Title: Proposal to ban the sale and supply of disposable vapes (UK-wide assessment) **IA No:** **RPC Reference No:** **Lead department or agency:** Department for Environment, Food and Rural Affairs (Defra) **Other departments or agencies:**	**Impact Assessment (IA)** **Date:** March 2024 **Stage:** Consultation **Source of intervention:** Domestic **Type of measure:** Secondary legislation **Contact for enquiries:** disposablevapes@defra.gov.uk

Summary: Intervention and Options

RPC Opinion: RPC Opinion Status

Cost of Preferred (or more likely) Option (in 2019 prices)			
Total Net Present Social Value	**Business Net Present Value**	**Net cost to business per year**	**Business Impact Target Status**
-£6964.3m	-£6986.5m	£811.7m	Qualifying provision

What is the problem under consideration? Why is government action or intervention necessary?

Disposable vapes are not commonly recycled and cause multiple negative environmental externalities when disposed of incorrectly. Those that are thrown in a bin with general waste end up in landfill or are incinerated, with the latter generating greenhouse gas emissions. Fire risks are also associated with their unsafe disposal or inappropriate mixing with the recycling stream due to the lithium batteries they contain. Disposable vapes that are littered cause visual pollution and can lead to dangerous chemicals entering the environment. With sales of disposable vapes projected to rise, there is a risk of an increase in the incorrect disposal of them. Additionally, youth vaping is also a concern given it is increasing and disposable vapes are the most popular form of vapes for this group. Government intervention is necessary to prevent the environmental harms from persisting and address the problem quickly.

What are the policy objectives of the action or intervention and the intended effects?

The policy objectives of the intervention are to:

- Accelerate a reduction in environmental harm by reducing the number of vapes being landfilled, incinerated and littered, thereby increasing recycling and reuse rates.
- Stimulate businesses and consumers to reduce their use of disposable vapes and encourage replacing them with reusable alternatives, thereby supporting a switch to less environmentally harmful products.

This policy is also part of the wider government agenda to tackle smoking and youth vaping.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

The options considered in the IA are:

- **Option 0: 'Do nothing'.**
- **Option 1 (preferred): A ban on the sale and supply of disposable vapes.** This option would have the maximum impact in reducing the social and environmental costs of disposable vapes. The current trend in the market is that consumption of disposable vapes is increasing, and so is the incorrect disposal of them. Therefore, a ban would be most likely to address the issues quickly and ensure that environmental benefits are realised as soon as possible and prevent increasing harm in the future.
- **Option 2 (non-regulatory): Information campaign to increase the number of disposable vapes being recycled.** This option has not been pursued due to low likelihood of being effective and being unable to address the issue quickly.

Further options were explored at the long list stage but have not been taken forward to the short list options appraisal.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 5 years post-implementation

Is this measure likely to impact on international trade and investment?		Yes		
Are any of these organisations in scope?	**Micro** Yes	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:**	**Non-traded:**	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: _____ Date: _____

Summary: Analysis & Evidence

Policy Option 1

Description: Ban on the sale and supply of disposable vapes

FULL ECONOMIC ASSESSMENT

Price Base Year 2023	PV Base Year 2024	Time Period 10 Years	Net Benefit (Present Value (PV)) (£m)		
			Low: -11,991.5	**High:** -6755.3	**Best Estimate:** -9074.9

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0.2		816.6	**6796.3**
High	0.6		1444.8	**12,023.7**
Best Estimate	0.4		1094.8	**9111.5**

Description and scale of key monetised costs by 'main affected groups'

The largest monetised cost is the profit loss to retailers of disposable vapes. Businesses (wholesalers and retailers) will also incur one-off familiarisation costs. There will also be a loss of landfill tax revenue to the government, but this will be a transfer as it is a savings to local authorities (LAs).

Other key non-monetised costs by 'main affected groups'

At this stage no producer impacts have been monetised as there is uncertainty as to how much domestic production of disposable vapes there is, but this is very likely to be small. Consumers with a preference for disposable vapes compared to alternatives items (reusable vapes or cigarettes) will lose out and they will also lose out through reduced consumer choice. Wholesalers and producers are also likely to incur a loss of profit. Retailers and wholesalers are likely to incur costs of purchasing alternative products, and retailers may incur excess stock costs. Local authorities will also incur enforcement costs.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0.0		3.9	**32.2**
High	0.0		4.9	**41.0**
Best Estimate	0.0		4.4	**36.6**

Description and scale of key monetised benefits by 'main affected groups'

LAs will incur landfill tax savings, but this is a transfer as it will be a loss of revenue to government. LAs will also incur overall waste management savings with landfill and energy from waste (EfW) gate fee savings as a result of no vapes being sent to landfill and incineration. There will also be a reduction in emissions from incineration of disposal disposable vapes.

Other key non-monetised benefits by 'main affected groups'

Potential benefits from alternative items including increased profit for producers and retailers have not been monetised as it is difficult to predict the switching behaviours of disposable vapes consumers. There will be further environmental benefits including reduced litter and avoided fires. LAs will also have reduced clean-up costs as a result of less disposable vapes being littered. Further benefits would be from a reduction in use and waste of critical raw materials and environmental benefits resulting from that. As well as a loss of resources in the economy, there are also environmental impacts with raw material extraction, disposable vapes production and manufacturing. More specifically, this includes greenhouse gas emissions and water consumption generated in their manufacture.

Key assumptions/sensitivities/risks	Discount rate (%)	3.5%

The sales of disposable vapes are projected to increase at a decreasing rate in the absence of intervention over the appraisal period, and so will the waste arisings associated with this. It is assumed when disposable vapes are placed in landfill, they will not degrade or release greenhouse gas emissions due to being composed of inert materials, but 0.23 tonnes of CO_2 are released upon incineration per tonne of disposable vape waste arisings.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 1057.6	**Benefits:** 0.0	**Net:** 1057.6	

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Evidence Base

Problem under consideration

1. Vapes (e-cigarettes) have increased in popularity in recent years, becoming more mainstream products. Research suggests that the proportion of vape users in the population has grown by over 400% from 2012 to 2023, with 9.1% of the population now users.[1] The market has grown rapidly, with the UK vaping industry estimated to be responsible for a turnover of £1.325 billion in 2021.[2] Vapes can be an effective tool to support smokers to quit, with the NHS actively encouraging current smokers to switch to vaping.[3] They are considered less harmful than cigarettes due to not containing tobacco but they usually still contain nicotine.[4] However, they have also increased in prevalence amongst children under the age of 18 (i.e. youth vaping) and people who haven't traditionally smoked cigarettes.

2. There has been a sharp increase in the use of disposable vapes (sometimes referred to as single-use vapes) in particular. Disposable vapes are defined as products that are not rechargeable (they use a lithium battery which cannot be recharged), that are not refillable (once empty, the cartridge or pod cannot be refilled) or that are neither rechargeable nor refillable.[5] In contrast, a reusable vape can be recharged and fully refilled multiple times by the user/vaper and will last much longer.

3. Disposable vapes tend to dominate the casual and beginner entry points of the market, with retailers including convenience stores primarily selling single-use products, whilst specialist vape stores tend to sell more reusable vapes and refill products.[6] It has been estimated that there is an approximate split of 60% turnover from disposable vapes in comparison to 40% from reusable vapes, refill cartridges and e-liquid.[7] There has been a surge in popularity in disposable vapes, largely due to their affordability with most types costing under £10[8], together with them being easy to access where they can be purchased at avenues such as newsagents and supermarkets, as well as specialist vape shops and through online retailers (including dedicated online vape retailers as well as major e-commerce platforms).

4. Vaping is not recommended for children and carries a risk of future harm and addiction. It is also an offence to sell vapes to children under the age of 18 in the UK. Despite this, it has been estimated that 20.5% of children aged between 11 and 17 in Great Britain had tried vaping and purchase from shops is the most common source.[9] This implies that there is poor compliance with the restriction of vape sales to those who are underage, thereby leading to underage and illegal vape use. Products are available in a variety of flavours (including various fruit flavours, sweet flavours and soft drinks) with attractive packaging which

[1] ASH (2023), Use of e-cigarettes (vapes) among adults in Great Britain, https://ash.org.uk/uploads/Use-of-e-cigarettes-among-adults-in-Great-Britain-2023.pdf?v=1691058248

[2] UKVIA (2022), First ever report into vaping's impact on UK economy reveals flourishing multi billion pound industry, https://www.ukvia.co.uk/first-ever-report-into-vapings-impact-on-uk-economy-reveals-flourishing-multi-billion-pound-industry/

[3] NHS, Using e-cigarettes to stop smoking, https://www.nhs.uk/live-well/quit-smoking/using-e-cigarettes-to-stop-smoking/

[4] Cancer Research UK (2023), Is vaping harmful?, https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/smoking-and-cancer/is-vaping-harmful

[5] Vapes that are rechargeable and not refillable or that are refillable and not rechargeable, are still considered disposable or 'single-use' even though the lifetime of the vape can be extended through refilling or recharging it.

[6] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[7] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[8] Based on desk-based research conducted in December 2023

[9] ASH (2023), Use of e-cigarettes among young people in Great Britain, https://ash.org.uk/resources/view/use-of-e-cigarettes-among-young-people-in-great-britain

potentially increases the risk for children to be exposed to these products. Research suggests that the majority of these vape users mainly used disposable vapes in 2023.[10]

5. The rise in the use of disposable vapes has led to an increase in the disposal of these products. There has been growing concern over the environmental impact of them, as they are typically discarded to general waste in a bin or littered, rather than recycled. In 2023, it was estimated that almost 5 million disposable vapes were either littered or thrown away in general waste every week in the UK, almost four times as much as the previous year.[11]

6. Disposable vapes which are thrown in a bin with general waste end up in landfill or being incinerated, and they also pose a fire risk due to their lithium-ion batteries. Battery-related waste fires that can be caused by the lithium-ion battery in electricals are a risk that waste collection vehicles and waste transfer sites face. If a disposable vape ends up inside a bin or household recycling lorry with other materials, they can be crushed in the waste and recycling process. This increases the chances that they could be punctured and self-combust, setting fire to dry and flammable waste or household recycling around them. This endangers the public and staff working on lorries and waste plants if fires are caused on the streets and waste centres across the UK, creating damage which can end up costing local councils millions to repair. These waste fires also contribute to a high level of greenhouse gas emissions. It is estimated that lithium-ion batteries are responsible for approximately 48% (over 200) of all waste fires occurring in the UK each year.[12]

7. When disposable vapes are littered, they introduce plastic, nicotine salts, heavy metals, lead, mercury and flammable lithium-ion batteries into the natural environment.[13] The chemicals can end up contaminating waterways and soil and can also be toxic and damaging to wildlife. When disposable vapes which have a plastic casing are littered, the plastic can grind down into harmful microplastics. Disposable vapes are primarily littered in public spaces and this generates clean-up costs to local authorities (LAs).[14]

8. Vapes, like other electricals, should not be placed in a general waste bin or littered, and should be recycled through specialist routes and facilities instead. Current estimates indicate that only 17% of vapers correctly recycle their disposable vapes upon disposal.[15] To be recycled, they must be taken to a vape shop or electronic shop using disposable bins, or to a local Household Waste and Recycling Centre (HWRC) using designated bins. Of the disposable vapes returned to a shop or HWRC, it is estimated that only 1% end up actually being recycled due to limited recycling capacity.[16] The remainder of vapes through this end-of-life route likely end up being sent to landfill given the Environment Agency's guidance that disposable vapes should not be incinerated.[17]

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[10] DHSC Media Centre (2024), Creating a smokefree generation and tackling youth vaping: what you need to know, https://healthmedia.blog.gov.uk/2023/10/12/creating-a-smokefree-generation-and-tackling-youth-vaping-what-you-need-to-know/

[11] Material Focus (2023), Number of disposable single-use vapes thrown away have in a year quadrupled to 5 million per week, https://www.materialfocus.org.uk/press-releases/disposable-single-use-vapes-thrown-away-have-quadrupled-to-5-million-per-week/

[12] Material Focus (2023), Over 700 fires in bin lorries and recycling centres are caused by batteries many of which are hidden inside electricals, https://www.materialfocus.org.uk/press-releases/over-700-fires-in-bin-lorries-and-recycling-centres-are-caused-by-batteries-many-of-which-are-hidden-inside-electricals/

[13] Office for Health Improvement and Disparities (2023), Youth vaping: call for evidence, https://www.gov.uk/government/calls-for-evidence/youth-vaping-call-for-evidence/youth-vaping-call-for-evidence

[14] Zero Waste Scotland (2023), Scoping policy options for Scotland focusing on understanding and managing the environmental impact of single use e-cigarettes: Detailed Technical Report, https://cdn.zerowastescotland.org.uk/managed-downloads/mf-zazzy3b2-1688050338d

[15] Material Focus (2023), Number of disposable single-use vapes thrown away have in a year quadrupled to 5 million per week, https://www.materialfocus.org.uk/press-releases/disposable-single-use-vapes-thrown-away-have-quadrupled-to-5-million-per-week/

[16] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[17] Wastepack (2023), Agency sets out vapes recycling stance, https://www.wastepackgroup.co.uk/2023/03/17/vapes-recycling-stance-set-out/

9. Disposable vapes are difficult and expensive to recycle.[18] The only recycling process available in the UK is manual dismantling which is costly and time consuming since most disposable vapes are not designed to be taken apart easily.[19] They are designed as one unit and require specific tools to remove the lithium-ion battery for recycling and careful handling of components to avoid operator exposure to the remaining e-liquid.

10. There are measures already in place to ensure responsible production and disposal of disposable vapes. The Waste Electrical and Electronic Equipment (WEEE) Regulations 2013[20] aim to encourage the reuse and recycling of these items by placing financial responsibilities on producers and distributors of electrical and electronic equipment (EEE) to pay for collection and disposal schemes for WEEE. This means that all producers who place EEE on the UK market, including producers of disposable vapes, are responsible for financing the costs of the collection, treatment, recovery and environmentally sound disposal of WEEE.

11. Under the WEEE regulations, EEE products are grouped into 14 categories.[21] Vapes fall within category 7, which covers toys, leisure and sports equipment. This creates a high probability that all producers within that category (whether vapes or otherwise) share in the cost of recycling vapes. However, the costs of recycling vapes are significantly higher than other category 7 products, with estimates of the cost of recycling a single vape to be £0.40-£1, and with costs by weight to be £5-£10 per kilogram.[22] This categorisation means that it is likely that vapes producers will not cover the full cost of vapes collected for recycling, reducing the incentive for them to ensure that their products are easily recyclable.

12. Furthermore, compliance with the WEEE regulations by vape producers is estimated to be low, particularly among producers and convenience stores. Retailers that sell over £100,000 worth of vapes are obliged to offer take-back services for recycling (i.e. they must provide a vape disposal bin in store). There are low levels of awareness amongst store owners and distributors for takeback schemes, as well as low levels of customer participation reported.[23] It is important to note that the WEEE regulations are being reviewed, with a consultation underway and closing in March 2024.[24] One of the proposed changes within these regulations is for vapes to become their own category of EEE. The aim of this is a redistribution of costs between producers to ensure that the cost of recycling vapes falls solely on vapes producers. This could incentivise vape producers to increase the recyclability of their products. It should be noted that these reforms will not have any impact on consumer behaviour and so it is not expected that there will be additional recycled tonnage of vapes as a result of this specifically.

13. Environmental impacts from manufacturing disposable vapes are also of concern. A typical disposable vape contains plastic, copper and a lithium battery. Lithium is a critical raw material which is essential to the production of electronic devices.[25] Lithium and other critical

[18] Valpak (2023), Dismantling a growing problem, https://www.valpak.co.uk/dismantling-a-growing-problem/

[19] IEMA (2022), Disposable vapes – a challenge to the recycling sector, https://www.iema.net/articles/disposable-vapes-a-challenge-to-the-recycling-sector

[20] Defra (2013), The Waste Electrical and Electronic Equipment Regulations 2013, https://www.legislation.gov.uk/uksi/2013/3113/contents/made

[21] Environment Agency (2023), Electrical and electronic equipment (EEE) covered by the WEEE Regulations, https://www.gov.uk/government/publications/electrical-and-electronic-equipment-eee-covered-by-the-weee-regulations/electrical-and-electronic-equipment-eee-covered-by-the-weee-regulations

[22] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[23] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[24] Defra (2023), Consultation on reforming the producer responsibility system for waste electrical and electronic equipment 2023, https://consult.defra.gov.uk/product-regulation-and-producer-responsibility/consultation-on-reforming-the-producer-responsibil/

[25] International Energy Agency (2021), The Role of Critical Minerals in Clean Energy Transitions, https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

materials included in disposable vapes, such as cobalt and copper, are finite resources. The increased demand for disposable vapes leads to an increased demand for these critical raw materials. It is estimated that the total amount of disposable vapes thrown away in 2023 contained enough lithium to provide batteries for 5000 electric vehicles.[26] This is a waste of valuable resources for a product that has a short life-span, where they can last for as little as one to a few days for more frequent users. As well as a loss of resources in the economy, there are also environmental impacts with raw material extraction, disposable vape production and manufacturing. Most notably, this includes greenhouse gas emissions and water consumption generated in their manufacture.[27]

14. Disposable vapes are the cheapest vape product for a one-off purchase. Reusable vapes are a readily available alternative to disposable vapes and have a much longer lifespan. They are made from more durable materials and are built to last longer. Although they are more expensive initially, reusable vapes are more cost-effective in the long term. Disposable vapes often contain the same components and materials as reusable vapes, however they usually have a smaller tank and battery, a cheaper plastic exterior, and parts that are not normally recyclable.[28] Reusable vapes are considered to be less environmentally damaging, since the same vape can be used for an extended period of time. This causes little change in consumer experience while reducing environmental impacts.

15. The Department of Health and Social Care (DHSC) published a call for evidence on youth vaping in April 2023[29] where the impact of vapes on the environment was a key theme of interest. A summary of responses to this call for evidence was published in October 2023, highlighting many of the key issues in relation to the damaging impact on the environment caused by disposable vapes as already mentioned so far in this IA.

Rationale for intervention

16. This section introduces the market failures associated with disposable vapes as identified through the problem under consideration, as well as why government intervention is justified to correct them.

17. There is an information failure with users of disposable vapes lacking awareness about the environmental impacts of incorrectly discarding vapes as well as lacking knowledge about the correct forms of disposal. Most disposable vapes end up in household general waste rather than being taken to facilities for electrical waste treatment. 45% of householders are unaware of the fire risk and 40% of householders are unaware of any information regarding how they should safely recycle their batteries, including those found in disposable vapes.[30] It has been estimated that 70% of people throw away their disposable vapes because they did not know they could be recycled.[31]

[26] Material Focus (2023), Number of disposable single-use vapes thrown away have in a year quadrupled to 5 million per week, https://www.materialfocus.org.uk/press-releases/disposable-single-use-vapes-thrown-away-have-quadrupled-to-5-million-per-week/

[27] Zero Waste Scotland (2023), Environmental impact of single-use e-cigarettes, https://www.zerowastescotland.org.uk/resources/environmental-impact-single-use-e-cigarettes

[28] Business Waste, How to Dispose of and Recycle Vapes, https://www.businesswaste.co.uk/how-to-dispose-of-and-recycle-vapes/

[29] Office for Health Improvement and Disparities (2023), Youth vaping: call for evidence, https://www.gov.uk/government/calls-for-evidence/youth-vaping-call-for-evidence

[30] Material Focus (2023), Over 700 fires in bin lorries and recycling centres are caused by batteries many of which are hidden inside electricals, https://www.materialfocus.org.uk/press-releases/over-700-fires-in-bin-lorries-and-recycling-centres-are-caused-by-batteries-many-of-which-are-hidden-inside-electricals/

[31] Material Focus (2023), Number of disposable single-use vapes thrown away have in a year quadrupled to 5 million per week, https://www.materialfocus.org.uk/press-releases/disposable-single-use-vapes-thrown-away-have-quadrupled-to-5-million-per-week/

18. There is a negative externality to the environment when disposable vapes are disposed of incorrectly whereby they are discarded in the bin and/or littered. This occurs because users of disposable vapes do not face private costs equivalent to the external social costs imposed by the incorrect disposal of them. Disposable vapes can lead to environmental externalities at end-of-life treatment as a result of their incorrect disposal, such as soil pollution through leakage of hazardous substances when they are landfilled, or greenhouse gas emissions when they are incinerated. The littering of disposable vapes costs public money to clean up and imposes other costs on society including visual pollution and environmental harm. The materials in disposable vapes, can lead to dangerous chemicals entering the environment, leaching into soil, groundwater, and waterways. Furthermore, the increased risk of fires from incorrect disposal imposes a wider social cost and can result in increased bills for LAs, property damage, and legal and admin costs from fires, as well as potential risk to life or injury for recycling plant staff. The potential yearly cost of recycling all vapes that are discarded incorrectly, could be £200 million a year – this cost is not met by producers, importers or retailers, but by taxpayers instead.[32]

19. There are also negative externalities associated with critical raw material extraction of lithium and production of disposable vapes. The production of disposable vapes relies on non-renewable resources and generates greenhouse gas emissions. The UK's Critical Minerals Strategy[33], published in 2022, sets out an approach to improve the resilience of critical mineral supply chains to increase the security of supply and action plan to best conserve critical raw materials. The strategy commits Defra to explore regulatory interventions to promote reuse, recycling, and recovery of critical minerals. Critical minerals include lithium to make batteries for many electrical items, including vapes. The resources used to make disposable vapes, including oil for plastic casing and metals like copper and lithium, could be better used in the manufacture of other products, like lithium being used in the creation of batteries for electric vehicles.

20. Additionally, even though disposable vapes are indeed recyclable, the costs of recycling them are high and there is limited recycling capacity in the UK. Unless disposable vape producers, importers and retailers comply with and finance their legal environmental responsibilities, then the requirement for government intervention will only strengthen.

21. Vapes were invented in China in 2003 and first introduced in the UK in 2005 (then more commonly known then as electronic cigarettes or e-cigarettes).[34] Since then, the vaping market has boomed with an influx of new devices, including disposable vapes, vape pens, pod vapes and box modes, available across many brands.[35] The opacity and frequent changes, in addition to the diversity of companies involved in the importation and distribution, makes the UK vape market complex to understand. Low barriers to entry allow new and opportunistic companies to import vape products. The innovation and the development of new types of vaping products provides opportunities for new entrants to satisfy demand for novel and innovative products. The market has grown rapidly and is likely to continue developing, with a high number of new entrants bringing products to the UK market and a range of retail channels bringing products to consumers.[36]

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[32] Local Government Association (2023), Disposable vapes FAQs, https://www.local.gov.uk/disposable-vapes-faqs

[33] DBT (2022), UK Critical Minerals Strategy, https://www.gov.uk/government/publications/uk-critical-mineral-strategy

[34] Public Health England (2014), Electronic cigarettes: A report commissioned by Public Health England, https://assets.publishing.service.gov.uk/media/5a7df89c40f0b62302688532/Ecigarettes_report.pdf

[35] Business Waste, How to Dispose of and Recycle Vapes, https://www.businesswaste.co.uk/how-to-dispose-of-and-recycle-vapes/

[36] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

22. In 2022, it was estimated that nearly 14 million disposable vapes were bought each month, equating to 167.5 million a year.[37] The annual figure more than doubled in 2023, where it was estimated that 360 million disposable vapes were placed on the UK market[38], suggesting that the sale of disposable vapes is unlikely to fall or plateau any time soon. By projecting the 2023 figure forward, it is predicted that by 2030 the number of disposable vapes placed on the UK market per year could rise to 1.033 billion. This assumes that consumption will continue to increase but at a declining rate relative to the rapid growth seen over the last couple of years, in the absence of any policy interventions targeted at disposable vapes.[39] An increase in consumption is concerning as, assuming the proportion of those that are incorrectly disposed continues, it will lead to greater environmental harm.

23. Information campaigns to increase recycling are already in place in the UK, though these cover waste electricals more generally as opposed to being specifically targeted at disposable vapes. For example, Material Focus, an independent organisation funded via the UK WEEE Regulations Compliance Fees[40], launched the 'Recycle Your Electricals' campaign[41] in 2020. This is a behaviour change campaign aimed at getting more people to recycle their waste electricals (including disposable vapes) by raising awareness of their disposal options.

24. Though there are other options to resolve the issues in relation to disposable vapes, they do not pose a comprehensive solution to address a growing problem with many complexities as have been highlighted so far in this IA. For example, further information campaigns could be effective, but more as a longer-term solution since it is likely that these would need to be sustained as opposed to having a one-off information campaign which would not necessarily be sufficient. They would not only need to educate consumers but would also need to drive a behavioural change to ensure that disposable vapes are recycled. However, this then brings other potential problems with disposable vapes being expensive and difficult to recycle, and the lack of infrastructure to deal with the number of vapes if they did all end up being recycled. Therefore, government intervention is necessary to prevent the environmental harms from persisting and address the problem quickly.

25. The Environmental Improvement Plan[42], the first revision of the 25 Year Environment Plan, states that one of the Government's goals is to "maximise our resources, minimise our waste" involving managing materials at the end of their life to minimise the impact on the environment. One of the targets within this is to reduce residual waste in total tonnes by 21%. The single-use design of disposable vapes has been considered a problem, and the prevalence of them goes against the general trend associated with single-use items, especially various single-use plastic items which have been banned over the last few years, including straws, plates and cutlery. [43] In the absence of proper management, disposable vapes are more hazardous to the environment than single-use plastics because of the chemicals they contain as well as the battery-related fire risk they pose.

26. It is also important to draw on evidence from other countries about the impact of disposable vapes and what policies they have implemented or are planning to put in place. New

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[37] Material Focus (2022), One million single use vapes thrown away every week contributing to the growing e-waste challenge in the UK, https://www.materialfocus.org.uk/press-releases/one-million-single-use-vapes-thrown-away-every-week-contributing-to-the-growing-e-waste-challenge-in-the-uk/

[38] Material Focus (2023), Number of disposable single-use vapes thrown away have in a year quadrupled to 5 million per week, https://www.materialfocus.org.uk/press-releases/disposable-single-use-vapes-thrown-away-have-quadrupled-to-5-million-per-week/

[39] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[40] The compliance fees are paid by electrical producers if they don't meet annual recycling targets set by the government. The fees are set higher than the average costs of collections to encourage collections to take place.

[41] https://www.recycleyourelectricals.org.uk/about-recycle-your-electricals-campaign/

[42] Defra (2023), Environmental Improvement Plan 2023, https://www.gov.uk/government/publications/environmental-improvement-plan

[43] Defra (2024), Single-use plastics bans and restrictions, https://www.gov.uk/guidance/single-use-plastics-bans-and-restrictions

Zealand introduced a ban on most disposable vapes in 2023 and now only single-use vaping products that have a removable battery, a child-safety mechanism, follow new nicotine requirements and comply with new labelling requirements, can be sold.[44] This is to improve product safety as removable batteries enable the battery to be inspected and prevent risk of battery failure or explosion, as well as contributing to combat their high volume of underage vapers. France is also considering a ban on disposable vapes amid health and environmental concerns, likely to come into effect by September 2024.[45] Australia banned the imports of disposable vapes from January 2024, in an effort to curb nicotine addiction in children.[46] Ireland and Germany are also considering bans on disposable vapes due to their concerns about environmental impacts and disposal issues. Other countries, such as Qatar and Singapore, have gone further and banned the use of vapes in their entirety, whereby the possession or sale of them can result in a penalty fine.[47]

27. In October 2023, the UK government issued the "Stopping the Start: Our new plan to create a smokefree generation" command paper that outlined future proposals the government will take to tackle smoking and youth vaping.[48] Within this, it was highlighted that there are concerns about the threat that single-use disposable products pose to the environment and the large number of children that are using disposable vapes. Following publication of the command paper, DHSC launched the 'Creating a smokefree generation and tackling youth vaping' consultation[49] within which Defra had a section relating to proposals to restrict the supply and sale of disposable vapes due to their environmental impacts.

Policy objectives

28. The policy objectives of the intervention are to:
    - Accelerate a reduction in environmental harm by reducing the number of vapes being landfilled, incinerated and littered, thereby increasing recycling and reuse rates.
    - Stimulate businesses and consumers to reduce their use of disposable vapes and encourage replacing them with reusable alternatives, thereby supporting a switch to less environmentally harmful products.

29. This policy is also part of the wider government agenda to tackle smoking and youth vaping.

Rationale and evidence to justify the level of analysis used in the IA (proportionality approach)

30. The range of costs and benefits as a result of the policy, including the direct costs to businesses included in the EANDCB, have been accurately identified. However, not all costs and benefits have been quantified, and it is not proportionate to do so at this stage.

[44] New Zealand Ministry of Health (2023), Vaping, herbal smoking and smokeless tobacco products regulation, https://www.health.govt.nz/our-work/regulation-health-and-disability-system/vaping-herbal-smoking-and-smokeless-tobacco-products-regulation

[45] BBC News (2023), E-cigarettes: France backs bill to ban disposable vapes, https://www.bbc.co.uk/news/world-europe-67622248

[46] Department of Health and Aged Care (2024), Disposable vape imports now banned, https://www.health.gov.au/ministers/the-hon-mark-butler-mp/media/disposable-vape-imports-now-banned

[47] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[48] DHSC (2023), Stopping the start: our new plan to create a smokefree generation, https://www.gov.uk/government/publications/stopping-the-start-our-new-plan-to-create-a-smokefree-generation

[49] DHSC (2023), Creating a smokefree generation and tackling youth vaping, https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping

31. Where robust evidence is unavailable, assumptions have made in lieu to quantify impacts and these are detailed in discussion. These have been clearly labelled in the cost-benefit analysis and sensitivity analysis has been used on key factors which influence the costs and benefits where deemed appropriate.

32. There are also certain impacts that have not been monetised at this stage due to a lack of available data. Engagement with stakeholders will be undertaken to develop the evidence base further in preparation for the final stage IA. Detailed qualitative analysis has been included as a placeholder for where this is the case.

Description of options considered

33. A long list of options has been assessed against a set of policy success criteria in order to filter through them to develop a shortlist of options, which includes criteria based on the policy objectives mentioned earlier in the IA and wider departmental objectives:

    - **Reduced harm and risk to the environment (improves environmental outcomes):** to what extent are significant negative impacts to the environment avoided or reduced, in order to achieve the policy objectives. This also pays regard to the environmental principles as set out in the Environmental Principles Policy Statement[50], more specifically the prevention principle.
    - Intervention can be **delivered/implemented in a timely manner:** to what extent does the policy deliver to the stated objectives in a timely manner to address the problem under consideration which is growing at an exponential rate.
    - **Feasibility/achievability:** to what extent can the option be delivered with existing resources and skills available, and with minimal logistical problems and implementation issues.
    - **Value for money (VfM):** is the option likely to deliver social value in terms of costs, benefits and risks? In relation to the NPSV, how much does the option maximise social benefits (i.e. high environmental and societal impacts in this case) in qualitative terms at the long-list stage.

34. A range of policy options were considered, and for these a high-level qualitative assessment was undertaken using the success criteria. A summary of the initial options considered in the long list is outlined in the subsequent paragraphs.

Long list of options

35. **Do-nothing**. Under the “do nothing” option, there would be no restrictions on the sale and supply of disposable vapes. This is the baseline against which all other options are assessed. Market failures related to the information failure due to a lack of consumer knowledge around correct disposal and environmental impacts of incorrect disposal, and negative externalities of environmental impacts would persist. Although, with no changes implemented, no deliverability or implementation issues would arise with this option.

36. **A ban on the sale and supply of disposable vapes (preferred).** This option would address the issue at source, whereby disposable vapes will not be available for sale and should encourage a reduction in the usage of them. A ban would be able to be implemented quicker than other options and be more effective in preventing waste of critical raw materials,

[50] Defra (2023), Environmental principles policy statement, https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement

and this in turn would have greenhouse gas benefits. It would also help to promote the use of the reusable alternative and increase consumer awareness of the environmental harms that disposable vapes can cause when they are not correctly disposed of. This option also follows what other countries have either already done or are planning to do to tackle the problems around disposable vapes.

37. **Implementation of a Deposit Return Scheme (DRS) for disposable vapes.** This option would entail deposits being placed on disposable vapes to incentivise people to recycle them. Though this could help with increasing recycling of disposable vapes and thereby reduce negative impacts on the environment, it would also end up having cost implications for vape producers, councils through the cost of recycling and monitoring compliance, and costs through establishing dedicated vape bins. This option would be less likely to promote the use of reusable alternatives and would also take several years to implement, when the problem under consideration is growing at an exponential rate. Further, as mentioned earlier, the UK currently lacks suitable facilities to recycle these products and so this option is less likely to be feasible.

38. **Request-only option.** This option would involve disposable vapes being available by request-only in all settings, but not readily on display (i.e. only made available if a consumer specifically asks for one).This would be similar to the current approach with tobacco products whereby retailers make temporary, limited size displays on request when selling a tobacco product to a customer aged 18 or over, though specialist tobacconists are still able to display tobacco in designated tobacco areas (i.e. specialist tobacconists can display and advertise tobacco products inside their shops provided they are not visible from the outside). Unlike tobacco products, there are no measures to regulate the display of vaping products in shops in the UK. Vaping products are openly and prominently displayed on countertops, at till points and in eye-catching display towers on shop floors.[51] Concern has been expressed about children seeing and easily picking up vapes due to them being displayed within aisles, close to sweets and confectionary products and on accessible shelves.[52] However, the impacts in reducing the usage of disposable vapes are uncertain with a request-only option. It would be more likely to act as a barrier for children and prevent them from vaping, but not necessarily for adult vapers. This in turn may not fully reduce the current environmental impacts being faced and so this option does not specifically target the policy objectives specifically related to the environment. It would also be more difficult for enforcement bodies to monitor if businesses are complying with this regulation and would likely have no effect on online consumption, where it is estimated that 30-35% of consumers purchase online.[53]

39. **Take-back scheme.** This option would build upon what is already in place with the current WEEE regulations. This will increase accessible take-back and recycling solutions, since it has been suggested that recycling facilities are not easily accessible. This would involve the introduction of retailer collection points or designated vape bins in more retailers and places like schools/universities and other public spaces. Responses to the DHSC Call for Evidence frequently mentioned that schools should have designated ‘vape bins’ where children could safely dispose of vapes, both to decrease littering and to take away opportunities for children to pick up discarded vapes to use or sell, which is an issue in schools.[54] Moreover, this option would make it easier for people to dispose of vapes correctly without having to go to a HWRC or a store with designated bins. However, this option is likely to be very costly to stores and schools, and even if more vapes were placed in these ‘vape bins’ there is no

[51] House of Commons Library (2023), Shop displays of tobacco and vaping products, https://commonslibrary.parliament.uk/research-briefings/sn05537/

[52] DHSC (2023), Stopping the start: our new plan to create a smokefree generation, https://www.gov.uk/government/publications/stopping-the-start-our-new-plan-to-create-a-smokefree-generation/stopping-the-start-our-new-plan-to-create-a-smokefree-generation

[53] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[54] Eunomia (2023), Environmental Impacts of Vapes, (unpublished)

guarantee they would end up being recycled due to the lack of recycling infrastructure in the UK and so could end up in landfill instead. Furthermore, given the prevalence in use by children (including being sold illegally to those underage), these consumers may not want to return to stores as they are likely hiding using them to begin with so there would be a lack of compliance.

40. **Creating recycling infrastructure to deal with disposable vapes.** A key challenge of dealing with disposable vapes is the lack of a well-established recycling infrastructure in the UK. As such, there is currently a limited infrastructure for what is a growing waste stream. Currently, the Environment Agency advises that manual dismantling is the only form of treatment for recycling vapes. To increase capacity for vape recycling, it could move towards a more mechanical treatment process, with potential procedures including using a nitrogen blanketing system to mitigate fire risk or a wet shredding system to suppress fires.[55] However, this would require significant investment and it could take several years for this infrastructure to be built whilst the problem is growing meaning there could be increased harm to the environment in the meantime. Therefore, it would not be a feasible option and it would also not be promoting reusable alternatives.

41. **Improved product design of disposable vapes for easier recyclability.** A standardisation for the design and recycling of disposable vapes could ease the burden on recyclers and enable automation of the recycling process, as opposed to current manual dismantling. However, even if disposable vapes were easier to recycle, the UK's waste management systems are unable to handle the huge quantities of disposable vapes being thrown away everyday and so it is not that feasible to implement this option. It would also be difficult for the UK to influence the design of disposable vapes as they are mostly produced overseas. Though it could be argued that if these products do not meet certain UK product specifications, then the UK would not import these disposable vapes for domestic sale. Additionally, this option could seem counterproductive as it wouldn't be promoting the use of reuseable alternatives.

42. **Tax on disposable vapes.** The implementation of a tax on disposable vapes would reduce the affordability of them and would be effective in reducing consumption, thereby reducing incorrect disposal and associated environmental impacts. It would also generate tax revenue for the government. Dependent on the amount of the tax, it could bring the price of disposable vapes up to the same level as or even higher than some reusable vapes, thereby discouraging the use of disposable vapes. However, this option may not be that feasible since the tax would have to be quite substantial to bring the prices in line with reusable vapes which are initially more expensive. It is more likely that an increase in the price of disposable vapes would dissuade the younger age groups as it is currently argued that vapes are more accessible due to their affordability which is enticing to them. Therefore, they would be more disproportionately affected by a price increase because of their lower purchasing power[56], and so they would be less likely to purchase disposable vapes. High taxes for disposable vapes could encourage switching to cigarettes, although this is highly unlikely given the cost of cigarettes. A further risk with a tax is that the effectiveness is likely to reduce over time without further intervention and so the desired impacts may not be sustained. This is because, similarly to cigarettes, vapes contain the addictive substance nicotine, which may mean that vape consumers will seek them out whatever the tax burden to satisfy the nicotine cravings.

[55] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[56] World Bank (2019), E-cigarettes: Use and Taxation, https://documents1.worldbank.org/curated/en/356561555100066200/pdf/E-Cigarettes-Use-and-Taxation.pdf

43. **Information campaign to increase the number of disposable vapes being recycled (non-regulatory option).** 75% of vapers think that producers and retailers should provide more information that vapes can be recycled and the word "disposable" should no longer be used in any marketing and promotion.[57] An information campaign specifically targeted at disposable vapes, making the instructions of the safe disposal of them more readily available (i.e. consumers knowing that they should always recycle rather than bin or litter their vapes) would raise public awareness of how to safely recycle disposable vapes. However, this could come with complications due to limited recycling capacity in the UK. Additionally, this approach would be unlikely to achieve the policy objective of accelerating the reduction in environmental harm over time.

44. Table 1 shows a summary RAG-rating of the qualitative assessment of each of the options in longlist against the policy success criteria and the key for the ratings is provided in Table 2.

Table 1: Summary qualitative assessment of longlist options

Option	Reduced harm and risk to the environment	Delivered/ implemented in a timely manner	Feasibility/ achievability	VfM
Do nothing	Red	Green	Green	Red
Ban on the sale and supply of disposable vapes	Green	Green	Green	Amber
Implementation of a DRS for disposable vapes	Green	Red	Red	Red
Request-only option	Red	Green	Green	Amber
Take-back scheme	Amber	Red	Amber	Green
Creating recycling infrastructure to deal with disposable vapes	Amber	Red	Red	Red
Improved product design of disposable vapes for easier recyclability	Green	Red	Amber	Amber
Tax on disposable vapes	Amber	Amber	Amber	Amber
Information campaign (non-regulatory option)	Amber	Amber	Green	Amber

Table 2: Key for assessment against success criteria

Key	Description
Red	Does not meet success criteria
Amber	Partially meets success criteria
Green	Meets/delivers success criteria

[57] Material Focus (2023), Number of disposable single-use vapes thrown away have in a year quadrupled to 5 million per week, https://www.materialfocus.org.uk/press-releases/disposable-single-use-vapes-thrown-away-have-quadrupled-to-5-million-per-week/

Short list of options

45. After scoring the options against the success criteria, it was deemed the most likely option to meet the success criteria was a ban on the sale and supply of disposable vapes. Based on the qualitative assessment of the longlist of potential policy options, one regulatory option and one non-regulatory option that aim to deliver the policy objectives were considered. The short list of options is as follows with further discussion in subsequent paragraphs:

    - Option 0: Do nothing / Baseline.
    - Option 1: Implement a ban on the sale and supply of disposable vapes (preferred option).
    - Option 2: Information campaign to increase the number of disposable vapes being recycled (non-regulatory option).

Option 0: Do nothing

46. This is the option against which all other options are assessed against, and as such the costs and benefits are zero. In the absence of government intervention, disposable vapes would continue to be produced, imported and sold in the UK, with no additional costs to businesses. It is predicted that sales will continue increasing in the UK, but at a declining rate. This means that environmental impacts with the incorrect disposal of disposable vapes, such as the risk of battery-related waste fires, will persist.

Option 1: Implement a ban on the sale and supply of disposable vapes (preferred option)

47. This is the preferred option. A ban on the sale and supply of disposable vapes will reduce the environmental and social costs caused by the production and incorrect disposal of them, as outlined earlier in this IA. This choice of intervention applies the precautionary principle and will secure the change and associated environmental benefits quickly and ensure that these are sustained into the future. The intention of the ban is to increase consumer and business awareness of the environmental harms disposable vapes cause with incorrect disposal and signal the Government's intention.

48. Disposable vapes are inherently unsustainable products, meaning an outright ban remains the most effective solution to this problem and would support the policy objectives. A ban would go further than other options to reduce the number of disposable vapes in circulation. It would also further help to send the signal to consumers that there is a reusable alternative and raise awareness of recycling (i.e. making it the norm for vapers to purchase reusable vapes and recycle them properly when the product reaches end-of-life). The intervention is expected to reduce the number of vapes being produced and subsequently littered, landfilled and incinerated. It will thereby encourage the reuse rates of reusable alternatives, ensuring the single-use product (i.e. disposable vapes) is out of circulation, thereby correcting the failures in the current market and addressing the issue at source.

49. A ban would also support the wider proposed reforms to the WEEE regulations which would increase an uptake of recycling of reusable products and ensure that they will be recycled in an appropriate way at their end-of-life. Further, the reforms to the WEEE regulations will ensure that producers of non-disposable vapes alone are covering the cost of recycling vapes collected under the regulations.

50. No exemptions are currently proposed under this ban. Further detail on this is discussed in the 'Wider Impacts' section of the IA, including disuccion of the Equalities Impact Assessment that has been undertaken.

51. **Consultation support for a ban:** the responses from the 'Creating a smokefree generation and tackling youth vaping' consultation[58] expressed a strong desire to restrict the sale and supply of disposable vapes with 79.6% of respondents agreeing. 69% of respondents agreed that this should be in the form of prohibiting their sale and supply (i.e. banning them).[59]

Option 2: Information campaign to increase the number of disposable vapes being recycled (non-regulatory option)

52. This option would entail making the instructions of the safe disposal of disposable vapes more readily available (i.e. consumers knowing that they should always recycle rather than bin or litter their vapes) and would raise public awareness of how to safely recycle disposable vapes.

53. Collective effort between industry, retailers and the regulation to change consumer recycling behaviours with an information campaign could bring some positive effect, however removing the source of waste (i.e. through banning disposable vapes) would be even more effective and more in line with the environmental principle of harm prevention. The significant amount of disposable vapes being discarded incorrectly highlights the need for education and awareness on how to dispose of finished vapes responsibly. However, this non-regulatory approach could take several years to reach the same desired effect a ban would have and so would be very unlikely to achieve the policy objective of accelerating the reduction in environmental harm over time. A one-off information campaign would also not be sufficient on its own and it is likely that these would need to be sustained through further campaigns instead, so this could be more of a long-term solution to the problem.

54. There is a higher likelihood of this option being less effective since regardless of how effective informative campaigns are, some people do not respond to these approaches. Any behaviour change campaign would require a broad array of alternative initiatives to be undertaken to ensure success, including increasing the number of retailer recycling points which are still very rare, especially in convenience stores. There is also no guarantee that it would encourage consumers to switch to reusable alternatives when disposable vapes would still be in circulation, and so this option would not address the broader policy objectives. There is also a risk that it could even disincentivise consumers of disposable vapes to switch to reusable alternatives, as they could think that recycling would remove the environmental harm associated with disposable vapes. Even if all disposable vapes were to be recycled, the UK lacks the infrastructure to be able to recycle them. And so, even if they are taken to a HWRC or electronic/vape shop with designated bins with the aim of being recycled, a very high proportion of these do not end up being recycled for end-of-life treatment and are very likely to end up in landfill instead.

55. Thus, an extensive cost-benefit analysis has not been undertaken for this option as it does not sufficiently meet the policy objectives. In the cost-benefit analysis, the preferred option is only assessed. Henceforth, **all discussion from this point forward in the IA is only referring to the preferred option.**

[58] DHSC (2023), Creating a smokefree generation and tackling youth vaping, https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping

[59] DHSC (2024), Creating a smokefree generation and tackling youth vaping consultation: government response, https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping/outcome/creating-a-smokefree-generation-and-tackling-youth-vaping-consultation-government-response

Summary and preferred option with description of implementation plan

56. The proposals will cover the sale and supply of disposable vapes. A disposable vape is designed for single-use and defined as one which is not refillable (by means of a refill container, single-use cartridge or tank), not rechargeable, or neither refillable or rechargeable. For the purposes of this regulation, a disposable vape is not rechargeable if it contains a battery which cannot be recharged or a coil which cannot be replaced.

57. The preferred option of banning the sale and supply of disposable vapes would be implemented using secondary legislation. As mentioned earlier, there was considerable support for this option, with analysis from the consultation showing that a majority of respondents support a prohibition of disposable vapes. The date the ban is expected to come into force is yet to be confirmed, but it is currently expected that this will be late 2024 at the earliest. Confirmation on the implementation date will be provided in the final IA.

58. The policy covers the UK, following on from the UK-wide consultation and so impacts discussed in this IA relate to the whole of the UK. Therefore, this is based on the policy assumption that the other devolved nations will follow. However, despite there being a common policy position across the devolved administrations (DAs), the actual finalised legislation will be for England-only since environmental policy is a devolved matter and it is anticipated that the DAs will develop their own legislation. Therefore, in the main body of the IA UK-wide impacts are discussed. However, for the final stage IA, the figures and impacts presented will reflect England-only in line with the legislation.

59. Banning the sale of disposable vapes would require inspections to be carried out by Trading Standards, with penalties enforceable through both criminal offences and civil sanctions. This will include powers to issue fixed monetary penalties or non-compliance penalties. Fines on conviction of a criminal offence will be determined by the magistrates court in accordance with the appropriate guidelines.

60. A draft Theory of Change has been developed to provide a working model of what is expected of the policy and how it is likely to work, including the intended achievement of the policy objectives. This can be seen in Annex A. It will also act as a reference framework for the design of the evaluation of the ban.

Assumptions

Reforms to the Waste Electrical and Electronic Equipment (WEEE) Regulations

61. The proposed reforms to the WEEE Regulations, expected to be implemented in 2025, will not have any impact on the counterfactual scenario meaning that there is no need to adjust the baseline estimates as a result.

62. Vapes are currently in category 7 of EEE covered by the WEEE regulations, which covers toys, leisure and sports equipment. This creates a high probability that all producers within that category (whether vapes or otherwise) share in the cost of recycling vapes. As part of the reforms to the WEEE regulations, a new category of EEE for vapes is expected to be created to ensure that where vapes are collected for recycling, vape producers that are placing those vapes on the UK market are paying the full cost of separate collection and recycling of waste vapes based on their market share.

63. The creation of this new category will not have an impact on what consumers do with their vapes when they become waste, whether they choose to discard in a bin, litter or recycle them. Therefore, the reforms will not bring any more vapes into the WEEE system. Instead, it would mean that where vapes are being recycled, the vape producer is paying for them as opposed to other electrical producers. And so, it is not expected that there will be any additional recycled disposable vapes as a result of the reforms, but that the issues of low recycling rates and consequential negative environmental impacts of incorrect disposal will persist in the counterfactual scenario (i.e. no ban scenario).

Counterfactual

64. In order to explore the current trends in the disposable vapes market, sales data from a Defra-commissioned report by the consultancy Eunomia[60] has been used.[61] Their research was conducted in 2023 to specifically enhance the evidence base on the single-use/disposable vape market and its environmental impacts within the UK. This included an evidence review, engagement with key stakeholders, and preliminary impact modelling analysing the environmental impacts of single-use vapes. The costs and benefits of the preferred option are assessed against the counterfactual where there is the absence of a ban (i.e. in the 'do-nothing' scenario).

65. The market concentration and route to consumers of vapes in the UK is characterised by a dynamic and evolving landscape with a mix of larger and smaller producers, a diverse range of distribution channels, including convenience, retail and specialist vape stores, and a growing online presence.

66. In 2023, it was estimated that 360 million disposable vapes were placed on the market (POM) in the UK, more than double the figure from 2022. This figure has been projected forward by Eunomia, showing that 1.033 billion disposable vapes could be placed on the UK market by 2030. This is based on the assumption that consumption will continue to increase at a declining rate relative to the rapid growth seen prior to 2023 and in the absence of any policy interventions. This also takes into account that the more regular disposable vape users would transition to reusable vapes given that these are significantly cheaper over the long term.[62] We have extrapolated this figure further to reach 1.344 billion disposable vapes in 2033 to cover the 10-year appraisal period.

67. The modelled scenario in the absence of a ban can be seen in Figure 1.

[60] https://eunomia.eco/

[61] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[62] Saxton, M (2022), Disposable Alternatives – The Next Step After Disposables, https://www.theelectroniccigarette.co.uk/blog/disposable-alternatives/

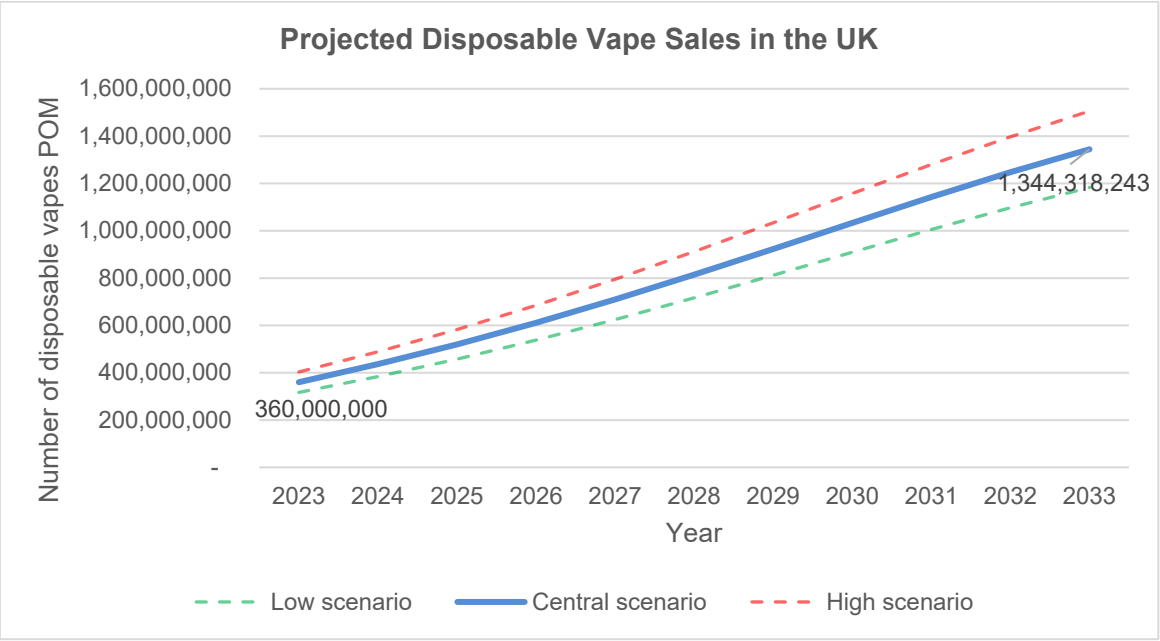

Figure 1: Chart of projected UK disposable vape sales
Source: Eunomia and Defra Modelling

68. The year-on-year growth rate of sales is summarised in Table 3, with values to the nearest percent.

Table 3: Year-on-year growth rate for disposable vapes POM

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Year-on-year growth rate (%)	21%	19%	18%	16%	15%	13%	12%	11%	9%	8%

69. The forecasts are recognised as being uncertain, and therefore sensitivity analysis around the central scenario has been undertaken to explore this risk, based on the high and low scenarios in single-use-vape consumption forecast in Zero Waste Scotland for the period 2022 to 2027 as Eunomia used the same growth rate for this period[63]. This works out to 12% (to the nearest percent) above and below the average/central scenario for disposable vapes POM, whilst keeping the year-on-year growth rate the same.

70. The growth rate and high/low sensitivity have also been applied to disposable vape waste arisings (measured in tonnes of waste as opposed to number of items)[64]. Figure 2 shows the projection of waste arisings from disposable vapes, using the same growth rate from Table 3.

[63] Zero Waste Scotland (2023), Scoping policy options for Scotland focusing on understanding and managing the environmental impact of single use e-cigarettes: Detailed Technical Report, https://cdn.zerowastescotland.org.uk/managed-downloads/mf-zazzy3b2-1688050338d

[64] Where it is assumed that most of the vape liquid is used during the vape's usable lifetime.

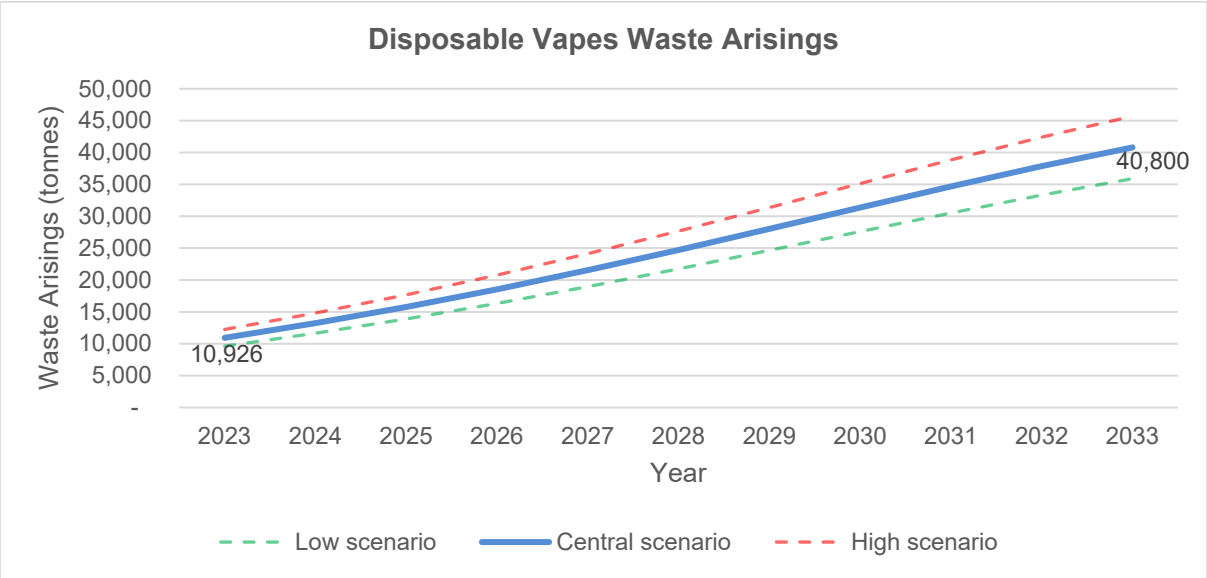

Figure 2: Chart of projected UK disposable vape waste arisings
Source: Eunomia and Defra Modelling

End-of-life and treatment route assumptions

71. Most of the costs and benefits considered in this IA are based on how disposable vapes are disposed of. In order to assess this, assumptions have had to be made around how they are managed at end-of-life and how they are treated.

72. At end of life, disposal and recycling behaviours determine the environmental impacts associated with resource recovery and waste management. Eunomia has estimated, based on data from Zero Waste Scotland, the following shares end-of-life management routes for disposable vapes, outlined in Table 4.

Table 4: Share of disposable vapes waste arisings for end-of-life management routes

End-of-Life Management Routes	Share of waste arisings
Recycled in a shop or HWRC	21%
Discarded into a bin	68%
Littered/other[65]	11%

73. Using research by Eunomia[66] based on stakeholder interviews and Defra Waste Statistics, it is assumed that disposable vapes will be treated the following way within each of the following collection routes, outlined in Table 5.

Table 5: Treatment routes for disposable vape waste arisings within each end-of-life/collection route

	Recycled in a shop or HWRC	Discarded into a bin	Littered/other [67]
Recycled	1%	0%	0%
Incinerated	0%	84%	84%
Landfill	99%	16%	16%
Total	**100%**	**100%**	**100%**

[65] Where 'other' captures categories with a very small share, including being given away or flushed down a toilet, and so are combined with litter

[66] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[67] Although it is assumed that all littered disposable vapes are collected, in reality it is possible for some to remain in the environment,.

74. The end-of-life routes for disposable vapes waste arisings have significant environmental impacts. It is assumed that these proportions will remain constant over the appraisal period for the counterfactual. Without any policy intervention, their environmental impact will continue to increase, given the higher levels of consumption projected over the appraisal period.

Greenhouse gas emissions associated with end-of-life phases

75. Because almost all materials within vapes are inert materials, when placed in landfill they will not degrade or release greenhouse gas (GHG) emissions. Therefore, the GHG emissions associated with landfilling of vapes would be negligible.[68]

76. During incineration, there is power generated by turbines as a result of the combustion of the waste (i.e. Energy from Waste (EfW)). By accounting for energy[69], 0.23 tonnes of CO_2 are released upon incineration per tonne of disposable vape waste arisings.

Producer impacts

77. Evidence suggests that most production of disposable vapes takes place abroad, with over 80% thought to take place in China, with there being 5 or 6 major producers[70]. We are uncertain of the exact market share of domestically produced disposable vapes, but it is likely to be a very small proportion. Engagement with stakeholders will be undertaken to gain further evidence on what proportion of disposable vapes are produced domestically.

78. Following the ban, we would expect businesses to choose the course of action which maximises their profit function. Though there is potential that for some producers this may mean exiting the market, we would also expect some producers to move to production of the next most profitable alternative for their business. It should be noted that because the ban is on sale and supply, and not a ban on the manufacture of these goods, disposable vapes could still be produced domestically to be exported to other countries.

79. We acknowledge that any switch in production is likely to result in lower total profit, at least in the short-term, otherwise producers would have already made this switch. In this instance, we have assumed that producers of disposable vapes will switch to producing reusable vapes and their refill components. However, this could be a simplifying assumption as these producers could already produce reusable vapes and their refill components, in addition to producing disposable vapes.

Number of retailers

80. The UK Standard Industrialisation Classification (SIC) 2007[71] classification of industrial activities does not include specific categories for the vaping industry. Instead, vaping businesses classify their activities under a range of codes, most of which include some tobacco related codes. Therefore, we have identified the following SIC codes and assumed that all 42,465 businesses categorised within these SIC codes sell disposable vapes:

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[68] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[69] Eunomia's modelling accounts for this and gives a credit for the energy produced that would otherwise need to be generated elsewhere (for instance by coal or wind turbine power sources).

[70] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[71] ONS (2009) UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007), https://www.ons.gov.uk/file?uri=/methodology/classificationsandstandards/ukstandardindustrialclassificationofeconomicactivities/uksic2007/uksic2007webamend8531.pdf

- 32,690 businesses in SIC 4711 (Retail sale in non-specialised stores with food; beverages or tobacco predominating)
- 8,055 businesses in SIC 4719 (Other retail sale in non-specialised stores)
- 1,720 businesses in SIC 4726 (Retail sale of tobacco products in specialised stores)

81. We do not know what proportion of these businesses sell disposable vapes, so we have assume all of them do. There is potential for this to be an underestimate of retailers impacted, as the Association of Convenience Stores (ACS) Local Shop Report 2023 put the number of convenience stores in mainland UK to be 49,388 in 2023[72] which does not include supermarkets or specialist vape stores and is higher than our estimate using SIC codes. However, we do not anticipate that all of these convenience stores will stock disposable vapes and so have not used this estimate for the number of retailers. Additionally, it has been estimated that there could be over 3000 specialist vape stores in the UK[73], which Is higher than the SIC codes estimate for retail sale of tobacco products in specialised stores. As a result, we acknowledge that the number of retailers needs to be investigated and will aim to seek a more robust estimate for the final stage IA as well as incorporate sensitivity analysis where this affects specific costs or benefits.

82. It should also be noted that unlike tobacco, vapes can be sold easily by any retailer in the UK (although in Scotland, retailers must register as a seller of nicotine products).[74] For tobacco products, retailers must have an economic operator ID for their business and facility IDs for each premise used to sell or store tobacco products.[75] This means that there are a range of potential unconventional retail routes, including market stalls, phone shops, hairdressers and other independent retailers that are able to sell vapes, even though they have limited experience with the vaping sector or the selling of age-gated products. Due to uncertainty about how many of these unconventional retailers sell disposable vapes, they have not been accounted for in the cost-benefit analysis, but they are likely to make up a very small proportion of retailers and contribution to sales. However, we will investigate this further for the final stage IA.

83. Additionally, as acknowledged earlier, it is estimated that 30-35% of sales of disposable vapes are online. It should be noted that these online sellers often have no physical presence in the UK. The UK Government regulators do not have any jurisdiction outside of the UK, meaning that they have no enforcement powers on online sellers based overseas, both in relation to placing on the market and waste obligations. We will aim to look into this further for the final stage IA.

Replacement by consumers (nature of substitution)

84. It is difficult to quantify the number of people switching either between different types of vapes (disposable to reusable), from vaping to smoking cigarettes, or stopping vaping/smoking altogether as a result of a ban on disposable vapes. This makes it difficult to predict what the consumption of banned disposable vapes will be replaced by.

[72] Association of Convenience Stores (2023), The Local Shop Report 2023, https://cdn.acs.org.uk/public/ACS%20Local%20Shop%20Report%202023.pdf

[73] CEBR (2022), Economic impact assessment of the vaping industry, https://www.ukvia.co.uk/wp-content/uploads/2022/11/Cebr_Report_06092022-clean.pdf

[74] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

[75] HMRC (2019), Selling and storing tobacco products, https://www.gov.uk/guidance/selling-and-storing-tobacco-products

85. Research has been undertaken by the charity, Action on Smoking and Health (ASH), looking into smoking status and vaping behaviour amongst vape users in Great Britain.[76] It found that 56% of vape users are ex-smokers, 37% are current smokers and a smaller proportion are people who have never smoked. It also found that around two thirds of vape users' most popular main device was a reusable vape[77], with 31% mainly using a disposable vape. However, we are unable to predict consumers' behaviour as a result of a ban on disposable vapes.

86. It could be assumed that dual users (i.e. those who smoke and vape) may revert back to only purchasing cigarettes, and ex-smokers who use disposable vapes may also revert back to cigarettes. However, if someone is a daily user of vapes, they are more likely going to be a user of a reusable vape to begin with, as is seen by the survey results.

87. Given this uncertainty, we have not quantified any impacts in relation to the substitution by consumers and what impact this will have on sales. However, we will aim to include some sensitivity analysis around this with different possible scenarios in the final stage IA.

Expected costs and benefits of the preferred option

88. All indicative estimates used in this analysis are in 2023 prices unless stated otherwise and are undiscounted.

89. Impacts grouped based on affected group are summarised in Table 6 and are discussed in the following sections.

[76] ASH (2023), Use of e-cigarettes (vapes) among adults in Great Britain, https://ash.org.uk/uploads/Use-of-e-cigarettes-among-adults-in-Great-Britain-2023.pdf?v=1691058248

[77] 50% of users mainly used an 'electronic cigarette that is rechargeable and has a tank or reservoir that you fill with liquids' and 17% of users mainly used an 'electronic cigarette kit that is rechargeable with replaceable pre-filled cartridges'

Table 6: Summary of expected impacts as a result of the policy

Group Impacted	Impact	Cost / Benefit	One-off / Ongoing	Direct / indirect to business
Producers (businesses)	Familiarisation costs	Cost	One-off	Direct
	Loss of profit from production of disposable vapes	Cost	Ongoing	Direct
	Capital investment cost for production of alternative items	Cost	One-off	Direct
	Less purchase of materials for production of disposable vapes	Benefit	Ongoing	Indirect
	Alternative material costs for production of alternative items	Cost	Ongoing	Indirect
	Profit gained through producing alternatives	Benefit	Ongoing	Indirect
Wholesalers (businesses)	Familiarisation costs	Cost	One-off	Direct
	Loss of profit from sales of disposable vapes	Cost	Ongoing	Direct
	Profit gained through sale of alternative items	Benefit	Ongoing	Indirect
	Wholesaler costs of alternative products	Cost	Ongoing	Indirect
Retailers (businesses)	Familiarisation costs	Cost	One-off	Direct
	Loss of profit from sales of disposable vapes	Cost	Ongoing	Direct
	Purchasing costs of alternative product	Cost	Ongoing	Indirect
	Excess stock costs	Cost	One-off	Direct
	Profit gained through sales of alternative products	Benefit	Ongoing	Indirect
	Reduction in fuel costs	Benefit	Ongoing	Direct
Other sectors (businesses)	Producers of reusable vapes and their refill components might have increased market	Benefit	Ongoing	Indirect
Consumers	Disutility through loss of enjoyment/convenience or reduced choice	Cost	Ongoing	Not applicable
Government	Loss of landfill tax revenue	Cost	Ongoing	
Local Authorities (LAs)	Enforcement costs (Trading Standards)	Cost	Ongoing	
	Reduced clean-up costs	Benefit	Ongoing	
	Landfill tax savings	Benefit	Ongoing	
	Landfill and EfW gate fee savings	Benefit	Ongoing	
Third parties	Reduced litter (amenity) benefit to society	Benefit	Ongoing	
	Production emission savings to society	Benefit	Ongoing	
	Disposal incineration emission benefit (reduced GHG emissions)	Benefit	Ongoing	
	Reduced fires	Benefit	Ongoing	
	Reduction in fuel emissions to society	Benefit	Ongoing	

Summary of monetised costs

Retailer familiarisation costs

90. Familiarisation costs are the one-off costs that businesses face upon implementation of the ban. For retailers, this will cover the time taken to inform employees about the ban, costs attached to any necessary price changes of products, and time taken to shop around for an alternative supplier of alternative items such as reusable vapes.

91. In order to monetise the familiarisation costs to retailers, the categories and number of businesses likely to be affected by the ban have been identified using SIC codes. Therefore, it has been estimated that 42,465 retailers will be affected by familiarisation costs in total, including convenience stores and specialist vape stores.

92. It was estimated that familiarisation would take 30 minutes of one full-time employee's time, based on the estimate used in previous single-use plastic bans IAs.[78] This was deemed an appropriate proxy due to being a similar policy. Low and high sensitivities have also been estimated to be 15 minutes and 45 minutes respectively to account for the uncertainty. These were costed at the hourly wage for each business category[79] and uplifted with a 22% non-wage labour cost uplift[80].

93. Table 7 provides a breakdown of the calculations in the central scenario, including the familiarisation cost per business in each SIC code and the final column showing the total familiarisation cost for each SIC code (i.e. familiarisation cost for one business multiplied by number of UK businesses). Table 8 shows the sensitivity analysis carried out with total familiarisation costs for the low, central and high scenarios.

Table 7: Total familiarisation costs for retailers in the central scenario

SIC Code	Number of UK businesses	Median Hourly Wage	Familiarisation cost per business[81]	Total familiarisation costs for businesses in SIC code[82]
4711 : Retail sale in non-specialised stores with food; beverages or tobacco predominating	32,690	£13.42	£8.19	£267,607
4719 : Other retail sale in non-specialised stores	8,055	£ 13.84	£8.44	£68,004
4726 : Retail sale of tobacco products in specialised stores	1,720	£11.79	£7.19	£12,370
Total	**42,465**			**£347,980**

[78] Defra (2023), Impact Assessment on the proposal to ban the supply of single-use food and beverage containers made from expanded or extruded polystyrene in England, https://www.legislation.gov.uk/ukia/2023/60/pdfs/ukia_20230060_en.pdf

[79] ONS (2023), Earnings and hours worked, industry by four-digit SIC: ASHE Table 16, https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/industry4digitsic2007ashetable16

[80] RPC (2019), RPC guidance note on 'implementation costs', https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/827926/RPC_short_guidance_note_-_Implementation_costs__August_2019.pdf

[81] $0.5\ hours \times Hourly\ Wage \times (1 + 22\%)$

[82] Rounded to the closest unit

Table 8: Sensitivity analysis for total familiarisation costs for retailers for all businesses in SIC codes

SIC Code	Low scenario (15 minutes)	Central scenario (30 mins)	High scenario (45 mins)
4711: Retail sale in non-specialised stores with food; beverages or tobacco predominating	£133,803	£267,607	£401,410
4719: Other retail sale in non-specialised stores	£34,002	£68,004	£102,005
4726: Retail sale of tobacco products in specialised stores	£6,185	£12,370	£18,555
Total	**£173,990**	**£347,980**	**£521,971**

94. Engagement with stakeholders will be undertaken in order to seek further evidence on the assumptions made around familiarisation for retailers, as well as views on whether the time required for familiarisation would vary across businesses dependent on their size.

Retailer profit loss from sales of disposable vapes

95. We currently do not have any exact information about how much profit comes from disposable vape sales for retailers. The percentage of revenue that will translate into profits is assumed to be 24% (to the nearest whole number), based on data from the Annual Business Survey (ABS)[83] and calculated as gross value added (GVA) divided by turnover[84], for the three retail SIC codes used (4711, 4719 and 4726) and an average taken between them. We do not know how much of this profit arises specifically due to sales of disposable vapes, however we have attempted to use this to provide an initial estimate of profit loss to retailers. Engagement will be undertaken with stakeholders to seek further evidence on the assumptions we have made to refine numbers for the final IA.

96. Retail price estimates of disposable vapes have been informed by desk-based research[85], where an average price of £5.30 has been estimated. Sensitivity analysis on this figure has been carried out, using the lowest and highest price within our sample. This can be seen in table 9.

Table 9: Retail price estimates for disposable vapes

	Retail price
Low	£3.95
Central	£5.30
High	£6.99

97. In order to calculate profit loss to retailers, the average price of a disposable vape has been multiplied by projected disposable vape sales for each year in the appraisal period (to

[83] ONS (2023), Non-financial business economy, UK: Sections A to S, https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/datasets/uknonfinancialbusinesseconomyannualbusinesssurveysectionsas

[84] This is the same assumption used in the WEEE IA.

[85] Defra research based on a sample (a compiled list of approximately 40 products that were deemed to be disposable vapes based on the definition given in paragraph 56) of products for sale from both online and in-store retailers, including specialist vape stores, newsagents and supermarkets.

calculate revenue), and this is then multiplied by the 24% figure mentioned earlier in this section. Table 10 provides calculations for the central scenario and Table 11 shows the sensitivity analysis around this, where the sensitivity is applied to the price of disposable vapes (i.e. using the low and high figures in table 9) as opposed to sales data.

Table 10: Profit loss to retailers in the central scenario (using the average price of disposable vapes)

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Disposable vape sales (millions)	436	520	611	710	814	923	1,033	1,142	1,247	1,344
Profit loss (£m)	£543m	£648m	£761m	£884m	£1,014m	£1,150m	£1,287m	£1,423m	£1,554m	£1,675m

Table 11: Sensitivity analysis for profit loss by retail price of disposable vapes (£millions)

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Low scenario	£405m	£483m	£568m	£659m	£756m	£857m	£960m	£1,061m	£1,159m	£1,249m
Central scenario	£543m	£648m	£761m	£884m	£1,014m	£1,150m	£1,287m	£1,423m	£1,554m	£1,675m
High scenario	£717m	£855m	£1,005m	£1,167m	£1,339m	£1,517m	£1,699m	£1,878m	£2,051m	£2,210m

Wholesaler familiarisation costs

98. As with retailers, wholesalers of disposable vapes are also likely to face one-off familiarisation costs with the implementation of a ban. Wholesalers classify their activities under a range of codes which include some tobacco related codes and other codes related to the sale of non-tobacco goods. For example, some wholesalers of vapes trade under SIC Code 4676: Wholesale of other intermediate products. Therefore, it has been estimated that 6,860 wholesalers across four SIC codes will be affected by familiarisation costs in total. This is likely to be an overestimate as some of these wholesalers might actually not sell disposable vapes.

99. It was estimated that familiarisation would take 30 minutes of one full time employee's time, the same as has been currently estimated for retailers (based off of the estimate used in previous single-use plastic bans IAs[86]). Low and high sensitivity have also been estimated to be 15 minutes and 45 minutes respectively to account for the uncertainty. These were costed at the hourly wage for each business category[87] and uplifted with a 22% non-wage labour cost uplift[88].

100. Table 12 provides a breakdown of the calculations in the central scenario, including the familiarisation cost per business in each SIC code and the final column showing the total familiarisation cost for each SIC code (i.e. familiarisation cost for one business multiplied by number of UK businesses), whilst Table 13 shows the sensitivity analysis carried out with total familiarisation costs for the low, central and high scenarios.

[86] Defra (2023), Impact Assessment on the proposal to ban the supply of single-use food and beverage containers made from expanded or extruded polystyrene in England, https://www.legislation.gov.uk/ukia/2023/60/pdfs/ukia_20230060_en.pdf

[87] ONS (2023), Earnings and hours worked, industry by four-digit SIC: ASHE Table 16, https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/industry4digitsic2007ashetable16

[88] RPC (2019), RPC guidance note on 'implementation costs', https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/827926/RPC_short_guidance_note_-_Implementation_costs__August_2019.pdf

Table 12: Total familiarisation costs for wholesalers in the central scenario

SIC Code	Number of UK businesses	Median Hourly Wage	Familiarisation cost per business[89]	Total familiarisation costs for businesses in SIC code
4617: Agents involved in the sale of food; beverages and tobacco	1,280	£15.81[90]	£9.64	£12,344
4635: Wholesale of tobacco products	195	£21.06	£12.85	£2,505
4639: Non-specialised wholesale of food; beverages and tobacco	3,700	£14.24	£8.69	£32,140
4676: Wholesale of other intermediate products	1,685	£17.18	£10.48	£17,658
Total	**6,860**			**£64,648**

Table 13: Sensitivity analysis for total familiarisation costs for wholesalers for all businesses in SIC codes

SIC Code	Low scenario (15 minutes)	Central scenario (30 minutes)	High scenario (45 minutes)
4617: Agents involved in the sale of food; beverages and tobacco	£6,172	£12,344	£18,517
4635: Wholesale of tobacco products	£1,253	£2,505	£3,758
4639: Non-specialised wholesale of food; beverages and tobacco	£16,070	£32,140	£48,210
4676: Wholesale of other intermediate products	£8,829	£17,658	£26,488
Total	**£32,324**	**£64,648**	**£96,972**

101. Engagement with stakeholders will be undertaken in order to seek further evidence on the assumptions made around familiarisation for wholesalers, as well as views on whether the time required for familiarisation would vary across businesses dependent on their size.

Loss of landfill tax revenue to Government

102. With disposable vapes banned, there is likely to be a loss in landfill tax revenue as it is calculated based on the weight of waste that goes to landfill. It is important to note that the landfill tax revenue represents a transfer of money between relevant parties. It is a loss of revenue to Government in this case and a savings to LAs. Landfill tax per tonne in 2023 is

[89] $0.5\ hours \times Hourly\ Wage \times (1 + 22\%)$

[90] To note, no median hourly wage was available for this SIC code, so mean hourly wage was used instead

£102.10 and this is multiplied by the estimated tonnes of disposable vape waste arisings sent to landfill for each year of the appraisal period.

103. Table 14 shows how this is calculated for the central scenario, with Table 15 showing the sensitivity analysis around the tonnes of waste sent to landfill (i.e. +/- 12%).

Table 14: Landfill tax revenue loss to government by year in the central scenario

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Waste sent to landfill (t)	4449	5303	6233	7238	8306	9415	10,540	11,654	12,723	13,713
Landfill Tax Loss (£m) [to 2 d.p.]	£0.45m	£0.54m	£0.64m	£0.74m	£0.85m	£0.96m	£1.08m	£1.19m	£1.30m	£1.40m

Table 15: Sensitivity analysis for landfill tax revenue loss to government by year (£millions)

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Low scenario	£0.40m	£0.48m	£0.56m	£0.65m	£0.75m	£0.85m	£0.95m	£1.05m	£1.14m	£1.23m
Central scenario	£0.45m	£0.54m	£0.64m	£0.74m	£0.85m	£0.96m	£1.08m	£1.19m	£1.30m	£1.40m
High scenario	£0.51m	£0.61m	£0.71m	£0.83m	£0.95m	£1.08m	£1.21m	£1.33m	£1.45m	£1.57m

Summary of monetised benefits

Landfill and EfW gate fee savings to LAs

104. As discussed above and outlined in tables 14 and 15, there will be savings for LAs but a loss for government as a result of the transfer of money,

105. By banning disposable vapes, it is expected that waste management costs to LAs will fall due to landfill tax and landfill and incineration (EfW) site gate fees being calculated by weight. Landfill tax is a transfer, however landfill and EfW gate fees are explicitly benefits to LAs. The gate fees are outlined in Table 16 and we have assumed that these will remain constant over the 10-year appraisal period. These are multiplied by the tonnages of waste expected to be sent to landfill and incineration to calculate savings. The gate fees were originally in 2019 prices[91], but have been inflated to 2023 prices as the standard price base year to be consistent for the cost-benefit analysis.

Table 16: Gate Fees in 2023 prices

	Gate Fee (£/t)
EfW	£109.85
Landfill	£29.53

106. Table 17 shows the landfill tax gate fee saving for each year in the appraisal period for the central scenario and Table 18 shows the sensitivity analysis for this around the tonnes of waste sent to landfill.

[91] WRAP (2021), Gate Fees 2019/20 Report: Comparing the costs of alternative waste treatment options, https://wrap.org.uk/sites/default/files/2021-01/Gate-Fees-Report-2019-20.pdf

Table 17: Landfill gate fee savings to LAs in the central scenario

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Waste sent to landfill (t)	4449	5303	6233	7238	8306	9415	10,540	11,654	12,723	13,713
Landfill Gate Fee savings (£m) [to 2 d.p.]	£0.13m	£0.16m	£0.18m	£0.21m	£0.25m	£0.28m	£0.31m	£0.34m	£0.38m	£0.40m

Table 18: Sensitivity analysis for landfill gate fee savings (£millions)

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Low scenario	£0.12m	£0.14m	£0.16m	£0.19m	£0.22m	£0.24m	£0.27m	£0.30m	£0.33m	£0.36m
Central scenario	£0.13m	£0.16m	£0.18m	£0.21m	£0.25m	£0.28m	£0.31m	£0.34m	£0.38m	£0.40m
High scenario	£0.15m	£0.18m	£0.21m	£0.24m	£0.27m	£0.31m	£0.35m	£0.39m	£0.42m	£0.45m

107. Table 19 shows the EfW gate fee saving for each year in the appraisal period for the central scenario and Table 20 shows the sensitivity analysis for this around the tonnes of waste incinerated.

Table 19: EfW gate fee savings to LAs in the central scenario

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Waste incinerated (t)	8773	10,457	12,290	14,274	16,378	18,565	20,785	22,981	25,089	27,041
EfW Gate Fee savings (£m) [to 2 d.p.]	£0.96m	£1.15m	£1.35m	£1.57m	£1.80m	£2.04m	£2.28m	£2.52m	£2.76m	£2.97m

Table 20: Sensitivity analysis for EfW gate fee savings

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Low scenario	£0.85m	£1.01m	£1.19m	£1.38m	£1.58m	£1.79m	£2.01m	£2.22m	£2.43m	£2.61m
Central scenario	£0.96m	£1.15m	£1.35m	£1.57m	£1.80m	£2.04m	£2.28m	£2.52m	£2.76m	£2.97m
High scenario	£1.08m	£1.29m	£1.51m	£1.76m	£2.02m	£2.28m	£2.56m	£2.83m	£3.09m	£3.33m

Disposal incineration emission benefit

108. Disposable vapes produce greenhouse gas emissions when incinerated, therefore a ban will result in emissions savings. To calculate the incineration benefit, the tonnes of CO_2e released upon incineration of disposable vapes (0.23 tonnes CO_2e per tonne of disposable vape waste arisings) are multiplied by the carbon value using 2020 carbon series[92] which has been inflated to be in 2023 prices as the standard price base year to be consistent with the cost-benefit analysis.

109. Table 21 explains these calculations, with figures rounded to the nearest whole number. Table 22 provides sensitivity analysis around this.

[92] BEIS (2021), Valuation of greenhouse gas emissions: for policy appraisal and evaluation, https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation#annex-1-carbon-values-in-2020-prices-per-tonne-of-co2

Table 21: Disposal incineration emission benefit for the central scenario

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Waste incinerated (t)	8773	10,457	12,290	14,274	16,378	18,565	20,785	22,981	25,089	27,041
Total GHG emissions from incineration (tCO_2e)	2036	2427	2853	3313	3802	4310	4825	5335	5824	6277
Carbon values in 2023 prices (£)	£287	£292	£296	£301	£305	£310	£314	£320	£324	£329
Total disposal emission incineration benefit (£m)	£0.58m	£0.71m	£0.84m	£1.00m	£1.16m	£1.33m	£1.52m	£1.71m	£1.89m	£2.06m

Table 22: Sensitivity analysis for disposal incineration emission benefit (£millions, to 2 d.p.)

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Low scenario	£0.51m	£0.62m	£0.74m	£0.88m	£1.02m	£1.17m	£1.33m	£1.50m	£1.66m	£1.82m
Central scenario	£0.58m	£0.71m	£0.84m	£1.00m	£1.16m	£1.33m	£1.52m	£1.71m	£1.89m	£2.06m
High scenario	£0.66m	£0.79m	£0.95m	£1.12m	£1.30m	£1.49m	£1.70m	£1.91m	£2.11m	£2.31m

Summary of non-monetised costs

Producer familiarisation costs

110. Producers of the banned items will also face familiarisation costs, from the time taken to read and understand the legislation and subsequently make business decisions relating to the ban. For some this could involve decisions relating to altering production processes or adjusting business plans. Therefore, it is expected that familiarisation costs will be higher per business for producers than for other businesses (retailers and wholesalers), though they are likely to vary for each individual producer.

111. These familiarisation costs would not apply to many domestic businesses as it is assumed that most production of disposable vapes takes place abroad.[93] As a result, it is deemed appropriate at this stage to not monetise any producer impacts as most producers of vape products are based abroad. Though, we will seek to test this for the final IA.

Producer profit loss from production of disposable vapes

112. Following the implementation of the ban, producers will be forced to stop selling disposable vapes in the UK/England and domestic producers are likely to stop production of these items entirely, though it should be noted that because the ban does not cover a ban on the manufacture of these goods they could still produce disposable vapes to export. Following the implementation of the ban, businesses will be expected to choose the course of action which maximises their profit function. Though there is potential for some producers to cease

[93] Though there might be a very small amount of production in the UK, but this negligible.

trading and exit the market, it is also expected that some producers will move to production of the next most profitable alternative for their business (i.e. reusable vapes). However, as it is assumed there is little domestic production of disposable vapes, this value is deemed negligible. Engagement with stakeholders will be undertaken to test this for the final IA.

Capital investment cost to producers

113. Where producers switch to producing other items, there is unlikely to be much capital investment cost associated with making this switch. This is because disposable and reuseable vapes contain the same components and materials, and so producers may not need to purchase entirely new production capital in order to switch production. However, as it is assumed there is little domestic production of disposable vapes, this value is deemed negligible. Engagement with stakeholders will be undertaken to test this for the final IA.

Alternative material costs to producers

114. As previously mentioned, disposable vapes often contain the same components and materials as reusable vapes and so there is likely to be negligible alternative material costs to producers if they decide to switch to producing reusable vapes but perhaps there could be more of the same finite resources used to produce reusable vapes instead. However, as it is assumed there is little domestic production of disposable vapes, this value is deemed negligible. Engagement with stakeholders will be undertaken to test this for the final IA.

Wholesaler profit loss from no longer stocking disposable vapes

115. We currently do not have any information about how much profit comes from disposable vapes for wholesalers. The percentage of revenue that will translate into profits is assumed to be 16%, based on data from the Annual Business Survey (ABS)[94] and calculated as gross value added (GVA) divided by turnover[95], for three of the four wholesaler SIC codes used (4617, 4639, 4676)[96] and an average taken between them. Because we do not know how much of this profit arises specifically due to sales of disposable vapes, we are unable to monetise the cost to wholesalers. However, engagement will be undertaken with stakeholders to seek further evidence on this and to monetise this for the final IA.

Wholesaler costs of alternative products

116. The wholesale sector is likely to be able to continue to trade the alternative items (i.e. reusable vapes, refill pods, etc.) replacing the banned items. There is a risk that some wholesalers could see reduced trade or margins, particularly during a transition period from disposable vapes to alternative items, which may initially be harder to source. Overall demand for vaping products could fall as some consumers may switch away from smoking and vaping entirely, and so there could be an overall fall in their sales.

117. There may be some increased costs to wholesalers if they are required to source a greater proportion of their stock from abroad than prior to the bans. This could also result in longer lead times for customers. However, this is deemed unlikely since the vast majority of disposable vapes are sourced from abroad anyway, and so this cost has not been monetised as it is likely to be negligible.

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[94] ONS (2023), Non-financial business economy, UK: Sections A to S, https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/datasets/uknonfinancialbusinesseconomyannualbusinesssurveysections as

[95] This is the same assumption used in the WEEE IA.

[96] SIC code 4635 has been excluded as no GVA value for 2021 was available, the latest year.

Excess stock costs for retailers

118. If businesses stockpile more disposable vapes than can be sold before the ban is implemented, there is a risk that they will be left with excess stock, which they may need to pay to dispose of, as well as marketing materials. This is expected to be reasonably small given that it is mostly small retailers who sell disposable vapes and they are unlikely to have much storage space. There will also be a transition period of at least 6 months prior to enforcement of the of the legislation to allow businesses time to run-down stocks. Further detail on this is provided in the 'Risks and mitigations' section of the IA.

119. We currently do not have any information about how often retailers, and in particular convenience stores, make their orders and with how much stock. However, engagement will be undertaken with stakeholders to seek further evidence on this.

Purchasing costs to retailers

120. Reusable vapes are more expensive on average than disposable vapes, resulting in costs to businesses, but we don't know whether this is offset by the cost of selling by reusables to consumers. However, we are uncertain how many retailers already stock the reusable alternatives, or if they only stock disposable vapes. Information on the wholesale price of disposable and reusable vapes and refill products will be investigated for the final stage IA. The wholesale market price takes into account any mark-up made by manufacturers and this is the cost expected to be incurred by UK retailers purchasing vapes for sale.

Disutility to consumers through loss of convenience or enjoyment

121. Though they are less environmentally damaging, reusable vapes may not be a perfect substitute for disposable vapes for those who do choose to switch. Consumers with a preference for disposable vapes compared to alternatives will lose out as a result of the ban, as well as losing out also through reduced consumer choice. Disposable vapes are easy-to-use and don't require much maintenance. Users do not need to worry about refilling them as they come pre-filled, or cleaning and replacing various components unlike the case with reusable vapes. Therefore, there are likely to be some disutility costs to consumers as a result of the loss of convenience with disposable vapes whether they switch to using reusable vapes or stop vaping altogether as they would have preferred to use a disposable vape.

122. However, there is evidence to suggest that any disutility costs from reusable vapes being inferior to disposable vapes are of less concern than the environmental considerations.[97] Main themes from respondents to the consultation who were in support of a prohibition on the sale and supply of disposable vapes, included litter, environmental harms and waste management. In addition, disutility costs may be short-lived but it is not possible to quantify this impact. It is also not possible to predict the proportion of users of disposable vapes who will switch to reusable vapes, cigarettes or stop vaping/smoking altogether, however we will aim to understand this better in the final IA and provide some sensitivity analysis around this.

Enforcement costs to LAs

123. There will be costs associated with inspection and law enforcement services to support he ban. Trading Standards Authorities would be best placed to enforce the ban, and work will

[97] DHSC (2024), Creating a smokefree generation and tackling youth vaping consultation: government response, https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping/outcome/creating-a-smokefree-generation-and-tackling-youth-vaping-consultation-government-response

be undertaken with LAs to establish the most effective and efficient way of enforcement. Further detail and quantification of these costs will be provided in the final stage IA.

Summary of non-monetised benefits

Producer profit gained through production of alternative goods

124. Where disposable vapes producers choose to switch to producing reusable vapes (in addition to refill cartridges/pods), they are likely to lose some profit otherwise producers would have already made the switch. We could also expect the market for reusable vapes to expand and this would further diminish this loss. However, it is reasonable to expect a proportion of the lost profit to be recouped through production of other items. This would be an indirect benefit and not considered in the EANDCB calculation, but further evidence will be sought for this through engagement with stakeholders.

Increased profit for current producers of reusable vapes

125. There could be increased market for current domestic producers of reusable vapes and their refill components. At this stage we do not have evidence of this. We only have anecdotal evidence that there is a considerably large e-liquid production market in the UK, with the device manufacturing currently being outsourced abroad. Drawing further attention to the growth of co-dependent markets (i.e., resurgence in e-liquid sales vs reusable vapes) could be a good approach, alongside the consequent increased opportunities for market entry. This could result in more opportunities to enter into the market from various angles, as opposed to disposables dominating sales completely.

Increased profit for wholesalers through sales of alternative products

126. Wholesalers could expect a proportion of their lost profit from disposable vapes to be recouped from the sales of reusable vapes and refill liquid/cartridges. This could potentially offset the lost profit from the sales of disposable vapes, however as there is uncertainty with how retailers will make their orders, it is difficult to predict at this stage.

Increased profit for retailers through sales of alternative products

127. Retailers could expect a proportion of their lost profit from disposable vapes to be recouped from sales of reusable vapes and refill liquid/cartridges and potentially also from cigarettes. However, as there is uncertainty with how consumers will substitute their consumption of disposable vapes, it is difficult to predict what this will mean for sales of alternative products.

Reduction in fuel costs to retailers

128. There is potential for there to be a reduction in transport fuel costs to businesses transporting vapes, assuming that they switch to selling reusable vapes and their refill components once disposable vapes have been banned. Not all disposable vapes will be replaced by reusable vapes, but in fact a proportion of them will be the refill components. It is likely that there will be a need for fewer deliveries as overall each vape lasts longer, and refillable components are likely to be lighter than disposable vapes, however there is uncertainty as to how retailers will make their orders.

129. If there is a reduction in weight as a result of switching to transporting the alternative products, this will require less fuel to transport. A number of factors are unknown making it difficult to form a reliable estimate of fuel savings, such as:

- Average distance travelled by each vape product in the UK
- Number of vapes/refill components carried on average in a lorry/van
- Mode/s of transport and vehicles used
- Fuel cost of the additional weight per mile, which will depend on the mode of transport and the weight a vehicle is already transporting.

130. We currently assume that any reduction in fuel costs from the ban are expected to be relatively small, particularly considering that the impact would be experienced across a number of companies, with many likely to be transporting a small number of vaping products within each truckload. Businesses most likely to experience these benefits are specialist vape stores.

Reduction in fuel emissions to society

131. In addition to lower fuel costs to businesses, the use of less fuel will result in lower greenhouse gas emissions. However, this has not been monetised as we currently assume that fuel savings to retailers are likely to be small. We will seek to refine these assumptions in the final stage IA.

Reduced clean-up costs to LAs

132. The implementation of the ban on disposable vapes is predicted to reduce clean-up costs to local authorities (LAs) for littered items. For consumers who decide to switch to reusable vapes, they are less likely litter them due to their reusability aspect, and so vapes overall are less likely to be present as litter. It has not been possible to monetise this benefit as there is no data available on what proportion of litter is made up of disposable vapes.

Production emission savings

133. Because fewer disposable vapes will be produced as a result of the ban, production-related emissions savings will be delivered. These benefits have not been monetised in this analysis as it is uncertain what exact proportion of disposable vapes are produced domestically in the UK, but further evidence will be sought on this for the final IA. Production emissions savings will be higher abroad than in the UK as most greenhouse gas emission savings will not accrue in the UK. However, the impacts abroad are still important to take into consideration when considering benefits on a global scale. Further discussion on this is provided around this in the ‘Wider Impacts’ section of the IA.

Reduced fires

134. Vapes contain flammable substances, such as lithium-ion in their batteries, that can cause fires if not handled appropriately. Fires at waste sites can have a huge range of negative consequences including financial losses, public sector costs (such as fire services) as well as air quality deterioration and pollution. Significantly, waste site fires compromise the safety of operatives and in the most severe cases, can lead to fatalities.

135. A 2021 study by Eunomia calculates that there are over 400 fires at waste sites per year[98]. They estimate that 48% of waste site fires are caused by lithium-ion batteries. Eunomia estimate that waste site fires caused by lithium-ion batteries cost the UK economy around £158 million per year. The majority of this cost (£142 million) accrues to waste site operators through damage to sites, business interruption etc, while the public sector (fire services and environmental regulators) face £6 million in costs. There are also £10 million in environmental and wider societal costs. The report emphasises reductions in the number of batteries placed in residual bins and incorrectly in recycling collections as key to reducing waste site fires. Despite labelling on products and consumer awareness campaigns, batteries are still disposed of in household residual bins.

136. A ban on disposable vapes would significantly reduce the number of vapes that are found in residual waste bins and thereby reduce the number of lithium-ion batteries ending up in waste bins and reduce the risk of fires. However, it should be noted that in the instance that savings do occur in the form of reduced fires, is difficult to allocate these savings to vapes specifically since lithium-ion batteries are used in many electrical products.

Reduced litter (amenity) benefit

137. The presence of litter can contribute to a fear of crime and injury, both of which have a negative well-being impact. Litter can also discourage the use of public spaces. 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 and willingness to use public spaces. Therefore, there is a social disamenity cost associated with litter. A ban on disposable vapes is expected to have positive amenity benefits by reducing the amount of them in circulation as well as littered.

Direct costs and benefits to business calculations

138. For the EANDCB, costs and benefits have been identified in Table 23 as being direct to business:

Table 23: Direct impacts to business following a ban on disposable vapes

Group Impacted	Impact	Cost / Benefit	One-off / Ongoing
Producers	Familiarisation costs	Cost	One-off
	Loss of profit from production of disposable vapes	Cost	Ongoing
	Capital investment cost for production of alternative items	Cost	One-off
Wholesalers	Familiarisation costs	Cost	One-off
	Loss of profit	Cost	Ongoing
Retailers	Familiarisation costs	Cost	One-off
	Loss of profit	Cost	Ongoing
	Excess stock costs	Cost	One-off
	Reduction in fuel costs	Benefit	Ongoing

139. It should be noted that producer impacts are likely to be very small as most producers of disposable vapes are based abroad, and so these impacts would not accrue domestically. However, we will seek to refine this for the final stage IA.

[98] Eunomia (2021), Lithium-Ion Battery Waste Fires Costing The UK Over £100m A Year, https://www.eunomia.co.uk/lithium-ion-battery-waste-fires-costing-the-uk-over-100m-a-year/

140. An initial estimate for the EANDCB has been provided, but not all of the direct costs/benefits to business have not been able to be monetised at this stage. We will be engaging with stakeholders to bridge evidence gaps and will aim to monetise these impacts for the final stage IA, along with including appropriate sensitivity analysis.

Risks and mitigations

141. There are several risks around imposing a ban on disposable vapes. These are discussed in this section, along with how the risks will be mitigated.

142. **Decrease in price of alternative product (i.e. reusable vapes).** Although it could be argued that there may be an increase in the price of reusable vapes due to a potential decrease in competition in the overall vape market with a ban on disposables, a decrease in their price is more likely since there are enough competitors. There is a risk here that consumers could then treat them like disposable vapes (i.e. throwing them away after use instead of refilling and recharging them as intended) meaning the original environmental problems with disposable vapes could persist. However, this is considered unlikely due to their higher initial price and the refill components being cheaper than purchasing a new device, so they should not be disposed of at the same frequency as disposable vapes.

143. **Excess stock**. There is a potential for excess stock after a ban with retailers, especially since sales/usage of disposable vapers are growing at an exponential rate. Prior to enforcement of the legislation, there will be a transition period of at least 6 months to act as a grace period. This will balance the need to allow businesses time to run-down stocks whilst also being able to address the problem under consideration.

144. **Stockpiling of disposable vapes by members of the public.** There is a risk that consumers may stockpile disposable vapes in response to a ban, which could increase sales and mean that the number of these items being consumed after the ban is underestimated. It is acknowledged that monitoring and enforcement might need to increase initially to mitigate this risk, meaning there might be increased enforcement costs to the public sector. A further risk is that there is potential for the number of vapes that currently exist in stock (i.e. prior to a ban) to end up in waste rather than being recycled, even after a ban comes into force. However, the focus of the policy is on future consumption and disposal of these items, which should both fall as they will no longer be in circulation in the domestic market.

145. **Black market or illicit sales for disposable vapes.** Although it is assumed that there will be 100% business compliance with regulations, there is the potential for an unintended consequence in the form of a black market developing. The illegal vape market already poses concern with issues such as banned ingredients, oversized tank sizes and exceeding legal nicotine strengths. It has been suggested that the illegal vape market could be comparable in size to the legal vape market[99]. In order to mitigate this risk from also including banned disposable vapes in the illegal market, powers will be granted to Trading Standards for increased enforcement.

146. **Inadequate provision of exemptions.** The importance of disposable vapes has been highlighted for certain groups, including older users, people with dexterity issues and those in in-patient mental health settings. This would impose welfare costs on those who rely on using disposable vapes as they are easier to use than reusable alternatives. Often, the

[99] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

provision of cables for charging reusable vapes is not permitted for safety reasons, but this can be worked around by having pre-charged non-disposable vapes which practitioners can give to patients. No exemptions are currently being considered as other vape devices and other smoking cessation aids will still be. Refillable and reusable devices have developed significantly towards increased convenience and ease-of-use and industry continue to develop them further, which will likely mitigate against the risk of particular users needing disposable vapes as there will be an accessible alternative for vulnerable groups.

147. **Negative implications for those looking to quit smoking**. When smokers switch to vaping, they tend to switch to disposable vapes first as reusable vapes are more expensive, though they can end up being cheaper in the long run. A current ex-smoker could return to smoking, disposable vapes are also more convenient to use than reusable vapes. Since reusable vapes are more expensive, greater price competition with vapes may actually increase smoking uptake. However, refillable and reusable devices have developed significantly towards increased convenience and industry will continue to develop them further, which will likely mitigate against the risk.

148. **Definition difficulty.** Loopholes could be exploited if the definition of 'disposable vapes' is not inclusive of all the vape types it covers, especially since the vape industry is rapidly changing with the various types of products it covers. For example, there are some devices that have refillable pods as opposed to a vape tank when typically referring to disposable vapes. Though these are technically refillable, there are concerns that consumers could use and treat them as disposable vapes. Additionally, there are some devices which include USB charging ports since the battery in those disposable vapes is rechargeable, though they are still technically single-use. To mitigate the risk around manufacturers circumventing the legislation and exploiting potential loopholes, the exact definition of disposable vapes will be carefully considered to encompass devices which are still technically single-use and this will be clearly provided.

Impact on small and micro businesses

Small and micro business assessment (SaMBA)

149. The small and micro businesses considered in this SaMBA are retailers and wholesalers, as we do not have much information about domestic producers of disposable vapes in the UK, however there are likely to be very few and evidence will be sought for the final IA. Producers will face costs in the form of lost profits and capital investment as a result of the ban. The level of lost profit and capital investment per business is likely to be linked to business turnover. Smaller producers of the banned items may be less likely to have the capital required to adjust their production processes and may be at a greater risk of going out of business. Engagement with stakeholders will be sought for this ahead of the final IA.

150. For disposable vape wholesalers and retailers, a breakdown of the number of businesses by SIC code and employment size band can be seen in the tables 24 and 25.

Table 24: Breakdown of number of wholesalers in the UK under the scope of the ban, by employment size band

SIC Code	Micro (1-9 employees)	Small (10-49 employees)	Medium (50 - 249 employees)	Large (250 or more employees)	Total
4617: Agents involved in the sale of food; beverages and tobacco	1,160	105	15	0	**1,280**
4635: Wholesale of tobacco products	170	15	5	5	**195**
4639: Non-specialised wholesale of food; beverages and tobacco	2,875	630	160	35	**3,700**
4676: Wholesale of other intermediate products	1,325	315	35	10	**1,685**
Total	**5,530**	**1,065**	**215**	**50**	**6,860**

Table 25: Breakdown of number of retailers in the UK under the scope of the ban, by employment size band

SIC Code	Micro (1-9 employees)	Small (10-49 employees)	Medium (50 - 249 employees)	Large (250 or more employees)	Total
4711: Retail sale in non-specialised stores with food; beverages or tobacco predominating	29,540	2,930	170	50	**32,690**
4719: Other retail sale in non-specialised stores	7,450	510	60	35	**8,055**
4726: Retail sale of tobacco products in specialised stores	1,635	80	5	0	**1,720**
Total	**38,625**	**3,520**	**235**	**85**	**42,465**

151. From the above it can be estimated that 96% of wholesalers of disposable vapes and 99% of retailers of disposable vapes are small and micro businesses which is expected due to mostly convenience stores selling disposable vapes.

152. Given the high number of businesses that are small and micro, it is highly likely that they will bear a significant proportion of the cost. Exemptions or partial exemptions from the regulation would not be appropriate as the majority of the ban's benefits would be lost and it would not help meet the policy objectives.

153. An extended transition period or temporary exemption would not result in lower transition costs for small and micro businesses as they would still incur familiarisation costs. Temporary measures would only be appropriate to alleviate any excess stock costs but we are uncertain as to how often retailers order their stock. We have assumed this is expected reasonably small given that it is mostly small retailers who sell disposable vapes and they are unlikely to have much storage space. There are no appropriate different requirements by firm size that could be introduced.

154. Compliant businesses are not expected to face any enforcement-related costs, due to the reactive enforcement method chosen. Therefore, differing inspection regimes by business size are not a relevant option.

155. Financial re-imbursement of compliance costs for smaller businesses would not be appropriate or feasible. Given the market structure of the impacted sectors, this would involve financial aid to the majority of businesses impacted by the regulation. The largest cost for the majority of small and micro businesses will be the higher unit cost of alternative material items. There would be no accurate and proportionate method of determining the level of cost incurred by each impacted business, to provide financial aid to cover this.

156. A voluntary or opt-in approach for smaller businesses would be likely to see the majority of the benefits of ban lost, as for an exemption, given the majority of sales of disposable vapes are from small and micro businesses, mostly convenience stores.

Medium-sized business assessment

157. Better Regulation Framework guidance classifies medium-sized businesses as having an employment size band between 50-499 employees[100]. As ONS data is unable to provide an estimate for the number of businesses with an employment size band between 50-499, we have used Nomis data to provide an approximate estimate[101]. Tables 26 and 27 show the number of businesses in the 50-499 employment size band for wholesalers and retailers, as obtained through Nomis data.

Table 26: Breakdown of number of wholesalers in the UK under the scope of the ban - medium-sized businesses

SIC Code	Number of medium-sized businesses (50 – 499 employees)
4617: Agents involved in the sale of food; beverages and tobacco	15
4635: Wholesale of tobacco products	5
4639: Non-specialised wholesale of food; beverages and tobacco	380
4676: Wholesale of other intermediate products	45
Total	**445**

[100] DBT (2023), Medium sized business regulatory exemption assessment: supplementary guidance, https://www.gov.uk/government/publications/better-regulation-framework/medium-sized-business-regulatory-exemption-assessment-supplementary-guidance

[101] Nomis (2023), UK Business Counts – enterprises by industry and employment size band, https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=142

Table 27: Breakdown of number of retailers in the UK under the scope of the ban - medium-sized businesses

SIC Code	Number of medium-sized businesses (50 – 499 employees)
4711: Retail sale in non-specialised stores with food; beverages or tobacco predominating	3,035
4719: Other retail sale in non-specialised stores	610
4726: Retail sale of tobacco products in specialised stores	5
Total	**3,650**

158. There are 445 wholesalers and 3650 retailers classified as medium-sized businesses. As outlined in the SaMBA, an exemption for small and micro businesses would render the policy ineffective and would hinder achieving its objectives. Therefore, an exemption which also included medium businesses would further hinder the policy from achieving its objectives.

Wider Impacts

Equality impact assessment

159. An equality impact assessment of the policy option has been carried out to assess impact on vulnerable groups[102]. Concerns were identified for those in certain health settings who may not have access to reuseable vapes and those who have learning disabilities or dexterity issues.

160. DHSC advised that other vape devices and other smoking cessation aids, including nicotine replacement therapy (NRT), will still be available through Local Stop Smoking Services. It is important to note that DHSC has already excluded disposable vapes from the list of products that can be accessed through the Swap to Stop programme. Refillable and reusable devices have also developed significantly towards increased convenience and ease-of-use and industry continue to develop them further– providing a convenient and accessible device for vulnerable groups.

161. Furthermore, an exemption would be a significant burden and additional complexity for enforcement agencies and local delivery partners.

162. Therefore, there are no proposed exemptions in the legislation.

Environmental impacts

163. There will be a plethora of natural capital benefits to society as a result of the ban on disposable vapes. According to HM's Treasury's Green Book, natural capital is defined as follows: "Natural capital includes certain stocks of the elements of nature that have value to

[102] To note, this was undertaken in line with the actual legislation for England-only and does not apply to the DAs.

society, such as forests, fisheries, rivers, biodiversity, land, and minerals. Natural capital includes both the living and non-living aspects of ecosystems."[103]

164. Some of these natural capital benefits have been monetised and included in the cost-benefit analysis, such as avoided carbon emissions from diverting disposable vapes away from incineration. However, several natural capital benefits have not been quantified due to complicated interactions and a lack of data, outlined below:
    - Reduced environmental negative externalities (to soil and wildlife) from littering. This benefit is expected to be very small.
    - Reduced environmental negative externalities from raw material extraction and disposable vapes production. This is expected to be small domestically as most of these processes occur abroad but there will still be a reduction in greenhouse gas emissions.
    - Reduced social and environmental negative externalities from landfill, including harmful chemicals leaking into soil.

165. The environmental principles from the Environmental Principles Policy Statement[104] have been considered, more specifically the prevention principle. This has helped to inform the qualitative assessment of options when moving from the long list to the short list. Environmental damage as a result of disposable vapes has already occurred and is predicted to increase in the absence of government intervention. It is therefore preferable for further damage to be prevented and a ban is more likely to address the environmental issues quickly as well as reduce the risk of further environmental harm to ensure damage does not spread.

Health benefits

166. It is difficult to assess the scale of health impacts resulting from a ban on disposable vapes as it is difficult to predict if and how users will switch to smoking cigarettes, reusable vapes or quit vaping/smoking altogether.

167. The latest evidence has found that, in the short and medium term, vaping poses a small fraction of the risks of smoking[105], because vapes do not contain tobacco. In 2016, a report by the Royal College of Physicians (RCP)[106] found that the hazard to health arising from long-term vapour inhalation from the vapes available today is unlikely to exceed 5% of the harm from smoking tobacco. Given this evidence, if the ban increased use of cigarettes, there could be health disbenefits. As mentioned above, we do not have any evidence for consumers' behaviour as a result of the ban.

168. However, vapes are not risk free and should only be used to help people quit smoking and remaining abstinent, they should not be used by non-smokers and especially not by children. The main ingredient of vapes that poses a health risk to young people is nicotine. When inhaled, nicotine is a highly addictive drug. The addictive nature of nicotine means that a user can become dependent on vapes when they use them regularly. Giving up nicotine can be very difficult because the body has to get used to functioning without it. Withdrawal

[103] HM Treasury (2022), The Green Book: appraisal and evaluation in central government, https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government

[104] Defra (2023), Environmental principles policy statement, https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement

[105] Office for Health Improvement and Disparities (2022), Nicotine vaping in England: 2022 evidence update, https://www.gov.uk/government/publications/nicotine-vaping-in-england-2022-evidence-update

[106] Royal College of Physicians (2016), Nicotine without smoke: Tobacco harm reduction, https://www.rcplondon.ac.uk/projects/outputs/nicotine-without-smoke-tobacco-harm-reduction#:~:text=However%2C%20the%20hazard%20to%20health,term%20hazard%20of%20e-cigarettes

symptoms can include cravings, irritability, anxiety, trouble concentrating, headaches and other mental and physical symptoms.

169. There are also some health risks associated with the other ingredients in vapes. For example, propylene glycol and glycerine (components of e-liquids) can produce toxic compounds if they are overheated[107]. The long-term health harms of colours and flavours when inhaled are unknown, but they are very unlikely to be beneficial. There is uncertainty about the scale and nature of long-term vaping harms. Not all the risks from vapes have been fully investigated, including inhaling additives for flavours, and the long-term effects of vaping are yet unknown, although further evidence will likely emerge in the future.

Trade implications

170. A ban on the sale and supply of disposable vapes will have implications for trade due to the impact on imports and will reduce the amount of products imported into the UK. As identified throughout this IA, there is a large potential market for disposable vapes, with the vast majority being imported and a very small proportion being produced domestically. To give an indication of the potential scale, Table 28 provides the volume of imports and exports currently in the industry. Research by Eunomia[108] used harmonised system (HS) codes to identify the import and export of vapes in the UK trade database. The three main categories for nicotine containing vape products in the UK trade data are included and categories that contain tobacco or reconstituted tobacco products are excluded. Through this, it was identified that the UK was a net importer of vape products in 2022, as shown in the Table 28. Though this does not separate out disposable vape products, it was identified that the majority of imports were from China (83%), with smaller numbers of imports from the United States (6%), Hong Kong (5%) and South Korea (4%). We will seek to gather a more robust estimate on domestic UK production of disposable vapes for the final IA.

Table 28: Value of vape products imported and exported in the UK in 2022

HS Code	Description	Likely products	Imports	Exports	Net imports
24041200	Products containing tobacco, reconstituted tobacco, nicotine, or tobacco or nicotine substitutes, intended for inhalation without combustion; Other, containing nicotine.	Single-use vapes containing vaping liquid. Pods and vaping liquids.	£377,689,758	£30,607,321	£347,082,437
24041910	Products intended for inhalation without combustion. Other. Containing tobacco substitutes.	Single-use vapes containing vaping liquid. Pods and vaping liquids.	£494,499	£470,175	£24,324
24041990	Products intended for inhalation without combustion. Other. Other.	Single-use vapes containing vaping liquid. Pods and vaping liquids.	£7,123,778	£14,077,997	-£6,954,219
85434000	Electronic cigarettes and similar personal electric vaporising devices	Vaping devices, without vaping liquid.	£207,088,026	£24,511,053	£182,576,973
Total			**£592,396,061**	**£69,666,546**	**£522,729,515**

[107] Komura et al. (2022), Propylene glycol, a component of electronic cigarette liquid, damages epithelial cells in human small airways, *Respiratory Research*, 23, 216, https://link.springer.com/article/10.1186/s12931-022-02142-2

[108] Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447

171. Table 28 also suggests that it is likely for overseas producers to have a comparative advantage in the manufacturing of alternatives to disposable vapes (i.e. reusable vapes and their refill components), implying that the UK is still likely to be reliant on imports of alternative vaping items in the event of a ban on disposable vapes. We will seek to provide further evidence on this for the final IA.

172. The UK will design the measures to ensure that they are consistent with our international obligations, including at the World Trade Organisation (WTO). Further work is currently taking place around notification requirements. There is international precedent for a ban on sale and supply of disposable vapes consistent with international treaties, with Australia already having banned disposable vapes, and New Zealand having restricted supplies.

Competition impacts

173. The initial competition assessment checklist by the Competition and Markets Authority (CMA) has been completed.

174. **Will the measure directly or indirectly limit the number or range of suppliers?** The policy would apply restrictions to producers of disposable vapes. Because the vast majority of these producers are based overseas, they are excluded from our assessment. Some domestic producers of disposable vapes may decide to exit the market if they do not switch to producing alternative items or decide not to export products abroad. Although there could be barriers to entry to new businesses entering the market in the form of higher costs of the alternative material items, this may be short lived as these items become more popular and economies of scale form.

175. **Will the measure limit the ability of suppliers to compete?** The regulation will control the characteristics of the products supplied and so there is likely to be a decrease in competition in the overall vape market. However, there could be positive competition impacts in alternative products, such as reusable vapes, through increased demand for these products encouraging new entrants to the market. At this stage, we are unable to determine how many reusable vapes producers are UK-based and the scale of consumers switching from disposable to reusable vapes.

176. **Will the measure limit suppliers' incentives to compete vigorously?** No, since the ban on the supply of disposable vapes is expected to be applied uniformly across the UK, it will create a level playing field for all businesses. Therefore it is not expected that there will be competition issues with consumers switching to a different retailer to request these items. Businesses will also be on a level playing field as they will not be able to undercut each other by offering cheaper disposable vapes as those will be banned.

177. **Will the measure limit the choices and information available to consumers?** The ban is expected to limit choices available to current consumers of disposable vapes. However, consumers will be able to switch to alternative products if they wish to. We would expect some consumers to quit vaping entirely as a result of the policy proposal.

Innovation impacts

178. Given how innovative the vape sector has been, there are likely to be innovation impacts resulting from a ban on disposable vapes. There could be some economies of scale for the production of reusable vapes, which in turn might spur some innovation on those items, in addition to current producers of reusable vapes. A variety of reusable vape devices are currently available, including refillable pod kits which are designed to be refilled with e-liquid

and closed-pod devices which are designed for the pre-filled pods/cartridges to be replaced when empty, and various sub-types within these categories. With technological advancements, there is an anticipation of even more refined and varied products arising. However, we were unable to find any evidence on this and understand that the majority of producers are based overseas and so are excluded from our assessment.

Monitoring and Evaluation

179. A post implementation review (PIR) will be undertaken in line with the statutory commitment.

180. A thorough evaluation plan will be developed in advance of the implementation of the ban and will be integrated into the delivery of the policy. The evaluation plan will be derived from the Theory of Change as set out in Annex A which illustrates how the desired change as a result of the policy is expected to happen, considering the causal chain that leads from the proposed inputs through to the expected outputs and outcomes. More information on the monitoring and evaluation strategy will be provided in the final impact assessment.

Annex A: Theory of Change