Regulatory Triage Assessment	
Title of measure	A ban on the supply of single-use plastic balloon sticks to the end user in England
Lead Department/Agency	Defra
Expected date of implementation	April 2023
Origin	Domestic
Date	20/11/21
Lead Departmental Contact	Louisa Fenocchi, Elizabeth Doherty
Departmental Triage Assessment	Low-cost regulation (fast track)

Rationale for intervention and intended effects

Single-use plastic balloon sticks are environmentally damaging. Even if placed in recycling bins, their thin shape means that they are more likely to fall between recycling machinery making them unlikely to be recycled. Littering of single-use plastic balloon sticks negatively impacts wellbeing and generates clean-up costs to local authorities. They can also contribute to the global marine plastic problem, damaging the marine environment and posing a risk to wildlife. Every single-use plastic balloon stick, if not properly disposed of, can contribute towards these costs over a long period of time as they are estimated to take hundreds of years to decompose. Even if disposed of correctly, single-use plastic balloon sticks may end up in incineration which generates carbon emissions.

Single-use plastic balloon sticks are typically made of a plastic polymer called polypropylene [1]. Polypropylene is characterised by a high melting point, resistance to cracking and stress even when flexed. It also does not react with water, detergents or acids so it won't break down easily. Despite these robust characteristics, plastic production depends on finite fossil fuels, and is therefore associated with non-renewable resource use and additional greenhouse gas emissions.

The objective of this policy is to help protect our environment for the future generations, improve the quality of the environment and reduce harm to human health and marine life. Also, to contribute to government's commitment to reduce avoidable plastic waste over the lifetime of the 25 Year Environment Plan. The ban is intended to ensure that single-use balloon sticks sold in the UK are made of less environmentally harmful materials that decompose quicker and have lower life-cycle impacts on the environment. It will also encourage investment in alternative options to single-use plastic, such as reusable options or innovative material substitutes. The ban also intends to increase consumer awareness of the environmental harms single-use plastic balloon sticks can cause when they are not correctly disposed of.

Viable policy options (including alternatives to regulation)

The main options under consideration are:

1. Do nothing (baseline); and
2. Ban the supply of single-use plastic balloon sticks to the end user in the UK. This is the preferred option. It will quickly adjust the market and be the most effective in reducing the social and environmental costs associated with plastic balloon sticks.

We considered two further options at a higher level which were:

3. Information and education; and
4. Taxation or charge.

Assessment of these options can be found in our further evidence section.

1 Resource futures: A preliminary assessment of the economic impacts of a potential ban on plastic cutlery, plastic plates and plastic balloon sticks

Costs overview

Initial assessment of impact on business

(All figures given in this assessment are in 2020 prices and are central sensitivity estimates. See Supporting Evidence for more detail on calculation methodology.)

A ban on the supply of single-use plastic balloon sticks to the end user will cause businesses to switch away from single-use plastic balloon sticks towards alternative-material items. We have selected paper as the main alternative material. Single-use paper balloon sticks have double the unit cost of single-use plastic balloon sticks, according to Defra commissioned research by Resource Futures [2].

Furthermore, the affected businesses will face familiarisation costs. Their employees will need to shop around for alternative suppliers and adjust their menu costs. We have calculated that businesses will face a one-off familiarisation cost of £0.31m in total when the ban is implemented in 2023. We have estimated that 67,190 enterprises will incur these familiarisation costs. This will include enterprises providing event catering activities, pre-primary education, primary education, child day-care activities and retail stores (we have excluded those which predominantly sell food, beverages or tobacco).

The equivalent annual net direct costs to businesses (EANDCB) is £0.8m. Over the ten-year appraisal period, this is equivalent to an additional net present value cost to businesses of £5.5m.

Enforcement costs to the public sector

There will also be enforcement costs associated with the ban. Enforcement costs relate to the estimated additional burden to 190 Trading Standards authorities offices across England[3] who will enforce the policy. We have estimated that the ban will occupy 3 days of the officer's time per annum at a day rate of £149 (inclusive of 22% non-wage labour costs). This results in a present value cost to the public sector of £0.66m over the ten-year appraisal period.

Environmental impact: disposal landfill emission cost and fuel emission costs

The ban will also have environmental impacts. In our 'end-of-life' assumptions, we assume that 26% of single-use balloon sticks are disposed of in landfill (irrespective of what they are made of).[4] Paper releases methane upon decomposition which does not occur when plastic is sent to landfill. This means the switch to paper alternatives will result in increased emissions at end of life. This is reflected in our estimated disposal landfill present value cost which of £0.01m over the 10-year appraisal period.

Furthermore plastic sticks are lighter than the paper alternative. Additional weight requires more fuel to transport which incurs additional greenhouse gas emissions. The cost of fuel emissions was estimated using the amounts for additional litres of fuel used. The CO_2e emissions from the additional fuel consumption, using an average of 2.4 kg CO_2e per litre of diesel burned,[5] are negligible over the 10-year appraisal period.

Benefits overview

Beach well-being benefit

The ban of single-use plastic balloon sticks will lead to reduced beach litter as paper alternatives degrade far quicker than plastic – our central estimate suggests paper degrades 650 times faster.[6] This will mean fewer litter items present on beaches at any time. Clean environments have a value to people who care for the welfare of wildlife and other people, and littered environments affect people's sense of safety, enjoyment

2 Resource futures: A preliminary assessment of the economic impacts of a potential ban on plastic cutlery, plastic plates and plastic balloon sticks

3 22 TSA in Wales https://www.tradingstandardswales.org.uk/about/, 190 in England and 32 in Scotland based on number of Unitary Councils https://lgiu.org/local-government-facts-and-figures-england/, 5 Trading Standards Service offices in Northern Ireland https://www.inputyouth.co.uk/tradingstandards.html.

4 Resource Futures: Preliminary assessment of the economic impacts of a potential ban on plastic cutlery, plastic plates and plastic balloon sticks

5 BEIS, Valuing greenhouse gas emissions in policy appraisal

6 Based on evidence from 'Resource Futures: Preliminary assessment of the economic impacts of a potential ban on plastic cutlery, plastic plates and plastic balloon sticks'

and willingness to use public spaces. Using a willingness-to-pay study[7] by Eftec, we estimate that reduced litter due to the ban results in a present value benefit of £0.15m over the ten-year appraisal period.

Environmental impact: disposal incineration and production emission benefit

There are also disposal emissions benefits that arise due to the ban causing a market switch from single-use plastic to paper balloon sticks. Paper does not produce emissions when incinerated as it comes from a biogenic source. Each tonne of paper incinerated actually saves carbon dioxide equivalent emissions (CO_2 e). The reduced incineration emissions are estimated to result in a present value benefit of £0.02m over the ten-year appraisal period.

Furthermore, the production of alternative materials to plastic is less emission intensive. We have assumed that 10% of total products consumed are manufactured in the UK[8]. This means that the ban will deliver production-related emissions savings. We estimate this will result in a present value benefit of £0.02m over the ten-year appraisal period.

Reduced clean-up costs to local authorities

The ban of single-use plastic balloon sticks will lead to reduced beach litter as the paper alternative degrades far quicker than plastic (our central estimate is 650 times quicker) so there will be fewer litter items present on beaches at any time. Fewer litter items on the beach relieves some of the burden to local authorities who are responsible for beach cleaning, resulting in a slight reduction in coastal clean-up costs. We have estimated that the ban will reduce beach cleaning costs by a present value of £202 over the ten-year appraisal period).

Non-monetised benefits

The ban will help reduce damage to marine life caused by marine plastic pollution. It is estimated that 1.5–4.5% of all global plastics production ends up in the ocean every year[9]. These items can break down and be ingested by marine life up and down the food chain. Nearly 700 marine species are affected by plastic ingestion and entanglement[10]. Single-use plastic balloon sticks are a particular risk to marine life given their long, thin form which can cause physical damage to an animal's digestive system.

BIT status/score

The proposal is a non-qualifying regulatory provision (NQRP). The exclusion that applies is the de minimis rule as the equivalent annual net direct costs to business (EANDCB) is less than ± £5 million.

Rationale for Triage rating

The EANDCB is £0.8m which is under the £5m threshold to require a full impact analysis.

Departmental signoff (*SCS*): Date:

Economist signoff (*senior analyst*): Date:

7 Eftec (2002), Valuation of Benefits to England and Wales of a Revised Bathing Water Quality Directive and Other Beach Characteristics Using the Choice Experiment Methodology

8 Resource Futures have reported that 10% of plastic balloon sticks are manufactured in England. We have assumed that this estimate applies across the UK.

9 http://www.sciencemag.org/news/2015/02/here-s-how-much-plastic-enters-ocean-each-year

10 https://www.biologicaldiversity.org/campaigns/ocean_plastics/

Better Regulation Unit signoff:	Date:

Supporting evidence

1. The policy issue and rationale for Government intervention

The ban of single-use plastic balloon sticks would reduce many of the negative externalities associated with the product's life-cycle. Single-use plastic balloon sticks have high carbon footprints upon production and incineration relative to alternatives. Plastic is made from oil or natural gas which emits a high amount of CO2e in production and disposal processes. Balloon sticks may also be littered which poses clean-up costs to local authorities and reduced welfare for citizens. Furthermore, plastic marine litter poses a risk to marine wildlife, mainly through entanglement and ingestion. It is estimated that there are over 150 million tonnes of plastic in the world's oceans[11]. Studies have also indicated that every year one million birds and over 100,000 sea mammals die from entanglement in marine litter in the North Pacific alone; a rate that appears to be increasing.[12,13]

2. Policy objectives and intended effects

The ban is intended to ensure that single-use plastic balloon sticks sold in England are made of less environmentally harmful materials that decompose more quickly and have lower life-cycle impacts on the environment. The ban will also encourage businesses to invest in alternative options to single-use plastic, such as reusable products or innovative material substitutes. The ban may encourage a level playing field between businesses and strengthen the plastic-free market by protecting it from low-priced plastic imports.

It is intended that banning the supply of single-use plastic balloon sticks to the end user will foster an increased degree of consumer confidence that the products they buy will not harm wildlife and the environment. It may also increase consumer awareness of the environmental harms plastic items can cause when they are not correctly disposed of.

3. Policy options considered, including alternatives to regulation

The main options under consideration are:

1. Do nothing (baseline)
2. Ban the supply of single-use plastic balloon sticks to the end user in England. This is the preferred option. Single-use plastic balloon sticks impose environmental and social costs on society and so banning the supply of them to the end user will reduce these significantly. This intervention will secure the change and associated environmental benefits quickly and ensure that these are sustained into the future.

We have considered further options, but these have not currently been appraised, as they are unlikely eliminate these single-use plastic items at the same speed or scale as the proposed ban and would therefore not create the same level of environmental benefits. We welcome views on those options at consultation.

Alternative options:

Information and education could be used to encourage firms and consumers to move away from plastic balloon sticks. However, there is evidence that consumers are already acutely aware of the harms of single-use plastics. There have been multiple campaigns recently including the BBC's Blue Planet II series, Daily Mail's Break the habit, Turn the Tide on Plastic and the Stir-Crazy Campaign. The additional impact of further information being provided on top of these campaigns is likely to very to be marginal.

A taxation or charge policy was rejected. Although this would likely be effective in reducing consumption, it would not be as effective as a ban where suitable alternatives are available[14]. Another risk with a charge instead

[11] https://www.asyousow.org/our-work/waste/ocean-plastics

[12] Thompson, R.C., et al., Plastics, the environment and human health: current consensus and future trends. Philosophical Transactions of the Royal Society B: Biological Sciences, 2009.

13 Mouat, J., R.L. Lozano, and H. Bateson, Economic Impacts of Marine Litter, 2010.

14 Availability of a paper alternative for balloon sticks was assumed in the analyses.

of a ban is that effectiveness reduces over time without further intervention. For example, in Ireland, plastic bag usage initially fell with the introduction of the first levy in 2002, but rose again five years post levy, requiring the charge to be increased[15]. A ban avoids this risk and ensures that the desired impact is sustained.

4. Expected level of business impact

Our Do-nothing Option assumes that all balloon sticks are plastic. In comparison to this option, we expect the business will be affected in the following way:

- **Material cost:** Resource Futures' report identified that single-use paper balloon sticks have double the unit cost of single-use plastic balloon sticks (i.e. £0.10 instead of £0.05). Resource Futures also estimated that approximately 16 million items are sold each year in England. We multiplied this figure by the £0.05 difference in unit price to get an estimated additional material cost of £6,196,361 NPV over the ten-year appraisal period.

- **Familiarisation cost:** these costs were measured by estimating the additional time required for one FTE from each enterprise in the year of policy implementation (i.e. a one-off cost). We have estimated that 5 industries (i.e. categorised by the SIC codes in Table 1) will be affected. There is no data available to estimate what proportion of enterprises will be affected under these SIC codes. As such, we have conservatively assumed that all enterprises will be affected by the ban. The corresponding wage by the affected SIC was multiplied by 22% on-costs to adjust for additional indirect costs such as holiday pay, pension contributions and national insurance contributions. When discounted, the central estimate for familiarisation costs is estimated to be £313,883 in the first year of implementation.

Table 1: Familiarisation cost calculation data, undiscounted

SIC code	UK enterprises	Hourly wage[1]	Inc. 22% on-costs[1]	High estimate: 15 mins	Central estimate: 30 mins	Low estimate: 45 mins
4719 : Other retail sale in non-specialised stores[1]	12,620	9.60	11.71	£36,951	£73,903	£110,854
5621 : Event catering activities	15,320	9.32	11.37	£43,549	£87,097	£130,646
8510 : Pre-primary education	4,930	9.46	11.54	£14,225	£28,449	£42,674
8520 : Primary education	19,385	14.37	17.53	£84,962	£169,923	£254,885
8891 : Child day-care activities	14,935	8.74	10.66	£39,812	£79,624	£119,437
Total	**67,190**	**N/A**	**N/A**	**£219,498**	**£438,997**	**£658,495**

5. Small and medium business assessment (SaMBA)

We have assumed that small and micro businesses will not be disproportionately affected by the proposed policy as we have no evidence to suggest they are more likely users of single-use plastic balloon sticks. This is in part because this policy should create the level playing field across all businesses and may also strengthen the market for innovation. However, small and micro businesses might face proportionally higher costs compared to larger businesses due to economies of scale. We are seeking to gain further evidence on the impact of the ban on SMBs in the consultation published alongside this document.

6. Monitoring and Evaluation

15 Institute for European Environmental Policy

The effect of this policy will be reviewed in line with the standard 5-year post implementation review process.

Proposed monitoring arrangements
We have devised a series of high-level theories of change from which a sub-set of SMART indicators will be selected. We expect that we will currently be collecting some of these, but that we will need to define and collect data on additional indicators relevant to specific policy initiatives.

We also plan to expand our routine monitoring from the high-level indicators to a) material-based indicators e.g. plastic waste and b) lead indicators of change, e.g. shifting patterns of behaviour. These will be reported in future editions of annual Monitoring Progress reports.
Both activities are elements of an external commission for evaluation of the Resources and Waste Strategy which we expect to start in early 2022. We have approval to start the procurement process, which we will be initiating in autumn 2021.

7. Expected level of non-businesses impacts

Environmental Impacts

Landfill emission cost: this cost was calculated by multiplying the estimated total number of single-use balloon sticks consumed in England (i.e. 16 million) by their estimated weight under a ban and no ban scenario. This total weight was then multiplied by the relative emissions impact of the two materials (polypropylene and paper) in landfill.

Under the ban scenario we assume all single-use balloon sticks are made of paper and the weight is 0.000012 tonnes per item. The no ban scenario assumes that all balloon sticks are made of plastic, with each weighing 0.000006 tonnes. The total weight of single-use balloon sticks under each scenario was then multiplied by the percentage of waste sent to landfill –26% for both polypropylene and paper[16]. Next, this was multiplied by the CO2e emissions per tonne in landfill (i.e. 0.009 for polypropylene and 1.042 for paper[17]) to give the total emissions generated by balloon sticks sent to landfill. Finally, this was multiplied by the carbon values[18] to estimate a monetary value for the emissions. The difference between the monetised values of the emissions that plastic and paper balloon sticks release upon landfill disposal represents the additional environmental cost caused by the ban. The present value across the 10-year appraisal period is £9,951

Reduced beach clean-up cost: a study by Mouat et al (2010) estimated that the UK spends £17.9m on coastal cleaning[19] this estimate is converted to 2020 prices to make it consistent with the rest of calculations. It is then multiplied by 64.73% which is the proportion of the cost assumed to be variable. We then adjust this estimate to reflect the proportion of the cost attributed to plastic balloon sticks which are estimated to make up to 0.0071%[20] of total beach litter. Finally, we take into account the percentage difference in decomposition rates between plastic and paper (i.e. 0.154%). This is to reflect that litter associated with paper balloon sticks would be left on the beach for less time before decomposing if not picked up. In other words, there will be less litter items to be cleared over time from paper balloon stick litter. This results in a reduced coastal clean-up cost of £202 (benefit) over the 10 year appraisal period.

Beach well-being benefit: To monetise the well-being benefit of reduced beach litter we have used an Eftec's survey which found that the average UK household would pay £8.50[21] a year for clean beaches. There are 23,274,000 households in England[22] so the total beach well-being benefit is £197,829,000 per annum. We then assumed that a small proportion of this estimate can be attributed to the reduction of littered balloon sticks. We estimated this proportion based on the difference between plastic and paper decomposition rates and the contribution of balloon sticks to total beach litter. The central estimate is that plastic (polypropylene) decomposes 650 times more slowly than paper does. Balloons and balloon sticks are estimated to make up

16 Defra, Local authority collected waste: annual results tables
17 BEIS, Government conversion factors for company reporting of greenhouse gas emissions
18 BEIS, Valuing greenhouse gas emissions in policy appraisal
19 Mouat, Lozano, Bateson: Economic Impacts of Marine Litter, 2010.
20 Resource futures: A preliminary assessment of the economic impacts of a potential ban on plastic cutlery, plastic plates and plastic balloon sticks
21 The Eftec survey resulted in a willingness to pay per household of £6 to £11. We have used the mean of these values in calculation.
22 ONS (2019) Families and households

0.71% of beach litter[23] . It is assumed that balloon sticks are sold with 1% of all balloons. Taking this into account, we estimate that balloon sticks make up 0.0071% of marine litter. These calculations suggest that the ban will deliver the beach well-being benefit of £21,135 per annum. This equates to net present benefit of £151,347 over the ten-year appraisal period.

Disposal incineration benefit: This is calculated similarly to the landfill emission cost, except this is a benefit as when incinerated plastic produces carbon emissions, unlike paper. We assume that 63% of balloon sticks are incinerated. To calculate the incineration benefit, we estimate the difference in tonnes of CO2e between the emissions released upon incineration of the plastic product (0.8 CO2e per tonne of material incinerated) and the emissions released upon incineration of paper alternatives (-0.331 CO2e per tonne of material incinerated,[24] negative because paper is a biogenic material). We then multiply the difference in emissions from incineration by the carbon value.[25] Using these calculations, the present value over the 10-year appraisal period is £17,218.

Production emission saving: The calculation is similar to the landfill emission and incineration emission impact calculations. First, total balloon stick consumption in England (16 million) is multiplied by the proportion of balloon sticks produced domestically (10%). This was then multiplied by the respective unit weights of polypropylene and paper balloon sticks (0.000006 tonnes and 0.000012 tonnes). This gives the weight of both plastic and paper-based balloon sticks in tonnes. Total tonnage is then multiplied by the emissions per tonne. The difference between the emissions (i.e. plastic versus paper) multiplied by the carbon values gives the production emission saving of £21,558 (PV) over the 10-year appraisal period.

8. Summary of impacts and NPV – Preferred Option

Table 2 below gives a summary of the monetised costs and benefits and total Net Present Value (NPV) for the preferred option to ban plastic balloon sticks.

Table 2: Scenario estimates for 10-year NPV figures

		Low	Central	High
Benefits	Production emission savings	£16,169	£21,558	£26,948
	Disposal incineration emission benefit	£12,914	£17,218	£21,523
	Reduced coastal clean-up costs	£161	£202	£243
	Beach well-being benefit	£85,104	£151,347	£235,327
Costs	Disposal landfill emission cost	-£12,439	-£9,951	-£7,463
	Paper sticks costs to businesses	-£7,745,452	-£6,196,361	-£4,647,271
	Familiarisation costs	-£470,824	-£313,883	-£156,941
	Enforcement costs	-£858,003	-£655,019	-£643,502
	Fuel costs	-£10	-£7	-£4
	Fuel emissions costs	-£5	-£3	-£2
	Total	**-£8,972,384**	**-£5,171142**	**-£6,984,899**

Note: Our 'high estimate' is low cost, high benefits, and our 'low estimate' is high cost, low benefits.

23 According to a European Commission study (2018), Impact Assessment, Reducing Marine Litter: action on single use plastics and fishing gear

24 Defra, Local authority collected waste: annual results tables

25 BEIS, Valuing greenhouse gas emissions in policy appraisal