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Energy and Transport Tax Team
HM Treasury
1 Horse Guards Road
London
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By email to ETTanswers@hmtreasury.gsi.gov.uk

30th May 2018

Dear ETT team,

Re: Tackling the plastics problem: using the tax system or charges to address single-use plastic waste

Thank you for inviting evidence on the problems associated with single use plastics and asking how the tax system or charges could address them.

The Renewable Energy Association's evidence in this document takes into account our commercial scale composting and anaerobic digestion operator members' experiences of managing plastics contamination in the biodegradable wastes they receive, biodegrading certified compostable packaging and non-packaging products in their facilities and supplying composts and digestates for use. We have also commented on the potential for Advanced Conversion Technologies (ACT) to make useful resources from wastes that include plastics, for example gasification and pyrolysis processes geared to making use of residual wastes.

We hope you find our response useful and would be pleased to clarify or discuss any of it if you were to request it.

Yours faithfully,

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REA response to HM Treasury's call for evidence on Tackling the plastic problem: using the tax system or charges to address single-use plastic waste

About the REA

The REA is a not-for-profit trade association, representing British renewable energy producers and promoting the use of renewable energy in the UK. It has around 550 corporate members, making it the largest renewable energy trade association in the UK. The REA helps its members build commercially and environmentally sustainable businesses whilst increasing the contribution of renewable energy to the UK's electricity, heat, transport and green gas needs. Its membership also includes composters, following the merger of the Association for Organics Recycling (formerly the Composting Association) in 2013. The REA has 208 members who have joined its 'Organics Recycling Group' (many of these operate commercial composting facilities), 208 members who have joined its 'Biogas Group' (many of these operate commercial scale anaerobic digestion facilities) and out of these, 89 members have joined both groups. Additionally, the REA also represents the energy from waste sector, with members involved in the delivery of advanced conversion technologies and traditional energy recovery projects.

The REA endeavours to achieve the right regulatory framework for renewables and organic waste recycling to deliver an increasing contribution to the UK's electricity, heat, recycling and transport needs. The Wood Heat Association is a subsidiary of REA, the largest renewable energy industry association in the UK. More info about the REA is at https://www.r-e-a.net/about

Renewable Energy Assurance Limited is a subsidiary of the REA. It's certification schemes include assessing and certifying the quality of waste-derived composts (termed Quality Composts by REAL) and digestates (termed Biofertisers by REAL), the compostability of packaging and non-packaging materials and finished products, and the amount of bio-based (see below) content in packaging and non-packaging products that carry 'bio-based' claims. More information is available at http://www.renewableenergyassurance.org.uk/

General points about the REA's response

Most of the REA's response is from the perspective of our members who commercially produce composts and digestates from biodegradable wastes that come from UK households and the following sectors: food supply chain, food retail, food service, hospitality and retail.

Scope of the call for evidence: it appears that evidence will be considered in all countries of the UK, by the government and the devolved administrations. The REA's answers take account of this interpretation of scope.

Organics recycling

In this response, unless the REA states otherwise the 'UK organics recycling industry' means commercial scale composting, anaerobic digestion (AD), aerobic digestion and hybrid treatment systems that include a digestion phase and a composting phase. Many of these UK facilities treat separately collected biodegradable wastes from at least one of; municipal, commercial / business / industrial, agricultural or forestry sources. Unless stated otherwise in this document, organics recycling means the biodegradation of biodegradable wastes leaving a residue that is largely compost or digestate, and in the case of AD the biogas produced is also a valued output. Annex A provides UK organics recycling industry key statistics for the year 2014, which are the most recent ones available.

In this response the REA has not discussed the circumstances in which organic recycling is classed as recycling and other circumstances in which it is classed as recovery. This is relevant to the overhauled PRN system that we and other respondents have called for but we have not discussed how the improved system could support recycling more strongly than recovery; this seems to be detail that could be discussed with HM Treasury and

government in due course. Unless stated otherwise in this document, the REA has used 'organics recycling' as a term that includes organics facilities that recycle biodegradable wastes and organics facilities that recover them.

Terminology

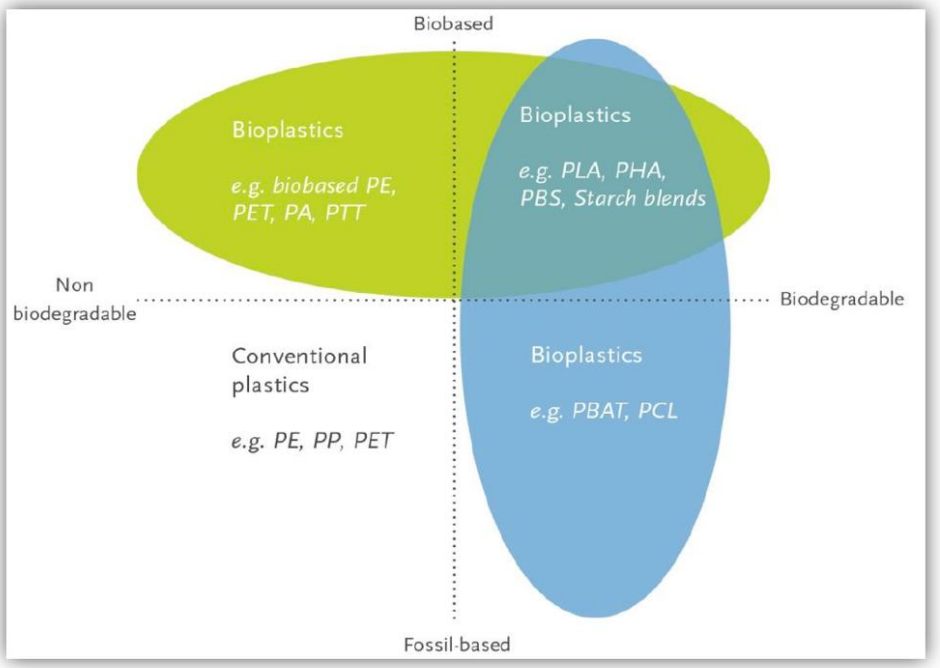
The term 'bioplastics' describes a range of materials with differing properties and applications. They are categorised into three major groups. The group a bioplastic item belongs to depends on whether it is;

a) biodegradable,

b) bio-based (made from renewable resources such as plants that have not been fossilised or includes a qualifying proportion of material from renewable resources), or

c) both biodegradable and bio-based.

The terms 'bio-based' and 'biodegradable' are not interchangeable because biodegradable bioplastics can, for example, be made from petroleum and not all bio-based bioplastics will biodegrade. Please see http://bbia.org.uk/faq/ and chart 1 for more information.



Source: Bio-Based and Biodegradable Industries Association (BBIA)

In this response, where the REA refers to plastic-like compostable packaging or non-packaging products we mean those which are independently certified compliant with a suitable standard (see below); criteria include their adequate biodegradation under laboratory conditions that simulate commercial-scale composting environments or commercial-scale 'wet AD' followed by a phase of composting of the separated solids.

Materials and standards

A wide range of packaging and non-packaging product items can be designed and manufactured to be compostable in their finished form. Some are plastic-like in their look and feel (from a layman's perspective) while others are made from materials that are not plastic-like, such as bags and sacks made from wood fibre derivatives. Whatever biodegradable material they are made of, they must be certified compostable and appropriately visually marked so that such products become widely recognised amongst staff working in relevant business sectors and consumers.

In this response the REA refers to packaging (e.g. flexible film wrap) and non-packaging product items (e.g. straws, liners for kitchen food waste caddies and liners for food waste bins) that, in their finished form, are

'certified compostable' by an independent certification body. This means packaging and non-packaging product items that have been independently assessed and certified as conforming to at least one of the following standards: BS EN 13432[1], BS EN 14995[2] or ASTM D6400[3]. The BS EN 13432 standard also sets criteria for packaging designed to decompose in AD systems that include a phase of composting the separated, digested solids.

Independent certification of conformity and certification marking and coding on products

Independent certification of conformance with an accepted standard is necessary because we have found products on the market where the manufacturer has self-claimed compostability but does not have the evidence to support the claim. Products that carry false claims of compostability undercut the market for genuinely compostable products and cause problems at organics recycling facilities and operator mistrust of other products that carry compostability claims. It is important that certified finished form compostable products bear a certification mark and unique certification code. Any product that is too small to bear certification marking and coding could instead be packaged with a label that shows that the product inside is certified compostable, e.g. compostable straws. This marking and code bearing help individuals identify which packaging and non-packaging products are compostable and enable efficient third party checks on whether each product marked compostable has a valid certificate issued by an independent certification body.

In this response, where the REA writes about compostable products this means independently certified compostable ones unless stated otherwise.

REA's answers to HM Treasury's questions

DEFINITION

Qu 1. How should the government define single-use plastics, and what items should be included and excluded, and why?

Answer to Qu 1

The Directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment (see https://g8fip1kplyr33r3krz5b97d1-wpengine.netdna-ssl.com/wp-content/uploads/2018/04/2018-04-27-11-52_01.pdf) uses a clear definition under Article 3. This directive has been recently proposed and is under discussion.

The REA supports this proposed directive's definition of a single-use plastic product: 'a product made wholly or partly from plastic that is not conceived, designed and placed on the market to accomplish within its lifecycle multiple trips or rotations by being refilled or re-used for the same purpose for which it was conceived.'.

The definition should be worded such that it includes all types of item regardless of whether made from renewable, non-renewable resources or a mixture of both, and regardless of how it degrades after use and whether it is recyclable, recoverable (e.g. at an energy from waste facility) or only suitable for disposal (e.g. in landfill).

[1] BS EN 13432:2000. Packaging. Requirements for packaging recoverable through composting and biodegradation. Test scheme and evaluation criteria for the final acceptance of packaging.

[2] BS EN 14995:2006. Plastics. Evaluation of compostability. Test scheme and specifications.

[3] ASTM D6400 – 12. Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities.

Use of the wide definition suggested above would maximise the scope and robustness of a policy on single-use plastics. Government could then set very specific criteria for any essential single-use plastic items which it believes should be exempt from any taxes or charges applicable to non-essential single-use plastic items.

ASSESSMENT

Qu 2a). What are the most important problems associated with single-use plastics, and why?

Answer to qu 2a)

Single-use plastics are frequently present in problematic amounts in biodegradable wastes separately collected from households and some commercial sources (e.g. restaurants and retail stores). For the UK organics recycling industry the significant problems associated with single-use plastics are;

i) the practical limitations on their removal from biodegradable wastes (removal of all pieces is impossible given the available time and resources [staff assigned to the job, machinery and space]),

ii) falling gate fees, which means that some composting facilities in areas where there is much competition for biodegradable waste feedstocks[4] operate on very slim margins and struggle cover costs associated with managing contamination in biodegradable wastes, plastics tending to be the main contaminant type,

iii) inadequate clauses in some organics recycling contracts on maximum allowable biowaste contamination by plastic and surcharging for managing plastic concentrations above zero but below the specified maximum or for rejecting biowaste deliveries whose plastics concentration is within this range but is too costly or time consuming to 'clean up',

iv) residues of plastic in composts and digestates made from biodegradable wastes, which in some cases have prevented the compost / digestate from being placed on the market as a product (causing loss of product sales revenue for the producer) and in other cases have prevented the compost / digestate from being spread on land under waste regulatory controls (the cost of other recovery (e.g. sending to an energy from waste facility) or disposal (e.g in landfill) being paid by the producer),

v) lower market demand for composts / digestates that have product status plus risk of loss of market confidence and loss of acceptance by quality assurance schemes for food and farming.

Findings from surveys

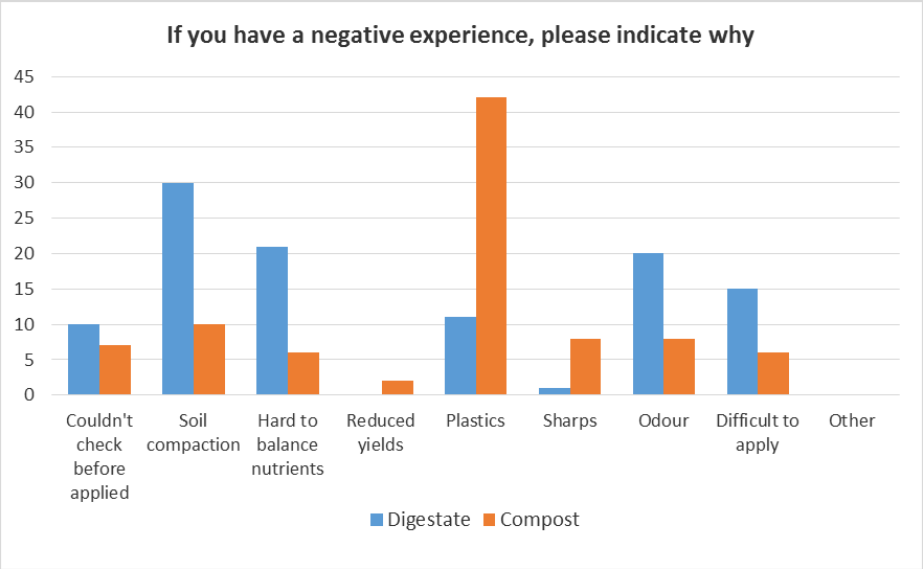
Surveys carried out in the UK in autumn 2016 as part of the (see http://www.organics-recycling.org.uk/page.php?article=3327)
have provided useful insight into the impacts of biodegradable waste quality
on compost and AD operators and how users view the quality of compost and digestate products.

'Both AD and compost operators clearly identified feedstock contamination as a significant issue affecting their businesses…AD operators more clearly identified commercial food waste as the most significant source of contaminants, although some operators found that household food waste was at least an equally important source of contaminants.
Compost operators most commonly identified both household and commercial waste as equal sources of contaminants, but a notable number of operators identified household food waste as the primary source of contaminants. This may reflect the type of feedstocks that composters typically process.'

[4] Feed-in-Tariff and, more recently, the Renewable Heat Incentive financial support has enabled the AD sector to drive gate fees down, as far as £0 (nil) in some localities and some AD operators are actually paying for biodegradable wastes.

More than two hundred people answered the survey on their views about the quality of compost and digestate products. Waste-derived composts and digestates that have product status are those which are independently certified compliant with the relevant End of Waste criteria[5]. Chart 1 below shows that just over 40 respondents reported a negative experience when using compost because of its plastic content and just over 10 respondents reported a negative experience when using digestate because of its plastic content.

Chart 1. Negative experiences of compost and digestate products and reasons why



Microplastics

A group of German researchers has published a paper (see http://advances.sciencemag.org/content/4/4/eaap8060.full) on 'the potential of organic fertilizers from biowaste fermentation [AD] and composting as an entry path for microplastic particles [those smaller than 5 mm] into the environment…All fertilizer samples from plants converting biowaste contained plastic particles, but amounts differed significantly with substrate pre-treatment, plant, and waste (for example, household versus commerce) type. In contrast, digestates from agricultural energy crop digesters tested for comparison contained only isolated particles, if any. Among the most abundant synthetic polymers observed were those used for common consumer products. Our results indicate that depending on pretreatment, organic fertilizers from biowaste fermentation and composting, as applied in agriculture and gardening worldwide, are a neglected source of microplastic in the environment.'

The researchers studied one 'biowaste composting' facility, one 'biowaste digester' (AD) facility and one 'agricultural energy crop digester' facility that processed only energy crops. The most abundant synthetic polymer types found were those used in common consumer products and the organic fertilisers made from biodegradable wastes from household and commercial sources contained more microplastics than digestates made from agricultural energy crops.

[5] England, Wales and Northern Ireland:
- the Quality protocol: compost (see https://www.gov.uk/government/publications/quality-protocol-for-the-production-and-use-of-compost-from-waste), its criteria including compliance with BSI's PAS 100
- the Quality protocol: anaerobic digesate (see https://www.gov.uk/government/publications/quality-protocol-anaerobic-digestate), its criteria including compliance with BSI's PAS 110

Scotland: Regulation of Outputs from Composting Processes (see https://www.sepa.org.uk/media/219843/wst-g-050-regulation-of-outputs-from-composting-processes.pdf), its criteria including compliance with BSI's PAS 100
Scotland: Regulation of Outputs from Composting Processes (see https://www.sepa.org.uk/media/219842/wst-ps-016-regulation-of-outputs-from-anaerobic-digestion-processes.pdf), its criteria including compliance with BSI's PAS 110

This research raises the question whether similar concentrations of microplastics are present in UK composts and digestates produced from household and/or commercial biodegradable wastes. Tests used in the UK on samples of composts and digestates produced from biodegradable wastes quantify and report the concentration of plastic particles that are equal to or greater than 2 mm in any dimension. The REA is working with other stakeholder organisations on the topic of microplatics.

Costs of dealing with plastics that arrive at organics recycling facilities

Based on information the REA has gained from members and from surveys of the UK organics recycling industry, the concentration of non-compostable plastics in biodegradable wastes delivered for organic recycling / recovery is, conservatively, 1 % weight for weight. Input tonnages to composting facilities totalled 5.92 million tonnes in the year 2014 and 'waste-fed' AD facilities reported treating 3.84 million tonnes that same year (see http://www.wrap.org.uk/sites/files/wrap/asori%202015.pdf). Assuming 80 % of those 9.76 million tonnes of waste contained, on average, 1 % w/w plastic, the UK organics recycling sector incurs an annual cost of **£7.26 million** (excl VAT) for removing approx. **78,080 tonnes of plastic** and sending it for recovery at Energy from Waste facilities. This is a very conservative estimate which does not include all costs incurred by the organics recycling sector for dealing with non-compostable plastics.

Assumptions made in the calculation and exclusions;

a) extraction of 1 tonne of plastic waste costs approx £10 / tonne of waste received at the organics treatment facility,

b) the cost of washing organic waste off the extracted plastic and managing the used wash water is excluded, or alternatively the extracted plastic is not washed and the value of the organic waste that sticks to it is lost at the organics treatment facility, and

c) the extracted plastic waste is sent to Energy from Waste facilities that charge a median gate fee of £83 / tonne excl VAT {in reality an unknown percentage of the extracted plastic waste goes to landfill (median gate fee of £107 / tonne incl landfill tax) instead of EfW; REA's perception is that the proportion of extracted plastic waste that goes to landfill is lower than the proportion that goes to EfW facilities}.

Excluded from the calculation;

a) the costs of transporting the extracted plastic waste from the organics treatment facility to the EfW facility, and

b) the costs of managing plastics at concentrations above 1 % w/w in wastes delivered to those AD facilities that accept at least some of their organic waste - usually separately collected food waste - bagged in non-compostable plastic (some of them have estimated that plastic is approx. 10 % w/w in waste delivered for treatment).

Our message: The UK organics recycling industry has measures in place for managing plastic contamination in biodegradable wastes and recognises the need for continuous improvement. We urge biodegradable waste suppliers, including local authorities, to take actions that reduce plastic contamination.

Policy ask 1: Reduction of plastic contamination would be helped by a strategy and supporting measures that, amongst other things, directs recyclable plastics to plastics reprocessors and certified compostable plastics to suitable types of organics recycling facilities.

Qu 2b) Which ***polymer types*** are particularly problematic?

Answer to qu 2b)

All conventional plastic polymer types are problematic in commercial composting and at any digestion facility that does not have suitable equipment for removing plastics before the organic waste is digested and at later stages in the treatment process. Problematic too are the types of bio-plastic that are not biodegradable, e.g. polyamide (PA, also known as nylon), polyethylene terephthalate (PET) and polytrimethylene terephthalate (PTT).

The German research referred to above found 11 polymer types in the samples of compost and digestate made from 'biowastes': styrene-based polymers (PS, acrylonitrile butadiene styrene, and styrene acrylonitrile), polyester (PES), polyethylene (PE), polypropylene (PP), PET, polyvinylchloride (PVC), polyurethane (PUR), polyvinylidene chloride (PVDC), polyamide (PA), and latex- and cellulose-based polymers. There was variation between the samples in terms of which polymer types were present.

Problematic also are oxo-degradable plastics, which are conventional plastics (polyethylene or polypropylene) with additives that assist their disintegration into smaller but still visible particles and then gradual degradation into particles too small to be seen by the naked eye. They are a particularly problematic polymer type for commercial producers of composts and digestates because;

i) manufacturers / suppliers of such plastics tend to claim they are 'biodegradable' but there is widespread lack of understanding that a 'biodegradable' claim does not a guarantee that the plastic item is 'compostable' (nor is it a guarantee that a plastic item is 'aerobically digestable' or 'anaerobically digestable'),

ii) oxo-degradable plastics have been present in household-source biodegradable wastes, even where the local authority, waste collection contractor or another relevant party has advised / instructed householders to exclude unsuitable types of bag / packaging from their organics bin (many householders are unsure in which bin they should put plastic that carries a 'biodegradable' claim, some incorrectly choosing their food / garden waste bin),

iii) oxo-degradable plastics tend to <u>disintegrate</u> into visible pieces by the end of approximately 8 weeks of commercial scale composting but it takes too long for those pieces to <u>decompose</u> to the extent of being no longer visible to the naked eye, and their polyethylene or polypropylene content takes even longer to degrade to a high but incomplete extent,

iv) oxo-degradable plastics are not designed for degradation under anaerobic digestion conditions (where available oxygen is extremely limited and in addition, treatment temperatures in mesophilic anaerobic digestion systems with no pasteurisation high-temperature phase are likely to be inadequate),

v) if present at a concentration exceeding 0.12 % on a weight for weight basis in compost, pieces of oxo-degradable plastic larger than 2 mm;

   a. will cause the compost to fail to achieve product ('end of waste') status and the compost producer will lose product sales revenue and incur the costs of sending the compost to a recovery option or to disposal under waste regulatory controls, or

   b. may cause compost that has waste status to be refused authorisation to be spread on land under waste regulatory controls, resulting in the compost being sent to an energy from waste facility (£83/tonne median gate fee) or in landfill (£107/tonne median gate fee, incl landfill tax) and the compost producer also incurring waste transportation costs; and

vi) the same problems as described in v) occur if pieces of oxo-degradable plastic larger than 2 mm are in digestate at a concentration exceeding the relevant limit set in End of Waste criteria for digestates made from acceptable types of biodegradable wastes.

Oxo-degradable plastics have not been able to comply with compostability standards that the UK organics recycling industry and regulators accept (see our general points section above for reference to the relevant standards). This type of plastic is also contaminant in the system for dry recycling of recyclable plastics and if not

adequately removed during plastics sorting it can shorten the functional lifetime of long-life plastic products such as water-proof membranes used in the construction industry.

At least one producer of oxo-degradable plastics has promoted this environment-polluting plastic as a solution to the littering problem. There is no internationally recognised standard which sets criteria for sufficient biodegradability in the open environment, nor would it be feasible to establish one given the diversity of open environment conditions, nor wise to attempt developing such a standard or do anything that states or implies that littering is acceptable. Oxo-manufacturers' claims that their products are biodegradable have in the past led Tesco into purchasing lightweight carrier bags but after this retailer looked into recyclability after use and identified that the oxo bags were weaker than polyethylene bags, this retailer changed to providing customers with polyethene bags that have 15 % recycled PE content (see https://www.edie.net/news/5/Tesco-makes-u-turn-on-biodegradable-plastic-bags/20622/).

In the USA and in some other countries it is illegal practice to market oxo-degradable plastics as 'biodegradable'. Indeed, the European Commission in their 16th January 2018 Plastics Strategy declared they will take measures to limit the use of oxo-degradable plastics in the EU (see http://ec.europa.eu/environment/circular-economy/pdf/oxo-plastics.pdf)

Mulch film is used in agriculture for supressing weed germination and growth. It can and has been made from material that is not polyethylene or oxo-degradable plastic and is independently certified compliant with a relevant standard or well established criteria developed by a certification body with competence on this topic. Examples are;

a) BASF's product named 'ecovio M' is certified compliant with the European standard for biodegradation of mulch films in soil, EN 17033 (see https://www.basf.com/en/microsites/BASFatK2016/must_sees/ecovio_m.html for further info), and

b) 'Mater-Bi® mulching film' which is 'OK Biodegradable Soil' certified by the Belgian certification body named Vinçotte. The 'OK Biodegradable Soil' criteria are well established, their requirement for 90% of the mulch film to be converted to carbon dioxide within 24 months are the basis for the biodegradation criteria set in EN 17033 (see http://www.patilux.com/wp-content/uploads/2015/01/Mater-Bi_EN_v1-2.pdf for further info).

In its response to HM Treasury the Bio-Based and Biodegradable Industries Association (BBIA) has made additional comments about problems caused by and limitations of oxo-degradable plastics. The REA agrees with the BBIA's points and emphasises that such plastics are an unwelcome source of plastic residues in UK waste-derived composts and digestates.

Policy ask 2: Ban all uses of oxo-degradable plastics in the UK.

Qu 2c) Which ***items*** are particularly problematic?

Answer to qu 2 c)

The ***plastic*** items listed immediately after this paragraph are particularly problematic in commercial composting, and 'dry AD' because they are the types most likely to be present in biodegradable waste deliveries, are resistant to biodegradation, are impossible to thoroughly remove during waste preparation for the biological phase / phases of treatment and are difficult to remove during compost / solid digestate mechanical screening (a post-biodegradation, mechanical treatment step which aims to remove larger woody particles and contaminants such as metal and plastic) without also removing a commercially valuable proportion of the compost / solid digestate particles.

i. Single use and/or light- to medium-weight carrier bags (not 'bag for life' bags), made from plastic or plastic-containing material that is not certified compostable (such as polyethylene, polypropylene and oxo-(bio)degradable plastic).

ii. Bin liners made from any plastic or plastic-containing material that is not certified compostable.

iii. Sticker labels on unpackaged fruit and vegetable items which can be purchased singly and on bunches of unpackaged bananas.

iv. Tea bags.

The following ***plastic*** item types are problematic ***if*** present in biodegradable wastes delivered for composting or 'dry AD' because of their size, shape and resistance to biodegradation;

i. straws,

ii. stirrers,

iii. cutlery and PSM cutlery (the latter made from a blend of plant starch and 20% polypropylene),

iv. food-contact grade filter papers, e.g. used when making coffee drinks from ground coffee,

v. the stick part of cotton swabs / Q-tips / cotton buds, and

vi. cigarette filter tips.

Out of the lists above, non-compostable single-use and/or light- to medium-weight plastic bags, plastic bin liners and plastic stickers from unpackaged fruit / veg *tend to be the most problematic* because;

i. they are the plastic item types most frequently present in biodegradable wastes supplied for composting,

ii. they don't adequately degrade by the end of the composting process,

iii. the polymer types they contain are environment pollutants and users do not like seeing pieces of plastic in compost / digestate, and

iv. pieces of plastic greater than 2 mm can be present in composts, are counted as contaminant when sampled compost is tested and have caused a number of compost batches to fail[6] to achieve adequate quality. Each inadequate quality batch is then: a) further treated with aim of removing enough plastic, passing further quality testing and being used on land or in containerised plant growing in a variety of markets, or b) be sent to a landfill, incineration or energy-from-waste facility if the producer decides that removing enough plastic is too time consuming, too costly or too difficult.

Problematic item types for 'wet AD' systems (systems that rely on pumping and digesting organics-laden liquids) can be similar as for composting and 'dry AD'; this is heavily influenced by the types of equipment used during preparing waste for feeding into the digester and when separating solids from liquids after completion of the digestion phase / phases. A significant proportion of the UK's wet AD facilities do not separate solids from liquids after digestion, producing only unseparated liquid digestate in addition to the biogas. Together, the wet AD sector operators supply unseparated liquid digestates, separated liquid digestates and separated solid digestates for use on land.

Please note that some 'wet AD' facilities agree to food waste being supplied in plastic kitchen caddie liners and/or plastic bin liners, and use depackaging machinery to remove the liners before the food waste is fed into the digestion system.

Similarly as in composting, plastic that gets into the digestion phase / phases; a) does not degrade adequately by the end of the full treatment process, b) the polymer types they contain are environment pollutants, and c) any pieces of plastic greater than 2 mm in digestate are counted as contaminant when sampled digestate is tested and have caused a number of digestate batches to fail[7] to achieve adequate quality. Each inadequate quality batch is then: a) further treated with aim of removing enough plastic, passing further quality testing and being used on land or b) sent for recovery or disposal at an appropriate facility if the producer decides that removing enough plastic is too time consuming, too costly or too difficult.

[6] Unfortunately up to date statistics on the number of compost quality failures due to plastic content are not available. Feedback from stakeholders that include compost producers and users indicates that plastic contamination is one of the two most common causes of compost quality failure.

[7] Unfortunately up to date statistics on the number of digestate quality failures due to plastic content are not available.

Qu 3a) Are there more environmentally friendly alternatives, currently available or possible in the future, to these types of single-use plastic items or their manufacturing processes, and can they still offer similar benefits?

Answer to qu 3a)

There are compostable alternatives to each of the item types in our answer to question 2 b) except, as far as the REA knows, for cigarette filter tips and the stick part of cotton buds. A wide range of compostable packaging (e.g. single-use carrier bags) and non-packaging products (e.g. liners for kitchen food waste caddies and food waste collection bins) are available. The product types are not only those which are plastic-like in their appearance, feel and weight, but also those made of materials of natural origin, such as wood, wood fibre, cotton fibre, starch, paper pulp and jute.

In the context of maximising the circular economy value of biodegradable wastes, compostable packaging and non-packaging item types designed for use in conjunction with food and drink products or with soil, growing media and plants in the amateur horticulture sector are more environmentally friendly than those made of conventional plastic, oxo-degradable plastic or non-biodegradable bio-based material. This is because post-use the compostable ones;

i. can be co-collected with biodegradable wastes for decomposition in the 'wet AD' facilities that include a phase of composting digested separated solids, and in 'dry AD' facilities and composting facilities,

ii. tend to have biodegradable waste residue stuck to them which,

   a. is of value when making composts and digestates and generating biogas during AD treatment, and

   b. needs to be managed according to Animal By-Products Regulation rules if the biodegradable waste is an animal by-product type (e.g. catering wastes - which include household food wastes – and former foodstuffs that contain animal-derived material), which a significant proportion of the organics recycling sector is geared up to do,

iii. as alternatives to non-compostable packaging and non-packaging products they enable avoidance of organics operator time, effort and money being spent on

   a. removing non-compostable items, and parts of such items, from biodegradable wastes at the treatment facility and from the digestate / compost produced, and

   b. putting sometimes inadequate quality digestate / compost to other recovery or disposal routes,

Digestible products are being developed specifically for 'high solids' AD facilities. Some of the products are based on PHA (polyhydroxyalkanoate) and quote results from testing in accordance with the American standard ASTM D5511[8]. Unless the products are rapidly soluble or dispersible, a form of pre-treatment such as shredding is required to make them suitable for 'wet AD'. Lack of suitable pre-treatment may result in self-segregation by flotation or sedimentation in the digestion tank then require removal instead of being digested.

Qu 3b) Should the government encourage biodegradability in plastics, and if so, how?

Plastic-like products that are suitable for recovery or recycling in biodegradable waste treatment facilities are only those which are independently certified compliant with a standard relevant to the type of managed biodegradation environment. Relevant standards are named and referenced in the REA's general points section above and there may be potential for UK industry and regulator acceptance of products independently certified compliant with ASTM D5511 where they are intended to be recovered or recycled in 'high solids' AD facilities. There is also potential for government support for certified compostable packaging and non-packaging products that are not plastic-like yet provide adequate product function, e.g. paper bags for bakery products that can be bought singly, such as unpackaged pastries.

[8] ASTM D5511 - 18. Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions.

Policy ask 3: Where the following single-use or short lifespan plastic or plastic-containing products are currently used, encourage their substitution by compostable ones;

i. liners for kitchen caddies and outdoor bins that hold food wastes,
ii. sticker labels on unpackaged fruit and vegetable items which can be purchased singly and on bunches of unpackaged bananas,
iii. bags available in retail stores' fruit, vegetable and bakery sections for putting single, unpackaged food items in,
iv. tea bags,
v. coffee pods / capsules,
vi. food-contact grade filter papers,
vii. food service disposables which cannot easily be avoided and are likely to have residues of food, ground tea, ground coffee or milk/cream-containing liquid on them after use (Vegware's response to HM Treasury includes useful detail about compostable food service disposables), and
viii. in the amateur horticulture sector, products in contact with growing media, plant roots or plant parts and which are not designed for long-lasting use, such as thin-wall-and-base trays and pots for germinating and growing plants, and plant identification labels designed to be inserted in the soil or growing medium alongside the plant.

Note about item i: Such liners are useful where food wastes are destined for treatment at composting or 'dry AD' facilities or 'wet AD' facilities that include a composting phase for separated digested solids. The REA acknowledges that a number of UK 'wet AD' facilities agree with suppliers of household food waste that it is supplied in polyethylene liners.

Please see the parts of REA's answer to questions 4 and 18 that tackle the topic of single-use and/or lightweight plastic carrier bags.

Fresh produce packaging is something that could be considered in terms of ***which*** packaging item shifts to certified compostables would be sensible (e.g. in terms of shelf-life benefits and for which there is no dry/mechanical/thermal recycling route/infrastructure nor prospect that this would become available and economic). Change should be brought about incrementally rather than suddenly, e.g. through cross industry category shifts, such as switching to certified compostable packaging for all tomatoes.

The REA's answer to question 18 includes more on the topic of how targeted substitution of appropriate plastic packaging and non-packaging products by compostable ones could be encouraged. Our aims are that demand for certified compostables develops such that production economy of scale enables them to be price competitive, they substitute the targeted plastic product types and at least a very high percentage of them are decomposed in organics recycling facilities post-use.

Single-use plastic item types that are already being recycled via the system for dry recyclable wastes should continue to be designed and produced as recyclable products and be recycled post-use, e.g. PET bottles. Future development of plastic products intended to be recycled through the dry recyclable wastes system should be co-ordinated with compostable packaging and non-packaging products, the aim being to avoid unnecessary complexity and potential confusion.

Qu 4. Are there single-use plastic items that are deemed essential by their nature or application, which cannot be substituted or avoided?

Answer to qu 4

In the time available the REA has answered about some of the specific plastic item types we highlighted as particularly problematic in our answer to question 2b).

Single-use and/or lightweight plastic carrier bags (not 'bag for life' bags)

Their substitution by certified compostable carrier bags would be beneficial if, post-use, most of them were to be decomposed at composting or digestion facilities or fed into energy-from-waste facilities and thus directed away from the waste streams that go to dry recycling facilities and materials reprocessors. Supply and use of certified compostable carrier bags fits in local authority areas where food waste is collected and treated at composting or 'dry AD' facilities or at 'wet AD facilities that include a phase of composting separated digested solids. Such substitution also fits where businesses have food waste arisings or are in the food service sector and have food/drink-soiled disposable packaging and service-ware wastes and want to send their biodegradable wastes to organics recycling facilities.

Standards and criteria in certification scheme rules, and testing and certification services for home compostable products are also in use. Providing an example, the food retailer Co-operative has made lightweight home compostable carrier bags available for consumers to purchase in some areas in the UK (e.g. see https://www.co-operative.coop/media/news-releases/the-co-operative-is-first-to-offer-compostable-carriers-in-hundreds-of-stores and https://www.packagingnews.co.uk/news/the-co-operative-offers-compostable-carriers-in-hundreds-of-stores-15-01-2014). This has provided a further beneficial use option for householders who can use these bags for lining their kitchen food waste caddies then home compost the bag and its contents or, if the food waste collection service allows it, put the bag and its contents into their food waste bin. This is an example of a beneficial dual-use product that suitably biodegrades under home or commercial composting conditions or if commercially digested, in a treatment process that includes a phase of composting digested solids. Certified home compostable carrier bags can play a valuable role in substituting single-use and/or lightweight plastic carrier bags.

Liners for kitchen caddies and bins that hold food waste

There is further potential for certified compostable liners to substitute polyethylene ones. Supply and use of certified compostable liners fits in local authority areas where food waste is collected and treated at composting or 'dry AD' facilities or at 'wet AD facilities that include a phase of composting separated digested solids. Certified compostable liners are also appropriate substitutes for use in businesses that have food waste arisings or are in the food service sector and have food/drink-soiled disposable packaging and service-ware wastes and want to send their biodegradable wastes to organics recycling facilities.

Local authority supply of certified compostable liners free of charge to householders has been part of a package of support measures that have increased the amount of food waste separately collected.
WRAP's household food waste collections guide (see http://www.wrap.org.uk/content/household-food-waste-collections-guide) draws on the findings from pilots WRAP undertook with 11 local authorities between 2013 and 2015 to implement cost-effective solutions aimed at increasing food waste for recycling. 'Delivering [support] materials to households can have a positive impact on increasing the tonnage of food waste collected from the kerbside. This is particularly the case when a 'package' of a residual bin sticker, a leaflet and a roll of caddy liners is provided to residents. This package represents the best value for money solution to raising participation, particularly as there are efficiencies in delivering all measures simultaneously.'

In two pilot trail areas where this package of support materials was supplied, pilot trial area 3 showed a 62 % increases in weekly tonnages of food waste collected and an 18.2 % increase in the number of participating households, while pilot trial area 4 respectively showed 36 % and 23.8 % increases. WRAP's guidance then goes on to advise: 'The supply of liners should be free, continuous and in sufficient supply for households. This will help to manage residents' expectation of the service, maximise its cleanliness and avoid the cost barrier for many households.'

Research supported by WRAP (see figure 6 in WRAP's report at http://www.wrap.org.uk/sites/files/wrap/3Rs%20Recycling%20Highlights%202015%20FINAL%20FOR%20PUBLICATION.pdf#page=12) has found that amongst 394 surveyed households that don't participate in their local food waste collection service, having to pay for liners was the main barrier amongst 4 % of them and amongst the top 4 barriers amongst 12 % of them. In addition, 2 % of households said their main reason for non-participation was 'Don't have any caddy liners / don't know how to get hold of them' and 7 % cited this amongst their top 4 reasons for non-participation. Together, when focussing on top 4 reasons for non-participation, having to pay for liners, not having any liners and not knowing how to get hold of them were part of the participation barrier reported by 19 % of the surveyed households.

REA comment: although the unit price difference between compostable and polyethylene liners isn't the only factor that influences whether a local authority provides householders with liners free of charge and exactly which liner products local retailers and on-line retailers stock, we know that the lower unit price polyethylene liners and the behaviour of one local authority resulted in at least one organics recycling facilities accepting these types of liners when it wouldn't otherwise have done so and incurring higher plastics and digestate management costs. The REA is not aware of any survey that has investigated the extent to which the lower unit price for polyethylene liners influences householders to buy and use them in areas where the local authority advises householders to buy and use only compostable ones if they want to use liners.

Sticker labels on singly sold, unpackaged fruit & vegetables
Inadvisable to avoid because potential to purchase fruit/veg singly helps avoid food waste and minimise food packaging and supports quick pricing at the checkout. The plastic sticker labels could be substituted by compostable ones. The latter would be larger because they would need to include their certification mark and certification code but a size increase that enables verification of the sticker label's compostability seems feasible.

Tea bags
Substitution seems likely to be feasible. The retailer Co-op Food is developing for its entire own-label standard tea range, tea bags that 'will be fully compostable in food waste collections after use' (see https://www.co-operative.coop/media/news-releases/the-new-green-tea-co-op-brews-up-solution-to-plastic-tea-bags)

Other single-use plastic items

i. Straws: avoid in open loop systems, could be substituted by compostable straws in closed loop systems such as businesses involved with food service where they have arranged for food and compostable packaging and non-packaging wastes generated on their premises (by staff and customers) to be organically recycled.
ii. Stirrers for drinks: same comments as for straws.
iii. Cutlery: same comments as for straws.
iv. Cotton swabs / Q-tips / cotton buds: avoid.
v. Cigarette filter tips: do a better job of directing them towards the residual waste stream.

The REA acknowledges that other measures including new infrastructure could provide a functioning system for turning a range of single-use plastic wastes into recycled plastic products or products that contain a sufficient percentage of recycled plastic.

PRODUCTION

Qu 5a) What factors influence the choice of polymer, or combination of polymers, in the production of single-use items?

Answer to qu 5 a)
Influences are ability of the polymer, or combination of polymers, to fulfil the intended function of the material or product, ease / practicability of manufacture, professional buyers' perception of the balance between benefits and disbenefits compared with alternatives, and the material's or product's price when compared with alternatives. Typically, insufficient consideration is given to what will happen to a product in its end of life phase, after use when it has become waste.

Qu 5b) Can you provide data on the production and use of single-use plastic items you produce?
c) What proportion of the polymers you use or sell do you import and export, respectively?

d) What proportion of the single-use plastics you produce do you export?

Answer to qu 5 b, c & d)
The REA is not a producer of single-use plastic items.

Qu 6. What proportion of the plastic that you produce is made of recycled plastic, and what are the barriers to increasing this?

Answer to qu 6
The REA does not produce plastic nor do most of its members.

Qu 7. What proportion of the plastic that you produce is commercially recyclable and what are the barriers to increasing this and improving the grade it can be recycled to?

Answer to qu 7
The REA does not produce plastic nor do most of its members. Our perception is that the barriers to increasing the recycling of plastics via the dry recyclates and reprocessors system are:

a) too many different types of plastic are being used, making the collection and reprocessing of each type uneconomic;

b) plastic products that are made of combinations of plastic types that are not technically or economically feasible to separate, either before being discarded or at a suitable stage in the waste management system;

c) deficiencies / gaps in dry recyclables sorting technology capabilities or plastic item types the technology hasn't the potential to sort (black plastic ready meal trays are an example and the REA does not know whether future waste sorting technology will address its current 'no sort' barrier);

d) lack of a strategy and mechanisms that focus stakeholders on only producing, using then dry recycling the essential types of plastic via the dry recyclables system, and

e) in the case of post-consumer flexible packaging, inadequate investment in collection, sorting and recycling infrastructure (see https://ciwm-journal.co.uk/100m-investment-needed-for-flexible-plastic-recycling-in-uk/)

Qu 8. In your opinion, how can the tax system or charges play a role in delivering better environmental outcomes at this stage?

a) What interventions should be implemented, and why?

b) What behavioural effect would these interventions have, both on this stage in the supply chain, and more broadly?

c) What would be the impact on your business?

Answer to qu 8

The packaging industry should pay for the collection and recovery or recycling of all types of packaging waste; this includes plastic packaging waste and certified compostable packaging waste. The REA agrees with the BBIA's call for total revision of the existing PRN system, introducing a contributory system in which materials that are easier to recycle and are effectively recycled are privileged with lower costs, whilst materials that are difficult to recycle and are effectively not recycled, pay higher contributions. This will drive redesign, use of fewer polymers in single products, use of compostable packaging for biodegradable products (e.g. food and potted plants), and drive down production of plastic packaging.

Importantly in the case of compostable packaging, its PRN value / tonne should not be less than the cost of organically recovering or recycling it. Contributions from manufacturers and distributors of compostable packaging should be directed towards the composting and digestion facilities that decompose compostable packaging waste. The cost of dealing with any contaminant material that is present as a result of the aim to collect compostable packaging also needs to be paid for by the waste supplier (e.g. via contaminant-specific

charges in the waste management contract) or by the compostable packaging manufacturers / distributors through higher PRN values / tonne. To best drive production and use of certified compostable packaging its PRN value / tonne should be similar to those of materials that are 'easier to recycle', although if the compostables' treatment cost / tonne is higher than this the optimal PRN value / tonne might be a compromise.

To drive production of compostable non-packaging, plastic-like products such as liners for kitchen caddies and bins that store food waste, a government intervention seems necessary at least until economy of scale enables certified compostable caddie / bin liners to be no more expensive to produce and buy per unit than those made of polyethylene.

RETAIL

Qu 9. What factors influence the design and specifications you make for the single-use plastic items you sell, and what are the barriers to using alternatives? In what way, and to what extent, do the decisions of producers and consumers influence the choice of single-use plastics you use in the items you sell?

Answer to qu 9
Not applicable to the REA.

Qu 10. Can you provide data on the volumes and costs of different types of single-use plastic used?

Answer to qu 10
Not applicable to the REA.

Qu 11. Have you taken any steps to address the environmental impact of the single-use plastic items you sell, including their end-of-life? Can you provide evidence of the effect these actions have had?

Answer to qu 11
At appropriate food stores, the Co-operative has move from supplying lightweight plastic carrier bags at a 5 pence per bag price, to lightweight home compostable carrier bags at a 6 pence per bag price. Printed text on the latter bag type shows and says it can be used as a liner for kitchen food waste caddies and be home composted. Text also advises 'For food waste collection check with your local authority'. These bags are available from Co-operative Food stores in locations where local authorities have a food waste collection requiring compostable bin liners; at the time of launch in January 2014 this involved approx. 400 Co-operative Food stores and 81 local authority areas. Use of the home compostable bags as liners for kitchen caddies / food waste bins means that householders in those areas are likely to buy fewer compostable liners or none. See https://www.co-operative.coop/media/news-releases/the-co-operative-is-first-to-offer-compostable-carriers-in-hundreds-of-stores and https://resource.co/business/article/co-operative-offers-compostable-carrier-bags

This Co-operative initiative is a good example of advantageous product substitution, enables the product to be put to more uses before becoming waste and appropriate recovery/recycling of the used product after it has become waste.

Qu 12. In your opinion, how can the tax system or charges play a role in delivering better environmental outcomes at this stage?

a) What interventions should be implemented, and why?

b) What behavioural effect would these interventions have, both on this stage in the supply chain, and more broadly?

c) What would be the impact on your business?

Answer to qu 12

Retail relevant tax system or charge interventions that REA envisages could deliver better environmental outcomes;

i. retailer contribution into an overhauled PRN system where contributions for non-recyclable packaging attract the highest rate and less readily recyclable packaging attracts higher rate than readily recyclable and compostable packaging, and

ii. partial VAT rebate on products in compostable packaging, until usage of this type of packaging is high enough to support lower prices per unit due to economy of scale and the organic recycling sector accepts it on a more widespread basis.

The REA has not had time to do the associated analysis that would fully answer question 12. See also the REA's answer to question 18 on the topics of single-use carrier bags and kitchen caddie and food bin liners.

CONSUMPTION

Qu 13. What factors influence consumers' choices related to single-use plastic items? How can the government encourage the re-use of these items?

Answer to qu 13

Our impression is that ready availability, convenience (making their lives easier) and low prices are the key factors that influence most consumers to choose single-use plastic items.

Qu 14. What are the barriers to consumers choosing alternatives to single-use plastic items, and how responsive would consumers be to price changes?

Answer to qu 14

Consumers

In the context of premium products sold in the retail market, Ecover has said most consumers will pay up to 10 % more but beyond this 'you lose a lot of customers' (stated in Radio 4's In Business Programme, https://www.bbc.co.uk/programmes/b0b3fl1v, minute 25 to 26).

Local authorities as buyers of single-use plastics and influencers on choices made by householders

In some local authority areas where food waste is separately collected the lower price per unit of polyethylene kitchen caddie / food waste bin liners (typically 3 p/unit) compared with certified compostable ones (typically 10 p/unit to 14 p/unit) has driven the local authority to provide householders with, or instruct them to buy, polyethylene liner. A number of them have switched from certified compostables to polyethylene, so price has been a significant factor for some local authorities. Their decision making takes account of ability of the organics recycling facility to remove polyethylene liners from the food waste.

Consumer understanding of 'which bin for which types of waste'

A barrier to consumers choosing alternatives to single-use plastic items is their understanding of which bin which types of wastes should go in. There is a plethora of different plastic polymer types and combinations of different materials used in packaging for which recovery at an EfW, pyrolysis or gasification facility or disposal at landfill are the only suitable waste management options. There are also differences between local authority areas in terms of which types of recyclable waste are collected for recycling and how they're collected (e.g. what type and colour of container they're put in and which ones are co-mingled together in the dry recyclables stream).

The REA believes that a proportion of consumers when deciding which product to buy, aren't influenced by whether its packaging is recyclable because they are unsure whether it is. Some consumers feel discouraged to sort their recyclable wastes into their recycling bin/container/sack because they believe at least some of it is not recycled.

The factors referred to above don't make it easy to provide guidance and instructions for householders in particular local authority areas on how they should recycle (which item should go in which bin) and to motivate them to recycle. Information on packaging about whether the item is recyclable (e.g. a 'check locally' instruction if there isn't yet widespread recycling of the item type, see https://www.oprl.org.uk/about-oprl/label-objectives/) and local authority instructions to householders have improved though there is opportunity for further improvement.

Qu 15. In what way, and to what extent, do the decisions of producers and retailers influence consumer choice?

Answer to qu 15
Our impression is that the decisions of 'leading brand' companies and retailers highly influence most consumers' choices.

Local authority decisions that influence householders' choices

In the case of liners for kitchen caddies and food waste bins the decision of the local authority decisions and their instructions to householders on how to recycle influences householders' choices. Where food waste is separately collected many local authorities used to provide certified compostable bags / liners to householders free of charge. More recently for cost saving reasons the trend is to no longer provide free liners, instead advising householders to buy their own liners if they want to use them. Where food waste is sent to composting facilities the liners must be certified compostable ones and where food waste is going to 'wet AD' facilities, especially those with no composting phase for digested separated solids, increasing numbers of local authorities have instructed that any liners used should be polyethylene ones. They are removed during waste preparation at the AD facilities and cheaper per unit than certified compostable ones.

The REA is aware of at least one case where a local authority has put pressure on their 'wet AD' contractor. 'Options' put forward by the local authority to the contractor were: pay for the cost of supplying householders with certified compostable liners (the cost is tens of thousands of pounds per year), accept polyethylene liners, or face risk of non-renewal of its food waste recycling contract. The contractor accepted polyethylene liners and changed their digestate screening and how solid digestate was subsequently dealt with. The contractor's plastics management and disposal costs have gone up as too have their food waste treatment costs, these extra costs being absorbed by the company rather than recovered from the local authority.

The point of highlighting this case is that the higher cost per unit of certified compostable liners compared with polyethylene liners has been the key reason why a local authority has put pressure on its organics recycling contractor.

Qu 16. In your opinion, how can the tax system or charges play a role in delivering better environmental outcomes at this stage?

a) What interventions should be implemented, and why?

b) What behavioural effect would these interventions have, both on this stage in the supply chain, and more broadly?

c) What would be the impact on consumers?

d) Are there specific items the government should be focussing on?

Answer to qu 16
Please see the REA's answer to question 18 where it covers the topics of compostable carrier bags and compostable liners for kitchen food waste caddies and food waste bins.

DISCARDING AND WASTE TREATMENT

Qu 17. What are the barriers to the collection of single-use plastics and more environmentally friendly methods of waste treatment, including barriers to any existing technologies?

Answer to qu 17

Barriers to collecting and recycling single-use plastic wastes into plastic products are;

i. insufficient demand for plastic products made from plastic recyclate,
ii. the great variety of plastic polymer types in use,
iii. in the case of post-consumer flexible packaging, inadequate investment in collection, sorting and recycling infrastructure, and
iv. where single-use plastic packaging has been in contact with food and drink that contains animal-derived material, the cost of washing to make it sufficiently hygienic for supply to plastics recyclers and the cost of treating the water used for washing the packaging waste (the Animal and Plant Health Agency would need to be consulted on compliance with Animal By-Products Regulations).

Qu 18. In your opinion, how can the tax system or charges play a role in delivering better environmental outcomes at this stage?

a) What interventions should be implemented, and why?

b) What behavioural effect would these interventions have, both on this stage in the supply chain, and more broadly?

c) What would be the impact on Local Authorities and business?

Answer to qu 18

Compostable packaging

The packaging industry should pay its fair share of costs arising from the collection and management of packaging wastes.

Policy ask 4: The Packaging Recovery Notes system should be overhauled such that it becomes a contributory system in which 'easier to recycle' materials are recycled and this can be done at lower cost than for 'difficult to recycle' materials. Higher contributions should be paid for the latter material type.

Those involved in the manufacture and supply of compostable packaging should pay the same contribution as for 'easily recyclable plastics' because they can be organically recycled. These contributions should then be directed towards facilities that treat the materials through organic recycling.

In terms of compostable packaging wastes, the potential effect on gate fees charged by organic recyclers for treating this waste type might be a reduction. Costs of managing the non-compostable waste contamination items that are likely to be present would need to be covered by the gate fee or the value of the PRN. The REA envisages that if the packaging industry were to pay more money into an overhauled PRN system then costs paid by local authorities for managing the packaging waste within household waste are likely to reduce. The impact on businesses that use packaging and/or sell products in packaging would depend on exactly how the overhauled PRN system would work.

In the case of compostable packaging the REA envisages that particular types of packaging item should be made compostable, the aim being to avoid generation of more compostable packaging waste than the organics recycling industry can treat. Significant amounts of plastic-like compostable packaging waste should not go into the dry recyclates system and although EfW facilities could recover them the aim would be for at least a very high proportion of it to be decomposed at organics recycling facilities. Influence on which packaging item types are designed to be compostable and supplied to the market could be achieved through an industry Code of Practice

which identifies the targeted ones and contexts in which their use is beneficial. It could potentially state which item types should only be made from plastic types suitable for the dry recyclates system.

The REA would be pleased to discuss further with HM Treasury and packaging industry representatives how an overhauled PRN system could work in respect of certified compostable packaging and non-packaging products.

Compostable carrier bags

The REA's answers to questions 11 and 18 so far show there is opportunity to beneficially use compostable carrier bags in local authority areas where they are suitable for including in household food waste collections (e.g. the wastes are sent to composting or 'dry AD' facilities or 'wet AD' facilities that include a phase of composting digested, separated solids).

Single-use *plastic* carrier bag charges are reducing the use of these products, which the REA welcomes. If compostable carrier bags were to become cheaper per bag than polyethylene ones – or at least no more expensive - this would encourage:

i. retailers to make compostable carrier bags available for purchase in local authority areas where the food waste collection supports compostable caddie/bin liners; and

ii. local authorities to supply compostable carrier bags in those areas or at least advise householders that any kitchen caddie / food bin liners they purchase must be compostable.

Proceeds from retailer sales of single-use *plastic* carrier bag charges are, after deducting retailer administration costs, donated to good causes. Proceeds from bag charges should be directed to the parts of the waste management industry that manage this material, preferably within recycling rather than recovery.

Policy ask 5: Adjust single-use carrier bag charges so that certified compostable ones become cheaper than polyethylene ones (preference 1) or at least no more expensive (preference 2).

Compostable liners for kitchen food waste caddies and food waste bins

Compostable liners for kitchen food waste caddies and food waste bins are not packaging so they seem unlikely to be within the scope of an overhauled PRN system. WRAP's guidance (see http://www.wrap.org.uk/content/household-food-waste-collections-guide) includes the following about liner prices; polyethylene liners (roll of 26) £0.005 per liner, and compostable liners (roll of 26) £0.017 per liner. The latter are 3.4 times more expensive per liner. The REA's answers to previous questions covered the topics of costs borne by organics recycling facilities in removing and disposing of non-compostable plastics and pressure from at least one local authority for the organics recycling facility to accept polyethylene liners, with consequential costs incurred by that business. The REA contends that benefits associated with competitive compostable liner prices would outweigh any disbenefits and fit with the reality of differing choices in liner types according to what suits the organics recycling facility and other influential factors.

Policy ask 6: Influence kitchen caddie and food bin liner prices such that certified compostable ones become cheaper than polyethylene ones (preference 1) or at least no more expensive (preference 2) until economy of scale demand for compostable liners enables price influencing measures to be withdrawn. A higher VAT rate or a charge per non-compostable liner could make them price competitive.

Good fit with food waste recycling opportunity

Food residues stuck to packaging waste suitable for the dry recycling system is unwelcome contaminant and such contamination would reduce if more food were to be packaged in compostable packaging (particularly food that contains animal-derived material), more food wastes were organically recycled (more local areas where food waste is collected separately from non-biodegradable wastes) and compostable packaging and non-packaging products were co-collected with the food waste.

WRAP's Synthesis of Food Waste Compositional Data 2014/15, estimates that 4.76 million tonnes of food waste are contained in annual domestic waste arisings. Accounting for the 314,516 tonnes already processed through AD in the year 2014, approximately 4.45 million additional tonnes of food waste could be organically recycled per year. These figures don't include the tonnage of compostable packaging and non-packaging products that could be co-collected with the food waste.

The REA emphasises again the importance of targeting which types of packaging and non-packaging items in which usage contexts are compostable ones; this keeps manageable the proportion of compostable items that are decomposed with other biodegradable waste and supports the direction of a very high proportion of them into the organics recycling system rather than into the dry recyclables system or going to EfW facilities.

Answer to Treasury question about supply of single-use plastic wastes to Energy from Waste facilities

During the call for evidence period, HM Treasury asked the REA what capacity or potential the energy-from-waste sector has for treating / recovering value from greater amounts of single-use plastic wastes. The does not have such figures but we believe that the National Infrastructure Commission's detailed modelling exercise looking at waste arisings and capacity infrastructure requirements (incl EfW) up to the year 2050 would provide useful figures. Expectation is that the NIC will report its findings by the end of July 2018. Below, the REA has commented on the potential for Advanced Conversion Technologies (ACT) to make useful resources from wastes that include plastics.

<u>Advanced Conversion Technologies</u>

Commercial scale ACT projects, such as gasification and pyrolysis, are ready for deployment now if an appropriate policy environment is established to support the transition from demonstration projects to commercial operations. Such technologies could play a key role in utilising plastics to decarbonise the heat and transport sectors providing the ability to derive renewable transport fuels from wastes (including plastics), BioSNG for gas-to-grid as well as 'green' chemicals.

Policy barriers

To date, the main barrier to ACT deployment has been the lack of a stable and reliable policy environment. Poorly delivered routes to market have so far been ineffective in securing deployment or incentivising the most innovative forms ACT that can deliver solutions for decarbonisation of the heat, transport and green chemical sectors. Specifically, this has meant several innovative projects that utilise plastic waste have failed to succeed to date, largely due to an inconsistent policy environment.

Over the last five years, the main support mechanism for ACT deployment has been the Contracts for Difference (CfD). In that time there have only been two allocation rounds, with the one in 2017 including a restrictive MW capacity cap on the deployment of fuelled technologies. The lack of clear projected dates for future allocation rounds has meant that many potentially commercially viable ACT projects have been delayed or abandoned. They have been left unable to secure financial closure while also having to pay significant ongoing costs, such as staff salaries, while not knowing when they would next be able to bid for a CfD to move the project forward.

Realising cost reductions

As is the case with all less established technologies, significant cost reductions in ACT will be delivered as increasing numbers of projects are built and become operational. The successful deployment of the first couple of commercial-scale projects accelerates growth of industry expertise and enables increases in electrical net efficiencies; in turn, this helps establish investor confidence as well as creating an affordable supply chain for machinery and input materials / wastes. Investor confidence will deliver a virtuous circle.

Due to the limited deployment of ACTs so far, funders lack several operational projects to see in action. Operational projects are important for reducing risks perceived by investors.

The ACT industry fully expects to deliver similar levels of cost reductions as seen in the wind energy sector, if given the opportunity to deploy the same critical mass. For example, in terms of net electrical efficiencies (NEE) it will only require the ACT industry to see an achievable 10% uplift in efficiency over these initial projects in order to be at a level equal to NEEs of other more established technologies, reaching a net efficiency of 24 – 30% by the 2020s.

Technical deployment barriers

The industry recognises, as is the case with all emerging and innovative activities, that some projects (including high profile ones) have failed. Importantly, this is not endemic to the sector but representative of some of the boundaries being pushed together with some elements of poor delivery leading to cash flow or board-commitment issues. Valuable lessons have already been learned from these projects.

Significant progress has been made in relation to the development of tar cracking technologies, which is key to allowing syngas produced by gasification to be used for higher value applications including renewable transport fuels. There are already well advanced commercial projects being developed that are aiming to deliver in the next few years, these however also depend on a stable policy environment being maintained. For comparison, in the USA and other countries in Europe support from domestic governments is being used to deploy commercial-scale projects using waste as a feedstock and gasification/pyrolysis combined with other technological components to deliver fuels or chemicals.

Clearly stated government ambitions, supported by a stable policy environment, will allow ACT to deliver decarbonisation in the transport, green chemicals and heat sectors.

As already discussed the primary support mechanism for ACT to date has been the CfD, however, the delivery of this mechanism has been ineffective in delivering a sizable number of projects. Despite this, the REA believes that there remains a role for ACT within the CfD, to get that initial critical mass of power ACT projects built which will help to establish supply chains, realise efficiencies and deliver cost reductions for the delivery of more advanced systems. Significantly, the latest reforms proposed to the CfD will likely fail to achieve this goal. While it is positive that BEIS understands the need to support the highest quality forms of gasification, CfD remains a support mechanism focused on power capacity and, as such, the reforms are potentially an inefficient way of trying to adapt an unsuitable power policy into a vehicle for delivering alternative sustainable products. The CfD system should remain focused on delivering initial commercial ACT power projects.

A more recent development has been the reforms to The Renewable Transport Fuels Obligation (RTFO). The development fuel sub-target, which includes Biomethane from bioSNG, should provide a strong stimulus and a market-driven incentive for ACT projects to produce renewable transport fuels. A strong RTFC price could prove more valuable than a CfD, thereby incentivising decarbonisation of the transport sector, including aviation.

However, overall, Government lacks an overarching strategy, with clearly stated aims of what they want to achieve from ACT. The current policy mechanisms are confused and not well aligned with an ambition to see ACT deliver the most advanced forms of sustainable products and deliver decarbonisation where it is most required. The CfD reforms are trying to deliver transport fuels while still focusing on delivering power capacity. At the same time the RTFO provides a new attractive option, but more needs to be done to encourage ACT developers and financiers to see it as bankable.

Within the context of plastics, ***the REA encourages HM Treasury to fully engage with the Waste and Resource Strategy*** currently being developed by DEFRA. This strategy looks set to be heavily informed by

the recommendations of the National Infrastructure Commission, who have conducted a detailed modelling exercise looking at waste arisings and capacity infrastructure requirements up to the year 2050. HM Treasury's involvement in the development of this strategy is crucial for stipulating precisely what Government wants to be delivered from ACTs, and for the development of dedicated cross-departmental policies required to deliver innovative projects able to utilise the residual waste stream, including plastics.

Possible future policy mechanisms

Policy ask 7: Government introduction of more focused policies that will help the delivery of ACTs, such as;

- suitable tax breaks (including for R&D commercialisation),
- Venture Capital Funding support, such as Enterprise Investment Schemes or new grants
- enhanced capital allowances,
- access to long-term market stabilisation contracts (a.k.a. "a subsidy-free CfD") that appropriately finance and are commensurate with the lifetime of the asset. This can be technology neutral and still provide support to ACT technologies that may fall outside of other support mechanisms, and
- a strong carbon price set at a sufficient level that will enable low carbon fuels to compete.

Annex A. UK organics recycling industry key statistics in the year 2014

The year 2014 is the most recent one for which data has been gathered, analysed and reported. See http://www.wrap.org.uk/sites/files/wrap/asori%202015.pdf for more info.

Composting industry:

Input material: 5.92 million tonnes processed (estimate)

Number of sites with permits: 310 (estimate)

Compost total: 3.51 million tonnes (estimate) of which

- approx. 3.21 million tonnes of product-status compost (certified compliant with End of Waste criteria) was made at 180 sites (51 % of sites), and
- approx. 300,000 tonnes of waste-status compost was made at 130 sites

Jobs: 1,434 (estimate)

Anaerobic digestion industry:

Input material: Total of 5.25 million tonnes processed with a total installed capacity of 6.57 million tonnes. Within total tonnage processed, 2.73 million tonnes (52 % of inputs) were treated in 'farm fed' facilities and 3.84 million tonnes (48 % of inputs) were treated in 'waste fed' facilities.

Number of facilities: 259

Renewable energy generating capacity: 238 MWe

Digestate total: 4.57 million tonnes (estimate) of which

- approx. 998,500 million tonnes of product-status digestate (certified compliant with End of Waste criteria) was made at 19 sites (7.3 % of sites)*, and
- approx. 3.58 million tonnes of waste-status digestate and energy crop derived digestate was made at 240 sites

* In 2015 this figure more than doubled, with over 2.4 million tonnes of product-status digestate being made at 42 AD facilities.

Jobs: 1, 008 (estimate)

Total organics recycling industry:

Input material processed: 11.17 million tonnes
Sites / facilities: 569
Renewable energy generating capacity: 238 MWe
Composts and digestates: 8.08 million tonnes

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