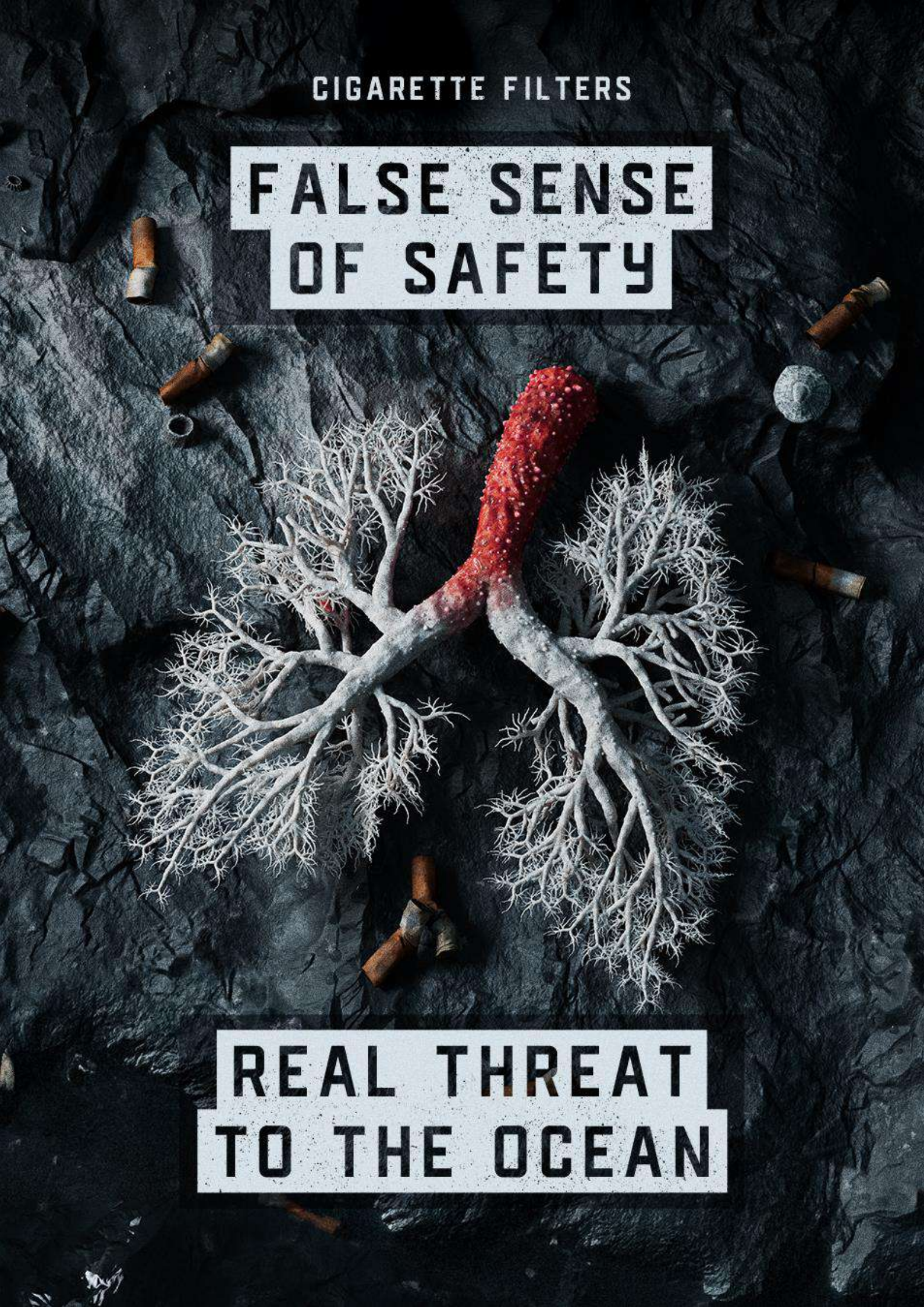

CIGARETTE FILTERS
FALSE SENSE OF SAFETY
REAL THREAT TO THE OCEAN

SURFRIDER FOUNDATION EUROPE

POSITION PAPER

TOBACCO PRODUCTS RELATED WASTE

WE CALL FOR A BAN OF CIGARETTE FILTERS

WE CALL FOR A BAN OF DISPOSABLE VAPES

WE CAN FOR A BAN OF NICOTINE POUCHES

Every year, plastic waste from tobacco products silently drains nearly 24 billion euros from our societies. The damage to marine ecosystems alone represents more than 19 billion euros in losses, while taxpayers shoulder an additional 4.6 billion euros in waste-management costs[1]. These numbers reveal what has long remained invisible: tobacco consumption is not only a public health crisis but also one of the most expensive and preventable sources of plastic pollution in Europe.

The health impacts of tobacco use are well-documented. However, there is growing concern about the environmental and additional health impacts linked to the pollution generated by tobacco- and nicotine-related products.

In recent years, new forms of pollution have emerged, particularly from disposable vapes and nicotine pouches, adding to the long-standing issue of cigarette butt litter. This paper highlights the need for the EU to address these specific waste sources by banning certain items, while acknowledging that other forms of tobacco-related pollution also exist [2] [3].

We fully recognize the health implications of tobacco and nicotine consumption and stand in support of organizations leading efforts on public health and tobacco control. Our contribution focuses on the environmental dimension of this issue, which remains largely overlooked in current policy discussions.

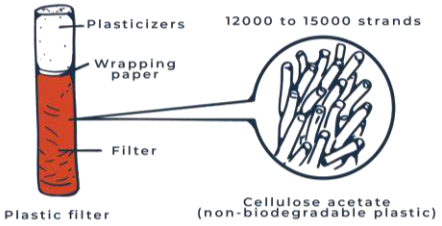
A SYSTEMIC WASTE PROBLEM: THE ENVIRONMENTAL COST OF TOBACCO PRODUCTS

Cigarette butts: a historic and persistent source of plastic and chemical pollution

Classified as single-use plastic items, cigarette butts remain **the most littered item worldwide**. Around **1.2 million tonnes** of cigarette butts have already been discarded into the environment, a figure that was expected to rise by **50% by 2025**[4]. On European beaches, cigarette filters account for **17% of all plastic items** and **21% of single-use plastics** collected[5].

This source of pollution is also **a growing concern for citizens**. Those numbers were highlighted during our citizen science projects and mobilisation on the issue: **over 223,773 cigarette butts** were collected during 44 cleanup events organized across 7 countries, bringing together **782 participants** united against this pollution and calling for urgent actions to tackle this toxic plastic waste.

A dual source of plastic and chemical pollution



Most plastic filters (97%) are made from **cellulose acetate (a non-biodegradable plastic)** wrapping paper and plasticizers. One filter alone is made up of 12,000 to 15, 000 strands of cellulose acetate[6]. They also contain residual tobacco and ash.

Once smoked, cigarette filters, and then butts absorb **thousands of toxic chemicals** including nicotine, polycyclic aromatic hydrocarbons, nitrosamines and heavy metals[7]. In total, nearly **7,000 chemical substances can be released from a single butt, including over 40 known mutagens and carcinogens.**

These substances can leach into the aquatic environment[8], contributing to water pollution and causing toxic effects on species[9] . For example, just one cigarette butt can contaminate up to 1,000 litres of water with nicotine at levels that are chronically toxic to biota[10].

Cigarette butts leach pollutants into soil, surface water, and groundwater as they age and break down, exposing wildlife to a wide range of contaminants - some of which may **bioaccumulate in foodchains[11].** Research has shown that cigarette butts can affect the growth, behaviour, reproduction, and have an impact on the survival of various organisms[12]. They are also a **significant source of microplastic pollution**. As they photodegrade, cigarette filters break apart into microplastics and nanoplastics. Each filter contains around 15,000 cellulose acetate fibres and can shed up to 100 microplastic fibres per day into aquaticenvironments[13].

Cigarette butts thus represent a source of plastic, microplastic, and chemical pollution, with long-lasting and irreversible impacts on the environment.

Emerging sources of pollution: nicotine pouches and disposable vapes

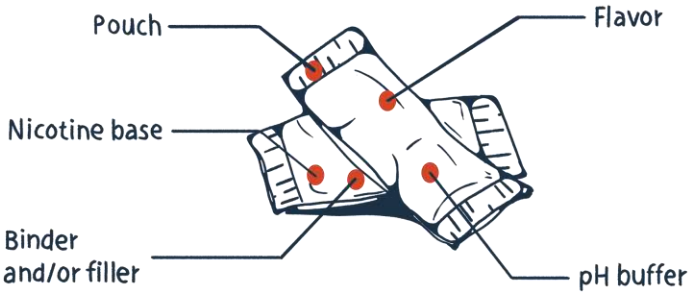
As Surfrider works with volunteers on the ground in many EU countries, we are also witnessing the rise of ***emerging sources of tobacco/nicotine-related sources of pollution*** *- mainly* ***single use plastic vapes and nicotine pouches****..*

Nicotine pouches: composition, use and environmental impacts

Nicotine pouches are **oral, tobacco-free, single-use products** placed between the gum and the upper lip, where nicotine is absorbed through the oral mucosa. Introduced on the European market in 2018[14], they are marketed as alternatives to cigarettes or as cessation tools, but are increasingly used recreationally, particularly by young people.

Although they contain no tobacco, those permeable pouches are made of plant-based **cellulose fibres impregnated with nicotine[15]** and additives such as flavourings, sweeteners and stabilisers[16]. According to research commissioned by the Danish Environmental Protection Agency[17], those pouches are made from **regenerated cellulose - a semi-synthetic material whose industrial processing reduces biodegradability, increases environmental persistence and creates a risk of fragmentation into microplastics**. Thus, although cellulose is a naturally occurring material and theoretically biodegradable, its transformation into semi-synthetic fibres alters this capacity. As such**, nicotine pouches behave more like plastic** than natural fibres once released into the environment.

Nicotine pouches are **non-recyclable, non-biodegradable, single-use products** destined for landfill or incineration. When littered, they contribute to plastic pollution in the same way as cigarette butts. Early evidence from Denmark illustrates the scale of the issue: **an estimated 5.3 million nicotine pouches are discarded into nature every year**, representing over three tonnes of waste, including around half a tonne of plastic-like material.



Furthermore, used pouches may still contain **significant amounts of nicotine[18]** as nicotine content depends on the brand and can range from 1.5 mg to 20 mg per pouch.

Thus, in addition to plastic pollution**, used pouches remain a source of chemical contamination**. Nicotine is a toxic and addictive substance classified under EU chemicals legislation as toxic if swallowed, very toxic by inhalation or skin contact, **and toxic to aquatic life with long-lasting effects[19]**. It is also qualified by the European Chemicals Agency (ECHA) as toxic to aquatic organisms with chronic effects, with a no observed adverse effect level (NOEC)[20] of 3 mg/L in fish and a Lowest Observed Effect Concentration (LOEC) of 0.02 mg/L in daphnia (small crustaceans)[21].

Beyond the immediate danger associated with potential ingestion by living beings, the dispersion of nicotine in the environment poses a broader ecological problem. Scientific evidence shows that **nicotine can affect aquatic organisms at very low concentrations[22]**, disrupting survival, growth and reproduction[23] across multiple trophic levels. This can compromise, in a short time, the balance of aquatic ecosystems[24]. Continuous release into soil and water therefore poses a risk of chronic ecological exposure.

Chemical analyses of commercial nicotine pouches also raise further concerns. **Studies have shown that nicotine content is sometimes underestimated on packaging[25] and that other harmful substances may be present, including formaldehyde[26], chromium and tobacco-specific nitrosamines[27].**

Disposable vapes: composition, use, and environmental impacts

Disposable vapes are **single use vaping devices that are sold precharged and prefilled** with liquid solution. Most e-cigarettes share similar components: a heating element (an atomizer), which converts a solution into a vapour without combustion, a power source and a e-liquid cartridge.[28] The liquid solution or e-liquid is generally made of propylene glycol and/or vegetable glycerine, water, nicotine, flavours and colourants with variations in nicotine concentration[29]. These single use devices are **discarded after a few days of use, once the limited number of puffs available had been consumed**. Disposable vapes are particularly popular among young people because they are affordable and exempt from flavour restrictions.[30]

Disposable vapes **combine three major pollution streams in a single product**. Each device contains plastic casings and pods, which are typically single use and not recyclable; electronic components, including circuit boards and lithium-ion batteries; and hazardous chemical waste, since any cartridge that has held nicotine is classified as dangerous waste and cannot enter regular recycling streams[31].

When e-cigarettes are thrown away, **these contents can leak into the surrounding environment.** Chemical and materials analyses of discarded devices detect toxic metals (lead, mercury, cadmium), brominated flame retardants and nicotine residues, indicating that spent vapes **may qualify as hazardous waste[32]**. Moreover, in the UK, where research was carried out, **5 million units are thrown away each week - equivalent to several thousand vehicle batteries' worth of lithium each year[33].**

Ecotoxicological research on e-cigarette waste has already **demonstrated harmful effects across a range of organisms,** including frogs, fish, microbes and sea urchins[34], pointing to toxicity across multiple trophic levels. These findings indicate that chemicals released from discarded vapes can disrupt aquatic ecosystems[35].

Taken together, the evidence shows disposable vapes are not a small or theoretical problem: they are a **fast-growing source of plastic, e-waste and toxic contamination** that current waste systems are not equipped to manage.

Pathways into the environment and limits of current waste management systems

An estimated **4.5 trillion cigarette butts[36] are discarded into the environment every year** - on the streets, beaches, parks, sidewalks, ...

Once thrown on the ground, cigarette butts can be carried by wind or rain into sewers or storm drains. From there, they either **flow directly into waterways or reach wastewater treatment plants** (depending on the type of sewer system). In any case, however, these facilities are not designed to capture plastic microfibers or toxic chemicals from cigarette butts. In areas with combined sewer systems, heavy rainfall can overwhelm the system and cause overflows which means that untreated water carrying cigarette butts (and other waste) is discharged straight into rivers or the sea.

Even when cigarette butts reach treatment plants, microplastics from cellulose acetate filters can pass through the effluents into aquatic environments or end up in sewage sludge that is later applied to fields - which spread the pollution even further.

Due to their small size and semi-synthetic composition, **nicotine pouches** follow the same environmental pathways as cigarette butts: they are **easily dispersed by wind and rain**, escape waste management systems, and release microplastics and chemicals into soils and waterways.

As their use expands, so does their environmental footprint. Recent surveys in Sweden show that snus and nicotine pouches have become the second most common form of urban litter, with tobacco-free pouches now accounting for most of these items. This trend is particularly concerning as cigarette-butt litter declines, indicating a direct substitution rather than an overall reduction in tobacco-related waste[37].

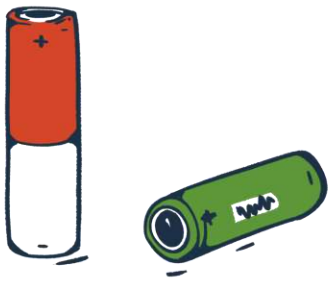
Beyond littering, nicotine pouches also place **growing pressure on wastewater systems**. In Sweden, wastewater treatment operators report an **increasing number of pouches being flushed down toilets**. These products do not biodegrade and can **interfere with treatment processes**, while releasing nicotine and microplastic-like fibres into aquatic environments. Surveys estimate that **around one million kilograms of pouches are discarded this way each year[38],** contributing to chemical contamination and microplastic pollution in urban water bodies. The Swedish experience, combined with rapidly rising pouch use across Europe, highlights a clear and growing risk to wastewater infrastructure and the environment. Without targeted regulation, nicotine pouches are set to become a persistent and costly source of plastic and chemical pollution.

Nicotine residues and other chemicals of concern in used pouches also complicate waste management. Nicotine pouches are sold in **rigid plastic containers**, usually made of polypropylene, which often include a compartment for storing used pouches when no bin is available. Although this packaging is theoretically recyclable and commonly marketed as such, **used pouches are frequently discarded inside the containers**. This practice **contaminates household recycling streams** and prevents plastic packaging from being effectively recycled[39].

Disposable vapes combine the drawbacks of single-use plastic with electronic waste. Their design is inherently flawed: they integrate batteries, electronics, and plastics into items intended to be discarded after short-term use. Disposable vapes are thus **both e-waste and hazardous waste** and, in the absence of dedicated disposal systems they are routinely littered or landfilled, creating avoidable environmental and safety risks[40].

In addition, **waste operators across Europe increasingly report that they cannot safely or efficiently handle these devices.** Fires caused by discarded lithium-ion batteries, including those from disposable vapes, have become a **serious hazard in collection trucks, sorting centres and recycling facilities[41].**

Thus, while littering is the most visible pathway by which tobacco products pollute the environment, it is not the only one, nor the most decisive. Even if cigarette butts and other tobacco-related waste were systematically collected, current waste management systems are not designed to safely or effectively treat this pollution. The **Extended Producer Responsibility obligations** introduced by the Single-Use Plastics Directive are an important step forward, as they begin to apply the polluter-pays principle to tobacco products. However, **these schemes remain unevenly implemented across Member States, with remaining unaddressed governance issues** within certain Producer Responsibility Organizations. Plus, they are structurally ill-suited to a product that combines plastic, toxic chemicals and, in some cases, hazardous waste. Cigarette filters cannot be recycled in practice, and their treatment either leads to landfill, incineration, or the continued release of microplastics and toxic substances into the environment. **As a result, EPR mainly shifts costs rather than preventing pollution at source.**[42]



LEGISLATIVE CONTEXT: A FRAMEWORK UNDER DEVELOPMENT, BUT INSUFFICIENT AS IT STANDS

International level

The **WHO Framework Convention on Tobacco Control** (FCTC)[43] already provides a useful legal basis for integrating environmental considerations. **Article 18** requires Parties to "have due regard to the protection of the environment and the health of persons" in relation to tobacco growing and manufacturing.

In recent years, the Conference of the Parties (COP) has strengthened this environmental dimension. At COP10 (2024), Parties adopted a decision explicitly recognising that **plastic cigarette filters are "unnecessary, avoidable and problematic"**[44], and calling attention to the environmental impacts associated with tobacco products and related electronic devices - including filters, batteries, cartridges and metals. This decision gives Parties a clear political mandate to take stronger national measures.

At COP11, this **momentum was consolidated**. With **active support from the European Union**[45], Parties reaffirmed the need to address the environmental harms of tobacco and nicotine products as part of comprehensive tobacco control, further strengthening the political basis for ambitious regional and national measures[46].

This direction is further supported by joint initiatives such as the **UNEP-WHO FCTC partnership**[47], which aims to raise awareness and drive action on the environmental and health impacts of plastic cigarette filters. These initiatives help translate political recognition into more operational tools (public awareness, data, guidance).

Several non-EU countries have also already demonstrated that ambitious measures are both **feasible and politically defensible**. Australia has moved to prohibit disposable vapes through import and sales bans[48], and Santa Cruz County (California, USA) has adopted a ban on the sale of filtered cigarettes, entering into force in 2027[49]. These examples show that **product-specific bans are implementable** when justified by environmental and health concerns.

EU level

The European Union has several pieces of legislation that touch on tobacco-related waste, but **none of them fully address** the environmental and health impacts of cigarette filters, disposable vapes or nicotine pouches. **Existing laws offer useful entry points for stronger, product-specific measures.**

The Zero Pollution Action Plan[50] sets **2030 objectives to reduce** plastic litter at sea by 50 percent and microplastics entering the environment by 30 percent. Tobacco-related litter is directly relevant to these objectives, yet no EU measure specifically targets this source of microplastic pollution.

The Single Use Plastics Directive (SUPD)[51] explicitly includes tobacco filters containing plastic. It introduces: marking requirements, consumption reduction obligations, Extended Producer Responsibility (clean-up, transport, treatment), and harmonised reporting formats.

The SUPD remains the only EU law directly targeting tobacco-related waste. It does not cover emerging products such as disposable vapes or nicotine pouches, and implementation varies across Member States.

The Tobacco Products Directive (TPD)[52] regulates product composition, labelling, packaging and market placement of tobacco and nicotine products, including e-cigarettes.

However:

- It does not address end-of-life impacts
- It does not establish EPR or waste-management obligations
- It does not cover the environmental impacts of filters, plastics or chemicals

Several Member States have nevertheless used national powers linked to the TPD framework to restrict or ban disposable vapes on public-health grounds. *See below on Member States legislation.*

Council Recommendation on smoke-and aerosol-free environments[53] replacing Council Recommendation 2009/C 296/02, is a **non-binding Recommendation** which encourages Member States to restrict the use of tobacco and nicotine products in public spaces. It is health-focused but offers an additional policy basis for restricting the use of single-use nicotine items.

Water Framework Directive (WFD)[54] **and related legislation**: Cigarette butts and components of disposable vapes release microplastics, nicotine, metals and other toxic substances that enter sewers and waterways.

Relevant developments include:

- Ongoing work on microplastic monitoring for drinking water
- The REACH restriction on intentionally added microplastics[55]
- Reviews of the WFD and UWWTD[56] that may strengthen requirements on micropollutants and microplastics

These initiatives do not address diffuse pollution from tobacco-related products, and public water operators currently bear most of the associated costs.

Under the **Waste Electrical and Electronic Equipment (WEEE) Directive**[57], disposable vapes are not adequately addressed. This regulatory gap was explicitly acknowledged in the Commission's evaluation conclusions published in July 2025[58].

Overall assessment

Despite several relevant legislative instruments, the **EU still lacks a coherent framework** to prevent or manage pollution from tobacco-related products. Filters, disposable vapes, and nicotine pouches continue to release plastics and toxic substances into the environment with no comprehensive EU response. **This regulatory gap, combined with ongoing EU work on plastics and microplastics, provides a credible basis for stronger measures, including restrictions or bans on unnecessary and polluting products**.

Member States level

Across the EU, several **Member States are beginning to take stronger action** on tobacco and nicotine products-related pollution. These developments are encouraging but still **insufficient and uneven**, highlighting the need for coordinated EU-level measures.

On cigarette filters

At Member State level, **momentum is slowly emerging**, although action remains fragmented. Some governments have begun **openly questioning** the legitimacy of cigarette filters: in Belgium, the national health council has recommended a full ban, arguing that filters provide no proven health benefit and generate significant environmental harm[59]. Similar discussions have taken shape in the Netherlands, where the former State Secretary for the Environment sought to place a ban on single-use cigarette filters on the agenda of the upcoming SUPD revision[60]. In Portugal, political commitments toward a "tobacco-free generation" by 2040 include growing interest in addressing tobacco-related waste[61]. These developments demonstrate that **filter bans and stricter measures are already considered feasible by several Member States.**

On disposable vapes

On disposable vapes, **national action is accelerating across the EU**, driven by converging concerns over youth addiction, chemical risks and mounting waste from lithium batteries, plastics and metals. **Several countries have already adopted full bans on disposable vapes**, including Belgium[62], France[63] and Spain[64], while others, such as Germany[65] and Ireland[66], have advanced political debates or formal government proposals to prohibit them. Austria has announced its intention to withdraw these products from the market on both health and environmental grounds[67], and similar discussions are underway in Poland[68] and Slovakia[69], where forthcoming legislation is expected. Even in countries that have not yet moved toward a ban, such as Latvia, restrictions on flavours or sales illustrate growing discomfort with the environmental footprint of these products[70]. Taken together, **these developments show a clear and expanding policy shift at national level**, strengthening the case for harmonised EU action to address the environmental and health impacts of disposable vapes.

On nicotine pouches

On nicotine pouches, the **regulatory landscape is rapidly tightening across the EU**, reflecting concerns about youth uptake, high nicotine concentrations and growing waste streams from single-use packaging. **Several countries have moved towards outright prohibitions**, including Belgium[71] and the Netherlands[72], while France is in the process of adopting legislation that will ban the production, import and distribution of oral nicotine products from 2026[73]. Other Member States are taking restrictive approaches through classification or strict market controls, as seen in Cyprus, where pouches are treated as medicinal products requiring market authorisation[74], or in Luxemburg[75] and Lithuania[76], which allow sales but impose limits on age; advertising, dosage or labelling. Political signals in countries like Poland[77] also indicate momentum toward bans or stronger regulations. This **fragmented but increasingly restrictive trend highlights both the environmental and public health concerns** related to nicotine pouches and the **need for a coherent EU-level response** to prevent regulatory loopholes and cross-border availability.

Faced with declining cigarette sales, the tobacco industry has preserved multi-billion-euro revenues[78] through the rapid rollout of new nicotine products, including nicotine pouches and disposable vapes. Yet pollution prevention and end-of-life responsibility remain largely absent from these business strategies.

SOLUTIONS TO ADDRESS TOBACCO PRODUCTS RELATED POLLUTION

CIGARETTE FILTERS

We call for a ban of cigarette filters

Plastic cigarette filters were never designed to protect human health. Initially, plastic filters were introduced to keep tobacco flakes from entering the smoker's mouth. In the 1950's, as the scientific community established a causal link between smoking tobacco and lung cancer[79], the tobacco industry responded by introducing cellulose acetate cigarette filters[80] to reassure consumers.

Since then, cigarette companies have marketed filters as a mean to reduce health risks for smokers and actively promoted this idea despite knowing their ineffectiveness[81].

In reality, **filters make cigarettes taste smoother and milder, which facilitates smoking initiation[82] and deepens nicotine dependence**. To satisfy nicotine needs, smokers adopt a compensatory behaviour when using filtered cigarettes, by taking more frequent and deeper puffs[83]. Filter ventilation also alters cigarette combustion and contributes to the formation of carcinogenic tobacco-specific nitrosamines associated with higher risks of peripheral lung adenocarcinoma[84].

In short, cigarette filters offer no human health benefit and pose a real threat to living organisms and ecosystem health.

Current solutions are ineffective or misleading

The **only effective solution is removing filters altogether.** Filters, regardless of the material they are made from, generate waste and do not make smoking safer.

In recent years, the tobacco industry has promoted **so-called biodegradable** filters as part of its broader strategy to portray itself as environmentally responsible. Yet these products do nothing to address the underlying pollution problem. Biodegradable filters **still leach toxic chemicals when discarded[85] and do not break down in real environmental conditions**. Their marketing may even encourage littering by creating the false impression that they are harmless.

Recycling is often presented as a simple solution to cut plastic pollution, but the reality is far more complex. Studies show that **around 76% of cigarette butts smoked in public spaces are littered**[86], and there is no evidence that providing recycling options would significantly change this behaviour. Recycling would therefore do little to prevent cigarette butts from remaining the most littered item in the world, and a major source of toxic chemicals and microplastics in soil and water.

Even if recycling systems were expanded, they would not be able to cope with the massive volume of waste generated.

While technically possible, cigarette butt recycling faces so many limitations that it cannot be considered efficient or effective:

- It is **complex** (different types of recycling possible) and resource-intensive (materials, energy, water, …).
- The **toxicity of the recycling leachate** depends on the type and condition of the cigarette butt (behavioral factors of smokers, environmental and climatic conditions, durability of the filter in the environment)[87].
- It **does not reduce the burden on local waste systems**, which continue to bear the financial and operational costs for collection and recycling, largely funded by taxpayers.
- Existing **recycling capacity is nowhere near sufficient** to deal with the scale of the problem.
- So-called **repurposing** of cigarette butts (e.g. turning filters into insulation or clothing) **risks spreading toxic substances even further**.

There is no viable pathway to incorporate cigarette butts into a closed-loop system.
Incineration remains the only end-of-life option available, yet it is environmentally harmful and does not address the root of the problem.

CONCLUSION

Attempts to adjust smoker behaviour, clean up litter or recycle filters are costly, insufficient and ultimately ineffective. Cigarette butts are consistently recognised as hazardous waste under European measures[88] and remain one of the most widespread and harmful forms of plastic pollution globally.

A ban on cigarette filters is therefore the most proportionate, health-protective and environmentally sound solution.

DISPOSABLE VAPES

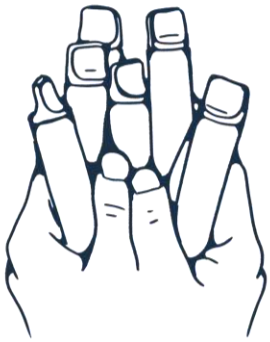
We call for a ban of disposable vapes

From a resource-efficiency and EU strategic-autonomy perspective, disposable vapes are particularly problematic. Research from the University of Oxford and UCL shows that the lithium-ion batteries in disposable vapes, although discarded after a single use, **remain capable of performing at high capacity for hundreds of cycles**[89]. This demonstrates a **significant waste of critical raw materials**[90] and highlights how irrational it is to use resources that are strategically important for the EU for items intentionally designed to be thrown away. Industry has so far provided no credible evidence that the single-use format provides added value that would justify such disproportionate resource consumption and the associated environmental and infrastructural impacts.

In addition, in many countries, insurers have started to refuse coverage or sharply increase premiums for waste-management companies due to the rising battery-fire risk[91]. This trend is destabilizing the sector and increasing operating costs for companies responsible for collection and treatment. The difficulty of safely handling disposable vapes has therefore become not only an environmental issue but also a growing financial and insurance problem for the entire waste chain[92].

Current solutions remain ineffective ormisleading

Some models are now sold as being refillable, or with higher numbers of puffs (e.g. 9 000 over the average of 600-900). However, those models **still end up as waste** once the internal battery or cartridge is depleted.



Claims that voluntary recycling initiatives will solve the issue are not supported by real-world evidence. Waste-management operators and insurers report that current systems are unable to cope with the volume and design of these devices. Fires, contamination risks, and the lack of economically viable recycling routes show that disposable vapes cannot be integrated into existing systems without causing damage and unsustainable costs.

Conclusion

In practice, disposable vapes undermine waste-management safety, increase financial burdens on operators and municipalities, and contribute to pollution from plastics, lithium residues, and hazardous chemicals. All of this occurs for a product with no demonstrated societal benefit that could justify its single-use design.

NICOTINE POUCHES

We call for a ban of nicotine pouches

Nicotine pouches are a rapidly expanding segment of the nicotine market, aggressively marketed across the EU, especially towards young people. Tobacco control NGOs, public health institutes and addiction specialists have repeatedly warned that these products create a new pathway to nicotine dependence without offering any health benefits[93]. **As an emerging product category, the EU still has a window of opportunity to regulate before the market becomes fully established**.

Current solutions remain ineffective or misleading

Whether made from conventional plastics, biobased materials, or marketed as biodegradable, nicotine **pouches break down into microplastics and release nicotine, flavourings, and other chemicals into aquatic environments**. Nicotine is highly toxic to aquatic organisms even at low concentrations. Policymakers must remain vigilant about material substitution: **biodegradable plastics rarely degrade in natural environments**, and toxic chemicals released by used pouches remain unchanged.

Conclusion

A ban on nicotine pouches would prevent a new wave of pollution, reduce pressure on waste operators and wastewater-treatment facilities, and save costs for municipalities and taxpayers. Acting now - before the market becomes entrenched - would limit both environmental contamination and public health risks.

Surfrider Foundation Europe gratefully acknowledges financial assistance from the European Union. The sole responsibility for the content of this publication lies with Surfrider Foundation Europe. It does not necessarily reflect the opinion of the funder mentioned above. The funder cannot be held responsible for any use that may be made of the information contained therein.

REFERENCES

[1] Sy DK; Tobacco industry accountability for marine pollution: country and global estimates *Tobacco Control* 2024;33:e1-e4.

[2]WHO Report, (2021) Tobacco poisoning our planet, https://iris.who.int/server/api/core/bitstreams/531014bb-58f7-4bd1-bbd8-0aefc07a44c5/content

[3] https://www.surfrider.eu/wp-content/uploads/2025/02/Surfrider info tabac.pdf

[4] Beutel M. W., Harmon T. C., Novotny T. E., Mock J., Gilmore M. E., Hart S. C., et al. (2021). A review of environmental pollution from the use and disposal of cigarettes and electronic cigarettes: contaminants, sources, and impacts. Sustainability 13 (23), 12994. doi: 10.3390/su132312994

[5] European Commission . Assessment of measures to reduce marine litter from single use plastics: final report and annex. Brussels: Directorate-General for Environment, European Commission; (2018). Available at: https://data.europa.eu/doi/10.2779/500175

[6] Belzagui F, Buscio V, Gutierrez-Bouzan C, et al. (2021). Cigarette butts as a microfiber source with a microplastic level of concern. Sci Total Environ 2021;762:144165.

[7] Beutel M. W., Harmon T. C., Novotny T. E., Mock J., Gilmore M. E., Hart S. C., et al. (2021). A review of environmental pollution from the use and disposal of cigarettes and electronic cigarettes: contaminants, sources, and impacts. Sustainability 13 (23), 12994. doi: 10.3390/su132312994

[8] Soleimani F., Dobaradaran S., De-la-Torre G. E., Schmidt T. C., Saeedi R. (2022a). Content of toxic components of cigarette, cigarette smoke vs cigarette butts: A comprehensive systematic review. Sci. Total Environ. 813, 152667. doi: 10.1016/j.scitotenv.2021.152667

[9] Green DS , Kregting L , Boots B . (2021) Effects of cigarette butts on marine keystone species (ulva lactuca L. and mytilus edulis L.) and sediment microphytobenthos. Mar Pollut Bull 2021 ;165:112152. doi:10.1016/j.marpolbul.2021.112152

[10] Green, Amy & Putschew, Anke & Nehls, Thomas. (2014). Littered cigarette butts as a source of nicotine in urban waters. Journal of Hydrology. 519. 10.1016/j.jhydrol.2014.05.046.

[11] Wei, H.-H. (2018). Determination of Organic Compounds in Smoked Cigarette Leachate and the Bioaccumulation Potentials in the Marine Mussel, Mytilus galloprovincialis. Master's Thesis, San Diego State University, San Diego, CA, USA.

[12] Green D. S., Tongue A. D. W., Boots B. (2022). The ecological impacts of discarded cigarette butts. Trends Ecol. Evol. 37 (2), 183-1925. doi: 10.1016/j.tree.2021.10.001

[13] Belzagui F, Buscio V, Gutierrez-Bouzan C, et al. (2021). Cigarette butts as a microfiber source with a microplastic level of concern. Sci Total Environ 2021 ;762:144165.

[14] Nadja Mallock, Thomas Schulz, Sebastian Malke, Nadine Dreiack, Peter Laux et Andreas Luch, « Levels of nicotine and tobacco-specific nitrosamines in oral nicotine pouches », *Tobacco Control*, vol. 33, nº 2, 2024, p. 193-200 (ISSN 0964-4563, e-ISSN 1468-3318, DOI 10.1136/tc-2022-057280

[15] Anses. 2023. Produits du tabac, produits connexes et aromes. Bilan des cas rapportes aux centres antipoison du 1er janvier 2017 au 31 decembre 2022. Autosaisine 2023- AUTO-0121.

[16] Al-Otaibi HM, Althobiani MA. Nicotine pouches: a narrative review of the existing literature. Front Public Health. 2025 Aug 26;13:1641308. doi: 10.3389/fpubh.2025.1641308. PMID: 40933411; PMCID: PMC12417499.

[17] Millioner af nikotinposer smides i naturen, Danish Environmental Protection Agency, April 2024 Nikotinposer - indhold og milj0konsekvenser

[18] Millioner af nikotinposer smides i naturen, Danish Environmental Protection Agency, April 2024 Nikotinposer - indhold og milj0konsekvenser

[19] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures

[20] The Predicted No-Effect Concentration (PNEC) value is the concentration of a substance below which adverse effects in the environment are not expected to occur.

[21] https://echa.europa.eu/brief-profile/-/briefprofile/100.000.177

[22] https://www.generationsanstabac.org/en/actualites/sachets-de-nicotine-une-nouvelle-source-de-pollution-plastique/

[23] Vlasceanu, A.M.; Baconi, D.L.; Olaru, O.T.; Gradinaru, D.; Nitescu, V.G. (2024) Assessment of the Bioaccumulation of Nicotine and Cotinine by the Crustacean Daphnia magna. J. Mind Med. Sci. 2024, 11,459-465. https://doi.org/10.22543/2392-7674.1540

[24] Oropesa, Ana-Lourdes & Floro, Antonio & Palma, Patricia. (2017). Toxic potential of the emerging contaminant nicotine to the aquatic ecosystem. Environmental Science and Pollution Research. 24. 16605-16616. 10.1007/s11356-017-9084-4

[25] Mallock N, Schulz T, Malke S, *et al.* (2024) Levels of nicotine and tobacco-specific nitrosamines in oral nicotine pouches *Tobacco Control* 2024;**33:**193-199

[26] Al-Otaibi HM, Althobiani MA. Nicotine pouches: a narrative review of the existing literature. Front Public Health. 2025 Aug 26;13:1641308. doi: 10.3389/fpubh.2025.1641308. PMID: 40933411; PMCID: PMC12417499.

[27] Mallock et al., 2024 (op cit).

[28] Andrew Turner, John W. Scott, Thomas Backshall-Kennedy, Maya C. Dabrowski, (2024) Deconstructing contemporary disposable vapes: A material and elemental analysis,Science of The Total Environment,Volume 954,2024,

[29] Buonocore F, Marques Gomes ACN, Nabhani-Gebara S, Barton SJ, Calabrese G. Labelling of electronic cigarettes: regulations and current practice. Tob Control. 2017 Jan;26(1):46-52. doi: 10.1136/tobaccocontrol-2015-052683. Epub 2016 Jan 20. PMID: 26790924; PMCID: PMC5256311 .

[30] Beutel, M.W.; Harmon, T.C.; Novotny, T.E.; Mock, J.; Gilmore, M.E.; Hart, S.C.; Traina, S.; Duttagupta, S.; Brooks, A.; Jerde, C.L.; et al.(2021). A Review of Environmental Pollution from the Use and Disposal of Cigarettes and Electronic Cigarettes: Contaminants, Sources, and Impacts. Sustainability 2021, 13, 12994. https://doi.org/10.3390/su132312994

[31] Pourchez, J.;Mercie, C.;Forest,V.; From smoking to vaping: a new environmental threat?, The Lancet 2023, Respiratory Medicine, Volume 10, Issue 7, e63 - e64

[32] Andrew Turner, John W. Scott, Thomas Backshall-Kennedy, Maya C. Dabrowski,Deconstructing contemporary disposable vapes: A material and elemental analysis, Science of The Total Environment,Volume 954,024,176292,ISSN 0048-9697,https://doi.org/10.1016/j.scitotenv.2024.176292.

[33] https://www.theguardian.com/society/2024/dec/16/more-than-a-million-vapes-a-day-in-uk-thrown-away-says-research?utm source=chatgpt.com

[34] Bas Boots, Dannielle S. Green, Amy C.M. Wright, Brigitta Olah-Kovacs, Louise Tovey,Ecotoxicological effects of leachate from e-cigarettes and e-liquid on the performance of perennial ryegrass (Lolium perenne),Environmental Pollution,Volume 348,2024,123888,ISSN 02697491 ,https://doi.org/10.1016/j.envpol.2024.123888.

[35] Dannielle Senga Green, Bas Boots, Brigitta Olah-Kovacs, Daniela Palma-Diogo, Disposable e-cigarettes and cigarette butts alter the physiology of an aquatic plant Lemna minor (Lemnaceae), Science of The Total Environment,Volume 892,2023,164457,ISSN 0048-9697,https://doi.org/10.1016/j.scitotenv.2023.164457.

[36] https://fctc.who.int/newsroom/spotlight/environment/4.5-trillion-cigarette-butts-are-equal-to-1.69-billion-pounds-of-toxic-trash#

[37] https://nordicwelfare.org/popnad/en/artiklar/from-cigarette-butts-to-snus-shifting-trends-in-urban-litter/

[38] https://www.sverigesradio.se/artikel/6565043

[39] Millioner af nikotinposer smides i naturen, Danish Environmental Protection Agency, April 2024 Nikotinposer - indhold og milj0konsekvenser

[40] Andrew Turner, John W. Scott, Thomas Backshall-Kennedy, Maya C. Dabrowski,Deconstructing contemporary disposable vapes: A material and elemental analysis, Science of The Total Environment, Volume 954,2024,176292,

[41] https://expra.eu/2025/05/20/ioint-call-for-eu-action-to-protect-waste-management-from-surging-lithium-battery-fires/

[42] https://rethinkplasticalliance.eu/wp-content/uploads/2024/02/SUPD-implementation-assessment-report EPR-Tobacco Surfrider-Europe RPA 20240205 Designe FINAL ppt.pdf

[43] https://treaties.un.org/doc/source/RecentTexts/FCTC en.pdf
[44] https://ash.org/wp-content/uploads/2024/02/FCTC-COP10-14-en-Art-18.pdf
[45] https://www.smokefreepartnership.eu/news/press-release-les-r%C3%A9sultats-de-la-cop11-renforcent-le-mandat-europ%C3%A9en-pour-une-r%C3%A9glementation-ambitieuse-du-tabac
[46] https://fctc.who.int/newsroom/news/item/22-11-2025-global-tobacco-control-conference-concludes-with-decisions-on-environment-liability
[47] https://www.unep.org/technical-highlight/unep-secretariat-who-fctc-partner-combat-microplastics-cigarettes#:~:text=Every%20year%2C%20the%20tobacco%20industry,UNEP's%20Chief%20of%20Public%20Advocacy.
[48] https://www.tga.gov.au/products/unapproved-therapeutic-goods/therapeutic-vaping-goods/vaping-hub/changes-regulation-vapes
[49] https://www.cbsnews.com/sanfrancisco/news/santa-cruz-county-california-filtered-cigarette-ban-2027/
[50] https://environment.ec.europa.eu/strategy/zero-pollution-action-plan en?
[51] European Commission. Single-Use Plastic Directive. Available at: https://environment.ec.europa.eu/topics/plastics/single-use-plastics en
[52] https://health.ec.europa.eu/document/download/c4aa6f75-7e52-463b-badb-cbb6181b87c3 en?filename=dir 201440 en.pdf

[53] https://data.consilium.europa.eu/doc/document/ST-15059-2024-INIT/en/pdf
[54] https://eur-lex.europa.eu/eli/dir/2000/60/oj
[55] https://eur-lex.europa.eu/eli/reg/2023/2055/oj
[56] https://eur-lex.europa.eu/eli/dir/2024/3019/oj
[57] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02012L0019-20240408
[58] https://environment.ec.europa.eu/publications/final-report-study-supporting-evaluation-directive-201219eu-waste-electrical-and-electronic en
[59] https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth theme file/20230511 css 9726 filtres a cigarette vweb.pdf
[60] https://www.riiksoverheid.nl/documenten/kamerstukken/2023/04/19/beleidsopties-ter-reductie-van-sigarettenfilters-in-zwerfafval
[61] https://www.gecp.pt/en/geracao-sem-tabaco-ate-2040/
[62] Ban of single use vapes since January 2025. https://etaamb.openiustice.be/fr/arrete-royal-du-03-mai-2024 n2024006807.html
[63] Loi n° 2025-175 du 24/02/2025 : Interdiction de la mise en vente, fabrication, distribution ou offre gratuite des dispositifs electroniques de vapotage pre-remplis non rechargeables (puffs) .https://www.legifrance.gouv.fr/iorf/id/J0RFTEXT000051244550?
[64] https://www.lavanguardia.com/vida/20250909/11042282/gobierno-aprueba-prohibir-venta-vapeadores.html
[65] https://www.zeit.de/politik/deutschland/2025-11/e-zigaretten-vapes-verbot-bundestag-gxe
[66] Ban on disposable vapes moves closer as Minister brings draft law to Cabinet https://www.theiournal.ie/vapes-to-be-banned-cabinet-bill-6877762-Nov2025/
[67] https://www.derstandard.at/story/3000000281924/staatssekretaerin-koenigsberger-ludwig-elektronische-einwegzigaretten-sind-ein-gesundheits-und-umweltproblem
[68] https://tvpworld.com/76554096/polish-health-ministry-preparing-bill-to-ban-disposable-e-cigarettes
[69] https://eadaily.com/ru/news/2025/06/13/eshche-odna-strana-v-es-planiruet-zapretit-odnorazovye-elektronnye-sigarety
[70] https://www.euronews.com/health/2024/12/31/tobacco-sellers-in-latvia-scramble-to-find-loopholes-to-circumvent-new-ban-on-products-and
[71] https://www.brusselstimes.com/1326931/a-year-on-nicotine-pouches-still-available-in-shops-despite-ban
[72] https://zoek.officielebekendmakingen.nl/stb-2024-292.html
[73] Projet de loi : vise a interdire production, import, distribution, detention, etc. des produits nicotiniques a usage oral (sachets, gommes, etc.), en metropole et outre-mer. Entree en vigueur prevue en mars 2026.
[74] Cyprus: oral tobacco and nicotine pouch regulation, December 2024 https://tobaccointelligence.com/cyprus-oral-tobacco-and-nicotine-pouch-regulation-december-2024/

[75] https://www.chd.lu/fr/node/2334 https://technical-regulation-information-system.
[76] https://consideratepouchers.org/fr/la-lituanie-decide-de-reglementer-les-sachets-de-nicotine/
[77] https://tvpworld.com/83384757/poland-plans-to-ban-nicotine-pouches-over-health-risks
[78] https://www.statista.com/statistics/259204/leading-10-tobacco-companies-worldwide-based-on-net-sales/?srsltid=AfmBOoqJ IvugFqT7n4dJ652RUfRrBOnnGcGcNzJUxiNpiVBRVfFxU6L
[79] Cornfield, J, Haenszel, W, Hammond, EC, Lilienfeld, AM, Shimkin, MB, and Wynder, EL. Smoking and lung cancer: recent evidence and a discussion of some questions. J Natl Cancer Inst. (1959) 22:173-203.
[80] Evans-Reeves K, Lauber K, Hiscock R. The 'filter fraud' persists: the tobacco industry is still using filters to suggest lower health risks while destroying the environment. Tobacco Control 2022;31:e80-e82.
[81] Evans-Reeves K, Lauber K, Hiscock R. The 'filter fraud' persists: the tobacco industry is still using filters to suggest lower health risks while destroying the environment. Tobacco Control 2022;31:e80-e82.
[82] L.T. Kozlowski, R.J. Connor, Cigarette filter ventilation is a defective design because of misleading taste, bigger puffs, and blocked vents, Tobacco Control, 2002, 11:i40-i50, doi:10.1136/tc.11 .suppl_1.i40
[83] L.T. Kozlowski, R.J. Connor, Cigarette filter ventilation is a defective design because of misleading taste, bigger puffs, and blocked vents, Tobacco Control, 2002, 11:i40-i50, doi:10.1136/tc.11 .suppl_1.i40
[84] Song MA, Benowitz NL, Berman M, Brasky TM, Cummings KM, Hatsukami DK, et al. Cigarette filter ventilation and its relationship to increasing rates of lung adenocarcinoma. J Natl Cancer Inst. (2017) 109:djx075. doi: 10.1093/jnci/djx075
[85] Green, D.S.; Kregting, L.; Boots, B. Smoked cigarette butt leachate impacts survival and behaviour of freshwater invertebrates. Environ. Pollut. 2020, 266, 115286
[86] Patel V, Thomson GW, Wilson N/ Cigarette butt littering in city streets: a new methodology for studying and results. Tobacco Control 2013;22:59-62.
[87] Hossaini Motlagh, A., Alinejad, N., Kazembeigi, F. *et al.* Quality variations of leachate resulting from cigarette filter recycling as a challenge for its management. *Sci Rep* **14**, 972 (2024). https://doi.org/10.1038/s41598-024-51530-9
[88] Rebischung F, Chabot L, Biaudet H, Pandard P. Cigarette butts: A small but hazardous waste, according to European regulation. Waste Manag 2018;82:9-14. doi:10.1016/j.wasman.2018.09.03
[89] Hamish T. Reid, Arthur Fordham, Lara Rasha, Mark Buckwell, Daniel J.L. Brett, Rhodri Jervis, Paul R. Shearing,Up in smoke: Considerations for lithium-ion batteries in disposable e-cigarettes, Joule,Volume 7, Issue 12,2023,Pages 2749-2759,
[90] Andrew Turner, John W. Scott, Thomas Backshall-Kennedy, Maya C. Dabrowski,Deconstructing contemporary disposable vapes: A material and elemental analysis, Science of The Total Environment,Volume 954,2024,176292,
[91] https://www.batteriesinternational.com/2025/06/06/eu-waste-firms-refused-insurance-over-li-batte ry-fi res-surge/?utm
[92] https://reports.insuranceeurope.eu/annual-report-2024-2025/s/83/battery-fire-risks?
[93] https://ash.org.uk/media-centre/news/blog/the-great-cigarette-filter-fraud