

In terms of both effectiveness and cost-effectiveness, supply-chain accreditation is without equal. As the urgency of addressing marine plastic pollution increases, the Commission should commit to tackling this significant source of marine plastic pollution, fulfilling its commitment made in the *Strategy for Plastics in a Circular Economy*, by proposing a new regulation for consideration by the European Parliament and the Council, one that takes a supply-chain approach toward reducing pellet loss.

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- <sup>3</sup> OSPAR Commission, *OSPAR Background Document on Pre-Production Plastic Pellets* (2018), p. 2.
- <sup>4</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 14-15, 45 and 127.
- <sup>5</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 45 and 127.
- <sup>6</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 45 and 127.
- <sup>7</sup> FIDRA, *Nurdle Free Oceans: Reducing Plastic Pollution in Our Seas* (website), available at <https://www.nurdlehunt.org.uk/take-part/nurdle-map.html>.
- <sup>8</sup> See e.g. Rochman, C. M. et al., *Ingested Plastic Transfers Hazardous Chemicals to Fish and Induces Hepatic Stress* (Scientific Reports, 2013), p. 3; Nobre, C. R. et al., *Assessment of Microplastic Toxicity to Embryonic Development of the Sea Urchin Lytechinus Variegatus (Echinodermata: Echinoidea)* (Marine Pollution Bulletin, 2015), pp. 15, 99-104; Mato, Y. et al., *Plastic Resin Pellets as a Transport Medium for Toxic Chemicals in the Marine Environment* (Environmental Science & Technology, 2001), pp. 35(2), 318-324.
- <sup>9</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 14 and 186-188.
- <sup>10</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), p. 67.
- <sup>11</sup> See OSPAR Commission, *OSPAR Background Document on Pre-Production Plastic Pellets* (2018), pp. 27-31; Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 14 and 91-94.

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- <sup>12</sup> See Operation Clean Sweep, *Program and Manual*, available at <https://www.opcleansweep.org/manual/> (last visited 19 February 2019)
- <sup>13</sup> See OSPAR Commission, *OSPAR Background Document on Pre-Production Plastic Pellets* (2018), pp. 21-23.
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- <sup>15</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 49-50.
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- <sup>22</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), p. 73.
- <sup>23</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), p. 72.
- <sup>24</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 73-74.
- <sup>25</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 73-74.
- <sup>26</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), pp. 73-74.
- <sup>27</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), p. 74.
- <sup>28</sup> OSPAR Commission, *OSPAR Background Document on Pre-Production Plastic Pellets* (2018), pp. 25-26.
- <sup>29</sup> Eunomia and ICF, *Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitter by (But Not Intentionally Added In) Products* (Final Report, 23 February 2018), p. 268.
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