

Title: Ban on the sale and supply of disposable vapes in England IA No: RPC Reference No: RPC-DEFRA-5331(2) Lead department or agency: Department for Environment, Food and Rural Affairs (Defra) Other departments or agencies:	Impact Assessment (IA)
	Date: 15/10/2024
	Stage: Final
	Source of intervention: Domestic
	Type of measure: Secondary legislation
	Contact for enquiries: disposablevapes@defra.gov.uk
Summary: Intervention and Options	RPC Opinion: GREEN

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 Qualifying provision
-£12,627.1m	-£12,705.8m	£1,851.6m	

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

Disposable vapes (or single-use 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 the absolute number of those incorrectly disposed of to rise. Additionally, increasing youth vaping is also a concern with disposable vapes being 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:

- Rapidly reduce environmental harm caused by the incorrect disposal of disposable vapes, by reducing the number of vapes in residual waste streams and being littered.
- Stop business and consumer use of disposable vapes and encourage replacing them with reusable alternatives, thereby supporting a switch to less environmentally harmful and inefficient products.
- Progress a reduction in sales of disposable vapes, leading to the eventual removal of them from the domestic market.

This policy is also part of the wider government agenda to tackle 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 as a result, so will the absolute number of those incorrectly disposed of. Therefore, a ban would be most likely to address the issues quickly, 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.

Is this measure likely to impact on international trade and investment?	Yes
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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:	
Will the policy be reviewed? It will be reviewed. If applicable, set review date: 5 years post-implementation				

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 Minister: Mary Creagh Date: 15th October 2024

Summary: Analysis & Evidence

Policy Option 1

Description: Ban on the sale and supply of disposable vapes in England

FULL ECONOMIC ASSESSMENT

Price Base Year 2023	PV Base Year 2025	Time Period 10 Years	Net Benefit (Present Value (PV)) (£m)		
			Low: -24,880.9	High: -7,412.5	Best Estimate: -17,029.7
COSTS (£m)		Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)	
Low		0.3	1,921.2	16,040.5	
High		0.9	3,399.1	28,380.5	
Best Estimate		0.3	2,575.7	21,505.3	
<p>Description and scale of key monetised costs by ‘main affected groups’</p> <p>The largest monetised cost is the profit loss to retailers of disposable vapes, followed by the profit loss to importers/re-branders and wholesalers. These businesses 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 saving to local authorities (LAs). LAs will also incur enforcement costs.</p>					
<p>Other key non-monetised costs by ‘main affected groups’</p> <p>No impacts to manufacturers have been monetised as stakeholder engagement highlighted there are likely to be no domestic manufacturers of disposable vapes. 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.</p>					
BENEFITS (£m)		Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)	
Low		0.0	419.2	3,499.6	
High		0.0	1,033.5	8,628.1	
Best Estimate		0.0	536.1	4,475.7	
<p>Description and scale of key monetised benefits by ‘main affected groups’</p> <p>Businesses (i.e. retailers, wholesalers and importers/re-branders) will be able to partially offset some of their lost profit by an increase in profit from sales of alternative vaping products. LAs will incur waste management savings in the form of landfill tax (a transfer as it is a cost to government), landfill gate fee and energy from waste (EfW) gate fee savings as a result of fewer disposable vapes being sent to landfill and incineration. There will also be a reduction in emissions from incineration of waste disposable vapes, and from reduced waste fires. Additionally, there will be a reduction in the presence of litter, resulting in amenity benefits.</p>					
<p>Other key non-monetised benefits by ‘main affected groups’</p> <p>Retailers may also be able to further offset their lost profit through sales of cigarettes/tobacco products and other alternative nicotine products. There will be benefits 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. However, as these impacts accrue overseas, they are out of scope of the main cost-benefit analysis.</p>					
Key assumptions/sensitivities/risks				Discount rate (%)	3.5%
<p>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 that when disposable vapes are placed in landfill, they will not degrade or release greenhouse gas emissions due to being composed of inert materials, but 0.21 tonnes of CO₂ are released upon incineration per tonne of disposable vape waste arisings.</p>					

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 2,497.1	Benefits: 0.0	Net: 2,497.1	
			9,257.8

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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 2021², and having grown even further since. 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. 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.⁶
4. 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 (not limited to those from vapes) are responsible for approximately 48% (over 200) of all waste fires occurring in the UK each

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 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/>

year according to the Environmental Services Association, costing around £158 million annually to waste operators, fire services and the environment.⁷

5. When disposable vapes are littered, they introduce plastic, nicotine salts, heavy metals, lead, mercury and flammable lithium-ion batteries into the natural environment.⁸ 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).⁹
6. 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.¹⁰ 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 and difficulty recycling these items.¹¹ 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.¹²
7. Disposable vapes are difficult and expensive to recycle.¹³ 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.¹⁴ They are designed as one unit, requiring specific tools to remove the lithium-ion battery for recycling and careful handling of components to avoid operator exposure to the remaining e-liquid.
8. There are measures already in place to ensure responsible production and disposal of disposable vapes. The Waste Electrical and Electronic Equipment (WEEE) Regulations 2013¹⁵ 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.

⁷ 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/>

⁸ 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>

⁹ 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>

¹⁰ 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/>

¹¹ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹² Wastepack (2023), Agency sets out vapes recycling stance, <https://www.wastepackgroup.co.uk/2023/03/17/vapes-recycling-stance-set-out/>

¹³ Valpak (2023), Dismantling a growing problem, <https://www.valpak.co.uk/dismantling-a-growing-problem/>

¹⁴ IEMA (2022), Disposable vapes – a challenge to the recycling sector, <https://www.iema.net/articles/disposable-vapes-a-challenge-to-the-recycling-sector>

¹⁵ Defra (2013), The Waste Electrical and Electronic Equipment Regulations 2013, <https://www.legislation.gov.uk/uksi/2013/3113/contents/made>

9. Under the WEEE regulations, EEE products are grouped into 14 categories.¹⁶ 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.¹⁷ 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. Capacity is likely to be significantly lower than for other WEEE, with SWEEP Kuusakoski, a large electronics recycler, noting that they were able to process eight to ten tonnes of category 7 WEEE per hour, whereas processing a tonne of vapes would require operatives to manually disassemble approximately 37,000 vapes.¹⁸
10. Furthermore, compliance with the WEEE regulations by vape producers is estimated to be low, particularly among producers and convenience stores. Until recently, retailers that sold over £100,000 worth of vapes were 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.¹⁹ In January 2024, these thresholds changed with it now being a requirement for all retailers of vape products to provide take-back for recycling of used vape products on a one-for-one, like-for-like basis.
11. It is also important to note that the WEEE regulations are currently being reviewed with one of the proposed changes within these regulations being for vapes to become their own category of EEE. This proposed change set out in the WEEE consultation which closed on 7 March 2024²⁰, specifically related to vapes, envisages a re-distribution of costs within the current system to ensure producers of all types of vaping products are solely responsible in future for the costs of collection and proper treatment in respect of those waste vapes that enter the system established by revisions to the WEEE Regulations. Wider reforms proposed in the consultation included measures to increase convenience for householders seeking to dispose of all types of waste electricals with new responsibilities placed on producers and distributors. This includes provision of producer financed communications to inform householders of how to properly dispose of unwanted items. However, it should be noted that communications campaigns generally take time to change consumer behaviour and so it is not expected that there will be a significant additional recycled tonnage of vapes as a result of this specifically.
12. 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.²¹ Lithium and other critical 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

¹⁶ 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>

¹⁷ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁸ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁹ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

²⁰ 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/>

²¹ 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. It is estimated that the total amount of disposable vapes thrown away in 2023 contained enough lithium to provide batteries for 5000 electric vehicles.²² 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.²³

13. 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.²⁴ 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.
14. 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.²⁵ 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.²⁶ There has been a surge in popularity in disposable vapes, largely due to their affordability with most types costing under £10,²⁷ together with them being easy to access where they can be purchased through avenues such as newsagents and supermarkets, as well as specialist vape shops and online retailers (including dedicated online vape retailers as well as major e-commerce platforms).
15. Until a few years ago, the only widely available disposable vapes were 'cigarette-like' e-cigarettes which were more generally produced by tobacco companies. Now, the newer disposable vape brands are designed in a more aesthetically appealing way, making them look more 'trendy' and therefore more attractive to a younger demographic.²⁸ The use of disposable vapes has risen particularly quickly among younger adults, where it is estimated that 57% of current vapers aged 18-24 used disposables as their main type of device in 2023.²⁹
16. Disposable vapes still remain popular due to convenience and ease of use – they are ready to use out of the package with no need to recharge and refill. Despite there being a reusable alternative, the popularity of disposable vapes amongst certain groups of users is likely to persist. Users of disposable vapes tend to be in the moment, ad-hoc purchasers, and vaping

²² 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/>

²³ Zero Waste Scotland (2023), Environmental impact of single-use e-cigarettes, <https://www.zerowastescotland.org.uk/resources/environmental-impact-single-use-e-cigarettes>

²⁴ Business Waste, How to Dispose of and Recycle Vapes, <https://www.businesswaste.co.uk/how-to-dispose-of-and-recycle-vapes/>

²⁵ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

²⁶ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

²⁷ Based on desk-based research conducted in December 2023

²⁸ IEMA (2022), Disposable vapes – a challenge to the recycling sector, <https://www.iema.net/articles/disposable-vapes-a-challenge-to-the-recycling-sector>

²⁹ 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>

more generally has become a core aspect of the way some vapers socialise with friends.³⁰ Younger vapers are more likely to use disposable vapes, and the social nature of vaping and it being a social or behavioural “norm” among friends and peer groups makes it challenging to give up.³¹

17. Vaping is also not recommended for children and carries a risk of future harm and addiction. It is 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.³² 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, sweet and soft drink flavours) with attractive packaging which potentially increases the risk for children to be attracted to these products. Research suggests that the majority of these vape users mainly used disposable vapes in 2023.³³
18. The Department of Health and Social Care (DHSC) published a call for evidence on youth vaping in April 2023³⁴ which included a chapter on ‘The impact of vaping products on the environment’. A summary of responses to this call for evidence was published in October 2023,³⁵ 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

19. 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.
20. 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 manufacturers, importers, retailers or consumers, but by taxpayers instead.³⁶

³⁰ Ipsos for HMRC (2024), Understanding the vaping market, <https://www.gov.uk/government/publications/understanding-the-vaping-market>

³¹ Ipsos for HMRC (2024), Understanding the vaping market, <https://www.gov.uk/government/publications/understanding-the-vaping-market>

³² 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>

³³ 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/>

³⁴ 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>

³⁵ Office for Health Improvement and Disparities (2023), Youth vaping call for evidence analysis, <https://www.gov.uk/government/calls-for-evidence/youth-vaping-call-for-evidence/outcome/youth-vaping-call-for-evidence-analysis>

³⁶ Local Government Association (2023), Disposable vapes FAQs, <https://www.local.gov.uk/disposable-vapes-faqs>

21. 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.³⁷ It has been estimated that 70% of people throw away their disposable vapes because they did not know they could be recycled.³⁸ However, this information failure would not be the main reason for government intervention as it would not address the problem related to the single-use design of disposable vapes, as there is an inefficiency with critical resources being consumed in an item with limited use when that same item could be designed to be reused many times.
22. Even though disposable vapes are indeed recyclable, in practice it is difficult. They are difficult to disassemble, the costs of recycling them are high and there is limited recycling capacity in the UK. Caution is also required when manually disassembling them for recycling as puncturing the lithium battery during removal risks starting a chemical fire.³⁹ And so, even if all disposable vapes were taken back to HWRCs and retailers to be recycled, the vast majority of them would likely end up being sent to landfill following this. This can lead to environmental and social disbenefits that reduce natural capital. Reusable vapes have a more modular design with removable batteries and are easier to recycle.
23. As a result of the lack of recycling of disposable vapes, the critical materials within them are lost forever when they are disposed of. There are many valuable materials inside the batteries that can be reused if recycled properly, including lithium. Once recovered, the materials can be reused in other things, like electronics or to produce new batteries. It is estimated that as much as 10 tonnes of lithium is lost each year when disposable vapes are thrown away in the UK, which could be used to make other batteries, including those for electric vehicles.⁴⁰
24. Disposable vapes are a prime example of a linear economy, whereby they are built without fully considering their potential longevity and follow the “make, use, dispose” approach.⁴¹ Disposable vapes pose several barriers to circularity whereby even if they are recycled, it may not seem efficient to do so due to the cost of recycling them. Reusable alternatives exist and are not commonly littered. Reusable vape batteries can typically last through hundreds of charge cycles, usually somewhere in the region of around 300 charge cycles⁴² meaning that the vape will last anywhere from several months to over a year for most vape users. This is in stark contrast to the single-use batteries used in disposable vapes.
25. More generally, there are negative externalities associated with critical raw material extraction of lithium and production of disposable vapes. The production of disposable vapes

³⁷ 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/>

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 UK Parliament (2023), Disposable Electronic Cigarettes (Prohibition of Sale), [https://hansard.parliament.uk/commons/2023-02-08/debates/D9DE57D8-C7FD-4611-B4A4-E74648B6B85C/DisposableElectronicCigarettes\(ProhibitionOfSale\)](https://hansard.parliament.uk/commons/2023-02-08/debates/D9DE57D8-C7FD-4611-B4A4-E74648B6B85C/DisposableElectronicCigarettes(ProhibitionOfSale))

⁴⁰ Recycle Your Electricals, Recycling vapes, <https://www.recycleyourelectricals.org.uk/how-to-recycle-electronics/what-electronics-can-be-recycled/recycle-vapes/>

⁴¹ Zero Waste Scotland (2023), Disposable vapes: A case for changing our throwaway culture, <https://www.zerowastescotland.org.uk/resources/changing-our-throwaway-culture>

⁴² The Electronic Cigarette Company, The Ultimate Guide to E-cig Batteries, <https://www.theelectroniccigarette.co.uk/batteries/the-ultimate-guide-to-e-cig-batteries>

relies on non-renewable resources and generates greenhouse gas emissions. The UK's Critical Minerals Strategy,⁴³ 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. As disposable vapes are a single-use item and so are not reused or predominantly recycled, the value of the critical raw materials is lost, and the negative externalities associated with their production are not avoided.

26. Vapes were invented in China in 2003 and first introduced in the UK in 2005 (then more commonly known as electronic cigarettes or e-cigarettes).⁴⁴ 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.⁴⁵ 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.⁴⁶
27. In 2022, it was estimated that nearly 14 million disposable vapes were bought each month, equating to 167.5 million a year.⁴⁷ The annual figure more than doubled in 2023, where it was estimated that 360 million disposable vapes were placed on the UK market,⁴⁸ 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 around 1 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.⁴⁹
28. Though it could be argued that users of disposable vapes will switch to reusables because they are cheaper in the longer term, this will not be true for all users, especially those using these devices more casually in social settings and not as a means to quit smoking. In regard to youth vaping, these users are not incentivised to limit their use and switch to reusable alternatives. If these users cannot take disposable vapes home or if they get confiscated, they are cheap and easy to replace. Disposable vapes have a very low upfront cost, which makes them more accessible to experimental users and those with limited money to spend.

⁴³ BEIS/DBT (2022), UK Critical Minerals Strategy, <https://www.gov.uk/government/publications/uk-critical-mineral-strategy>

⁴⁴ Public Health England (2014), Electronic cigarettes: A report commissioned by Public Health England, https://assets.publishing.service.gov.uk/media/5a7df89c40f0b62302688532/Ecigarettes_report.pdf

⁴⁵ Business Waste, How to Dispose of and Recycle Vapes, <https://www.businesswaste.co.uk/how-to-dispose-of-and-recycle-vapes/>

⁴⁶ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

⁴⁷ 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/>

⁴⁸ 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/>

⁴⁹ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

29. An increase in consumption is concerning as this will lead to an increase in the absolute number of those that are incorrectly disposed, thereby leading to greater environmental harm. Additionally, there will be an increased demand for these devices leading to greater environmental harm associated with raw material extraction and the production of disposable vapes.
30. The UK vape market is challenging to understand, with stakeholders from across the industry uncertain as to the overall size of the market. Large parts of the market are illicit, and not accurately recorded, with it being estimated that the illegal vape market is comparable in size to the legal vape market by industry stakeholders.⁵⁰ There are already regulations currently in place for vapes under the Tobacco and Related Products Regulations 2016 (TRPR).⁵¹ Under these regulations, disposable vapes must contain no more than 2ml of e-liquid (approximately 600 ‘puffs’) and a maximum nicotine strength of 20mg/ml.⁵² Despite these limits, there is evidence that a significant number of illegal products above this limit are being sold. The most common forms of illegal vapes include those having tank sizes larger than the legal limit, those exceeding the legal nicotine strength, and those containing banned ingredients.⁵³ The overwhelming majority (approximately 99%) of seized illegal vapes were single-use, as confirmed by Trading Standards.⁵⁴
31. 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,⁵⁵ launched the ‘Recycle Your Electricals’ campaign⁵⁶ 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.
32. 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. Therefore, government intervention is necessary to prevent the environmental harms from persisting and address the problem quickly.
33. The Environmental Improvement Plan⁵⁷, 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, underpinned by some interim targets including that to reduce residual waste in total tonnes by 21% by 31 January 2028. 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,

⁵⁰ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

⁵¹ Department of Health (2016), The Tobacco and Related Products Regulations 2016, <https://www.legislation.gov.uk/uksi/2016/507/regulation/36>

⁵² MHRA (2016), E-cigarettes: regulations for consumer products, <https://www.gov.uk/guidance/e-cigarettes-regulations-for-consumer-products>

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), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

⁵⁵ 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.

⁵⁶ <https://www.recycleyourelectricals.org.uk/about-recycle-your-electricals-campaign/>

⁵⁷ Defra (2023), Environmental Improvement Plan 2023, <https://www.gov.uk/government/publications/environmental-improvement-plan>

including straws, plates and cutlery.⁵⁸ 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.

34. 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 Zealand introduced a ban on most disposable vapes in 2023 whereby only vaping devices that have a removable battery, a child-safety mechanism, follow new nicotine requirements and comply with new labelling requirements, could be sold.⁵⁹ This was 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. Further to this, in March 2024, the New Zealand government announced that they would ban all disposable vapes in a bid to prevent minors from taking up vaping.⁶⁰ France is also considering a ban on disposable vapes amid health and environmental concerns, likely to come into effect by September 2024.⁶¹ Australia banned the imports of disposable vapes from January 2024, in an effort to curb nicotine addiction in children.⁶² 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.⁶³
35. 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.⁶⁴ 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' consultation⁶⁵ 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

36. The policy objectives of the intervention are to:
- Rapidly reduce environmental harm caused by the incorrect disposal of disposable vapes, by reducing the number of vapes in residual waste streams and being littered.
 - Stop business and consumer use of disposable vapes and encourage replacing them with reusable alternatives, thereby supporting a switch to less environmentally harmful and inefficient products.

⁵⁸ Defra (2024), Single-use plastics bans and restrictions, <https://www.gov.uk/guidance/single-use-plastics-bans-and-restrictions>

⁵⁹ 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>

⁶⁰ Reuters (2024), New Zealand government to ban disposable e-cigarettes, <https://www.reuters.com/world/asia-pacific/new-zealand-government-ban-disposable-e-cigarettes-2024-03-20/>

⁶¹ BBC News (2023), E-cigarettes: France backs bill to ban disposable vapes, <https://www.bbc.co.uk/news/world-europe-67622248>

⁶² 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>

⁶³ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

⁶⁴ 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>

⁶⁵ DHSC (2023), Creating a smokefree generation and tackling youth vaping, <https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping>

- Progress a reduction in sales of disposable vapes, leading to the eventual removal of them from the domestic market.
37. There are indicators of success of the policy in line with the policy objectives, likely to include (but not limited to):
- A reduction in the number of vapes being landfilled, incinerated and littered.
 - A reduction in sales of disposable vapes, replaced by a shift towards an increase in sales of reusable alternatives.
38. The intervention also links with wider Government objectives and the issues need to be addressed if longer-term visions/goals are to be realised. In the 25 Year Environment Plan⁶⁶, the Government set out its ambition to help protect the environment for future generations, improve environmental quality, and reduce harm to human health and marine life. One of the key goals is ‘minimising waste’ which includes a target of eliminating avoidable plastic waste by the end of 2042 and a target to work towards eliminating all avoidable waste by 2050. Publication of the Resources and Waste Strategy⁶⁷ shortly followed this, setting out how England will both prevent and better manage waste by moving to a more circular economy. In the Environmental Improvement Plan, the first revision of the 25 Year Environment Plan, 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, which includes a target to reduce residual waste in total tonnes by 21%.⁶⁸
39. This policy is also part of the wider government agenda to tackle youth vaping. There are concerns about the threat that single-use disposable products pose to the environment as well as the large number of children that are using disposable vapes.⁶⁹

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

40. The range of costs and benefits as a result of the policy, including the direct costs to businesses included in the equivalent annual net direct cost to business (EANDCB), have been accurately identified and quantified where appropriate to do so with the evidence available.
41. Where robust evidence is unavailable, assumptions have been 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.
42. There are also certain impacts that have not been monetised either because of proportionality or due to a lack of available data, but these have been discussed qualitatively. These impacts do not affect the EANDCB and so require a less rigorous assessment, but detailed qualitative analysis has been included in its place.
43. As previously mentioned, Defra had a section within DHSC’s ‘Creating a smokefree generation and tackling youth vaping’ consultation. To complement this and to aide with the

⁶⁶ Defra (2018), 25 Year Environment Plan, <https://www.gov.uk/government/publications/25-year-environment-plan>

⁶⁷ Defra (2018), Resources and waste strategy for England, <https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england>

⁶⁸ Defra (2023), Environmental Improvement Plan 2023, <https://www.gov.uk/government/publications/environmental-improvement-plan>

⁶⁹ 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>

development of this final-stage IA, Defra held a private consultation in March 2024 following publication of the draft regulations, within which a survey was distributed to selected stakeholders representing the affected sectors. Defra also conducted targeted stakeholder engagement with representatives from trade associations and industry experts with knowledge of the vaping sector in order to develop the evidence base further. The feedback via responses from the survey and information from stakeholders has been incorporated into the cost-benefit analysis where appropriate. Further detail on Defra's consultation and engagement approach is outlined in Annex A.

Changes made from the draft IA to the final IA

44. Following stakeholder engagement, there have been several changes that have been made from the draft IA⁷⁰ to the final IA. A summary of these is listed as follows:

- The implementation date for the ban has been confirmed for Spring/Summer 2025.
- The impacts presented in the IA reflect England-only, in line with the legislation as opposed to being UK-wide since it is anticipated that the devolved governments will develop their own legislation.
- Further description on how the counterfactual has been informed has been included.
- No impacts to manufacturers are monetised as it is highly unlikely that there are any domestic manufacturers of disposable vapes in the UK, as highlighted through engagement.
- We have engaged with stakeholders to understand and attain figures for the number of businesses that will be affected by the ban, but as there is still uncertainty with precise figures, sensitivity analysis has been conducted.
- Previously, we had assumed that disposable vape profit margins for retailers were approximately 24%. This has been updated following engagement with stakeholders to 45%.
- We now include the profit loss for wholesalers and importers/re-branders as monetised costs, with respective profit margins of 12% and 15%, informed through stakeholder engagement.
- It is unlikely that businesses will face excess stock costs as businesses agreed that the implementation period should be no less than 6 months to exhaust stock.
- There will be a reactive method of enforcement, and so businesses will not face any costs associated with enforcement/inspection.
- Potential consumer switching behaviours as a result of the ban have been explored, as the lost profit to businesses from sales of disposable vapes will at least be partially offset by sales of alternative vaping products from consumer switching.
- Further benefits to society have now been monetised, including the reduction in litter (amenity benefit) and reduced emissions from waste fires. There are other benefits that have not been monetised but could have been, such as reduced emissions from raw material extraction and disposable vapes manufacture, but since these accrue overseas they are out of scope of our assessment.
- The SaMBA has been strengthened as a result of identifying the number of businesses, in addition to gathering turnover estimates attributable to small and micro businesses.
- An indication of the monitoring and evaluation plan has been provided.

⁷⁰ Defra (2024), The Environmental Protection (Single-use Vapes) (England) Regulations 2024 draft SI, <https://www.gov.uk/government/publications/the-environmental-protection-single-use-vapes-england-regulations-2024-draft-si>

Description of options considered

45. A long list of options was 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/government 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 would not only be limited to the negative impacts associated with the incorrect disposal of disposable vapes, but also the negative impacts associated with the single-use design including impacts from manufacturing and the inefficient use of resources. This also pays regard to the environmental principles as set out in the Environmental Principles Policy Statement,⁷¹ 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 year-on-year.
- **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, and does it deliver VfM (including non-monetised benefits) against the stated policy objectives?
- **Supportive strategic fit with wider public policies:** to what extent does the option align with wider government objectives, namely other measures to tackle youth vaping and the harms of vaping products (i.e. by discouraging young people and non-smokers from vaping, whilst maintaining the current financial incentive to choose vaping over smoking). For example, the policies to restrict vape flavours, regulate vape packaging⁷² and implementing a vaping products duty⁷³.

46. 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

Do-nothing

47. 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 negative externalities of environmental impacts associated with incorrect disposal as well as the inefficient use of resources would persist. Although, with no changes implemented, no deliverability or implementation issues would arise with this option.

⁷¹ Defra (2023), Environmental principles policy statement, <https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement>

⁷² 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#tackling-the-rise-in-youth-vaping>

⁷³ HM Treasury (2024), Vaping Products Duty consultation, <https://www.gov.uk/government/consultations/vaping-products-duty-consultation>

A ban on the sale and supply of disposable vapes (preferred)

48. This option would address the issue at source, whereby disposable vapes would 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 the waste of critical raw materials, and this in turn would have greenhouse gas benefits. It would also help to promote reusable alternatives which are a more efficient use of resources and increase consumer awareness of the environmental harms that disposable vapes can cause when they are not correctly disposed of.
49. This option also aligns with wider government objectives as explored during the 'Creating a smokefree generation and tackling youth vaping' consultation⁷⁴. The Tobacco and Vapes Bill will deliver on the Prime Minister's commitment to create a smokefree generation, as well as reducing the appeal and availability of vaping products to children by creating powers to regulate vaping products. This option also follows what other countries have either already done or are planning to do to tackle the environmental problems around disposable vapes.

Implementation of a Deposit Return Scheme (DRS) for disposable vapes

50. This option would entail deposits being placed on disposable vapes to incentivise people to recycle them. A deposit on a disposable vape will make consumers more likely to return it in order to get their money back, and therefore less likely to dispose of incorrectly. In addition, there is a possibility that disposable vapes which are littered are likely to be picked up by other people in order to gain the deposit. Though this option could help with increasing the intention to recycle of disposable vapes and therefore reduce negative impacts on the environment, it would not be promoting reusable alternatives and so there will still be an inefficient use of resources. There could also end up being cost implications for vape producers and councils through the cost of recycling and monitoring compliance, and costs through establishing dedicated vape bins. The UK currently lacks suitable facilities to recycle these products so there would not be enough infrastructure to deal with the number of disposable vapes to be recycled, as well as these products being difficult to recycle, and so it is likely they will end up being sent to landfill. Extensive work with industry would also be required to prepare for the changes. This option would be similar to the proposed DRS for drinks containers which was first announced in 2019, suggesting a DRS could take several years to implement whilst the problem under consideration is growing at an exponential rate.

Request-only option

51. 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.⁷⁵ Concern has been expressed about children

⁷⁴ 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> 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>

⁷⁵ House of Commons Library (2023), Shop displays of tobacco and vaping products, <https://commonslibrary.parliament.uk/research-briefings/sn05537/>

seeing and easily picking up vapes due to them being displayed within aisles, close to sweets and confectionary products and on accessible shelves.⁷⁶

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 option is similar to that as included in the 'Creating a smokefree generation and tackling youth vaping' consultation, where there was a section on regulating point of sale displays of vapes, for which 68.3% of respondents agreed that vapes must be kept behind the counter and cannot be on display, in order to be an effective option to restrict vapes to children and young people.⁷⁷ Therefore, this option specifically may not fully reduce the current environmental impacts being faced as this option does not specifically target the policy objectives related to the environment. It would also be more difficult for enforcement bodies to monitor if businesses are complying with this regulation and it would likely have no effect on online consumption.

Wider take-back scheme

53. This option would build upon what is already in place with the current WEEE regulations. Currently, all shops selling vapes are now required to take back old vapes. However, to make recycling facilities even more easily accessible, designated vape bins in more retailers and places like schools/universities and other public spaces could be offered. 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.⁷⁸ 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 guarantee they would end up being recycled due to them being difficult to recycle along with the lack of recycling infrastructure in the UK, and so would likely end up in landfill instead.

54. Given the prevalence in use by children (including being sold illegally to those underage), these consumers may not want to return to their disposable vapes to public spaces as they are likely hiding using them to begin with so there would be a lack of compliance. Additionally, it has been suggested that usage of take-back is very low to begin with and so increasing designated bins in other public places may have little effect. Furthermore, this option would not address the wider lifecycle impacts of disposable vapes and would not be promoting the use of reusable alternatives.

Creating recycling infrastructure to deal with disposable vapes

55. 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.⁷⁹ 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

⁷⁶ 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>

⁷⁷ 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>

⁷⁸ Eunomia (2023), Environmental Impacts of Vapes, (unpublished)

⁷⁹ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

feasible option and it would also not be promoting reusable alternatives. There is also uncertainty with the likely waste flows of vapes in the future stemming from changes in consumer preferences or the failure to provide adequate consumer education and collection options to increase the flow of disposable vapes to treatment facilities. This uncertainty would be a barrier to investment in moving towards more mechanical treatment.

Improved product design of disposable vapes for easier recyclability

56. 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 would not be promoting the use of reusable alternatives which have a more efficient lifecycle performance by typically having around 300 charge cycles⁸⁰ in comparison to disposable vapes which are discarded after single use.

Tax on disposable vapes (per device)

57. A number of countries, including Italy and Sweden,⁸¹ have introduced various forms of tax on vapes, but many of them base the tax in relation to the volume of liquid consumed rather than a tax per device, and cover vapes overall rather than specifically being targeted at disposable devices.⁸² At the Spring Budget in March 2024, the Government announced a UK-wide Vaping Products Duty based expected to be implemented in October 2026. Though, this is targeted at nicotine strength of liquid in vaping products more generally, and not targeted at disposable devices.

58. The implementation of a tax on disposable vapes (per device), whilst there is no tax on reusable vapes, would reduce the affordability of them and would be effective in reducing consumption, potentially reducing the absolute number of those incorrectly disposed of and the 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, 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,⁸³ 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. Additionally, a tax would not necessarily address the littering

⁸⁰ Vapestore, How to look after your E-cigarette Batteries, <https://www.vapestore.co.uk/battery-safety-and-charging-guide>

⁸¹ World Bank (2019), E-cigarettes: Use and Taxation, <https://documents1.worldbank.org/curated/en/356561555100066200/pdf/E-Cigarettes-Use-and-Taxation.pdf>

⁸² 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>

⁸³ World Bank (2019), E-cigarettes: Use and Taxation, <https://documents1.worldbank.org/curated/en/356561555100066200/pdf/E-Cigarettes-Use-and-Taxation.pdf>

behaviour or remove the environmental impacts altogether since it wouldn't boost, or ease recycling of disposable vapes.

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

59. 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.⁸⁴ 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 objectives of accelerating the reduction in environmental harm over time as well as not addressing the wider lifecycle impacts of disposable vapes and promoting reusable alternatives.

Short list of options

60. 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	Supportive strategic fit with wider public policies
Do nothing	Red	Green	Green	Red	Red
Ban on the sale and supply of disposable vapes	Green	Green	Green	Amber / Green	Green
Implementation of a DRS for disposable vapes	Amber	Red	Red	Amber	Red
Request-only option	Red	Green	Green	Amber	Amber
Wider take-back scheme	Amber	Red	Amber	Amber	Red
Creating recycling infrastructure to deal with disposable vapes	Amber	Red	Red	Red	Red
Improved product design of disposable vapes for easier recyclability	Amber	Red	Amber	Amber	Red
Tax on disposable vapes (per device)	Amber	Amber	Amber	Amber	Amber
Information campaign (non-regulatory option)	Amber	Amber	Green	Amber	Red

⁸⁴ 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/>

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

61. 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

62. 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 England, with no additional costs to businesses. It is predicted that sales will continue increasing in England, 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)

63. 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 caused by incorrect disposal and signal the Government's intention.

64. 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 much 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.

65. 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.

66. Additionally, legislating to end the sale of disposable vapes, would create a level playing field for businesses and create consistency, helping to ensure that children are not able to purchase them and contribute to tackling youth vaping. Unlike other options in the long list which were more targeted towards increasing recycling, the policy option of a ban aligns more with related public policies, including the wider package of measures to tackle youth vaping (e.g. restricting point of sale displays and restricting packaging)⁸⁵.
67. No exemptions are proposed under this ban. Further detail on this is discussed in the 'Wider Impacts' section of the IA, including discussion of the Equalities Impact Assessment that has been undertaken.
68. **Consultation support for a ban:** the responses to the 'Creating a smokefree generation and tackling youth vaping' consultation,⁸⁶ and more specifically regarding Defra's section in relation to 'Restricting the supply and sale of disposable vaping products', expressed a strong desire to restrict the sale and supply of disposable vapes with 79.6% of respondents agreeing. 69% of respondents agreed that restrictions on disposable vapes should take the form of prohibiting their sale and supply (i.e. banning them), with key themes around environmental harms, including the need to reduce plastic and battery waste.⁸⁷

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

69. 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.
70. 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 disposed of incorrectly highlights the need for education and awareness on how to dispose of finished vapes responsibly. 76% of vapers say they would be more likely to recycle if vapes were marketed as 'recyclable'⁸⁸. 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.
71. 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 recycling points which are

⁸⁵ DHSC (2024), Creating a smokefree generation and tackling youth vaping, <https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping>

⁸⁶ DHSC (2023), Creating a smokefree generation and tackling youth vaping, <https://www.gov.uk/government/consultations/creating-a-smokefree-generation-and-tackling-youth-vaping>

⁸⁷ 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>

⁸⁸ 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/>

still fairly rare. 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 associated with the inefficient use of resources. There is 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.

72. It could be argued that an information campaign would serve better as an accompaniment to a regulatory option, rather than a standalone option. For example, wider reforms proposed in the consultation for the reforms to the WEEE regulations included provisions of producer financed communications to inform householder of how to properly dispose of unwanted items. The accompanying consultation stage impact assessment for the reforms to the WEEE regulations estimated communications costs of £170.7m over 10 years (in 2019 prices), financed by producers of all types of EEE.⁸⁹
73. 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.**

Summary and preferred option with description of implementation plan

74. The proposals will cover the sale and supply of disposable vapes. A **disposable vape** (referred to as '**single-use vape**' in the legislation) is defined as a vape which is not designed or intended to be re-used and includes any vape which is not both refillable and rechargeable.
75. The preferred option of banning the sale and supply of disposable vapes will 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 supported a prohibition of disposable vapes.
76. Despite the 'Creating a smokefree generation and tackling youth vaping' consultation being UK-wide and there being a common policy position across the 4 nations, the actual finalised legislation is for England-only since environmental policy is a devolved matter and it is anticipated that the devolved governments will develop their own legislation. Therefore, the figures and impacts presented in this IA reflect England-only in line with the legislation.
77. The ban is expected to come into force in Spring/Summer 2025 in England. While separate legislation is being introduced by each nation, the UK Government and devolved governments are working together to agree a date for when the ban will come into force, to provide certainty for businesses and consumers.

⁸⁹ 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/>

78. 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.
79. A preliminary 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 B. It will also act as a reference framework for the design of the evaluation of the ban.

Assumptions

Definitions

80. 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.
81. **Reusable vapes** (i.e. non-disposable vapes) come in various types but will mostly fall in one of the following categories:
- A **refillable and rechargeable vape** is a device that does not come pre-filled but sometimes an e-liquid is sold with the device. Users can refill the vape tank with e-liquid and recharge the battery. Certain components of the products can be replaced such as the coils and batteries.
 - A vape **pod system** is a vape that uses a pod rather than a vape tank. A pod system consists of a small battery, which is rechargeable, and a refillable or replaceable pod/cartridge that contains the e-liquid.
 - **Vape mods** or **tank devices** are a type of vape device that are designed for vape users who want a more customisable vaping experience. They typically offer more features, such as a bigger and more powerful battery and adjustable power.

England weighting

82. A wide range of evidence has been used in this IA, some of it having been UK-wide (e.g. through externally commissioned research, ONS datasets, etc.) and so some figures were calculated on a UK-wide basis due to data availability. As the actual legislation is for England-only, these figures have been adjusted to account for this. Where relevant, figures have been multiplied by 84% (to the nearest percentage) to adjust from UK to England. This is based on ONS Population Estimates to show that England makes up approximately 84% of the UK's population.⁹⁰

⁹⁰ ONS (2024), Estimates of the population for the UK, England, Wales, Scotland, and Northern Ireland, <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland>

Counterfactual

83. In order to explore the current trends in the disposable vapes market, sales data from a Defra-commissioned report by the consultancy Eunomia⁹¹ has been used.⁹² 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).

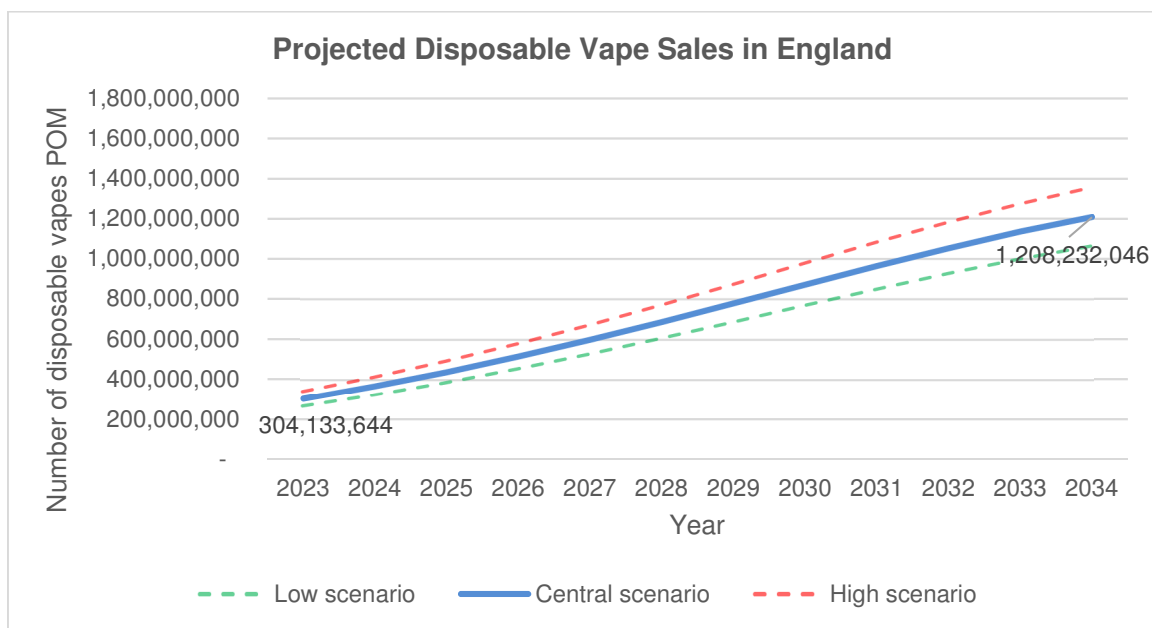
⁹¹ <https://eunomia.eco/>

⁹² Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

Projected disposable vape sales

84. It was estimated that 360 million disposable vapes were placed on the market (POM) in the UK in 2023.⁹³ This figure has been projected forward by Eunomia, showing that around 1 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 some of the more regular disposable vape users would transition to reusable vapes given that these are significantly cheaper over the long term.⁹⁴ We have adjusted this based on the proportion of the UK population accounted for by England and have extrapolated the data further to reach 1.2 billion disposable vapes in 2034 to cover the 10-year appraisal period.
85. The modelled scenario in the absence of a ban can be seen in Figure 1, with figures for years 1, 5 and 10 of the appraisal period in Table 3.

Figure 1: Chart of projected disposable vape sales in England



Source: Eunomia and Defra Modelling

Table 3: Baseline disposable vape sales projection in England

	2025	2029	2034
Low scenario	386,465,185	686,102,397	1,063,161,745
Central scenario	439,199,044	779,722,283	1,208,232,046
High scenario	491,932,902	873,342,169	1,353,302,347

86. The year-on-year growth rate of sales is summarised in Table 4, with values to the nearest percent.

⁹³ 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/>

⁹⁴ Saxton, M (2022), Disposable Alternatives – The Next Step After Disposables, <https://www.theelectroniccigarette.co.uk/blog/disposable-alternatives/>

Table 4: Year-on-year growth rate for disposable vapes POM

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Year-on-year growth rate (%)	21%	19%	18%	16%	15%	13%	12%	11%	9%	8%	6%

87. Eunomia’s projection is based on the year-on-year growth rate in single-use-vape consumption forecast in Zero Waste Scotland, for the period 2022 to 2027.⁹⁵ This growth trend is assumed to continue between 2027 and 2030, and has been extrapolated further assuming it will continue until 2034. In the absence of any intervention, key changes are expected to be a continued growth in the uptake of vapes across the population along with a rising share of disposable vape users (and share of sales revenue) among the growing number who use vapes.

88. Zero Waste Scotland’s forecast took into consideration the following:

- The evolution in the proportion of the adults using vapes (all types, not only disposables) appears to be growing at roughly 0.55 percentage points per annum at the Great Britian level, based on data from the yearly GB survey by Action on Smoking and Health (ASH). In addition to the latest figures for the proportion of adults using vapes in Scotland being around 13.2% in October 2022.
- The radical shift reported in sales and the increased use of disposable vapes as a main vaping device indicates a direction of travel, but the pace of the change that was witnessed in 2021-2022 will not be sustained.
- Across a 10-year time period from 2012 to 2022, various ‘uptake’ surveys (including from the ONS, ASH and the Smoking Toolkit Study) suggested that further increases in user numbers for vapes are likely in the coming years, in addition to there being a decline in smoking prevalence across the same period suggesting that further decline is likely in the future (i.e. since vapes are a smoking-cessation tool, some of the uptake can be attributed to the decline in smoking as smokers quit).

89. As such, it was deemed reasonable to consider that, in the absence of any intervention, key changes to be expected are:

- A continued growth in the uptake of vapes across the population;
- Alongside this growth, a rising share of disposable vape users among the number of those who use vapes (irrespective of some users switching to reusables).

90. More specifically, Zero Waste’s Scotland projection was based on the following assumptions based on current trends:

- Uptake of vapes in the under 16s increasing by 2 percentage points per annum⁹⁶;
- Uptake of vapes in the population aged 16 and over increasing by 1.5 percentage points per annum (i.e. 1.5% of the population are added to the number of vape users in each year);
- Increase in the proportion of vape users whose main device is disposable vapes of 4% per annum (of e-cigarette users in the age-bracket) across the under 16s, the 16-24 age bracket, and the 25-34 age bracket;
- Increase in the proportion of vape users whose main device is disposable vapes of 2% per annum (of e-cigarette users in the age-bracket) across those aged 35 and upwards;

⁹⁵ 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>

⁹⁶ Zero Waste Scotland’s projection note that in their forecast this is not a ‘legally compliant’ situation, otherwise there would be zero sales of single-use e-cigarettes to under-18s.

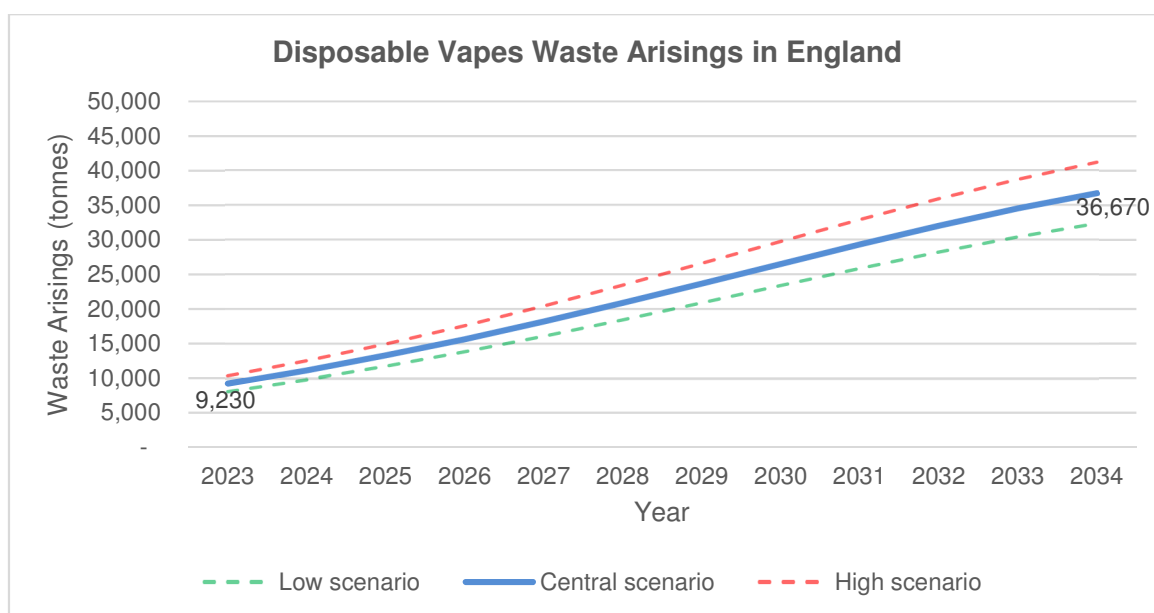
- The number of disposable vape units purchased per annum, expressed per person for whom disposable vapes are the main device used, remains constant (139 to 177 disposable vape units per annum per user for the low and high scenarios).

91. 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.⁹⁷ 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.

Projected waste arisings

92. 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), also modelled by Eunomia. This has also been adjusted based on the proportion of the UK population accounted for by England and extrapolated further to cover the appraisal period. For each disposable vape contributing to this, it is assumed that most of the vape liquid is used during the vape's lifetime, and so the average weight of a disposable vape when it becomes waste is around 30g.⁹⁸ Figure 2 shows the projection of waste arisings from disposable vapes, with figures for years 1, 5 and 10 of the appraisal period in Table 5, using the same growth rate from Table 4.

Figure 2: Chart of projected disposable vapes waste arisings in England



Source: Eunomia and Defra Modelling

Table 5: Baseline disposable vapes waste arisings projection in England (tonnes)

	2025	2029	2034
Low scenario	11,729	20,823	32,267
Central scenario	13,330	23,665	36,670
High scenario	14,930	26,506	41,073

⁹⁷ 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>

⁹⁸ The average weight when the disposable vape is full is 32.2g and the reduction in weight is based on 2ml of liquid estimated to be 50:50 propylene glycol and glycerin with 20mg of dissolved nicotine salts, but with 0.25g remaining at end of life.

Potential interaction with other policies

Reforms to the WEEE Regulations

93. 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.
94. The current regulations place obligations on producers of electrical equipment to finance the cost of collection and treatment of vapes that arise at HWRCs and treatment of vapes collected by distributors (i.e. retailers and online sellers). 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, when the cost of managing waste vapes is significantly higher than for other types of category 7 EEE.
95. As part of the reforms to the WEEE regulations, a new category of EEE for vapes is expected to be created (subject to final decision via government response following the consultation) 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. Creating a new category for vapes overcomes the deficiency in existing regulations that brings a high risk of unfair allocation of costs. It does not represent a new cost to business, but rather a cost transfer that removes the risk that waste management costs for vapes are spread across all category 7 producers rather than those producers that are placing vape products on the market.
96. Given the likelihood of cost redistribution with the creation of a new category, it could be argued that vape producers may end up paying more for recycling, potentially passing some of these costs onto consumers. If these were passed onto consumers, it could lower the demand for vaping products. However, the impact on demand is unlikely to be significant for it not already being covered within our sensitivity analysis for disposable vapes POM data.
97. Furthermore, the existing WEEE Regulations provide powers for the Secretary of State to set annual WEEE collection targets. A decision to create a new category for vapes would require the Secretary of State to set a weight-based collection target. The size of that target is entirely at their discretion, hence it is not possible to quantify likely cost impacts of future targets on vape producers (or indeed any other type of producer) in future years. Indeed, to do so would require a presumption of future targets which could prejudice the Secretary of State's discretion to set targets in the future. However, the existing regulations already ensure costs arising from vapes arising at HWRCs and distributors are captured within the system. Any future target would take into account those volumes and future available data on the impacts of the ban on disposable vapes on waste arisings.
98. The creation of this new category will likely 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. It will not result in increased tonnage of vapes entering the UK system, since in itself it will not result in changes of consumer behaviour to result in more vapes being disposed of at HWRCs or being returned to distributors on purchase of new products. Therefore, this will not lead to increased volumes of vapes being collected and consequently increased costs of compliance on business. Instead, it would mean that where vapes are being recycled, the vape producer is paying for them as opposed to other electrical producers. Though there are wider reforms that were proposed in the consultation including communication campaigns and collections from householders that may lead to an increase in the number of disposable vapes being collected for recycling, it is not expected that these quantities will be large enough to address the problem (presented in this IA) and it will take

time to build required infrastructure to ensure that all vapes are eventually recycled (and, ideally, limited infrastructure is used for reusable products that are increasing economic efficiency).

99. Based on the above, the issues of low recycling rates and consequential negative environmental impacts of incorrect disposal of disposable vapes would persist in the counterfactual scenario (i.e. no ban scenario), irrespective of the latest WEEE proposals.

Smokefree generation policies

100. One of the measures as part of the Tobacco and Vapes Bill is to make it an offence to sell tobacco products to those born on or after 1 January 2009. This is designed to phase out the sale of tobacco products, while not stopping anyone who currently legally smokes from being able to do so,⁹⁹ contributing to the wider government objective of creating a smokefree generation. This means that anyone who turns 15 or younger in 2024 will never legally be sold tobacco products from January 2027, when this policy takes effect and when those born in 2009 start turning 18 years old.
101. The latest data from the ONS' Smoking Habits in the UK¹⁰⁰ shows that 11.6% of those in the 18-24 age group in England currently smoke (from 2022). Assuming there is a uniform distribution across this age group (as the data is not split by single year of age) and applying it to the latest ONS population estimates¹⁰¹, this suggests that there are approximately 76,000 18-year olds who currently smoke. Though it should be noted that the proportion of people in this age group who currently smoke does seem to have been decreasing gradually year-on-year, and so there is potential for this to fall further in future years.
102. Although vapes are a smoking-cessation tool, a significant proportion of them are used by people who have never smoked tobacco before. As a result of individuals born on or after 1 January 2009 not being able to purchase cigarettes or other tobacco products, there is potential for them to take up vaping (i.e. those that would have become smokers in the absence of the policy, end up becoming vapers). This could mean that there is a potential upward increase in demand for vaping products overall, and likely disposable vapes too. And so, a proportion of 18-year-olds each year who would have taken up smoking in the absence of this policy intervention, may end up taking up vaping and that could be in the form of using disposable vapes. If this were to be the case, this could end up increasing the projected vape sales in the current counterfactual outlined above. However, there is no evidence to support whether this is likely as well there being no further information about other variables (e.g. how many of these users would have been dual users, thereby using both tobacco and vapes), and so it has not been factored into the counterfactual.

Vaping Products Duty

103. In March 2024, the government announced at the Spring Budget that it would introduce a new Vaping Products Duty from October 2026.¹⁰² The duty is intended to discourage non-smokers from taking up vaping, while maintaining the financial incentive to choose vaping over smoking. In addition to this, tobacco duty will also be increased from October 2026 to further maintain the financial incentive to choose vaping over smoking.

⁹⁹ DHSC (2024), Tobacco and Vapes Bill 2024, <https://www.gov.uk/government/collections/tobacco-and-vapes-bill-2024>

¹⁰⁰ ONS (2023), Smoking habits in the UK and its constituent countries, <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/datasets/smokinghabitsintheukanditsconstituentcountries>

¹⁰¹ ONS (2024), Estimates of the population for the UK, England, Wales, Scotland, and Northern Ireland, <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland>

¹⁰² HM Treasury (2024), Spring Budget 2024, <https://www.gov.uk/government/publications/spring-budget-2024>

The vaping duty will be based on the levels of nicotine contained in products. The proposed rates are currently as follows (noting that they can be pro-rated):

- £1.00 per 10ml for nicotine free liquids,
- £2.00 per 10ml on liquids that contain 0.1-10.9 mg of nicotine per ml, and
- £3.00 per 10ml on liquids that contain 11mg or more nicotine per ml.

104. At the time of writing this IA, the details of this policy have not been finalised (April 2024). A consultation on this duty, led by HM Treasury and HM Revenue and Customs (HMRC), was open for views on the proposals for the design and implementation of this UK-wide duty,¹⁰³ meaning potential for timelines and implementation of the tax to change post-consultation.

105. Furthermore, the structure of the duty means that disposable vapes would not be captured. This is because the ban had already been accounted for in the baseline to inform the tax base due to being published prior to the Spring Budget announcement and due to being implemented before the vaping duty comes into force. The Office for Budget Responsibility (OBR) estimated that the vaping duty will raise £0.5 billion by 2028-29 with several uncertainties in the costings, including the impact of the ban on disposable vapes. In their analysis, it was assumed that 40% of existing users of disposable vapes would switch to alternative vaping products and would therefore be liable for the duty.¹⁰⁴ As a result, this duty was not accounted for in our counterfactual scenario to avoid double counting impacts, whilst ensuring consistency across government analyses.

106. In a scenario where there is the absence of a ban on disposable vapes, one could expect that the duty would decrease the projected volume of disposable vapes sales. However, the magnitude of the change would depend on several factors, including a response from the supply chain that could potentially try to lower the impact of the duty, for example via reduced profit margins, suggesting that the overall impact to industry could be lower if the duty was factored into our counterfactual.

End-of-life management and treatment route assumptions

107. 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.

Split of end-of-life management routes

108. 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 of end-of-life management routes for disposable vapes (to the nearest percent), outlined in Table 6.

Table 6: Share of disposable vapes waste arisings by end-of-life management route

End-of-life management route	Share of waste arisings
Recycled in a shop or HWRC	21%
Discarded into a bin	68%
Littered/other ¹⁰⁵	11%

¹⁰³ HM Treasury (2024), Vaping Products Duty consultation, <https://www.gov.uk/government/consultations/vaping-products-duty-consultation>

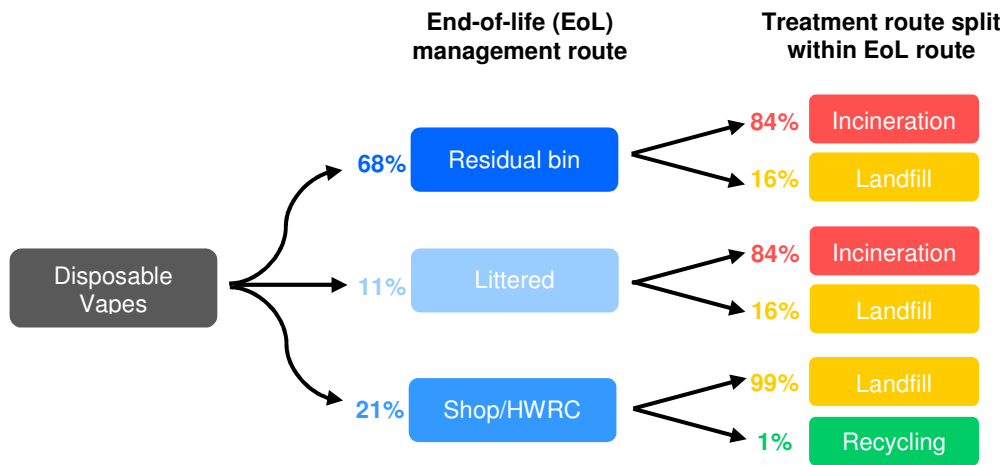
¹⁰⁴ OBR (2024), Economic and fiscal outlook March 2024, https://obr.uk/docs/dlm_uploads/E03057758_OBR_EFO-March-2024_Web-AccessibleFinal.pdf

¹⁰⁵ Where 'other' captures categories with a very small share, including being given away or flushed down a toilet, and so are combined with litter

Split of final treatment routes

109. Using research by Eunomia¹⁰⁶ 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 Figure 3.

Figure 3: Flow chart of disposable vapes routes at end-of-life



110. The overall proportions for the final treatment routes based on Figure 3 are summarised in Table 7 (to 1 decimal place).

Table 7: Share of disposable vapes waste arisings by final treatment route

Treatment route	Share of waste arisings
Recycled	0.1%
Incinerated	66.3%
Landfill	33.6%

111. The final treatment 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.

112. The proportions being sent via the treatment routes in the absence of a ban are also the same proportions of disposable vapes waste arisings diverted from the treatment routes as a result of the ban. This is discussed when calculating certain impacts in the cost-benefit analysis. The breakdown of this for residual waste (i.e. landfill and incineration) for the appraisal period can be seen in Table 8 using the proportions from Table 7 applied to Figure 2 in a central scenario.

Table 8: Disposable vapes waste arisings diverted from residual waste (tonnes)

	2025	2029	2034
Incineration	8,834	15,684	24,303
Landfill	4,480	7,954	12,325

¹⁰⁶ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

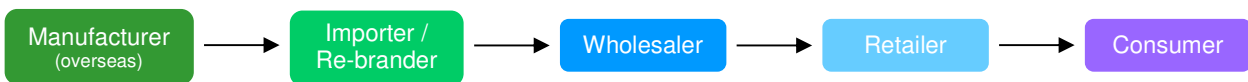
Greenhouse gas emissions associated with end-of-life treatment routes

113. 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 the landfilling of vapes would be negligible.¹⁰⁷
114. 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 energy¹⁰⁸, 0.21 tonnes of CO₂ are released upon incineration per tonne of disposable vape waste arisings. Although, this is likely to be a conservative estimate as this is accounting for the energy offset, when the energy sector will decarbonise by 2035¹⁰⁹ and so the impact could be bigger towards that timeframe. Therefore, for avoided emissions from EfW we are technically underestimating the benefit.
115. There are both process emissions and avoided emissions associated with the recycling of disposable vapes. The net recycling emissions are negative, implying that the credits from recycling of vapes outweigh the processing burdens. The credits achieved by recycling are higher than burdens, as the GHG emissions associated with production of primary materials (e.g. copper and aluminium) are high. Therefore, by recycling these materials there is a high level of avoided GHG emissions, by assuming that the recycle offsets emissions from primary production. For the battery and non-battery components of disposable vapes, -0.58 tonnes of CO₂ are released upon each tonne of recycled disposable vape waste arisings.

Supply chain and route to consumers

116. Government guidance uses the term ‘producer’ to refer to anyone who manufactures or imports vape products or who re-brands any vape product as their own.¹¹⁰ For the purposes of our cost-benefit analysis, we have considered these categories of ‘producer’ separately as they would not incur the same impacts as a result of the ban.
117. The supply chain is complex given the diversity of companies involved in the importation and distribution and ambiguity over which actor is the ‘first’ to place products on the market. For the purposes of our cost-benefit analysis, and following engagement with stakeholders, we have decided the most appropriate route to use is that outlined in Figure 4. This is the most common route to consumers and will aide in avoiding double-counting impacts.

Figure 4: Flow chart of the typical route to market for disposable vapes



118. Stakeholder engagement highlighted that there is very little to no domestic manufacture of disposable vapes, and that wholesalers are unlikely to import disposable vapes directly and would source from an importer/re-brander instead. It should also be noted that there are some cases where products may go straight from an importer, who may also have their own retail channels, rather than via a traditional wholesaler.

¹⁰⁷ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁰⁸ 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).

¹⁰⁹ BEIS (2021), Plans unveiled to decarbonise UK power system by 2035, <https://www.gov.uk/government/news/plans-unveiled-to-decarbonise-uk-power-system-by-2035>

¹¹⁰ MHRA (2016), E-cigarettes: regulations for consumer products, <https://www.gov.uk/guidance/e-cigarettes-regulations-for-consumer-products>

Manufacturer impacts

119. It is difficult to ascertain the exact market share of domestically produced disposable vapes, but it is likely to be very little to none. Evidence suggests that most production of vapes products takes place abroad, with over 80% thought to take place in China, and there being 5 or 6 major producers.¹¹¹
120. Vapes must be notified to the Medicines and Healthcare products Regulatory Agency (MHRA) before being legal to place on the UK market. Based on information provided by MHRA and their vape product notification data, there are 323 manufacturer accounts (394 accounts including importers) in the UK. However, it should be noted that this is how submitters are identifying themselves and many of them would not be considered manufacturers in the traditional sense, nor for the purposes of our analysis (e.g. some of them are likely to be re-branders). Furthermore, this figure is not exclusive to disposable vapes and includes all e-cigarette products (e.g. all other vapes, e-liquid, etc.).
121. Through engagement with stakeholders with knowledge of the vaping industry, they were not aware of any manufacturers of disposable vapes in England. If there is any domestic manufacture, it would likely be a very low volume and not make up a meaningful proportion of the disposable vapes placed on the market, as it is not known of. Therefore, given that there is no robust evidence of domestic production, we have not quantified any impacts to manufacturers as these would be out of scope of our assessment if they are all based overseas. However, we have provided some qualitative discussion instead around what a likely scenario could be if there were any domestic manufacturers.
122. 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 manufacturers this may mean exiting the market, we would also expect some manufacturers to move to production of the next most profitable alternative for their business. It should also 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.
123. It has been acknowledged that any switch in production is likely to result in lower total profit, at least in the short-term, otherwise manufacturers would have already made this switch. In this instance, we have assumed that manufacturers of disposable vapes would switch to producing reusable vapes and their refill components. However, this could be a simplifying assumption as these manufacturers could already produce these products in addition to producing disposable vapes, as there might still be an optimising strategy to manufacture both products if the two types of vapes are in different markets.

Number of retailers

124. The route to consumers is characterised by a diverse range of distribution channels, including convenience, retail and specialist vape stores, and a growing online presence. Therefore, it is difficult to establish the exact size of the retail sector. In order to determine the number of retailers of disposable vapes that would be affected by the ban, it is important to look at the most common routes of purchase.

¹¹¹ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

125. It should also be noted that unlike tobacco, vapes can be sold easily by any retailer in England.¹¹² 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.¹¹³ 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. However, it is difficult to ascertain the exact numbers of these unconventional sellers as it is unlikely that all of them will be selling disposable vapes.

126. The UK Standard Industrialisation Classification (SIC) 2007¹¹⁴ 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.¹¹⁵ It is more appropriate to use the number of outlets (local units) rather than the number of businesses (enterprises) as certain costs (e.g. familiarisation) are more likely to fall at a premise level rather than a business level.

127. Through engagement with stakeholders, there is still uncertainty with the number of retailers of disposable vapes. Responses ranged from either not holding data on the overall number of retailers, only holding data for a particular type of retailer, and an estimate based on there even being as many as 200,000 retailers of disposable vapes in the UK if accounting for the unconventional routes (e.g. petrol stations, bars, pubs, nightclubs, second hand mobile phone stores, barbers etc.). Although, one stakeholder with knowledge of the vaping industry stated that an estimate of around 50,000 vape retailers in the UK would be broadly correct, noting that this would include the typical routes (i.e. convenience stores and specialist vape shops).

128. Data identified by DHSC as part of the IA for the Tobacco and Vapes Bill¹¹⁶ suggests that there are an estimated 49,751 vape retailers in England, comprised of:

- 41,659 convenience stores,
- 5,014 supermarkets,
- 3,079 specialist vape shops.

It should also be noted that these figures were adjusted for England based on proportion of the UK population accounted for by England (approximately 84%).

129. Additionally, as acknowledged earlier, it is estimated that 30-35% of vape sales are online, though this mostly applies to other vaping products rather than disposables. We have engaged with stakeholders who estimate from general industry knowledge that there could be around 200 online vape retailers that solely operate online (i.e. excluding physical stores with an online presence and major e-commerce platforms) in England, with only a fraction of such businesses having greater scale than micro-enterprises.

130. As the retail landscape is very broad and there is some uncertainty, we feel it is reasonable to undertake some sensitivity analysis around this and combine some of the sources. For a central scenario, we estimate that there are 49,291 retailers selling disposable vapes in England. This figure is similar to the estimate that DHSC had, though it incorporates more

¹¹² Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹¹³ HMRC (2019), Selling and storing tobacco products, <https://www.gov.uk/guidance/selling-and-storing-tobacco-products>

¹¹⁴ 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>

¹¹⁵ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹¹⁶ DHSC (2024), Tobacco and Vapes Bill: impact assessment, <https://www.gov.uk/government/publications/tobacco-and-vapes-bill-impact-assessment>

up-to-date numbers for some categories. A breakdown with justifications for the sources we have used are outlined in Table 9.

Table 9: Number of retailers selling disposable vapes in England (central scenario)

Source	Justification for using source	Number of retailers in England
SIC code 4711 (Retail sale in non-specialised stores with food; beverages or tobacco predominating)	Stakeholder engagement confirmed this SIC code is most likely to cover convenience stores, and will also cover supermarkets.	42,642
SIC code 4730 (Retail sale of automotive fuel in specialised stores)	Stakeholder engagement highlighted that petrol forecourt operators, most of which operate under a convenience store model, will also be impacted by the disposable vapes ban and they fall under this SIC code.	3,430
Specialist vape shops – number from Local Data Company (3,573 in the UK) ¹¹⁷	Stakeholder engagement confirmed this is likely to be a more accurate number and is more up-to-date, and so we use this instead of SIC code '4726: Retail sale of tobacco products in specialised stores' (1,842 in England). Additionally, though our stakeholder survey it came to our attention that some specialist vape shops would use SIC codes other than 4726.	3,019
Online vape retailers	Highlighted through stakeholder engagement. It would not be appropriate to use SIC code '4791: Retail sale via mail order houses or via Internet' which online businesses tend to use, since this would be too much of an overestimate with there being 34,675 local units in England using this SIC code.	200
Total		49,291

131. We have decided not to use a low scenario, as we do not feel there would be a significantly lower number of retailers than that of the central scenario. However, for a high scenario, we account for most of the potential routes and therefore this is an extreme scenario. We estimate that there are 138,545 retailers of disposable vapes in England. The breakdown of this with a justification of sources we have used is outlined in Table 10.

¹¹⁷ The Independent (2024), Number of independent vape shops across UK jumps again, <https://www.independent.co.uk/business/number-of-independent-vape-shops-across-uk-jumps-again-b2471961.html>

Table 10: Number of retailers selling disposable vapes in England (high scenario)

Source	Justification for using source	Number of retailers in England
SIC code 4711 (Retail sale in non-specialised stores with food; beverages or tobacco predominating)	As in central scenario	42,642
SIC code 4730 (Retail sale of automotive fuel in specialised stores)	As in central scenario	3,430
Specialist vape shops number from Local Data Company	As in central scenario	3,019
Online vape retailers	As in central scenario	200
SIC code 4742 (Retail sale of telecommunications equipment in specialised stores)	To account for an unconventional route (i.e. phone shops)	2,116
SIC code 5630 (Beverage serving activities)	To account for an unconventional route (i.e. pubs, bars and nightclubs)	37,903
SIC code 6190 (Other telecommunications activities)	To account for an unconventional route (i.e. phone shops)	6,585
SIC code 9602 (Hairdressing and other beauty treatment)	To account for an unconventional route (i.e. barbers and hairdressers)	42,651
Total		138,545

132. The main impact in the IA where the number of retailers is used is to calculate familiarisation costs. It should be noted that with the number of retailers in the high scenario, they have the capability to sell disposable vapes but not all of them will do so. At some point they will have to familiarise with the new regulations, but it is not proportionate for us to obtain a more accurate number of retailers with the unconventional routes of retailers of disposable vapes.

Substitution by consumers (switching behaviour)

133. There are studies that have shown that disposable vapes appear to be a substitute for reusable vapes, as well as vapes more generally being substitutes for cigarettes.^{118,119} However, it is difficult to quantify the number of people switching either between different types of vapes (disposable to reusable), from vaping to smoking cigarettes/tobacco, 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.

134. The Smoking Toolkit Study is run by University College London and consists of monthly surveys of the adult population of England which include detailed questions on smoking and smoking cessation.¹²⁰ A recent study using results from this survey was published in 2024 looking at which groups would be affected by a ban on disposable vapes.¹²¹ The findings from this have largely influenced our analysis for potential consumer switching behaviours.

135. By looking at disposable vape usage proportions split amongst smoking status, we can try make assumptions around consumer switching behaviour. A brief description of these categories of vapers by smoking status are described as follows:

- **Never smokers:** those who never smoked tobacco regularly, but currently vape.

¹¹⁸ Pesko MF, Huang J, Johnston LD, Chaloupka FJ (2018), E-cigarette price sensitivity among middle-and high-school students: Evidence from monitoring the future, *Addiction*, 113(5)

¹¹⁹ Stoklosa M, Drope J, Chaloupka FJ (2016), Prices and e-cigarette demand: evidence from the European Union, *Nicotine & Tobacco Research*, 18(10)

¹²⁰ <http://www.smokinginengland.info/>

¹²¹ Jackson SE, Tattan-Birch H, Shahab L, et al. (2024), Who would be affected by a ban on disposable vapes? A population study in Great Britain, *Public Health* 227 (2024)

- **Current smokers:** those who are dual users, and so smoke tobacco and vape.
- **Recent ex-smokers:** those who currently vape but have stopped smoking in the past year.
- **Previous smokers:** those who currently vape but stopped smoking over a year ago.

136. By using this information, we arrive at the following split in Table 11. We use this to also apportion the number of sales, although we recognise that this is a very simplifying assumption as not all users necessarily purchase the same number of products, and it is difficult to predict whether there will be any volume effects (e.g. current disposable vape users switching to reusable vapes and vaping less altogether).

Table 11: Share of disposable vape users by smoking status

Disposable vape user category by smoking status	Proportion of disposable vape users ¹²²
Never smokers	20%
Current smokers	49%
Recent ex-smokers	10%
Previous smokers	20%

137. We have assumed that those who have never smoked regularly will end up quitting vaping/smoking altogether as the ban is likely to discourage an uptake of vaping amongst these users, particularly as a significant proportion of this sub-group are aged 18-24 and have driven the rapid rise in vaping among young never-smokers. We also assume those who are long-term previous smokers are more likely to transition to reusables given that they are likely to have been longer-term users of vapes.

138. There is more uncertainty with those who are current smokers and recent ex-smokers, as there is potential for part of them to revert back to only smoking tobacco or re-lapse to smoking. Therefore, we use data from ASH, around satisfaction levels for vapes compared with cigarettes and apply these percentages to the proportions in Table 9. 52% of current smokers and 28% of ex-smokers are less satisfied with vapes compared with cigarettes,¹²³ and so we assume these proportions of those categories are likely to revert back to smoking or use alternative non-vaping products, with the remainder likely to switch to reusable vaping alternatives. A summary of these proportions by smoking status and our assumptions for switching behaviour can be seen in Table 12.

Table 12: Share of disposable vape users by assumed switching behaviour

Disposable vape user category by smoking status	Switching behaviour assumption	Proportion of disposable vape users
Never smokers	Quit vaping/smoking altogether	20%
Current smokers	Revert back to smoking or alternative non-vaping product	26%
	Transition to reusable vapes	24%
Recent ex-smokers	Revert back to smoking or alternative non-vaping product	3%
	Transition to reusable vapes	7%
Previous smokers	Transition to reusable vapes	20%
Total		100%

¹²² Total does not sum to 100% due to rounding

¹²³ 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>

139. Based on Table 12, it is expected that 51% of current disposable vape users will switch to using reusable vapes as a result of the ban. Our calculations for switching behaviours by consumers will only focus on alternative vaping products in the main cost-benefit analysis, however we do discuss the other categories (e.g. smoking tobacco or alternative non-vaping products) qualitatively as there is more uncertainty. Given there will be some uncertainty with predicting future consumer switching to alternative vaping products, we have conducted some sensitivity analysis around this. In the central scenario, 51% of current users of disposable vapes will switch to alternative vaping products; in the low scenario, we assume 40% will switch based on research conducted by HMRC as part of the vaping products duty; and in the high scenario, we assume 100% of users will switch to reusable alternatives. This is outlined in Table 13.

Table 13: Proportions of users switching to alternative vaping products - sensitivity

	Low scenario	Central scenario	High scenario
Proportion of current disposable vape users switching to alternative vaping products	40%	51%	100%

140. It should also be noted that this captures which type of vape users mainly use, and so vapers who used disposables as a secondary product are not captured. This may be a particular issue for assessing disposable use, as people who mainly use other e-cigarette devices may buy them as temporary replacements if they forget to take their device out with them or if it runs out of battery while away from home.

141. Given that there are different types of vape, we have decided to limit it to the most popular two reusable vapes: ‘rechargeable with pre-filled cartridges’ and ‘rechargeable with tank to refill’. Given that the characteristics of these do vary, and there is uncertainty as to which will be more popular as a result of the ban on disposable vapes, we assume there will be a 50/50 split between these categories (i.e. of the disposable vape users switching to alternative vaping products, 50% of them will switch to a refillable tank device and 50% of them switch to a device with pre-filled cartridges).

142. As the average number of charge cycles for a reusable vape is around 300, we assume that one new device will be purchased for every 300 disposable vapes.¹²⁴ Refill cartridges are normally sold in packs of 2, and so one pack will be purchased for every 2 disposable vapes. Refillable tank devices are filled with separate e-liquid and this is normally sold in 10ml bottles, which is five times as much as the e-liquid capacity of a disposable vape (2ml) and the tank container for a reusable vape – and so one 10ml bottle of e-liquid will be purchased for every 5 disposable vapes.

Expected costs and benefits of the preferred option

143. All indicative estimates used in this analysis are in 2023 prices unless stated otherwise. Figures are modelled over the standard 10-year appraisal period (covering years 2025 – 2034) at a discount rate of 3.5%.

¹²⁴ The Electronic Cigarette Company, The Ultimate Guide to E-cig Batteries, <https://www.theelectroniccigarette.co.uk/batteries/the-ultimate-guide-to-e-cig-batteries>

Summary of expected impacts

144. Impacts grouped based on affected group are summarised in Table 14 and are discussed in the following sections.

Table 14: Summary of expected impacts as a result of the policy

Group Affected	Impact	Cost / Benefit	One-off / Ongoing	Monetised?	Direct / indirect to business
Manufacturers¹²⁵	Familiarisation costs	Cost	One-off	No	Direct
	Loss of profit from sales of disposable vapes	Cost	Ongoing	No	Direct
	Capital investment cost for production of alternative items	Cost	One-off	No	Direct
	Alternative material costs for production of alternative items	Cost	Ongoing	No	Indirect
	Profit gained through sale of alternative vaping products	Benefit	Ongoing	No	Indirect
Importers and Re-branders	Familiarisation costs	Cost	One-off	Yes	Direct
	Loss of profit from sales of disposable vapes	Cost	Ongoing	Yes	Direct
	Profit gained through sale of alternative vaping products	Benefit	Ongoing	Yes	Indirect
Wholesalers	Familiarisation costs	Cost	One-off	Yes	Direct
	Loss of profit from sales of disposable vapes	Cost	Ongoing	Yes	Direct
	Profit gained through sale of alternative vaping products	Benefit	Ongoing	Yes	Indirect
Retailers	Familiarisation costs	Cost	One-off	Yes	Direct
	Loss of profit from sales of disposable vapes	Cost	Ongoing	Yes	Direct
	Excess stock costs	Cost	One-off	No	Direct
	Profit gained through sales of alternative vaping products	Benefit	Ongoing	Yes	Indirect
	Profit gained through sales of tobacco and other nicotine products	Benefit	Ongoing	No	Indirect
	Reduction in fuel costs	Benefit	Ongoing	No	Direct
Other sectors	Increased profit for current manufacturers of alternative vaping products	Benefit	Ongoing	No	Indirect
	Reduced costs to waste site operators from waste fires	Benefit	Ongoing	No	Indirect
Consumers	Disutility through loss of enjoyment, convenience or reduced choice	Cost	Ongoing	No	Not applicable
Government	Loss of landfill tax revenue	Cost	Ongoing	Yes	
Local Authorities (LAs)	Enforcement costs	Cost	Ongoing	Yes	
	Reduced clean-up costs	Benefit	Ongoing	No	
	Landfill tax savings	Benefit	Ongoing	Yes	
	Landfill gate fee savings	Benefit	Ongoing	Yes	
	EfW gate fee savings	Benefit	Ongoing	Yes	
	Reduced cost from waste fires	Benefit	Ongoing	No	
Society (third parties)	Reduced litter (amenity) benefit	Benefit	Ongoing	Yes	
	Production emission savings	Benefit	Ongoing	No	
	Raw material extraction emission savings	Benefit	Ongoing	No	

¹²⁵ No manufacturer impacts are monetised as part of the main cost-benefit analysis as there is no evidence of there being any domestic manufacturers of disposable vapes.

	Disposal incineration emission benefit (reduced GHG emissions)	Benefit	Ongoing	Yes	
	Reduced waste fires resulting in reduced GHG emissions	Benefit	Ongoing	Yes	
	Reduction in fuel emissions	Benefit	Ongoing	No	

Net Present Value estimates

145. The monetised costs and benefits form the total Net Present Value (NPV) estimates for the preferred option, estimated over the ten-year appraisal period. We have developed 3 different scenarios (low, central and high) to enable sensitivity analysis. All values in Table 15 are in 2023 prices with 2025 present value.

Table 15: 10-year NPV estimates in £millions (2023 prices, 2025 present value) (to 1 decimal place)

Impact	Low (worst case)	Central	High (best case)
Costs			
Importers/re-branders – Familiarisation costs	£0.0	£0.0	£0.0
Importers/re-branders – Loss of profit from sales of disposable vapes	£3,499.0	£2,651.2	£1,977.2
Wholesalers – Familiarisation costs	£0.0	£0.0	£0.0
Wholesalers – Loss of profit from sales of disposable vapes	£3,180.9	£2,410.2	£1,797.5
Retailers – Familiarisation costs	£0.9	£0.3	£0.3
Retailers – Loss of profit from sales of disposable vapes	£21,687.8	£16,432.9	£12,255.6
Government – Loss of landfill tax revenue	£9.7	£8.6	£7.6
LAs – Enforcement costs	£2.2	£2.2	£2.2
Total Costs	£28,380.5	£21,505.3	£16,040.5
Benefits			
Importers/re-branders – Profit gained through sale of alternative vaping products	£419.1	£537.6	£1,047.9
Wholesalers – Profit gained through sale of alternative vaping products	£381.0	£488.7	£952.6
Retailers – Profit gained through sales of alternative vaping products	£2,598.0	£3,332.3	£6,495.0
LAs – Landfill tax savings	£7.6	£8.6	£9.7
LAs – Landfill gate fee savings	£1.9	£2.1	£2.4
LAs – EfW gate fee savings	£13.5	£15.3	£17.1
Society – Reduced litter (amenity) benefit	£1.5	£3.5	£5.4
Society – Disposal incineration emission benefit	£8.0	£9.1	£10.2
Society – Reduced waste fires resulting in reduced GHG emissions (combustion-related)	£11.4	£12.9	£14.5
Society – Reduced waste fires resulting in reduced GHG emissions (black carbon)	£57.6	£65.5	£73.3
Total Benefits	£3,499.6	£4,475.7	£8,628.1
NPV	-£24,880.9	-£17,029.7	-£7,412.5

146. Although the final NPV is negative, the ban remains the preferred option due to the non-monetised factors excluded from the NPV estimates. There are several key benefits that have not been monetised, however they are analysed qualitatively as non-monetised

benefits. 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. Given that disposable vapes are inherently unsustainable products, an outright ban is the most effective solution.

Summary of monetised costs

Familiarisation costs to businesses

147. Familiarisation costs are the one-off costs that businesses face upon implementation of the ban so will only occur in the first year of the appraisal period. Those supplying disposable vapes (i.e. retailers, wholesalers, importers and re-branders) will be required to spend time reviewing any new guidance to ensure that they are selling legal products.
148. Guidance for businesses supplying disposable vapes is currently in development but it is anticipated that it will not exceed 2000 words. The time taken to review this guidance is based on a typical technical text reading speed of 75 words per minute.¹²⁶ Therefore, we would expect it to take each person needing to read the guidance around 27 minutes, and we have rounded this up to 30 minutes in our analysis (i.e. 0.5 hours). This familiarisation time was tested with stakeholders who mostly agreed with this approach.
149. As there is more uncertainty around the number of businesses impacted as opposed to the time to familiarise, sensitivity analysis has been carried out on the former for the relevant affected groups.

Retailers

150. In order to monetise the familiarisation costs to retailers, for our central scenario the categories and number of premises likely to be affected by the ban have been identified using a mix of SIC codes and other sources to improve accuracy, as outlined earlier in the IA. It has been estimated that 49,291 retailers will be affected by familiarisation costs in total, most likely to include convenience stores, supermarkets and specialist vape retailers.
151. It is assumed that the guidance would only be read by the shopkeeper and owners in each shop selling disposable vapes, as supported by stakeholder engagement. We do not expect that staff in the shop would be required to familiarise themselves with the guidance, as it is the shopkeepers and owners that are most likely to be responsible for ensuring that products in their stores are compliant with the new regulations. The ONS Annual Survey of Hours and Earnings (ASHE) provides a median hourly wage for shopkeepers and owners (retail and wholesale) of £11.15 using Standard Occupational Classification (SOC) code 7131.¹²⁷ This hourly wage was then uplifted with a 22% non-wage labour cost uplift.¹²⁸
152. The calculation methodology for this is as follows, based on familiarisation being undertaken by one full-time equivalent (FTE) employee:
- $$\text{Familiarisation cost per retailer} = \text{time taken (in hours)} \times \text{hourly wage} \times (1 + 22\%)$$
- $$\text{Familiarisation cost per retailer} = 0.5 \times £11.15 \times 1.22$$
- This equates to a familiarisation cost of £6.80 for each retailer.

¹²⁶ BEIS (2017), Business Impact Target: Appraisal of guidance, <https://assets.publishing.service.gov.uk/media/5a8234f8e5274a2e8ab580e8/business-impact-target-guidance-appraisal.pdf>

¹²⁷ ONS (2023), Earnings and hours worked, occupation by four-digit SOC: ASHE Table 14, <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

¹²⁸ 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

153. By multiplying the familiarisation cost for each retailer by all the number of stores/premises, the total familiarisation costs expected to be incurred by disposable vape retailers is £335,250.

154. To take into account some of the uncertainty surrounding the number of retailers, sensitivity analysis has been conducted, with our high estimate outlined earlier in the IA. The number of retailers in each scenario is summarised in Table 16 along with the total familiarisation cost.

Table 16: Retailer familiarisation costs - sensitivity analysis

	Low scenario ¹²⁹	Central scenario	High scenario
Number of retailers	49,291	49,291	138,545
Total familiarisation cost (£)	£335,250	£335,250	£942,316

Wholesalers

155. As with retailers, wholesalers of disposable vapes are also likely to face one-off familiarisation costs with the implementation of a ban. We had initially used ONS SIC codes to identify the number of disposable vape wholesalers. 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. We were uncertain of the proportion of these wholesalers selling disposable vapes so we assumed all of those within these categories did. We initially estimated that there were 6,860 wholesalers of disposable vapes in the UK across the following four SIC codes:

- 4617: Agents involved in the sale of food; beverages and tobacco
- 4635: Wholesale of tobacco products
- 4639: Non-specialised wholesale of food; beverages and tobacco
- 4676: Wholesale of other intermediate products

By adjusting this for England, this would equate to 5,795 wholesalers.

156. Data identified by DHSC as part of the IA for the Tobacco and Vapes Bill¹³⁰ suggested that there are 17,294 food, beverage, and tobacco wholesalers in the UK using data from ONS' Annual Business Survey (ABS). Adjusting this to England they had estimated there were 14,587 food, beverage, and tobacco wholesalers in England. However, due to a lack of specific data for vape wholesalers, they had assumed that this would be equivalent to the number of vape wholesalers.

157. Both our initial estimate and DHSC's overall estimate for vape wholesalers are overestimates for the number of wholesalers selling disposable vapes in England. During stakeholder engagement, stakeholders were not able to state a precise number of wholesalers of disposable vapes in England since many come and go opportunistically depending on supply and demand from retailers. And so, they had estimated that there are between 50-100 wholesalers of disposable vapes in England.

158. It is assumed that the guidance would only be read by the owners of each wholesaler supplying disposable vapes (i.e. familiarisation will be undertaken by one FTE employee), as supported by views from stakeholders. We do not expect that staff in the store/warehouse would be required to familiarise themselves with the guidance, as it is the owners that are

¹²⁹ The central scenario is also used for the low scenario to calculate NPV and EANDCB estimates

¹³⁰ DHSC (2024), Tobacco and Vapes Bill: impact assessment, <https://www.gov.uk/government/publications/tobacco-and-vapes-bill-impact-assessment>

most likely to be responsible for ensuring that products in their stores are compliant with the new regulations. The ONS ASHE provides a median hourly wage for shopkeepers and owners (retail and wholesale) of £11.15 using SOC code 7131.¹³¹ This hourly wage was uplifted with a 22% non-wage labour cost uplift.¹³²

159. The calculation methodology for this is the same as for retailers, also resulting in a familiarisation cost of £6.80 for each wholesaler. For our central scenario we take the mid-point of the range and assume there are a total of 75 wholesalers of disposable vapes in England. By multiplying this by the familiarisation cost for each wholesaler, the total familiarisation costs expected to be incurred by disposable vape wholesalers is £510.

160. To take into account some of the uncertainty surrounding the number of wholesalers, sensitivity analysis has been conducted around this, using the upper and lower bounds of the range. The number of wholesalers in each scenario is summarised in Table 17 along with the total familiarisation cost.

Table 17: Wholesaler familiarisation costs - sensitivity analysis

	Low scenario	Central scenario	High scenario
Number of wholesalers	50	75	100
Total familiarisation cost (£)	£340	£510	£680

Importers and /re-branders

161. Importers and re-branders will also face familiarisation costs. As with wholesalers, there is uncertainty around an exact number but stakeholder engagement suggested that there are under 10 main importers (stakeholders estimate it is likely to be circa 7) and potentially an additional 20 or more that are less specialised. There are also around 10 re-branders of disposable vapes in England of sufficient scale to be noticeable on the market.

162. Based on information provided by MHRA from their vape product notification data, there are around 80 submitters of disposable vapes defining their status as manufacturers and importers in England. As submitters are responsible for defining their status, it is highly unlikely that these would be considered manufacturers in the traditional sense (i.e. with production facilities), and are more likely to be importers, distributors or re-branders, still in line with what is considered a “producer” under UK law.

163. Therefore, using this information we work to an assumption that there are between 20-80 importers/re-branders of disposable vapes in England. The lower bound of this range of 20 would account only for the main importers and re-branders and would form our low scenario. For a central scenario, we add on the additional 20 importers that are less specialised bringing this to a total of 40. For a high scenario, we use the upper bound of the range of 80.

164. Stakeholders suggested that it would most likely be a technical director/manager reviewing the guidance. The ONS ASHE provides a median hourly wage for ‘production managers and directors in manufacturing’ of £24.95 using SOC code 1121¹³³ (the most similar SOC code

¹³¹ ONS (2023), Earnings and hours worked, occupation by four-digit SOC: ASHE Table 14, <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

¹³² 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

¹³³ ONS (2023), Earnings and hours worked, occupation by four-digit SOC: ASHE Table 14, <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

based on occupation description¹³⁴). This hourly wage was uplifted with a 22% non-wage labour cost uplift.¹³⁵ The calculation methodology for this is as follows, based on familiarisation being undertaken by one FTE employee:

$$\text{Familiarisation cost per importer/re-brander} = 0.5 \times £24.95 \times 1.22$$

This equates to a familiarisation cost of £15.22 for each importer/re-brander.

165. For our central scenario we assume there are a total of 40 importers and re-branders of disposable vapes in England, thereby equating to a total familiarisation cost of £609. To take into account some of the uncertainty surrounding the number of wholesalers, sensitivity analysis has been conducted around this, using the upper and lower bounds of the range. The number of importers and re-branders in each scenario is summarised in Table 18 along with the total familiarisation cost.

Table 18: Importer and re-brander familiarisation costs - sensitivity analysis

	Low scenario	Central scenario	High scenario
Number of importers/re-branders	20	40	80
Total familiarisation cost (£)	£304	£609	£1,218

Loss of profit to businesses from sales of disposable vapes

Retailer profit loss

166. When we initially estimated approximate profit margins for disposable vapes in the retail market, we had based this on data from the Annual Business Survey (ABS)¹³⁶ and calculated this as gross value added (GVA) divided by turnover for broad SIC codes within which those selling disposable vapes would likely fall in (4711, 4719 and 4726), to arrive at a figure of 24% (to the nearest whole number). As there was no further data available to us at the time, namely due to the commercial sensitivity of profit data, this was deemed an appropriate figure to test with stakeholders. Since then, engagement with stakeholders has shown that this was an underestimate and we have now refined this figure.

167. As confirmed by stakeholders, the average profit margin for disposable vapes for retail businesses mostly falls between 40% to 50%. For the purposes of our analysis, we have taken the mid-point of this range and so the average profit margin is assumed to be 45%.

168. Retail price estimates of disposable vapes have been informed by desk-based research where an average price of £5.30 has been estimated in 2023.¹³⁷ Stakeholders also agreed with this estimate. Sensitivity analysis on this figure has also been carried out, using the lowest and highest price within our sample. This can be seen in Table 19.

¹³⁴ Warwick Institute for Employment Research, CASCOT: Computer Assisted Structured COding Tool, <https://cascotweb.warwick.ac.uk/#/classification/soc2020>

¹³⁵ 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

¹³⁶ ONS (2023), Non-financial business economy, UK: Sections A to S, <https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/datasets/uknonfinancialbusinesseconomyannualbusinesssurveysectionsas>

¹³⁷ Defra research conducted in 2023 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 80) of products for sale from both online and in-store retailers, including specialist vape stores, newsagents and supermarkets.

Table 19: Retail price estimates for disposable vapes

	Price
Low	£3.95
Central	£5.30
High	£6.99

169. In order to calculate profit loss to retailers, the average price of a disposable vape has been multiplied by projected disposable vape sales in the absence of intervention (as outlined in the ‘Assumptions’ section) for each year in the appraisal period (to calculate revenue), and this is then multiplied by the average profit margin. The calculation methodology for this for each year of the appraisal period is as follows:

$$\text{Total profit loss to retailers} = \text{price} \times \text{number of sales} \times \text{profit margin}$$

$$\text{Total profit loss to retailers} = £5.30 \times \text{number of sales} \times 45\%$$

170. For the central scenario, this results in a present value cost of £16,432.9m over the appraisal period.

Wholesaler profit loss

171. Through engagement with stakeholders, the average profit margin for disposable vapes for wholesalers mostly falls between 10% to 14%. For the purposes of our analysis, we have taken the mid-point of this range and so the average profit margin is assumed to be 12%.

172. By deducting the profit margin of 45% from the retail prices in Table 19, we can calculate approximate wholesale prices as outlined in Table 20. Sensitivity analysis has also been carried out, using the lowest and highest price within our sample.

Table 20: Wholesale price estimates for disposable vapes

	Price
Low	£2.17
Central	£2.91
High	£3.84

173. Similarly to the calculation for profit loss to retailers, in order to calculate the profit loss to wholesalers, the average wholesale price of a disposable vape has been multiplied by projected disposable vape sales in the absence of intervention for each year in the appraisal period and this is then multiplied by the average profit margin. The calculation methodology for this for each year of the appraisal period is as follows:

$$\text{Total profit loss to wholesalers} = \text{price} \times \text{number of sales} \times \text{profit margin}$$

$$\text{Total profit loss to wholesalers} = £2.91 \times \text{number of sales} \times 12\%$$

174. For the central scenario, this results in a present value cost of £2,410.2m over the appraisal period.

Importer/re-brander profit loss

175. Stakeholder engagement confirmed that importers and re-branders are likely to operate on slightly higher profit margins than wholesalers, in the range of 10-20%. We have taken the mid-point of this range and so the average profit margin is assumed to be 15%.

176. By deducting the profit margin of 12% from the wholesale prices in Table 20, we can calculate approximate prices charged by importers and re-branders as outlined in Table 21. Sensitivity analysis has also been carried out, using the lowest and highest price within our sample.

Table 21: Importer/re-brander price estimates for disposable vapes

	Price
Low	£1.91
Central	£2.56
High	£3.38

177. Similarly to the preceding calculations for profit loss, in order to calculate the profit loss to importers and re-branders, the average price charged by of a disposable vape has been multiplied by projected disposable vape sales in the absence of intervention for each year in the appraisal period and this is then multiplied by the average profit margin. The calculation methodology for this for each year of the appraisal period is as follows:

$$\begin{aligned} \text{Total profit loss to importers/re – branders} &= \text{price} \times \text{number of sales} \times \text{profit margin} \\ \text{Total profit loss to importers/re – branders} &= £2.56 \times \text{number of sales} \times 15\% \end{aligned}$$

178. For the central scenario, this results in a present value cost of £2,651.2m over the appraisal period.

Loss of landfill tax revenue to Government

179. Landfill tax is an extra environmental tax that must be paid when any waste is disposed of at a landfill site by businesses, LAs and other organisations. It is charged by the weight of waste that going to landfill. With disposable vapes banned, there is likely to be a loss in landfill tax revenue to Government. It is important to note that the landfill tax revenue represents a transfer of money between relevant parties – in this case, it is a loss of revenue to Government and a savings to LAs.¹³⁸

180. Landfill tax normally increases each year in line with inflation based on Retail Price Index (RPI). In keeping with our price year, the standard rate of landfill tax in 2023 is £102.10 per tonne.¹³⁹ However, in the 2024 Spring Budget, it was announced that tax rates for the year 2025-26 will increase to £126.15 per tonne to better reflect actual RPI and ensure the tax continues to incentivise investment in more sustainable waste management infrastructure.¹⁴⁰ Given that the ban is coming into force in 2025, it has been deemed appropriate to use this newer figure and adjust it to 2023 prices to be consistent with the cost-benefit analysis. By deflating £126.15 in 2025 prices to 2023 prices, we arrive at a figure of £122.81.

181. The landfill tax per tonne is multiplied by the estimated tonnes of disposable vape waste arisings expected to be diverted from landfill as a result of the ban for each year of the appraisal period (as outlined in the ‘Assumptions’ section of the IA). It is assumed that 33.6% of disposable vapes waste arisings end up in landfill each year and this proportion is assumed to remain constant across the appraisal period. The calculation methodology for this is as follows for each year of the appraisal period:

$$\begin{aligned} \text{Loss of landfill tax revenue} &= \text{landfill tax per tonne} \times \text{disposable vapes diverted from landfill (in tonnes)} \\ \text{Loss of landfill tax revenue} &= £122.81 \times \text{disposable vapes diverted from landfill (in tonnes)} \end{aligned}$$

182. For the central scenario this results in a present value cost of £8.6m over the appraisal period. Sensitivity analysis has also been undertaken around the tonnes of waste diverted from landfill in line with the tonnes of waste arisings (i.e. +/- 12%).

¹³⁸ It is not expected that businesses will be affected by this.

¹³⁹ HMRC (2023), Landfill Tax increase in rates, <https://www.gov.uk/government/publications/landfill-tax-rates-for-2023-to-2024/landfill-tax-increase-in-rates>

¹⁴⁰ HM Treasury (2024), Spring Budget 2024, https://assets.publishing.service.gov.uk/media/65e8578eb559930011ade2cb/E03057752_HMT_Spring_Budget_Mar_24_Web_Accessible_2_.pdf

Enforcement costs to LAs

183. There will be costs associated with inspection and law enforcement services to support the ban. Trading Standards Authorities (TSAs) would be best placed to enforce the ban, and work will be undertaken with LAs to establish the most effective and efficient way of enforcement.

184. Enforcement costs relate to the estimated additional burden to the TSAs across England which will enforce the policy, using a reactive method (i.e. inspections only occur after a complaint). As the ban will be enforced using a reactive method, compliant businesses will not face any enforcement-related costs. Non-compliant businesses will incur costs associated with seized products if they are inspected but these have not been monetised, as per Better Regulation guidance to assume 100% compliance by businesses.

185. The assumptions and calculation of enforcement costs have been agreed with the Association of Chief Trading Standards Officers (ACTSO). It is expected that enforcement costs will only be incurred in the first three years of the policy (i.e. only during the first three years of the appraisal period) as it is assumed that all businesses are compliant.

Inspection costs

186. The following costs for inspection incurred by TSAs are indicative and have only been included to inform the analysis for the IA. There is a possibility that these costs will need to be reviewed in future and potentially refined further.

187. It is estimated that of the premises selling disposable vapes, a total of 33,105 premises in England may require a visit to check compliance or carry out enforcement. ACTSO stated that it is unlikely that there will be any visits to supermarkets, petrol station forecourt shops or convenience stores owned by reputable chains, hence this figure is lower than the total number of retailers. Of these premises, it is estimated that 10% will be inspected (i.e. 3311 premises). Inspecting premises selling these items in the first instance will occupy 2 hours of an officer's time per year at a rate of £83.18 per hour in 2023 prices (originally £84.45 in 2024 prices which has been deflated to 2023 prices to align with our price base year). This equates to around £551,000 and is calculated as follows:

$$\begin{aligned} \text{Cost of first inspection} &= \text{number of premises inspected} \times \text{time taken (in hours)} \times \text{hourly cost} \\ \text{Cost of first inspection} &= 3311 \times 2 \times £83.18 \end{aligned}$$

188. Assuming there is a 25% non-compliance rate following the initial visit (i.e. by 828 premises), inspecting premises selling these items in the second instance will occupy 3 hours of an officer's time per year at a rate of £83.18 per hour. This equates to around £207,000 and is calculated as follows:

$$\begin{aligned} \text{Cost of second inspection} &= \text{number of premises inspected} \times \text{time taken (in hours)} \times \text{hourly cost} \\ \text{Cost of second inspection} &= 828 \times 3 \times £83.18 \end{aligned}$$

189. Therefore, the total annual enforcement cost to local authorities attributed to inspection costs is £757,277. Enforcement costs are expected to only be incurred for the first 3 years of the policy. This results a present value cost of £2.2m over the appraisal period.

Other costs associated with enforcement

190. In addition to inspection costs, there may also be increased costs to trading standards for seizure events, associated disposal costs and potential legal costs. These costs have not been monetised in this IA.

Summary of monetised benefits

Profit gained through sales of alternative vaping products

191. As a result of the ban on disposable vapes, businesses will face reduced profits. However, some of this impact could be partially offset by an increase in expenditure on alternative vaping products. There is also likely to be some profit gained through the sale of tobacco goods or other non-vaping products, however we have only monetised the profit gained from alternative vaping products. As this is an indirect impact to businesses, we have provided an illustrative scenario in our analysis and assume that these products will have the same profit margins as disposable vapes.

Retailers

192. Retailers could expect a proportion of their lost profit from disposable vapes to be recouped from sales of reusable vapes and refill liquid/cartridges. We assume in our central scenario that 51% of existing users of disposable vapes will switch to alternative vaping products. As outlined earlier in the IA, we have also conducted some sensitivity analysis on this proportion with it being 40% of users switching in a low scenario and 100% of users switching in a high scenario.

193. We assume that 50% of the switched products will go to cartridge devices and the remaining 50% will go to refillable tank devices. From desk-based research, we estimate the average retail price of the components to be the following as outlined in Table 22.

Table 22: Retail price estimates for alternative vaping products

Reusable vape type	Component	Price
Cartridge vape	Rechargeable vape with pre-filled cartridge (i.e. device with no re-fills)	£9.00
	Refill cartridges (pack of 2)	£7.00
Refillable vape	Rechargeable vape with tank (i.e. device with no e-liquid)	£17.00
	Bottle of e-liquid (10ml)	£3.00

194. As outlined earlier in the 'Assumptions' section, we assume that based on the number of charge cycles of an average vape battery (300), that a new device will be purchased for every 300 disposable vapes. Refill cartridges which are normally sold in packs of 2 will be purchased for every 2 disposable vapes, and a 10ml bottle of e-liquid will be purchased for every 5 disposable vapes.

195. Based on there being a 51% switch from disposable vapes to alternative vaping products, this means that we can apportion 51% of disposable vapes POM from the baseline scenario (from Figure 1 and Table 3 in the 'Assumptions' section of the IA) to these users likely to switch to alternative vaping products. This is outlined in Table 23.

Table 23: Number of disposable vapes from baseline scenario apportioned to users likely to switch to alternative vaping products

	2025	2029	2034
Number of disposable vapes apportioned to users likely to switch to alternative vaping products	225,333,919	400,041,577	619,891,292

196. Based on there being a 50/50 split between these users switching to cartridge vapes and refillable vapes, the figures in Table X will be halved for each. And so, the number of new devices that will have to be purchased based on charge cycles will be the same for each and is calculated as follows for each year of the appraisal period:

$$\text{Number of reusable devices} = \frac{\text{number of disposable vape sales apportioned to consumers switching}}{\text{number of charge cycles per reusable vape (i. e. 300)}}$$

Splitting the total number out for each device type, we arrive at the following numbers in Table 24.

Table 24: Number of reusable vaping devices purchased as a result of the ban

	2025	2029	2034
Number of cartridge vape device sales	375,557	666,736	1,033,152
Number of refillable vape device sales	375,557	666,736	1,033,152
Total reusable vape devices sold	751,113	1,333,472	2,066,304

197. In addition to devices, there will also be sales from refills. For cartridge devices, based on refills coming in packs of 2, sales will be based on 50% of disposable vape sales from consumers (in Table 23) switching divided by 2. For refillable tank devices, based on bottles of e-liquid on average being equivalent to the liquid in 5 disposable vapes, this will be based on 50% of the disposable vape sales from consumers switching (in Table 23) divided by 5. These are calculated as follows:

$$\text{Number of refill packs for cartridge vapes} = 50\% \times \frac{\text{number of disposable vape sales apportioned to consumers switching}}{2}$$

$$\text{Number of e – liquid bottles for refillable vapes} = 50\% \times \frac{\text{number of disposable vape sales apportioned to consumers switching}}{5}$$

198. And so, we arrive at the following numbers of sales for refills in Table 25.

Table 25: Number of refills for reusable vaping devices purchased as a result of the ban

	2025	2029	2034
Number of refill cartridges sold (packs of 2)	56,333,480	100,010,394	154,972,823
Bottles of 10ml e-liquid sold	22,533,392	40,004,158	61,989,129

199. We assume that retailers will use the same profit margin (45%) for these alternative vaping products as disposable vapes. And so, the profit gained from sales of alternative items would be calculated as for each year of the appraisal period:

$$\text{Profit from sales of alternative vaping products} = \text{number of sales from product} \times \text{retail price} \times \text{profit margin}$$

200. Hence, this results in a present value benefit of £3,332.3m over the appraisal period for all the alternative vaping products together. Sensitivity analysis has also been undertaken on this based on the proportion of consumers switching.

Wholesalers

201. The wholesale sector is likely to be able to continue to trade the alternative items replacing the banned items. 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, based on the same proportions of consumers switching used to calculate increased profit for retailers. By deducting the retail profit margin from the above four items, the average wholesale prices of them are as follows in Table 26.

Table 26: Wholesale price estimates for alternative vaping products

Reusable vape type	Component	Price
Cartridge vape	Rechargeable vape with pre-filled cartridge (i.e. device with no re-fills)	£4.95
	Refill cartridges (pack of 2)	£3.85
Refillable vape	Rechargeable vape with tank (i.e. device with no e-liquid)	£9.35
	Bottle of e-liquid (10ml)	£1.65

202. Calculations are undertaken similarly as with retail with only the price and profit margin differing. We also assume that wholesalers will have the same profit margin (12%) for these alternative vaping products as disposable vapes. Hence, this results in a present value benefit of £488.7m over the appraisal period. Sensitivity analysis has also been undertaken on this with the proportion of consumers switching.

Importers/re-branders

203. Importers and re-branders could expect a proportion of their lost profit from disposable vapes to be recouped from the sales of reusable vapes and refill liquid/cartridges, based on the same proportions of consumers switching used to calculate increased profit for retailers. By deducting the retail profit margin from the above four items from wholesale prices, the average prices charged by importers and re-branders is as follows in Table 27.

Table 27: Importer/re-brander price estimates for alternative vaping products

Reusable vape type	Component	Price
Cartridge vape	Rechargeable vape with pre-filled cartridge (i.e. device with no re-fills)	£4.36
	Refill cartridges (pack of 2)	£3.39
Refillable vape	Rechargeable vape with tank (i.e. device with no e-liquid)	£8.23
	Bottle of e-liquid (10ml)	£1.45

204. Calculations are undertaken similarly as with retail and wholesale with only the price and profit margin differing. We also assume that importers and re-branders will have the same profit margin (15%) for these alternative vaping products as with disposable vapes. Hence, this results in a present value benefit of £537.6m over the appraisal period. Sensitivity analysis has also been undertaken on this with the proportion of consumers switching.

Reduction in waste management costs to LAs

205. By banning disposable vapes, it is expected that waste management costs to LAs will fall due to the landfill tax and landfill and incineration (EfW) site gate fees they have to pay falling. As with landfill tax, the gate fees are charged 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 28 and we have assumed that these will remain constant in real terms over the 10-year appraisal period, noting that the BIT calculator accounts for inflation. It should also be noted that the landfill gate fee excludes landfill tax, as they are calculated separately. The gate fees used were originally in 2022 prices¹⁴¹, but have been inflated to 2023 prices to align with the price base year used in this cost-benefit analysis as outlined in Table 28. Gate fees are then multiplied by the tonnages of waste expected to be diverted from landfill and incineration as a result of the ban to calculate savings.

Table 28: Gate Fees (to the nearest £)

	Gate Fee (£/t)
EfW	£110
Landfill	£30

Landfill tax savings

206. As discussed previously, there will be savings in landfill tax for LAs but a loss for government as a result of the transfer of money. The calculation for this is outlined in 'Loss of landfill tax revenue to Government' section, noting that this will be a cost to government but a benefit to LAs.

207. This results in a present value benefit of £8.6m over the appraisal period, with sensitivity analysis undertaken around the tonnes of waste sent to landfill (also outlined above).

Landfill gate fee savings

208. Landfill gate fee savings are calculated as the landfill gate fee multiplied by the tonnes of waste diverted from landfill as a result of the ban. It is assumed that 33.6% of disposable vapes waste arisings end up in landfill each year and this proportion is assumed to remain constant for the appraisal period. The calculation methodology is as follows for each year in the appraisal period:

$$\begin{aligned} \text{Landfill gate fee savings} &= \text{Landfill gate fee} \times \text{disposable vapes diverted from landfill (in tonnes)} \\ \text{Landfill gate fee savings} &= £30 \times \text{disposable vapes diverted from landfill (in tonnes)} \end{aligned}$$

209. This results in a present value benefit of £2.1m over the appraisal period. Sensitivity analysis has also been undertaken on this with regards to the tonnes of waste sent to landfill (+/- 12%).

EfW gate fee savings

210. EfW gate fee savings are calculated as the EfW gate fee multiplied by the tonnes of waste diverted from incineration. It is assumed that 66.3% of disposable vapes waste arisings end up being incinerated each year and this proportion is assumed to remain constant for the appraisal period. The calculation methodology is as follows for each year in the appraisal period:

$$\begin{aligned} \text{EfW gate fee savings} &= \text{EfW gate fee} \times \text{disposable vapes diverted from incineration (in tonnes)} \\ \text{EfW gate fee savings} &= £110 \times \text{disposable vapes diverted from incineration (in tonnes)} \end{aligned}$$

¹⁴¹ WRAP (2023), Gate Fees Report 2022/23: Comparing the costs of alternative waste treatment options, <https://wrap.org.uk/sites/default/files/2023-09/WRAP%202022-23%20Gate%20Fees%20Report.pdf>

211. This results in a present value benefit of £15.3m over the appraisal period. As with landfill gate fee savings, sensitivity analysis has been undertaken with regards to the tonnes of waste sent to landfill (+/- 12%).

Emissions savings to society

212. In order to monetise emissions savings for certain benefits to society as a result of the ban, the number of avoided emissions are multiplied by carbon values, which are priced per tonne of CO₂.¹⁴² Because these were originally in 2020 prices, these have been inflated to 2023 prices to be consistent with the cost benefit analysis. A summary of these values are outlined in Table 29.

Table 29: Carbon values in 2023 prices

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Carbon value (£ per tonne of CO₂)	£292	£296	£301	£305	£310	£314	£320	£324	£329	£335

Disposal incineration emission benefit

213. Disposable vapes produce greenhouse gas emissions when incinerated, therefore a ban will result in emissions savings as a result of the waste diverted from incineration. 66.3% of disposable vapes end up in incineration when they become waste and this proportion is expected to remain constant during the appraisal period.

214. To calculate the incineration emission benefit, the tonnes of CO_{2e} released upon incineration of disposable vapes (0.21 tonnes CO_{2e} per tonne of disposable vape waste arisings¹⁴³ multiplied by the tonnes of waste diverted from incineration) are multiplied by the carbon values. The calculation methodology for this is as follows for each year in the appraisal period:

$$\text{Incineration emission benefit} = \text{disposable vapes diverted from incineration (in tonnes)} \times \text{GHG emissions released per tonne (i. e. 0.21)} \times \text{carbon value}$$

215. This results in a present value benefit of £9.1m over the appraisal period. Sensitivity analysis has been provided around this with +/- 12% on tonnes of waste incinerated.

Reduced emissions from a reduction in waste fires

216. The lithium-ion batteries in disposable vapes have been reported to have caused fires. 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.

217. Eunomia has modelled the emission impacts associated with waste fires caused by disposable vapes whereby they have estimated that li-ion batteries cause 201 fires in landfill sites per year and the share of those accounted for by disposable vapes was estimated to be 19%.¹⁴⁴ This figure was projected forwards in line with the year-on-year consumption of disposable vapes. We have adjusted these figures for England-only and extrapolated to cover the appraisal period. The number of waste fires estimated to be attributable to

¹⁴² BEIS/DESNZ (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>

¹⁴³ As outlined in the 'Assumptions' section of the IA

¹⁴⁴ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

disposable vapes per year in England during the appraisal period can be seen in Table 30, noting this uses the same growth rate from Table 4.

Table 30: Number of waste fires attributed to disposable vapes in England

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Number of waste fires	47	56	65	74	84	94	104	114	123	131

218. The emissions associated with the burning of waste in landfill sites due to fires caused by disposable vapes consists of combustion-related GHG emissions and black carbon emissions. These have also been modelled by Eunomia and we have adjusted these figures for England-only and extrapolated to cover the appraisal period. As a result of the ban, there will be a reduction in these emissions and these are outlined in Table 31 for years 1, 5 and 10 of the appraisal period.

Table 31: Reduced emissions from waste fires caused by disposable vapes

	2025	2029	2034
Combustion-related GHG emissions (tCO₂e)	2,605	4,625	7,166
Black carbon emissions (tCO₂e)	13,218	23,467	36,363

219. In order to monetise the emissions savings from avoided waste fires as a result of the ban, the total number of emissions for each year in Table 31 are multiplied by carbon values for the corresponding year in Table 29. The calculation methodology for this is as follows for each year of the appraisal period:

$$\text{Emission savings from avoided waste fires} = \text{reduced emissions} \times \text{carbon values}$$

220. This results in present value benefits of £12.9m for the reduction in combustion-related GHG emissions and of £65.5m for the reduction in black carbon emissions. Sensitivity analysis has been undertaken both for combustion-related GHG emissions and black carbon emissions, which is +/- 12% for the number of emissions each year multiplied by the same carbon values.

Reduced litter (amenity) benefit to society

221. A ban on disposable vapes is expected to have positive amenity benefits by reducing the amount of them in circulation as well as littered. 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.

222. These impacts are difficult to monetise directly, so we have adapted a willingness to pay (WTP) method. The Economics for the Environment Consultancy (Eftec) estimated that households' mean marginal willingness to pay for a 1 percentage point reduction in Local

Authority area litter is £0.66 per year in 2020 prices.¹⁴⁵ By adjusting for inflation, this is equivalent to £0.74 per year in 2023 prices.

223. Based on there being 23,860,129 households in England¹⁴⁶, we estimate that the total WTP for a 1 percentage point improvement in terrestrial environment is £17,679,428 per annum. It is assumed that a small proportion of this estimate can be attributed to a reduction in littered disposable vapes.

224. Our attribution is based on research undertaken by Zero Waste Scotland.¹⁴⁷ At least 15,000 tonnes of litter is discarded into the urban and rural environment and is subsequently cleared by LAs each year in Scotland, which equates to approximately 250 million easily visible items every year. In 2022, the amount of disposable vapes littered equated to 0.1% to 0.5% of the tonnage of total litter, and between 0.3% to 1.1% of the count of total litter. In order to monetise the amenity benefit, we have used the proportion of the count of litter attributable to disposable vapes – the mid-point of the range constitutes a central scenario and the ranges form a low and high scenario for sensitivity analysis. By projecting the proportion forward using the same growth rate in Table 4 (and as Zero Waste Scotland), we arrive at the following proportions across the appraisal period as outlined in Table 32.

Table 32: Projection of proportion of litter attributable to disposable vapes

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Proportion of litter made up by disposable vapes	1.2%	1.5%	1.7%	2.0%	2.2%	2.5%	2.7%	3.0%	3.2%	3.4%

225. As a result of the ban, it is assumed that there will be a 100% reduction in disposable vapes litter. In order to calculate the reduction of disamenity of litter, the yearly proportion of litter outlined in Table 32 is multiplied by the total WTP estimate. The calculation methodology is as follows for each year of the appraisal period:

$$\text{Reduced litter (amenity)benefit} = \text{proportion of litter made up by disposable vapes} \times \text{total WTP}$$

$$\text{Reduced litter (amenity)benefit} = \text{proportion of litter made up by disposable vapes} \times \text{£17,679,428}$$

226. This amounts to a present value benefit of £3.5m over the appraisal period. Sensitivity analysis on the proportion of litter disposable vapes make up has also been undertaken based on the upper and lower bounds of the range provided for the proportion of count of litter.

¹⁴⁵ Eftec (2020), Amenity Value Benefits of a Deposit Return Scheme for Drinks Containers, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=20652>

¹⁴⁶ ONS (2023), Families and households, <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/datasets/familiesandhouseholds>

¹⁴⁷ 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>

Summary of non-monetised costs

Manufacturer costs

227. As stated earlier in the IA, stakeholders we engaged with indicated that there is no knowledge of domestic production of disposable vapes in England. As a result, we have not sought to monetise any costs or benefits to manufacturers as these impacts would be negligible since they would not apply to many (or even any) domestic businesses. Instead, we have provided some high-level qualitative discussion for impacts in regards to what could be a likely scenario.

Familiarisation costs

228. Manufacturers of the banned items will 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 manufacturers than for other businesses (i.e. retailers, wholesalers, importers and re-branders), though they could vary for each individual manufacturer.

Profit loss from sales of disposable vapes

229. Following the implementation of the ban, manufacturers will be forced to stop selling disposable vapes in England. Domestic manufacturers may stop production of these items entirely, though it should be noted that because the ban does not cover a ban on the manufacture of disposable vapes, they could still produce 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 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, likely alternative vaping products (e.g. reusable vapes).

Capital investment cost

230. Where manufacturers switch to producing other items, such as reusable vapes, there is unlikely to be much capital investment cost associated with making this switch. This is because disposable and reusable vapes contain the similar components and materials, and so manufacturers may not need to purchase entirely new production capital in order to switch production.

Alternative material costs

231. 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. It should also be noted that this cost could overlap with changes in profit margins.

Excess stock costs to retailers

232. 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 low risk because there will be a transition period of at least 6 months prior to enforcement of the legislation to allow businesses time to run-down stocks. The responses from the 'Creating a smokefree generation and tackling youth vaping' consultation mostly agreed that an implementation

period for restrictions on disposable vape should be no less than 6 months after the law is introduced, with 59.5% agreeing.¹⁴⁸ The main theme in responses was that businesses (including retailers) and consumers needed time to adjust to the changes (more specifically, the need to sell existing stock by businesses) so it should be no less than 6 months.

233. Given the government response announcing the ban has been published over a year before implementation and there will be further communications on this prior to the implementation period, this further supports businesses in providing them with adequate time to prepare and adapt (i.e. practically giving more than 6 months' notice).

Disutility to consumers through loss of convenience or enjoyment

234. 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 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.

235. 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.¹⁴⁹ 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 likely that some current users of disposable vapes will switch to using reusable vapes as a result of the ban. We have assumed that 51% of current users will switch to alternative vaping products.

Summary of non-monetised benefits

Manufacturer benefits

Profit gained through sale of alternative vaping products

236. Where disposable vape manufacturers choose to switch to producing reusable vapes (potentially in addition to refill components), they are likely to lose some profit otherwise they 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 the production of other items.

Increased profit for current manufacturers of alternative vaping products

¹⁴⁸ 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#restricting-the-supply-and-sale-of-disposable-vaping-products>

¹⁴⁹ 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>

237. There could be increased market for current domestic manufacturers of reusable vapes and their refill components. Stakeholder engagement indicated that there is no knowledge of any disposable or reusable vape devices in the UK, as well as pre-filled pods/cartridges mostly being produced overseas. Stakeholder engagement also confirmed that the vast majority of e-liquid consumed in the UK is produced in the UK, hence confirming that there is a considerably large e-liquid production market in the UK.

238. The potential increase in profit to these businesses is dependent on changes in consumer behaviour caused by the ban. If consumers switch to refillable vapes (i.e. those with a tank to refill with e-liquid) as opposed to prefilled pod/cartridge devices, there will likely be increased profit for domestic manufacturers of e-liquid.

239. Though it should also be noted that through our stakeholder engagement it was indicated that if there is a significant shift to the use of refillable vapes, some capital expenditure may be required to expand production of bottled e-liquid to meet additional demand. Additionally, if there is a scenario where there is a more significant shift to prefilled pod devices, there is a chance that the filling of prefilled cartridges/pods in the UK could become an economic requirement, leading to capital expenditure on pod-filling machinery.

Retailer profit gained through sales of tobacco products and other nicotine products

240. In addition to retailers being able to partially offset the lost profit through sales of alternative vaping products, some are also likely further offset this through sales of tobacco/cigarettes and other non-vaping products for nicotine replacement (e.g. in the form of chewing gum, skin patches, mouth sprays, etc.).

241. In regards to tobacco products, it is difficult to predict the switching behaviour using our counterfactual for disposable vapes sales. As outlined earlier in the IA, we assume 51% of current disposable vape users will switch to alternative vaping products, and Table 12 shows that we assume 29% of current users will either revert/re-lapse to smoking tobacco or use an alternative nicotine product. For tobacco products, it may not be totally accurate to assume that this proportion of 29% will be constant over the appraisal period, especially since one of the main measures announced as part of the Tobacco and Vapes Bill¹⁵⁰ in 2024 is to raise the legal age of sale for tobacco products by making it an offence to sell tobacco products to those born on or after 1 January 2009, thereby phasing out the sale of tobacco products, while not stopping anyone who currently legally smokes from being able to do so. As a result of this interaction and there being uncertainty with future sales, we have not sought to monetise any potential profit gained through sales of tobacco products as a result of the ban on disposable vapes.

242. As vapes more generally are used for smoking cessation, there is also a chance that as a result of the ban on disposable vapes, some users may refer to other forms of smoking cessation with other products for nicotine replacement. However, as there is uncertainty with this and the variety of products, we have not attempted to quantify the potential profit gained through sales with these products.

Reduction in fuel costs to retailers

243. 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

¹⁵⁰ DHSC (2024), Tobacco and Vapes Bill 2024, <https://www.gov.uk/government/collections/tobacco-and-vapes-bill-2024>

replaced by reusable vapes, but in fact a proportion of them will be the refill components (i.e. refill pods/cartridges and bottles of e-liquid). It is likely that there will be a need for fewer deliveries as overall each vape lasts longer, and refillable components are lighter than disposable vapes, however there is uncertainty as to how retailers will make their orders and in what ratios for the various vaping products, which could differ amongst different businesses.

244. 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
- Ratio of vapes to refill components
- 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.

245. Any reduction in fuel costs from the ban is likely 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. Hence, the cost-benefit analysis, and more specifically the EANDCB estimate, will not be sensitive to this assumption. It should also be noted that this impact could overlap with changes in profit margins.

Further emissions savings to society

Reduction in fuel emissions to society

246. In addition to potentially lower fuel costs to businesses, the use of less fuel will result in lower greenhouse gas emissions. However, this has not been monetised as it is likely that fuel savings to retailers are likely to be small.

Production emission savings

247. 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 the main cost-benefit analysis as there is no knowledge of domestic disposable vape manufacture and so, production emissions savings will not accrue in England. Research by Eunomia has shown that production emissions account for around 26% of total GHG emissions in the disposable vape lifecycle, which is a much higher proportion than the monetised GHG emission impacts from incineration (around 2%) and waste fires (around 15%).¹⁵¹

Raw material extraction emissions savings

248. In addition to production emissions savings, there will also be emissions savings from the extraction of critical raw materials to produce disposable vapes. Research by Eunomia showed that raw material extraction accounts for the most significant share of GHG emissions associated with disposable vape lifecycle, almost 60% of total GHG emissions can be attributed to this stage.

249. In comparison to the monetised GHG emission savings in the IA from avoided incineration and avoided waste fires (which make up around 2% and 15% of the total share of GHG

¹⁵¹ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

emissions associated with the disposable vape lifecycle), if the avoided GHG emissions from raw material extraction were monetised there would be even more substantial benefits. However, as these impacts would not accrue domestically they have not been monetised.

Reduced clean-up costs to LAs

250. The implementation of the ban on disposable vapes may reduce clean-up costs to local authorities (LAs) for littered items. However, it is likely that most littered disposable vapes would be collected and cleaned-up (e.g. through street cleaning) and so savings for this are likely to be very small. For consumers who decide to switch to reusable vapes, they are less likely to litter them due to their reusability aspect, and so vapes overall are less likely to be present as litter.

Broader environmental impacts of littering that are avoided

251. It is known that littering can lead to vapes entering land areas (e.g. city parks), and to a lesser extent, aquatic environments (e.g. vapes being disposed of in restroom facilities). It is difficult to quantify the impact that such littering may have on the environment since there is limited research around the rate of degradation of a vape placed in aquatic or land-based environments, in addition to what components of the vape will come into contact with the environment.

252. One potential avenue by which disposable vapes may damage the environment is the use of plastic in the vape casing. If littered, it is possible that over an undefined period of time, the plastic will degrade to form small microplastics in the environment. Some data suggests that microplastics can be toxic and cause inflammation if ingested by animals or humans, and there is a more general risk to animals with accidental ingestion of vapes which may lead to choking.¹⁵²

253. The lithium-ion batteries which many disposable vapes contain may also be a source of damage to the environment as they could be classified as hazardous waste due to the metallic compounds they contain.¹⁵³

Reduced cost of fires to waste site operators, LAs and society

254. Emissions savings from fires at landfill sites have been monetised earlier on in the IA. However, this is likely to be a lower bound estimate for the total number of waste fires caused by disposable vapes, since fires may also be caused in waste collection vehicles, waste transfer sites and recycling facilities.

255. It is estimated that 200 waste fires were caused by lithium-ion batteries in the UK in 2020, costing a total of approximately £158 million (in 2020 prices).¹⁵⁴ Around 84.4% of these costs were incurred by waste site operators with many types of cost including in the form of material damage, business interruption, resources and stock. Around 7.2% of the costs were incurred by fire and rescue services in the form of resource costs, and the remainder of costs were mostly incurred by the environment and society in the form of GHG emissions and air pollution. A more recent study estimated that lithium-ion batteries cause 710 fires at

¹⁵² Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁵³ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁵⁴ Eunomia (2021), Cutting Lithium-Ion Battery Fires In The Waste Industry, <https://eunomia.eco/reports/cutting-lithium-ion-battery-fires-in-the-waste-industry/>

wastes sites and waste trucks per year¹⁵⁵, however as data is not available for the proportion of these fires attributable to the batteries in disposable vapes, it has not been possible to monetise the benefits associated with the reduced cost of fires.

Direct costs and benefits to business calculations

Identified direct costs and benefits

256. For the EANDCB, costs and benefits have been identified in Table 33 as being direct to business:

Table 33: Direct impacts to business as a result of the ban

Group Affected	Impact	Cost / Benefit	One-off / Ongoing
Manufacturers	Familiarisation costs	Cost	One-off
	Loss of profit from sale of disposable vapes	Cost	Ongoing
	Capital investment cost for production of alternative items	Cost	One-off
Importers/re-branders	Familiarisation costs	Cost	One-off
	Loss of profit from sale of disposable vapes	Cost	Ongoing
Wholesalers	Familiarisation costs	Cost	One-off
	Loss of profit from sale of disposable vapes	Cost	Ongoing
Retailers	Familiarisation costs	Cost	One-off
	Loss of profit from sale of disposable vapes	Cost	Ongoing
	Excess stock costs	Cost	One-off
	Reduction in fuel costs	Benefit	Ongoing

257. Most of the direct costs and benefits to business have been monetised. As there is no evidence to suggest domestic manufacture, we have only discussed these impacts qualitatively. Additionally, a couple of direct impacts to retailers have not been monetised, namely excess stock costs and a reduction in fuel costs. It is not expected that retailers will incur excess stock costs as there will be an implementation period of at least 6 months to exhaust stocks which was deemed sufficient with support from the consultation, and the reduction in fuel costs will be negligible.

Supporting discussion for classification of direct impacts to business

258. **Familiarisation costs.** These costs are necessary for businesses currently selling/supplying disposable vapes to understand the new regulations and ensure compliance.

259. **Loss of profit from sale of disposable vapes.** There is a direct ban on business activity as businesses will no longer be able sell disposable vapes. And so, there will be a loss of profit to businesses in the supply chain as a result of the removal of disposable vapes from the market. The potential profit gained through the sale of alternative items is indirect because this benefit is dependent on the behaviour of consumers changing to alternative vaping products as a result of the ban.

260. **Excess stock costs to retailers.** Businesses may need to dispose of any stock that has not been sold prior to implementation of the ban. For example, if they are holding more than

¹⁵⁵ Material Focus (2022), 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/>

6 months' worth of stock (i.e. longer than the implementation period), it is likely that they will face costs to dispose of the remaining stock that could not be sold ahead of implementation in order to remove stock that is not in compliance with the new regulations. However, as there was support in the consultation that the implementation period must be no shorter than 6 months, it is unlikely that there will be excess stock costs.

261. Reduction in fuel costs to retailers. Businesses will no longer be able to sell disposable vapes and so will no longer be able to transport these goods to their premise for sale. It is more likely that businesses will switch to reusable vapes and their refill components which will likely be lighter overall in their ratio than disposable vapes.

262. Capital investment costs to manufacturers. As a result of the ban on disposable vapes, manufacturers will either exit the market or adjust by changing their production with capital equipment to produce alternative items. As there is no evidence of domestic manufacturers, from an illustrative perspective we feel it would be more likely that manufacturers would switch to producing alternative items. Therefore, one-off capital investment would be required to ensure new products are compliant with the new regulations (i.e. not considered disposable vapes under the definition in legislation).

EANDCB calculation

Table 34: EANDCB estimate (2023 prices)

Group Affected	Direct Impact	NPV Estimate (to 1 decimal place)
Importers/re-branders	Familiarisation costs	£0.0
	Loss of profit from sales of disposable vapes	£2,651.2
Wholesalers	Familiarisation costs	£0.0
	Loss of profit from sales of disposable vapes	£2,410.2
Retailers	Familiarisation costs	£0.3
	Loss of profit from sales of disposable vapes	£16,432.9
Total Costs		£21,494.4
Total Benefits		£0.0
Net Costs		£21,494.4
EANDCB (annualised)		£2,497.1

Risks and mitigations

263. There are several risks and unintended consequences as a result of imposing a ban on disposable vapes that could affect the presented costs and benefits in this analysis. These are discussed in this section, along with how the risks will be mitigated.

264. 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 or no change in their price is more likely. This is because there are enough competitors, and since there will be an increase in demand for these products as some current users of disposable vapes will switch to these products. There is a risk here that consumers could then treat reusable vapes 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.

265. **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.
266. **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 in the short-term and mean that the number of these items being consumed after the ban is underestimated.
267. **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 market¹⁵⁶. 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.
268. **Continued purchase of disposable vapes from overseas online market places (OMPs).** This is a risk given that a meaningful proportion of sales of disposable vapes are online. Local and national trading standards will be responsible for online compliance. There will be a range of measures to mitigate against illegal trading online. For example, take-down procedures of these products by large platforms and pre-implementation engagement with online platforms.
269. **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 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 available. 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.
270. **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, because 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.

¹⁵⁶ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

Impact on medium, small and micro businesses

Small and micro business assessment (SaMBA)

271. Only costs incurred by retailers and wholesalers are quantified for this SaMBA. There is no evidence of there being any domestic manufacturers of disposable vapes, and so any impacts on overseas manufacturers are out of scope for this assessment. For importers and re-branders, we deemed it appropriate to assume that there are around 40 importers and re-branders (around 20 main and 20 less specialised) of disposable vapes in England based on figures provided through stakeholder engagement. With the main importers and re-branders of disposable vapes, stakeholder engagement confirmed that these are medium and large businesses. With the additional importers that are less specialised, stakeholders highlighted that given their diverse nature it was difficult to say how many would be SMBs, but that that they were also more likely to be medium and large enterprises, and so it would be fair to assume that no importers and re-branders of disposable vapes in England are considered SMBs.

Number of small and micro businesses affected

272. As we have had difficulty in ascertaining the exact size of the retail sector for disposable vapes, we have mainly used ONS data along with some figures from stakeholder engagement. For SIC codes, we use the number of enterprises (businesses) from ONS data¹⁵⁷. For the number of specialist vape shops, stakeholder engagement highlighted that 75% of the total number of stores would be small and micro businesses (SMBs), whilst the remainder would most likely be made up of larger chains. Stakeholders also estimated that around 80% of online vape retailers would be small and micro businesses. This is summarised in Table 35.

Table 35: Number of small and micro retailers of disposable vapes in England

SIC Code/Source	Number of SMBs (1-49 employees)	Total businesses
4711: Retail sale in non-specialised stores with food; beverages or tobacco predominating	27,431	27,617
4730: Retail sale of automotive fuel in specialised stores	1,825	1,926
Specialist vape shops – number from Local Data Company (3,573 in the UK, adjusted to 3,019 in England)	2,264	3,019 ¹⁵⁸
Online vape retailers	160	200
Total	31,680	32,762

273. Based on these categories of stores, we estimate that there are 31,680 vape retail businesses in England that are SMBs. This is around 97% of all vape retail businesses. Additionally, as we undertook some sensitivity analysis around the number of retailers for some impacts, with the additional four SIC codes used (4742, 5630, 6190 and 9602) for the extreme scenario, 77,423 of these businesses are SMBs out of 78,099, using the same ONS

¹⁵⁷ ONS (2023), UK business: activity, size and location,

<https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation>

¹⁵⁸ To note, this would be a maximum estimate for the number of businesses that are specialist vape shops as there is uncertainty as to how many premises would be attributed to the remaining businesses that are larger chains.

dataset¹⁵⁹ for the central scenario. In total for this high scenario (i.e. adding the total number to the previous 4 sources in Table 35), 109,103 businesses are SMBs out of 110,861 in England, which is around 98%.

274. For wholesalers, we have used figures from stakeholder engagement as these were more reliable than using ONS SIC codes. For the number of disposable vape wholesalers in England, stakeholders estimated that there are between 50-100 (and for certain impacts in the cost-benefit analysis we took the mid-point of this range to assume that there are 75 wholesalers), and that around 75% of these wholesalers would be considered SMBs.

275. A summary of the share of SMBs by affected business group as a result of the ban is shown in Table 36.

Table 36: Share of businesses that are small and micro by affected business group

Group Affected	Proportion that are SMBs (1-49 employees)
Retailers	97%
Wholesalers	75%

Proportion of overall costs expected to fall on small and micro businesses

276. The main costs that SMBs would incur because of the ban are familiarisation costs and the loss of profit from sales of disposable vapes.

277. For the retail sector, SMBs make up around 69% of total turnover of disposable vapes, as highlighted through stakeholder engagement. Therefore, we estimate that 69% of the costs of the policy will be borne by small and micro retailers.

278. For disposable vape wholesalers, although the majority of these businesses are small and micro, the vast majority of actual revenue will be attributed to medium/large businesses. Through stakeholder engagement, it is estimated that around 90% of the actual revenue is attributed to medium/large businesses, and so the remaining 10% is made up by small and micro businesses.

279. The only cost incurred by these businesses which is directly related to sales of disposable vapes is the loss of profit. Table 37 shows this estimated cost to all businesses and to SMBs by affected business group based on the proportions of the costs of the policy being borne by these groups. The costs are the total cost over the 10-year appraisal period and are discounted at a rate of 3.5%.

Table 37: 10-year NPV of loss of profit from disposable vapes, all and SMBs (to 1 decimal place)

Group affected	Costs for all businesses in group (£ millions)	Costs for SMBs in group (£ millions)
Retailers	£16,432.9m	£11,338.7m
Wholesalers	£2,410.2m	£241.0m

280. Familiarisation costs are not directly linked to the sales of disposable vapes. To apportion out the costs incurred by SMBs, we use the distributional split of small and micro businesses for each affected group from Table 36. Tables 38 shows the estimated cost to all businesses and to small and micro businesses by affected group. These are the total costs over the 10-year appraisal period and are discounted at a rate of 3.5%.

¹⁵⁹ ONS (2023), UK business: activity, size and location, <https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation>

Table 38: 10-year NPV of familiarisation costs, all and small and micro businesses

Group affected	Costs for all businesses in group (£ millions)	Costs for SMBs in group (£ millions)
Retailers	£0.335m	£0.324m
Wholesalers	£0.0005m	£0.0004m

Consideration of exemptions and mitigations

281. 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 (as demonstrated above). Other than helping to provide tailored information, no other exemptions or mitigations will be provided for these businesses as this will undermine the policy objectives. Discussion around considerations for these is provided in Table 39.

Table 39: Discussion for exemptions and mitigations for SMBs

Mitigating option	Supporting discussion
Full exemption	A full exemption from the regulation would not be appropriate as the presence of SMBs in the affected sectors is too high (over 90% of retailers and around 75% of wholesalers) and so the majority of the ban’s benefits would be lost, thereby not helping to meet the policy objectives.
Partial exemption	As with a full exemption, a partial exemption from the regulation would also not be appropriate as the presence of SMBs in the affected sectors is too high and so the majority of the ban’s benefits would be lost, thereby not helping to meet the policy objectives.
Extended transition period	An extended transition period would not result in lower transition costs for SMBs as they would still incur transition costs in the form of familiarisation costs.
Temporary exemption	Temporary measures would only be appropriate to alleviate any excess stock costs but the implementation period of at least 6 months will be enough time for businesses to sell existing stock, as supported by consultation responses ¹⁶⁰ .
Different requirements by firm size	There are no appropriate different requirements by firm size that could be introduced. 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.
Information	Defra will work with stakeholders to help ensure guidance is developed in a way that best supports business (including SMBs), to assist them with this policy.
Financial aid	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 SMBs will likely be the changes in profit margins and volumes of alternative vaping products sold. 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.
Opt-in and voluntary solutions	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, especially within the retail sector.

¹⁶⁰ 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>

Medium-sized business assessment

282. Better Regulation Framework guidance classifies medium-sized businesses as having an employment size band between 50-499 employees¹⁶¹. 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 for SIC codes¹⁶² along with estimates from stakeholder engagement.
283. For retailers, using Nomis data there are 120 medium-sized businesses in SIC code 4711 and 85 medium-sized businesses for SIC code 4730. Stakeholders were not able to provide an exact number for specialist vape shops or online retailers, but it is expected that of the remaining balance of those that were not small or micro businesses, they would mostly be medium-sized.
284. As with retailers, stakeholders were not able to provide an exact number of wholesalers that would be classified as medium-sized businesses. However, it is expected that of the remaining balance of those that were not small or micro businesses, they would also mostly be medium-sized. Similarly, as no importers and re-branders are considered to be SMBs, there is uncertainty as to how many would be medium-sized, but it is more likely that there would be more medium-sized businesses within this category than large businesses.
285. As outlined in the SaMBA, an exemption for SMBs 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

286. An equality impact assessment of the policy option has been carried out to assess impact on vulnerable groups. Concerns were identified for those in certain health settings who may not have access to reusable vapes and those who have learning disabilities or dexterity issues. These groups are dependent on the convenience of disposable vapes to pursue smoking cessation and it was suggested that reusable vapes may not be a viable alternative within these settings due to restricted patient access to plugs and chargers, and limited capacity for staff to recharge devices on a patient's behalf.
287. However, 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,¹⁶³ a scheme designed to cut smoking rates by encouraging smokers to swap cigarettes for vapes. 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 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>

¹⁶² 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>

¹⁶³ DHSC (2023), Smokers urged to swap cigarettes for vapes in world first scheme, <https://www.gov.uk/government/news/smokers-urged-to-swap-cigarettes-for-vapes-in-world-first-scheme>

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

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

Distributional impacts

290. Disposable vapes are relatively more affordable over the short term, with them usually being priced below £10. Prices for refillable devices, on the other hand, vary greatly from approximately £10 to £40.¹⁶⁴ Evidence suggests that general vape use is most popular among less advantaged social grades, and they have seen the largest increase in usage since 2021.¹⁶⁵ It is difficult to say whether this is applicable to only disposable vapes, although the fact there is the largest increase since 2021 suggests this could be due to disposable vapes as they have surged in popularity since then. It could be argued that the low cost of disposable vapes has made them an accessible smoking-cessation tool for people in low-income settings therefore it a ban on the sale and supply of disposable vapes may lead to a disproportionate impact on disadvantaged groups that have higher rates of smoking and typically find it harder to quit.

291. However, although reusable vapes are more expensive initially, they are more cost-effective longer-term. Refills, either in the form of e-liquid (with some as affordable as £1 per 10 ml) or pods/cartridges (generally priced around £5 for packs of 2), are of a lower cost than the cost of a new disposable vape.

Environmental impacts

292. There will be a number of natural capital benefits to society as a result of the ban on disposable vapes. HM Treasury's Green Book, defines natural capital as follows: "Natural capital includes certain stocks of the elements of nature that have value to society, such as forests, fisheries, rivers, biodiversity, land, and minerals. Natural capital includes both the living and non-living aspects of ecosystems."¹⁶⁶

293. 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.

¹⁶⁴ Office for Health Improvement and Disparities (2023), Youth vaping call for evidence analysis, <https://www.gov.uk/government/calls-for-evidence/youth-vaping-call-for-evidence/outcome/youth-vaping-call-for-evidence-analysis>

¹⁶⁵ Smoking in England (2024), E Cigarettes Latest Trends, <https://smokinginengland.info/graphs/e-cigarettes-latest-trends> (last accessed: 20/03/2024)

¹⁶⁶ 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>

294. The environmental principles from the Environmental Principles Policy Statement¹⁶⁷ have been considered, and this policy specifically fits under 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.

295. Due to disposable vapes being single-use products that are not primarily recycled, there is value lost from the loss of critical materials that constitute the disposable vapes. These materials (e.g. lithium in the batteries) are finite resources which are wasted in single-use products when they are disposed of incorrectly, depleting these critical finite resources is unsustainable. There will be a reduced reliance on raw material extraction and manufacture of disposable vapes will reduce the negative externalities associated with extraction and manufacture. Out of the overall GHG emissions with disposable vapes lifecycle, it is estimated that raw material extraction accounts for the most significant share of emissions, over double that from emissions released during manufacture.¹⁶⁸

296. It is expected that some users will switch to reusable alternatives from disposable vapes which will support moving towards a more circular economy as these devices will be disposed of far less frequently.

Health benefits

297. 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, though we have provided some illustrative analysis on a potential scenario earlier in the IA.

Potential health risks reduced as a result of the ban

298. The latest evidence has found that, in the short and medium term, vaping poses a small fraction of the risks of smoking¹⁶⁹, because vapes do not contain tobacco. In 2016, a report by the Royal College of Physicians (RCP)¹⁷⁰ 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. We have assumed that most users of disposable vapes will switch to reusable vapes, however there will be a proportion of users that may revert back to smoking tobacco or quit vaping and smoking altogether.

299. 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

¹⁶⁷ Defra (2023), Environmental principles policy statement, <https://www.gov.uk/government/publications/environmental-principles-policy-statement/environmental-principles-policy-statement>

¹⁶⁸ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://scienceresearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁶⁹ 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>

¹⁷⁰ 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>

difficult because the body has to get used to functioning without it. Withdrawal symptoms can include cravings, irritability, anxiety, trouble concentrating, headaches and other mental and physical symptoms.

300. 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 overheated¹⁷¹. 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.

Potential reduced uptake in smoking in instances where vaping is gateway to smoking

301. For people who have never smoked but are current vapers, there is a possibility that vaping could play a role in smoking initiation, and there are known health risks with smoking. Therefore, a ban on disposable vapes, which tend to be more popular with youth vapers and those who have never smoked, could indirectly reduce the long-term impacts associated with those who subsequently take up smoking as a result of vaping. However, although some studies have shown that there is an association, it is difficult to establish causality between vaping and subsequent smoking and so evidence is inconclusive on this matter.¹⁷²

Trade implications

302. 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 market for disposable vapes, with the vast majority (if not all) being imported. Based on stakeholder engagement, we assume that there is no domestic production. To give an indication of the potential scale, Table 40 provides the volume of imports and exports currently in the industry. Research by Eunomia¹⁷³ 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. We have updated this with the latest figures from 2023¹⁷⁴ as shown in the Table 40. 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%).

¹⁷¹ 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>

¹⁷² Scottish Government (2024), Vaping as a gateway to smoking – evidence briefing, <https://www.gov.scot/publications/vaping-gateway-smoking-evidence-briefing/pages/6/>

¹⁷³ Eunomia (2023), Analysis of the Market for Vapes: Exploring the environmental impacts of single-use vapes, <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21447>

¹⁷⁴ HMRC, UK Trade Info, <https://www.uktradeinfo.com/trade-data/>

Table 40: Value of vape products imported and exported in the UK in 2023

HS Code	Description	Likely products	Imports	Exports	Net imports
24041200	Products containing nicotine, intended for inhalation without combustion (excl. containing tobacco or reconstituted tobacco)	Disposable vapes containing vaping liquid. Pods and vaping liquids.	£939,808,917	£71,425,048	£868,383,869
24041910	Products containing tobacco substitutes, intended for inhalation without combustion (excl. containing nicotine)	Single-use vapes containing vaping liquid. Pods and vaping liquids.	£672,899	£219,891	£453,008
24041990	Products containing nicotine substitutes, intended for inhalation without combustion (excl. containing nicotine or tobacco substitutes)	Single-use vapes containing vaping liquid. Pods and vaping liquids.	£6,508,424	£15,123,551	-£8,615,127
85434000	Electronic cigarettes and similar personal electric vaporising devices	Vaping devices, without vaping liquid.	£99,903,316	£14,956,499	£84,946,817
Total			£1,046,893,556	£101,724,989	£945,168,567

303. Given the amount exported, it could be argued that the UK may have some domestic production of vaping products. This is not the case for single use products (i.e. disposable vapes) and pre-filled pods, but stakeholder engagement confirmed that the vast majority of e-liquid (outside of single-use products and pre-filled pods) consumed in the UK is manufactured domestically, so the volume of exports is more likely to be attributed to this.

304. Table 40 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 other 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. Through our stakeholder engagement, there was no knowledge of manufacture of any disposable or reusable vape devices.

305. 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 have announced an intention to introduce a ban on disposable vapes.

Impacts on the UK internal market

306. The term 'UK internal market' refers to the set of trading relationships within and across the 4 UK nations (i.e. England, Scotland, Wales and Northern Ireland). If the UK government and devolved governments have a common commencement date for the ban in Spring/Summer 2025, it is unlikely that there will be an impact on the UK internal market.

307. However, in the event of there being some distortion to the internal market because of gaps in the introduction of legislation between the four governments, there could be some

further impacts in England. For example, in a scenario where England's ban comes into force before the other nations, disposable vapes could be bought legally in Scotland and Wales, but used and disposed of incorrectly (e.g. by littering) in England. This could also contribute to a black market for disposable vapes as they could be purchased in bulk from Scotland or Wales, and sold illegally in England.

Competition impacts

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

Will the measure directly or indirectly limit the number or range of suppliers?

309. The policy would apply restrictions to manufacturers of disposable vapes. Because the vast majority of these producers are based overseas, they are excluded from our assessment. Some domestic manufacturers 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.

310. The proposal would also apply restrictions to importers, wholesalers and retailers of disposable vapes, however it is expected that they will mostly switch to supplying alternative items or increase supplying them if they already do so.

Will the measure limit the ability of suppliers to compete?

311. 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 vaping products, such as reusable vapes or e-liquid, through increased demand for these products encouraging new entrants to the market. Stakeholder engagement indicated that there are likely no UK-based manufacturers of devices (disposable and reusable), however there is of e-liquid. As we have assumed that the majority of disposable vape users will switch to alternative vaping products, there is likely to be an increased demand for e-liquid required for reusable vapes.

312. The policy would apply restrictions to all businesses (importers, re-branders, retailers and wholesalers) equally. The proposals will not limit businesses' ability to compete on quality, geographical location, price, advertisement or other grounds on which businesses frequently compete. However, businesses in the supply chain which solely import disposable vapes for domestic sale and/or those solely selling disposable vapes will no longer be able to do so.

Will the measure limit suppliers' incentives to compete vigorously?

313. 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.

Will the measure limit the choices and information available to consumers?

314. 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. The proposals do not limit the information available to consumers.

Innovation impacts

315. Given how innovative the vape sector has been, there are likely to be innovation impacts resulting from a ban on disposable vapes. The vape market has expanded dramatically. From first being in the international market in 2005 where most e-cigarettes/vapes looked like smoked cigarettes, they later evolved into products with refillable tank systems along with the expansion to disposable products.
316. 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

Monitoring and data collection

317. A preliminary Theory of Change, set out in Annex B, has been developed in order to understand both the context within which the policy objectives are delivered and the process of change that will result from the intervention and cause the desired policy objectives. For the evaluation plan, data will be used to track the inputs, outputs and outcomes of the intervention based on this Theory of Change.
318. As the ban is planned to come into force in Spring/Summer 2025, baseline data will be collected in 2024 to serve as a reference point against which progress can be measured and evaluated. Engagement with stakeholders (including wholesalers and retailers) will be undertaken to gather evidence on the ban on the sale and supply of disposable vapes.
319. In order to track whether the policy has been successful in delivering its objectives, key metrics will need to be identified. These will be refined by external consultants in the second part of 2024, however a potential list of metrics may include the following:
- Number of disposable vapes being littered post-ban
 - Share of disposable vapes in residual waste
 - Enforcement
320. As the policy focuses on disposable vapes, so will the evaluation. Therefore, the sale of other vaping products are out of scope. However, unintended consequences and spillover effects in terms of reusable vapes will also be monitored as part of the evaluation.

Evaluation plan

321. This policy will be evaluated as part of the wider Resources and Waste Strategy. The evaluation will design and deliver:
- **Process evaluation** involving engagement with stakeholders to understand how the policy is implemented which will be repeated over the lifetime of the evaluation, with

the aim of understanding initial outcomes of the policy and indicative progress towards longer-term outcomes.

- **Impact evaluation** covering high-level policy outcomes of the policy, involving theory-based analysis using theories of change to investigate impacts by exploring the causal chains thought to bring about change by the intervention.
- **Economic evaluation** in which the benefits of the policy will be compared with its costs and estimates of the cost/benefit ratio of making the progress to date towards achieving the policy outcomes.

322. As a result of being embedded in the Resources and Waste Strategy evaluation programme, the process and economic evaluation will be carried out at the policy level (i.e. for the ban) and will be incorporated into the impact (policy outcome) as well as the Strategy evaluation which provides a synthesis of all evaluation activities.

Process evaluation

323. The process evaluation will be undertaken 6 months after implementation of the ban, and will primarily be based on feedback from stakeholders. It will assess the extent to which progress is being made as intended, why and for whom; summarise the early benefits and disbenefits; and consider any possible improvements.

Impact evaluation

324. This policy will be considered and evaluated across different policy outcomes (POs) of the Resources and Waste Strategy evaluation plan, more specifically:

- PO1: More products are regularly retained, reused, repurposed, refurbished, or manufactured.
- PO2/3: Recycling rates for households, businesses, and municipal waste increase and Household, municipal and business waste streams improve in quality.
- PO4: Plastics waste is prevented at all stages of the plastics life cycle.

325. The ban aligns with the change anticipated with PO1 which is expected to generate the extension of product lifecycles, and a reduction in the amount of waste generated as products (i.e. reusable vapes as opposed to disposable vapes) are discarded less often and less frequently. The ban is also linked to policies targeting WEEE and batteries which underpin PO2/3 which seek to reduce waste from WEEE and batteries (including waste from vapes), and also improve how the waste that will be produced will be managed. Activities associated with the ban also support PO4 which focuses on how the Resources and Waste Strategy will tackle the high use of single-use plastic items (including packaging) both by individuals and businesses.

326. The impact evaluation will try to distinguish, quantitatively, the impact of the ban as distinct from other factors while recognising the system interactions that mean it is rarely the case that a single policy leads to a single outcome. This will account for what impacts the ban has had alone or in combination with other interventions, including other vaping policies, in order to determine the success of the ban specifically. The impact evaluation will gather quantitative and qualitative evidence about the difference the ban is making, which aspects are working, which are not working so well, and recommendations for future improvements.

Value-for-money (economic) evaluation

327. The policy will also be part of the value-for-money evaluation in which a cost-benefit analysis will be carried out for the Strategy, using the quantified attribution of impact and data to be collected by the contractor on costs of taking action. Impacts will be monetised in accordance with best practice and will involve making estimates of costs and monetising direct and consequential benefits. The analysis will produce estimates of uncertainty, using

sensitivity analysis and qualitative ratings where quantitative measures are unavailable. Results will be reported as cost benefit ratios which demonstrate the scale of return (or otherwise) on public investment.

Post-implementation review

328. There is a statutory requirement for the policy to be reviewed 5 years post-implementation and so a post implementation review (PIR) will be conducted. The information collected as highlighted throughout this section will be necessary to complete the review.

Annexes

Annex A: Stakeholder Consultation and Engagement Process

Engagement Approach	Dates	Details
Public consultation as part of DHSC's 'Creating a smokefree generation and tackling youth vaping' consultation	October – December 2023	<p>Within DHSC's consultation, Defra had a section relating to restricting the sale and supply of disposable vaping products, which helped to inform evidence on support for the preferred option (i.e. the ban) and length of implementation period (i.e. at least 6 months). Questions included:</p> <ul style="list-style-type: none"> • Do you agree or disagree that there should be restrictions on the sale and supply of disposable vapes? • Do you agree or disagree that restrictions on disposable vapes should take the form of prohibiting their sale and supply? • Are there any other types of product or descriptions of products that you think should be included in these restrictions? • Do you agree or disagree that an implementation period for restrictions on disposable vapes should be no less than 6 months after the law is introduced? • Are there other measures that would be required, alongside restrictions on supply and sale of disposable vapes, to ensure the policy is effective in improving environmental outcomes?
Stakeholder survey	March 2024	<p>The government response to this consultation was published in January 2024.¹⁷⁵</p> <p>A private consultation in the form of a survey was distributed to selected stakeholders, some of whom engaged with their members before providing a response. A series of initial questions were asked which aided to fill some of the evidence gaps for this IA. Information from the responses to this survey was collected and contributed to producing high and low estimates for our cost-benefit analysis relating to different impacts businesses would face. This was followed up with further engagement where necessary.</p>
Targeted stakeholder engagement	March – April 2024	<p>Meetings and email follow-ups with stakeholder representatives from various trade associations and representatives from agencies with knowledge of the vaping industry. This included following up with certain stakeholders post-survey where there were remaining evidence gaps or where further clarification was required.</p>

¹⁷⁵ DHSC (2024), Creating a smokefree generation and tackling youth vaping: 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>

Annex B: Theory of Change

