The GREEN PAPER on a European Strategy on Plastic Waste in the Environment: Comments from ISWA

International Solid Waste Association
Auerspergstrasse 15/41
A-1080 Vienna, Austria
Phone: +43 1 2536001 - 12
Fax: +43 1 253600199
www.iswa.org

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Introduction
This report is in response to and addresses issues raised by the EU consultation Green Paper on Plastic Waste in the Environment issued by the EU Commission on 7 March 2013. This response draws together comments from the International Solid Waste Association (ISWA) Working Groups. Overall, however, ISWA would support both the analysis in the paper and its conclusions.

Background
There are a few technical issues which we feel have been neglected in the paper. The paper places the start of the plastics era at a date which is later than that commonly accepted, perhaps because the Green Paper is looking at the use of oil-based sources for plastics feedstock. In the nineteenth century the first sources used for plastic manufacture were from natural and renewable sources before utilising first coal-based products and then predominantly oil and even later for certain purposes condensate and natural gas. Perhaps therefore we should regard the historic profile for plastics as being parallel to that which we are striving for energy generally but especially the oil sector with the later years of the 21st century seeing a return to natural and renewable raw materials taking over from fossil-fuel based feedstock sources.

There is also another technical issue in that the green paper makes the assumption that all plastics can be recycled. While the vast majority of plastics are thermoplastics, there is a significant proportion of plastics: thermosets and a very minor fraction elastomers, which are very difficult, often impossible, to recycle and the main resource efficient recovery option for these polymeric materials is energy recovery. Thermoplastics generally are well suited for recycling but have lower durability and shorter life span than thermoset plastics, which on the other hand are less suited for recycling. Therefore, for thermoset plastics, the focus has to be on enhanced durability and reuse. For thermoplastics, the main emphasis should instead be put on effective and efficient material recycling.

Plastic waste is heterogeneous and comes from diverse sources
Furthermore, the vast amount of different types, grades and qualities of thermoplastics as well as thermoset plastics, makes the recovery situation even more complex. In addition, the sources of plastic waste production are diverse and the mixture and cleanliness of plastic waste differ from source to source. From some sources, such as production industry, the waste plastic might be quite homogenous and clean but the further down the value chain and closer to the end consumer, the more heterogeneous and contaminated the waste plastic generated is likely to be. Any successful strategy and handling of waste plastic must take the heterogeneous characteristics of plastic waste into account when proposing solutions and designing future approaches to handling and processing.

There is an issue with regard to the collection of all plastics packaging waste for recycling which exemplifies the problem of attempting to recycle all plastics waste from household and MSW sources. In
several Member States, for example, the requirements of their legislative implementation of the Packaging and Packaging Waste Directive are for the segregation at source of all household plastics packaging waste. In the case of collection to sorting then sometimes the discard rates from a MRF (materials recovery facility) exceed 15% due to a variety of factors: inappropriate initial segregation, sorting ineffectiveness and inefficiencies and poor quality output materials due, for example, to co-mingling of the collection of dry recyclables, as is common in the UK. Perhaps if this residual material were to go to an energy recovery facility some benefit would be gained but there are still the environmental costs associated with the separate collection, sorting and processing, hopefully regained environmentally through the recovery of this material through EfW.

The environmental impacts of doing all this separate collection, sorting and processing of household plastics waste prompted the City of Vienna to limit separate collection of plastics from households just to certain hard plastics, predominantly bottles, in order to limit the amounts of plastics collected and sorted. Any plastic waste not collected would in any case go through to Vienna’s three energy recovery facilities. Otherwise the plastics waste having gone through the sorting facility would have been baled for use as a fuel in a cement kiln in Austria and a payment made by the City for each tonne used by the cement company. This still occurs but on a reduced scale compared to the 1990s.

In the case of Italy, Germany and most other European countries there is a legal requirement to collect all consumer plastics packaging waste. Therefore there are high costs and minimal overall environmental benefit for the processing of a fraction of mixed plastic that ultimately go to cement kilns or to the limited number of incineration plants meeting the R1 criterion. Also there will be the premium payments paid by the packaging compliance scheme for the privilege to be able to fulfil their contractual and legal obligations for the recycling and recovery of packaging waste collected by the municipalities.

For the future for plastics packaging there are two positive perspectives that can be picked out. One is the fact that, with high oil prices and consequent high plastics prices, there are a number of plastic polymers that now have a commercial value, such as polypropylene (PP) bottles and containers, now frequently separated for reprocessing in the UK, for example. The other is that industrial companies are becoming more inventive in greater sorting of different polymers and also in using mixed plastic wastes for production of a wider range of products, beyond the plastic lumber traditionally associated with mixed plastics recycling. However, not all of these processes will be classified as recycling. The use of plastic waste for production of diesel fuel, for example, even if proven on a large scale commercially, would not of course be classified as recycling as far as the EU is concerned but as a recovery operation.

**The top of the waste hierarchy has to be utilised – therefore focus on reduction, reuse and substitution**

The expected growth of plastic usage worldwide combined with increasing resource scarcity, makes it obvious that reduction, reuse and perhaps substitution both for certain uses and the use of renewable feedstocks are tools that have to be integrated into a successful European strategy on plastic waste. Actions to be taken should include:

1. **Waste prevention** – several aspects including design and the potential for re-use of plastic items. Reduction of the amount of plastic used in different applications due to smarter product design and thereby lower amounts of plastic used per product manufactured. Reduction actions are relevant both for thermoset plastics and thermoplastics and can be introduced into rules and guidelines of eco-design. Furthermore, economic incentives, such as extended producer responsibility, can be a driver for resource reduction initiatives. However, there may also be an argument for increasing the thickness of some plastic film products, such as the widely used single use carrier bag. Thicker gauge bags would be easier to re-use and subsequently recycle. The progression of this policy can be achieved through the banning of single use plastic bags or taxing or making a compulsory charge for all plastic bags. In the case
of Italy because of the issue of contamination of compost by plastic bags, since 2010 only compostable plastic bags are permitted to be used by retailers but again a charge is levied.

2. Reuse of plastic products, parts thereof, and for packaging will become increasingly important. In the same way as for reduction initiatives, extended producer responsibility and rules on eco-design can be used as drivers for greater reuse. This is especially the case for plastic packaging where the introduction of and more widespread use of reusable packaging solutions can contribute substantially to plastic reuse, especially if European standards for such packaging solutions and deposit schemes for them are introduced and made compatible on an EU-wide basis. This would be most easy and effective for primary and secondary packaging products. Increasingly retailers in European countries are adopting the use of returnable transport containers especially for manufacturing industry and in retailing for fruit and vegetables, often for European-wide logistics systems. In the latter case, this change has substantially reduced the amounts of wood and cardboard used for packaging of fruit and vegetables. Nevertheless, there are still further opportunities that could be exploited.

3. Substitution of fossil-based plastics by non-fossil renewable materials, preferably from cellulose based materials such as paper, cardboard and wood and especially agricultural wastes. In order to avoid issues associated with diversion of food resources no agricultural products normally used as food sources should be used as a basis for bio-plastics production. There is also the issue of "micro-plastics", plastic based nano-materials which can escape into the environment with uncertain longer-term consequences. There might be advantage to have these based on renewable resources.

4. Use of re-usable polycarbonate bottles in place of glass bottles and single use plastic containers, currently has limited application with very localised systems but could be more widely utilised. For some types of packaging uses the substitution of non-reusable plastic packaging with reusable glass packaging might be beneficial.

**Primary collection is crucial to sound handling of plastic waste**

Collection of plastics is the most expensive element in the whole of recovery to reprocessing process with therefore a need to ensure maximum payloads to minimise the resource costs of collecting and initial transport of plastic wastes. This is most significant for plastic wastes from the household sector.

If not collected and transported to processing, recycling or other treatment facilities in an orderly way, plastic waste will be, and at its worst still is in some parts of the EU, dumped close to residential quarters or burned in an uncontrolled manner. More likely, smaller items of plastic waste film will be blown around in urban areas before finally ending up clogging drains, being eaten by animals, going into water courses and becoming marine litter or in other ways disrupting natural ecosystems. This is as far from economically sound, resource efficient and environmentally friendly handling of plastic waste as one can imagine.

Well functioning collection systems for plastic waste are a crucial prerequisite for economically sound, resource efficient and environmentally friendly handling of plastic waste. Therefore, ensuring that the Member States fulfil their obligations to establish proper collection systems has to be a key issue for the Commission. Of course, collection of source separated plastic waste or co-mingled recyclables are by far the most preferable options, but naturally, in the lack of other alternatives, collection of mixed waste, including all plastic wastes, is better than no organised collection at all.

**Material recycling of thermoplastics is resource efficient and a great European business opportunity**
With continuing growth in plastic usage worldwide in combination with increasing resource scarcity, it is obvious that well-functioning and highly efficient plastic recycling operations, especially when it comes to thermoplastics, would be a business well worth investing in. Europe has the know-how, the skilled work force and the infrastructure needed and with the proper framework conditions in place European recycling of thermoplastics is environmentally friendly, resource efficient and can be made economically viable (see example in appendix from UK). The European Union can play an active role providing those framework conditions.

First of all, promoting collection schemes for plastic waste for recycling and supporting a high level of recyclability for the plastic products put into the market are important actions that will secure a stable supply of waste plastic for the recycling industry. Increasing the coverage of collection schemes, either for collection of source separated plastic waste or for collection of co-mingled recyclables for post-collection sorting, will secure the supply of waste plastic for the recycling industry. In addition to good coverage for collection, it is also important to ensure that the plastic products produced are easy to recycle. Special focus should be put on avoiding hazardous materials within plastic items, as well as avoiding composite materials where not necessary on health and safety grounds. Avoiding colourants that reduce the value of reclaimed plastics and perform no other property than a marketing function should be an essential guiding principle for eco-design. It is also important to ensure that bio-plastics introduced on the market can be mixed with fossil-based plastic to avoid negative effects on the recyclability of the plastic waste. Such priorities should be introduced into future guidance on eco-design.

Processing of plastics waste by sorting and baling to provide viable amounts of single polymers, increasingly also colour sorting as well in the case of PET containers, is an important first step in the transformation of plastics waste into new products. Having initially relied on hand sorting, still often used in older MRFs there is now a wide range of equipment that can undertake the sorting of different types of polymer. Nevertheless often visual/manual final quality control is still undertaken in many sorting plants. Occasionally there have been companies that have taken advantage of flows of non-mainstream materials that were contaminants and which were previously being rejected or exported in order to establish a new potential feedstock stream so that polypropylene containers are being separated at MRFs in addition to PET and HDPE bottles. There is an increasing number of MRFs that are now separating a wider range of polymers coming from packaging items, such as pots, tubs and trays in order to pass these through to specialist plastic MRFs and then onto specialist reprocessing facilities.

Besides stable supply, commonly acknowledged material grades and consistency in quality of those grades are important for building trust in recycled plastics and thereby to secure a long-term demand for recycled plastic. Standardisation of material grades and quality assurance methods have to be developed in cooperation between producers of plastic products, suppliers of recycled plastic and quality assurance bodies. The European Union can play an important role in this process as facilitator and network node as well as by securing transparent and concomitant coordination between voluntarily standardisation agreements and mandatory legislation.

Furthermore, the European Union can provide the economic conditions needed for further development of the European plastic recycling business. One part of such a task, is to set aside seed capital for research into enhanced technologies, improved processing and market development of the industry and thereby supporting the development of a more effective, efficient and safe industry. In addition, shifting taxes from labour to materials would give reclaimed plastic an even greater value and strengthen the position of recycled plastic in comparison with plastic produced from virgin raw materials. At the same time lower labour costs would reduce the collection, processing and production costs for recycled plastic.

In addition, new green public procurement policies can be an effective tool to increase the demand for recycled plastic and thereby support the development of the European plastic recycling industry.
Finally, effective enforcement of the environmental legislation creates a level playing field based on sound market mechanisms and supports the establishment of facilities and infrastructure needed for proper handling of plastic waste. Furthermore, poor enforcement hinders the pursuit of irresponsible waste producers and dubious waste processors and exporters who obtain an unfair economic advantage over soundly based and environmentally conscientious waste producers and recycling companies. Obviously, when it comes to strengthening the enforcement authorities and to engage in the international fight against waste trafficking, the European Union and European-wide regulatory organisations, such as IMPEL, have an important role to play.

**Bio-plastics**

The term "biodegradable" itself is often misunderstood by consumers but also by many dealers and suppliers of biodegradable plastics. This misunderstanding is linked to the properties of:

- recycling of bio-plastics by means of AD or composting
- the proportion of renewable “ingredients” in bio-plastic materials and products

"Naturally compostable” should refer only to materials and products that are proven (certified) to be technically biodegradable in composting or AD plants and hence can be processed according to at least one of the following standards:

1. EN 13432:2000: Packaging - Requirements For Packaging Recoverable Through Composting And Biodegradation - Test Scheme And Evaluation Criteria For The Final Acceptance Of Packaging

Following experience in bio-waste collection and recycling there is a need for reinforcement of legal requirements to make a clear distinction between compostable- and technically-biodegradable only bio-plastics and this would be warmly welcomed. Reinforcement of legal requirements should explicitly set a clear distinction between bio-plastics suitable to be recycled in AD and/or composting processes and those that are not. The term biodegradable should be equivalent to compostable and thus should be associated only with bio-plastics (or appropriate fossil based plastics) complying with the EN standards noted above.

Hence bio-plastics not recyclable in composting or AD-plants, as stipulated by the testing scheme established by the CEN standards, for example, oxo-degradable plastics, should not be labelled as biodegradable.

*Legal requirements should be enforced by introducing mandatory information on bio-plastic products to inform consumers and should be clearly linked to the possibility of recycling them because of the increased demand for separate collection schemes for bio-wastes.*

Bio-plastics that cannot be processed in accordance with the three EN standards noted above should be labelled only as “degradable”, without the prefix “bio”, so to minimise confusion over this issue.

With a view to safeguarding recycling processes well established by the EU’s composting sector (and in a more limited but rapidly expanding sector of anaerobic digestion of biowaste) requires oxo-degradable plastics being excluded from biological recycling plant. The ban should be introduced as soon as a strategy for separate collection and recycling of bio-waste is started.

The composting sector can act as a significant treatment for assuring material recycling of bio-based plastics. It must be noted that non-compostable fractions are usually delivered together with bio-waste into composting facilities.
Current evidence shows that biodegradable plastics already play a significant role in some EU MSs in at least three distinct sectors:

a) Separate collection of bio-waste, and specifically the most putrefiable and moisture rich part of it, namely food waste: a large variety of bags and liners are currently used to facilitate and enhance separate collection and recycling in a biological treatment site (either aerobic or anaerobic).

b) Biodegradable packaging-products and/or materials, that are marketed as “green” packaging.

c) Other bio-based goods and materials, such as chewing bones for dogs, cutlery, dishes and other tableware suitable for processing in a biological treatment site (either aerobic or anaerobic).

Composting represents the most commonly applied recycling process for separately collected bio-waste in the EU, both in terms of number of plants and annual capacity. Hence bioplastic items, once they become waste, are closely linked to aerobic and anaerobic digestion (AD) recycling processes, with both aiming to produce high-quality products in terms of producing certified end of waste materials.

Experience of separate collection schemes for food waste in EU countries, such as: Italy, Spain, the UK and more recently Austria and from the more limited approaches in Germany, shows that the use of biodegradable (compostable) plastics is highly compatible with separate collection and recycling schemes for bio-waste. **Hence framework conditions should forbid the use of bio-plastics for separate collection of bio-waste that are not compostable according to EU-Standard 13432. Indeed, framework conditions should promote diffusion of compostable biodegradable bags to be used as liners for kitchen caddies and wheeled bins.**

Further promotion should address the marketing and distribution of food products in retail and supermarket chains and in the fast-food sector, since both the food to be sold and its packaging could be treated as a combined single solid-waste stream and recycled in composting and AD plants.

The composting sector can be a significant means to enable the recycling of bio-based plastics. However often non-compostable fractions are also delivered to composting plants (proportionally 3-5% and above) in EU MSs with a mature composting sector, for example: Germany, Austria, Italy and the UK. According to the Italian Composting and Bio-gas Consortium about 53k tpa of plastic-bags were managed as rejects in Italy’s 280 composting plants. Plastics rejects have a share of 30-40% of total rejects and so the Italian composting sector had to sustain a cost burden of € 4.8 million approximately to dispose up to 40,000 tpa of waste plastics. Thus, if these bags were to be made of (compostable) bio-plastics they could easily undergo material recycling, representing a net revenue for the sector. Hence the decision to taken in 2010 by the Italian government to only allow the use of bio-plastic bags by retailers in order to ensure both higher quality compost and reduced costs for composting plants in Italy. Therefore producer-responsibility appropriately applied to bio-plastics could represent an additional income for the already established bio-waste recycling sector in the EU.

**Behavioural Factors**
The main issue facing the plastics recovery system is the importance of ensuring consumers separate and place plastic items into segregated containers for their collection as the first stage in the system. Promotion of the separation message to consumers has close links with behavioural aspects with messages to stimulate the consumers to do the right thing with their plastic waste items. There is the need to ensure that messages are simple and easy to follow to ensure maximum separation of appropriate types of plastic waste are segregated but also that consumers are not presented with conflicting advice. Clearly that promotion is easiest where there is a uniform approach to the collection of plastics nationally.

Regulation throughout the recovery system is necessary, especially trans-frontier shipment requirements. There is concern about the export of plastics to other countries, especially to those in South East Asia, which are the destination for an increasing proportion of all types of plastics not just plastic packing films and containers, which is the main focus of attention but also plastics sourced from WEEE and ELVs. While the environmental impacts of this transport have been shown to be minimal there are concerns about the quality requirements imposed by the importing countries, which look tough but often are minimal in reality.

Bi-lateral agreements and increasingly stringent quality and health requirements have been placed on plastic waste imports by more importing countries. While the export of plastics from the EU to countries outside the OECD can be curtailed by the importing countries, very few of those countries have imposed little more than token restrictions. More significantly is the concern that while high standards for the plastics waste flows are required both by exporting and importing regulatory authorities often the degree of contamination acceptable to processors in the importing countries is higher than acceptable for those reprocessors in the exporting countries. In addition to higher costs for further sorting and processing the reprocessors also face higher costs for the treatment and disposal of contaminating wastes that are rejected through the processing system.

More recently it appears that the Chinese authorities have been stepping up their systems of regulatory control for reclaimed plastic imports into China. In addition to checks on the sorting plants, where inspectors give only 24 hours notice the customs inspectors in China are undertaking more rigorous checks on containers arriving in China. While this has caused considerable disruption for exporters and shipping companies it has shown that there is a need to be ever more vigilant regarding quality controls within sorting plants. It should also assist the European reprocessors to compete on a more equal basis.

**Marine litter is a global problem that has to be solved by international cooperation**

Marine litter is a not a necessary consequence of global trade but once out into the environment plastic waste can be transported by wind and water throughout the world and is unaffected by national or administrative borders. However, products produced in one part of the world, will be discarded in another part and, if not taken care of properly, might as well end up in a third part of the world as plastic islands (gyres) or other types of marine litter, harming marine ecosystems as well local communities and businesses.

Of course, the European Union should put its own house in order by providing full coverage for primary waste collection, establishing proper treatment options and initiating campaigns in order to change attitudes
to littering at roadsides, beaches and other public places, but when that is said, engaging in international cooperation is at least as important as what can be done at home. Engaging in development projects in order to increase the capacity in infrastructure needed for proper collection and handling of waste where these are less developed than in the European Union is crucial. It might be a good idea to place priority on marine litter and plastic waste within the European Union’s new neighbourhood policy, but the engagement must go further than that. In addition, to address problems related to proper handling of waste from shipping vessels, such as infrastructure, incentives and enforcement supporting waste collection by offloading waste in harbours rather than dumping at sea has to be a key focus point within the European Union as well as on the international arena through the IMO (International Maritime Organisation).

Appendix: case study of PET and HDPE Reprocessing Facilities in the UK

In the UK there has been an interesting development with regard to the recovery and recycling of PET and HDPE containers so that there is now greater capacity for the reprocessing of these items through to materials for reuse in new containers. This happened for several reasons but the principal factor was a guarantee from a major retailer to support the price of the materials recovered from used items, a significant voluntary extended producer responsibility initiative. In addition, the fact that there was an already well-established supply chain in the UK for discarded PET and HDPE containers, mainly to South East Asia. Therefore it was easier to divert some of those supplies away from that long-established trade route. However, it should be noted that this diversion was on a market trading basis so that there is still trade with the Far East, the Netherlands and other countries where these countries offer a better deal than the UK reprocessing facilities. There was in addition some regional development funding and loan support provided in order to set up some of the six facilities now operating in the UK for reprocessing PET and HDPE containers.

ISWA, Vienna draft of 16.07.13