

Fossil Fashion

The hidden reliance of fast fashion on fossil fuels



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| Piles of unsorted waste

| Credit: iStock



Shoppers at Macy's Herald Square
Department Store on Black Friday

Credit: Shutterstock

Executive summary

Today's fashion industry has become synonymous with overconsumption, a snowballing waste crisis, widespread pollution and exploitation of workers in global supply chains - but the industry shows few signs of slowing down. A less-reported issue is the increasing evidence that shows the fashion industry relies heavily on the use of cheap synthetic fibres, especially polyester, to fuel its insatiable fast-fashion business model. This report reveals how dependent the fashion industry's current production model is on fossil-fuel extraction and how this stands in the way of transitioning to a truly circular economy. Without prompt and radical legislative action and a considerable slowdown, fast fashion's quest for cheap clothing will create untenable volumes of waste and toxic microfibres, and emit more carbon than the planet can handle.

Since the early 2000s, fashion production has doubled and is expected to grow in volume from 62 million tonnes in 2015 to 102 million tonnes by 2030,¹ representing \$3.3 trillion in value.² Much of this growth is rooted in runaway consumption; we are buying more clothes than ever before, wearing them less and creating huge piles of textile waste, most of which ends up in landfill or is burnt in toxic incinerators. Few average consumers are aware that this skyrocketing production of clothes is enabled by cheap synthetic fibres, mostly polyester, which is found in over half of all textiles produced. In fact, there is a clear correlation between the growth of polyester production and the growth of the fast-fashion industry - one cannot exist without the other.

Production of polyester has grown ninefold in the past 50 years, and the fibre has been widely adopted in the fashion industry as a low-cost material that allows brands to churn out a never-ending variety of cheap items for the latest style or season, with durability of little concern. Polyester is cheap, costing half as much per kilo as cotton, and has cemented itself as the backbone of today's throwaway fashion model. The trends speak for themselves, with the average consumer buying 60% more clothing compared to 15 years ago, yet wearing each item of clothing half as long. Polyester's flexibility as a material has seen it creeping into other materials too, with blends such as cotton and polyester increasingly being used, creating another set of problems when it comes to waste management.

Dependence on fossil fuels

Production of cheap synthetic fibres not only enables low-quality, throwaway fashion - it also makes the fashion industry highly dependent on continued fossil-fuel extraction. The production of synthetic fibres for the textile industry currently accounts for 1.35% of global oil consumption. This exceeds the annual oil consumption of Spain. Numerous studies have also shown that the oil and gas industry is betting on burgeoning production of plastic (which includes synthetic fibres) as a key future revenue stream, as demand for oil from the energy and transport sectors declines.³ BP's energy scenario presumes plastic production will account for 95% of future growth in demand for oil demand, while the International Energy Agency (IEA) predicts petrochemicals will represent up to 50% of growth in oil demand by 2050 and 4% in the projected growth of gas demand.

We observe similar market projections in the textile sector. It is now estimated that synthetic fibres will grow from 69% to 73% of total fibre production globally by 2030, with polyester accounting for 85% of this. In other words, if the fashion industry continues with business as usual, in less than 10 years, almost three-quarters of our textiles will be produced from fossil fuels. What is more, these fossil fuels are getting dirtier,⁴ already coming from fracked gas and even with projects in the pipeline to produce polyester from coal. In 2015, polyester production for textiles alone was responsible for emissions of over 700 million tonnes of carbon dioxide (CO₂) equivalent⁵ - similar to the annual greenhouse gas (GHG) emissions of Mexico⁶ or 180 coal-fired power plants. This is projected to nearly double by 2030, reaching twice the GHG emissions of Australia.⁷ If these expansion plans go ahead, the textile sector's emissions could grow rapidly and undermine the climate commitments of fashion brands.

The recycling red herring

Recycling will not solve fast fashion's problems, nor will it curb the exponential growth in the use of synthetic fibres. Currently, less than 1% of clothes are recycled to make new clothes, and the share of recycled polyester is declining; while it accounted for 14% in 2019,⁷ this will in fact decrease to 7.9% of overall polyester production by 2030.⁸ Furthermore, virtually all recycled polyester in clothing comes not from recycled garments, but from recycled plastic bottles. Legislation and voluntary commitments by consumer goods companies means there will be more competition for recycled PET. With limited options for viable fibre-to-fibre polyester recycling, at the end of its life this polyester will be sent to landfill or burnt. Turning polyethylene terephthalate (PET) bottles into recycled polyester fibre therefore represents a one-way ticket to disposal, while this material should instead remain in a closed-loop bottle-to-bottle recycling system.

Recycling also does nothing to solve a problem both microscopic and enormous: microfibres. These tiny fragments of plastic shed from our clothes when we wash them, wear them or throw them out, and leak into our bodies and the natural world. Microfibres are found throughout ocean ecosystems, with a recent study discovering that 73% of microfibre pollution in formerly pristine Arctic waters is from synthetic fibres that could be coming from textiles.⁹ Graver still, microplastics have even been found in the placentas of unborn babies, affecting the human body in ways that are not yet fully understood.

A According to the Materials Systems Laboratory, the global impact of polyester fabric will grow from roughly 880 billion kg CO₂e in 2015 to a projected 1.5 trillion kg CO₂e by 2030. An estimated 80% of polyester production goes into textile, meaning emissions from polyester will reach 1.2 billion tonnes CO₂ equivalent (MtCO₂e) by 2030.
<https://matteroftrust.org/wp-content/uploads/2015/10/SustainableApparelMaterials.pdf>
 In 2018, Australia's total production-based emissions, including forestry, land-use and land-use change were 537 MtCO₂e.
https://en.wikipedia.org/wiki/List_of_countries_by_greenhouse_gas_emissions

The way forward

Unless we move away from the fossil fashion production model, we risk pushing past planetary boundaries in our quest for cheap fashion. We will be entirely unable to cope with the mountains of clothing waste produced by the system, and reliance on fossil fuels will contribute to catastrophic levels of climate change. We cannot rely on the fashion industry to address this issue by voluntary means, especially as our investigation reveals that numerous initiatives in the 'sustainable apparel' sector try to portray polyester as more sustainable than natural fibres. This is not just marketing - these assessments are being used to make concrete decisions about future fibre demand and production. For example, brands signing up to the Global Fashion Agenda (GFA) Pulse intend to replace 30% of their cotton with polyester by 2030.

It is more urgent than ever to find effective legislative solutions to put the fashion industry on a more sustainable track and to push towards great circularity. The Covid-19 pandemic has revealed the cracks in the fashion industry's faulty and short-termist business model, but the crisis also represents an opportunity for change. Fashion brands have to become accountable for what happens in their supply chains and they must shoulder full responsibility for what happens to their clothes at the end of life - in line with the polluter pays principle.

The European Commission has announced that this year it will publish a comprehensive EU strategy for textiles. This strategy creates a crucial opportunity to tackle the global impact of fast fashion, by decoupling the fashion industry from fossil fuels and making sure the industry shifts to responsible production based on the use of sustainable fibres, and by slowing down production through a switch to more durable clothes with greater levels of reuse and effective recycling. Governments worldwide should follow suit and commit to developing ambitious legislation for the textile sector.

Specific recommendations relating to the EU textile strategy, fashion brands and consumers are presented at **the end of this report.**

Polyester is now found in over half of all textiles produced
 Credit: Pixabay





1. Introduction: The rise of fossil fashion

The global fashion industry is one of the most polluting industries in the world. Research from the European Environment Agency has highlighted that textiles are the fourth largest cause of environmental pressure after food, housing and transport.¹⁰ The fashion industry is responsible for a significant share of global water pollution,¹¹ consumes more energy than shipping and aviation combined,¹² and by 2050 is anticipated to be responsible for 25% of the world's remaining carbon budget.¹³ Furthermore, our clothes release half a million tonnes of microfibres into the ocean every year, equivalent to more than 50 billion plastic bottles.¹⁴

Worse yet, the majority of fashion today is made from fossil fuels; synthetic fibres produced from finite resources such as crude oil and natural gas account for over two-thirds (69%) of the material input for clothes worldwide. This is dominated by polyester, which is present in more than half (56%) of textiles we use today,¹⁵ some distance ahead of nylon, acrylic and elastane.¹⁶

Synthetics are made from heavily processed petrochemicals. Nylon and polyester yarns are most commonly produced by melting polymer chips or granules and then extruding them to produce very long, fine filaments that are wound together to form the yarn.¹⁷ Polyester is generally produced from PET, which is derived from crude oil and natural gas.¹⁸ The fact that most clothes on the market contain plastic makes the textile sector the largest user of plastic after packaging and construction, accounting for around 15% of plastic use.^{19,20} As such, the problem of synthetics is closely linked with the plastics crisis at all stages of the life cycle, from extraction to use to disposal, and strongly associated with the increasing problem of plastic pollution.

While cotton has historically been the dominant material used for textile production, over the last few decades it has lost much of its market share to plastic-based fibres such as polyester.²¹ The first entirely synthetic fibres became widely available in the early 20th century. In 1940 DuPont introduced nylon and, a year later, British chemists John Rex Whinfield and James Tennant Dickson patented PET polyester.²² It wasn't long before synthetic use experienced a drastic surge: synthetic fibres, which constituted 30% of total global manufactured fibre production in 1975, represented 68% by 2019. In comparison, manmade cellulosic fibres, such as viscose, which had constituted almost 12% of the total in 1975, had fallen to a mere 6% by 2019. While global production

Virgin polyester yarn is produced from oil or gas

Credit: Shutterstock

of manufactured fibres increased fourfold over these 44 years, synthetic fibre production, largely dominated by polyester, knocked it out of the park, becoming nine times larger by the end of the same period. This means that over the half past century, the production of fossil-fuel-based fibres has grown at double the pace of overall global fibre production.

The success of polyester has hinged on its cheap production. As the industry has grown, the costs of production have shrunk, making polyester even more widely available and competitively priced.²³ Polyester is also regarded as a fibre that performs well, being strong, crease-resistant and quick-drying. This combination of qualities has prompted many high-street retailers and increasingly luxury brands to turn to polyester,²⁴ making it the darling of fast fashion.

In addition to its use in apparel, polyester is used throughout the nonwoven industries, with applications in industrial filter materials, medical and hygiene products, and construction materials. It can be used in its pure form as well as in blends with other fibres, particularly cotton, wool and viscose,²⁵ making reuse and recycling even more difficult due to the low availability of technologies to separate collected textiles by fibre composition and recycle them.

Today polyester is not only the synthetic fibre of greatest production volume but also has the highest predicted growth rate. In 2019 it accounted for 56% of total fibre production and 81% of synthetic fibre production. Despite market disruptions induced by the Covid-19 crisis, polyester production is expected to grow at an annualised growth rate of 4.1% per year in the period 2019-2030 and account for 63% of total fibre production by 2030.²⁶

Global production of polyester is dominated by Asia, with China being the main production hub; in 2019 it accounted for 72% of production, followed by the rest of Asia (21%), North America (3%), Europe, the Middle East and Africa (2% each).²⁷ Based on data provided by chemical industry experts, Tecnon OrbiChem, we forecast that China will be manufacturing 79% of the world's polyester by 2025.²⁸

Based on data provided by Tecnon OrbiChem, we also estimate that by 2030, synthetic fibres will exceed 73% of total fibre production globally, with polyester accounting for 85% of this. In other words, if the fashion industry continues with business as usual, in 10 years almost three-quarters of our textiles will be produced from fossil fuels.²⁹

1.1. Environmental impacts from cradle to grave

The production of synthetic fibres is reliant on the extraction of fossil fuels, such as crude oil, gas, and potentially even coal (see Chapter 2). Beyond carbon emissions, this is also inextricably linked with other significant environmental harms including oil spills, methane emissions, water and air pollution, impacts on human health - particularly for communities near extraction sites - wildlife disruption and biodiversity loss.³⁰

Synthetics are also energy-intensive to produce,³¹ which means extracting and burning additional fuel to power manufacturing facilities, further contributing to climate change. The carbon footprint of a single polyester shirt is 5.5kg compared to 2.1kg for a cotton shirt.³² According to the Ellen MacArthur Foundation (EMF), CO2 emissions for synthetic clothing are six times higher than those for cotton (530 million tonnes of CO2 for plastic-based fibres in comparison to 86 million tonnes for cotton).³³ In 2015, polyester production for textiles alone was responsible for over 700 million tonnes of CO2 equivalent³⁴ - similar to the annual GHG emissions of Mexico³⁵ or those of 180 coal-fired power plants.³⁶ This is projected to nearly double by 2030 to 1.2 billion tonnes of CO2 equivalent, reaching twice the annual GHG emissions of Australia.³⁷

There are substantial concerns related to the environmental impact of microfibre pollution caused by synthetic fibres. Because polyester, nylon, acrylic and other synthetic fibres are made from non-biodegradable plastics, they do not decompose, meaning that, unless they have been incinerated, more or less every plastic fibre ever made is

still with us. The average polyester product is likely to survive in landfill for over 200 years, leaching chemicals, shedding microfibres and releasing methane as it rots.³⁸ Throughout washing, use and end of life, synthetic fibres fragment into smaller particles, most too small to be seen by the naked eye, and it has been estimated that around half a million tonnes of plastic microfibres are released from plastic-based textiles such as polyester, nylon and acrylic and end up in the ocean annually.³⁹ (See Box 3.1. for more information.)

1.2. Cheap synthetic fibres: the backbone of fast fashion

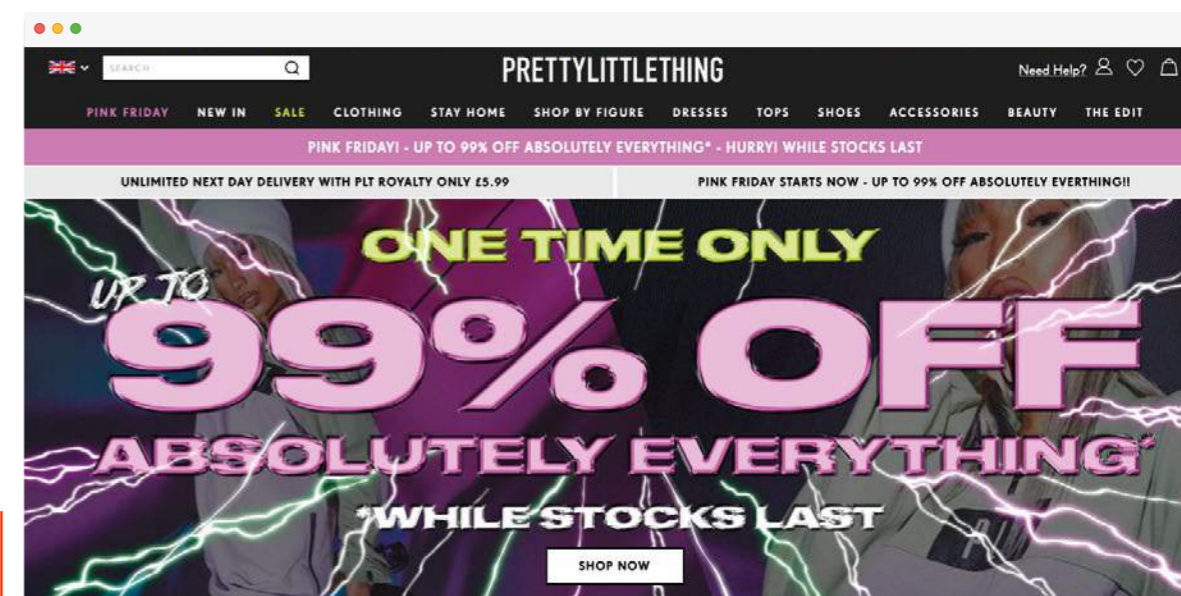
Today, fast fashion is synonymous with a throwaway model of consumption accompanied by low-quality, disposable clothing. The Cambridge English Dictionary defines fast fashion as 'clothes that are made and sold cheaply, so that people can buy new clothes often'.⁴⁰ Although the origins of fast fashion can be pinpointed to the late 20th century, the early 2000s are regarded as the era when fast fashion flourished and dramatic changes were made in the production and consumption of clothing. In 2000, H&M opened its first store in New York, accompanied by a comment from a retail analyst that it is now '*chic to pay less*'.⁴¹ The early 2000s was also the period when polyester overtook cotton as the most in-demand fibre.⁴²

The correlation between the rise of fast fashion, the availability of cheap fossil-fuel-derived materials and the plummeting cost of clothes is remarkable. Which was the driver - cheap raw materials finding a new market or the new business model looking for cost-cutting mechanisms - is a matter of debate. However, from the 1980s onwards synthetics have experienced a steep rise in use, closely tracking increasing clothing sales, while production of other fibres, such as silk, cotton and wool, has remained stable (see page 14).

For example, in the United States over 60 years, apparel has moved from costing 1.5 times the price of other items in the average consumer basket to costing less than half, strongly suggesting that fossil fuels are a fundamental lynchpin of fast fashion.⁴³ This is not surprising considering that polyester is cheap, costing half as much per kilo as cotton,³ and that the synthetic market grew ninefold between 1975 and 2019.⁴⁴

In turn, fashion production and consumption have gone through the roof. Collection launches by fashion brands are no longer seasonal - where fashion used to cycle through a few seasons a year, 50-100 'micro-seasons' have become the new normal.⁴⁵ Zara produces 20 collections a year, with a five-week design-to-retail cycle; H&M releases 16 collections each year, with production times varying from a few weeks to six months; others, such

Pretty Little Thing's
'Pink Friday' sale
in November 2020



^B For the week ended 1 September 2020, polyester partially oriented yarn (POY) 150 denier (D) was at \$0.83-0.88/kg FOB, NE Asia. By contrast, the September 2020 China Cotton Index (CC Index 3128B) was 12,900 RMB/tonne or, at the prevailing exchange rate, \$1.89/kg.

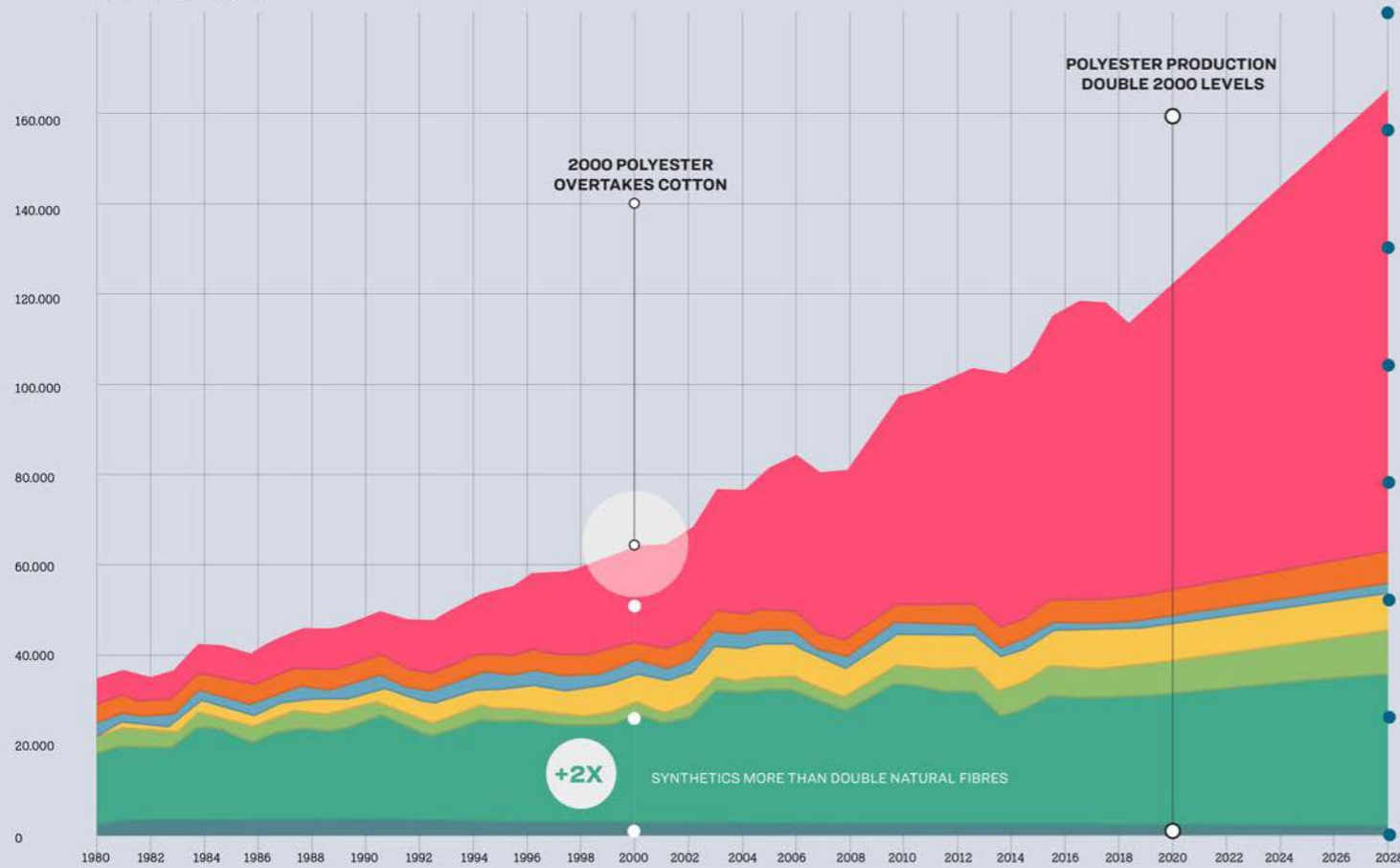
FAST FASHION AND THE RISE OF POLYESTER

THE MAJORITY OF FIBRE PRODUCTION IS SYNTHETIC AND COMES FROM FOSSIL FUELS

WORLD FIBRE PRODUCTION BY FIBRE TYPE 1980-2030

THOUSAND METRIC TONS

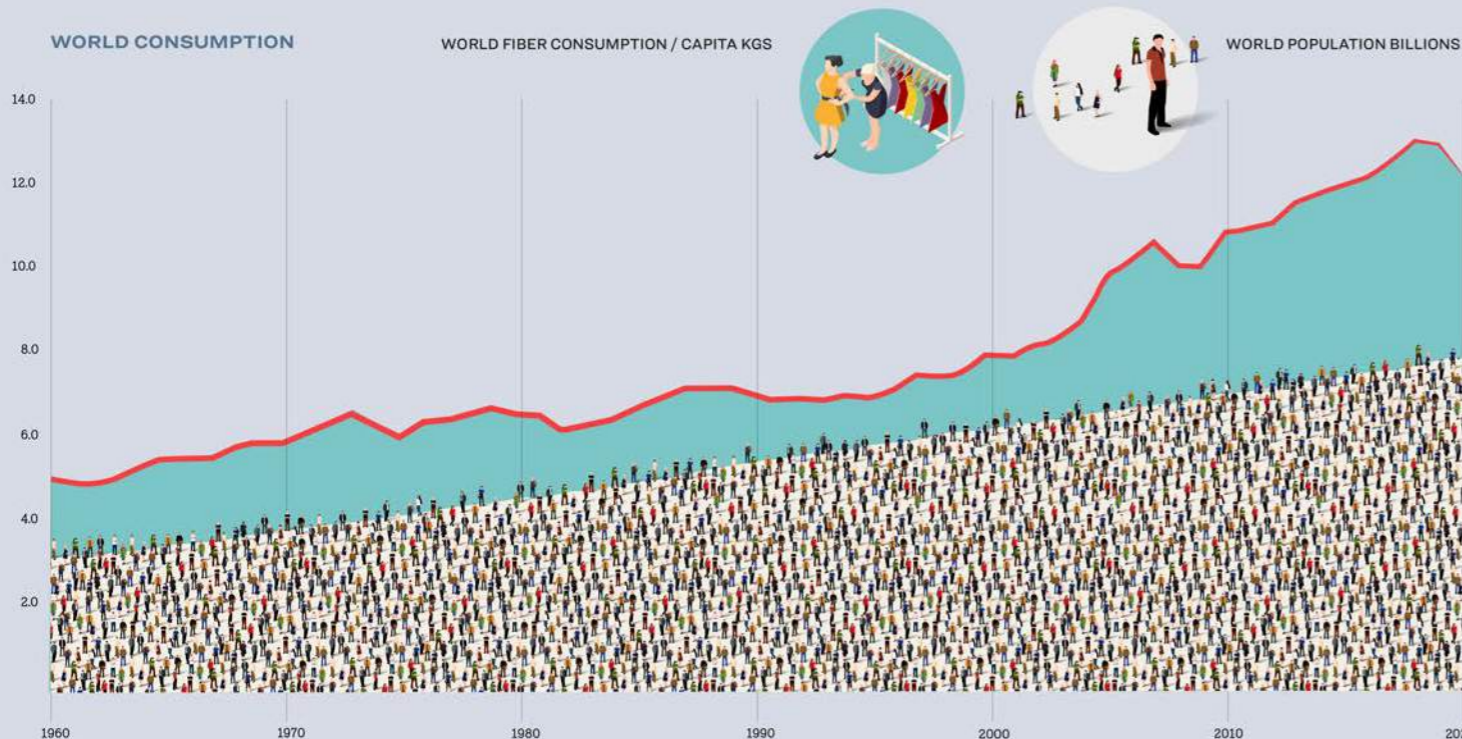
(Source: Tecnon OrbiChem)



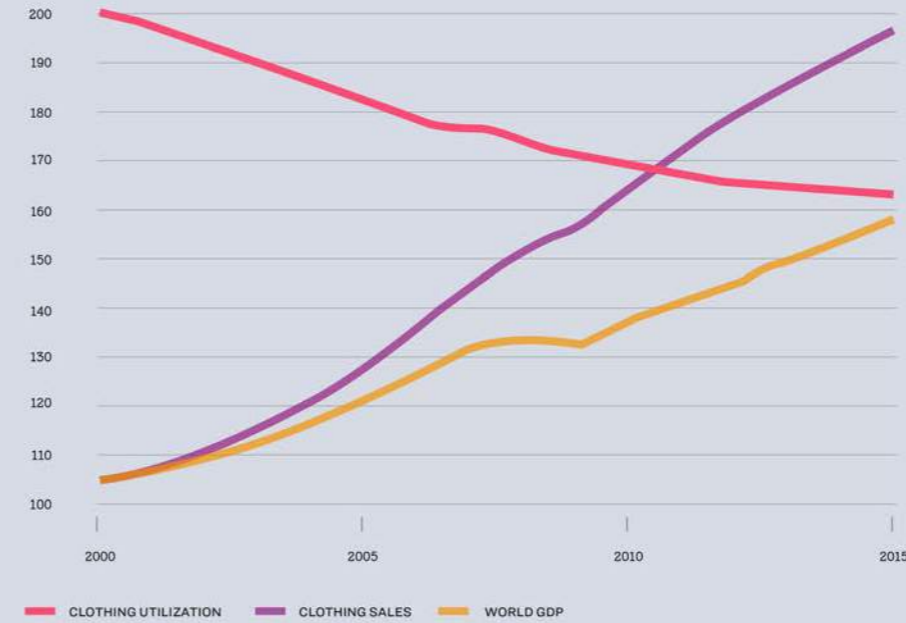
source: cotton analytics

WE ARE CONSUMING MORE CLOTHES PER CAPITA THAN EVER BEFORE

(Source: Cotton Analytics)



WE'RE USING CLOTHES LESS AND LESS BUT THE SALE OF CLOTHES HAS GROWN FASTER THAN POPULATION OR GDP



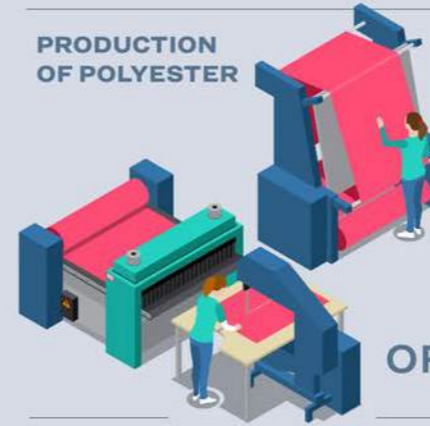
Source: McKinsey and the Ellen MacArthur Foundation

SOME GARMENTS ARE DISCARDED AFTER JUST

7/8 USES



PRODUCTION OF POLYESTER



RESULTS IN MILLION TONNES

700 = 180

OF CO2e/YEAR

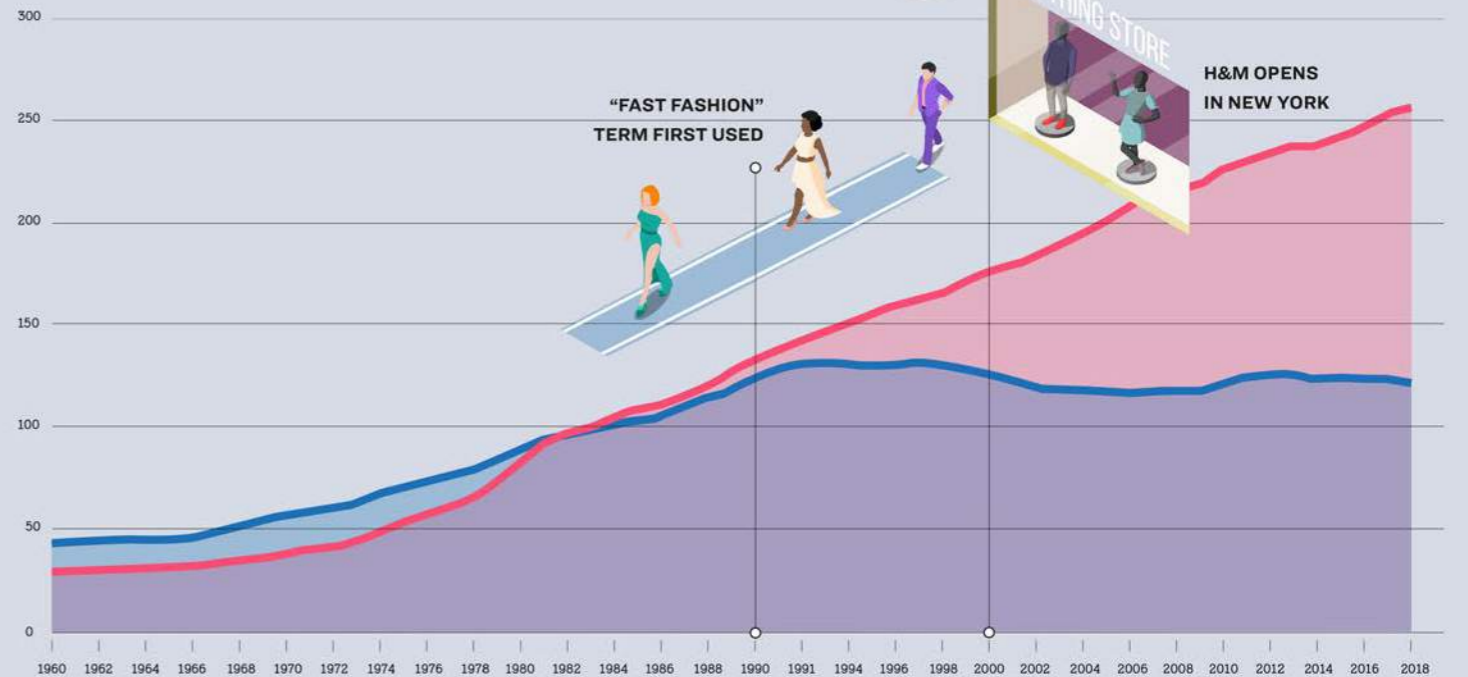
WHICH IS THE EQUIVALENT TO THE ANNUAL EMISSIONS OF

COAL-FIRED POWER PLANTS



PRICE OF APPAREL V. PRICE OF ALL ITEMS (US)

Source: Cotton Analytics and Fred Economic Data



FASHION BRANDS AND RETAILERS HAVE AGGRESSIVELY CUT COSTS AND USED CHEAP MATERIALS, PUSHING THE PRICE OF CLOTHING DOWN RELATIVE TO PRICES OF OTHER CONSUMER GOODS.

as Boohoo, ASOS and Missguided, can produce merchandise in just 2–4 weeks, retailing at rock-bottom prices.⁴⁶ For example, in its November 2020 'Pink Friday' sale, retailer Pretty Little Things slashed prices by up to 99%, offering some items for as little as 5p.⁴⁷

It is therefore no surprise that between 2000 and 2014 clothing production doubled, with the average consumer buying 60% more clothing compared to 15 years ago. Each item of clothing is now kept for half as long.⁴⁸ Some estimates suggest that consumers treat the lowest-priced garments as nearly disposable, discarding them after just seven or eight wears.⁴⁹

These dramatic changes and the rise of the disposable fast-fashion model do not come without a cost. Current purchasing practices by brands force suppliers to cut corners on labour rights and environmental protection if they are to successfully fulfil their orders. As demonstrated by the fashion industry's \$16 billion debt to garment workers in 2020⁵⁰ and mountains of discarded clothing pouring into landfill at a rate of one garbage truck per second,⁵¹ cheap clothes are in fact anything but cheap, with the true costs borne by underpaid workers and the planet.

In 2019, the CEO of H&M warned of the 'terrible social consequences' of attempts to rein in consumption.⁵² Workers' rights NGO Labour Behind the Label strongly criticised these comments noting that '[i]t is corporate greed, rather than environmental concerns that stands in the way of poverty alleviation. Profit from fast fashion at rock-bottom prices is only possible through poverty pay, unsafe working conditions and suppression of unions'.⁵³ Covid-19 has further exposed the deep-rooted inequality at the core of the global fashion industry, with companies cutting off their suppliers at the last minute and refusing to pay for orders, pushing workers to the brink of survival. A recent story in *The Guardian* described how a Bangladeshi garment worker from a factory in Dhaka, producing clothing for high-street brands in Europe and the US, including Arcadia, contemplated killing her children and taking her own life in the face of destitution after fashion companies refused to pay what they owed to workers.⁵⁴

While many brands publicly proclaim their moves to circularity, sustainability or 'climate-positive' targets, the majority of such claims apply to a very small share of their total sales. A recent study by retail analyst *Edited* highlighted that 'sustainable' items, labelled as such by the brands without giving further insight into why they are better for the environment, account for as little as 3% of collections available online from UK and US retailers.⁵⁵ For comparison, according to the EMF, the average rate of annual overstock liquidation – or burning large volumes of unsold items – across the industry is also 3%.⁵⁶ Viewed in light of the scale of production of low-quality clothes by these companies and the reliance of major brands on cheap synthetic materials and overstock liquidation the majority of commitments should be considered greenwashing of the worst kind.

Without radical action and a considerable slowdown, fast fashion's quest for cheap clothing will continue to generate untenable volumes of waste and emit more carbon than the planet can handle.

2. Fossil fuels: The feedstock for fast fashion

Most synthetic fibres are produced from crude oil, which undergoes the process of cracking to produce ethylene, from which polyester fibres are produced, or propylene, which is the basic ingredient of acrylic fibres. The production of plastic-based fibres for textiles uses around 350 million barrels of oil each year^{57,58} – which has more than doubled since 2000.⁵⁹ As we have seen, this is projected to grow rapidly in the future, akin to similar projections of a significant increase in the general production of petrochemicals.⁶⁰

BOX 2.1: Current oil & gas consumption for the production of plastic fibres

According to the IEA, petrochemicals accounted for 14% of oil demand and 8% of gas demand in 2017. This translates into more than 500 million tonnes of oil-equivalent (Mtoe) feedstock per year to make nearly 1 billion tonnes of chemical products. According to Carbon Tracker, plastic production accounts for 9% of current total oil demand, which the EMF projects will grow to 20% by 2050. Production of synthetic fibres for the textile sector accounted for 15% of plastic production according to the IEA, which makes the sector the third largest user of plastic, behind packaging and construction. This indicates that around 1.35% of all oil is used for the production of synthetic fibres, which is higher than the annual oil consumption of Spain.⁶¹

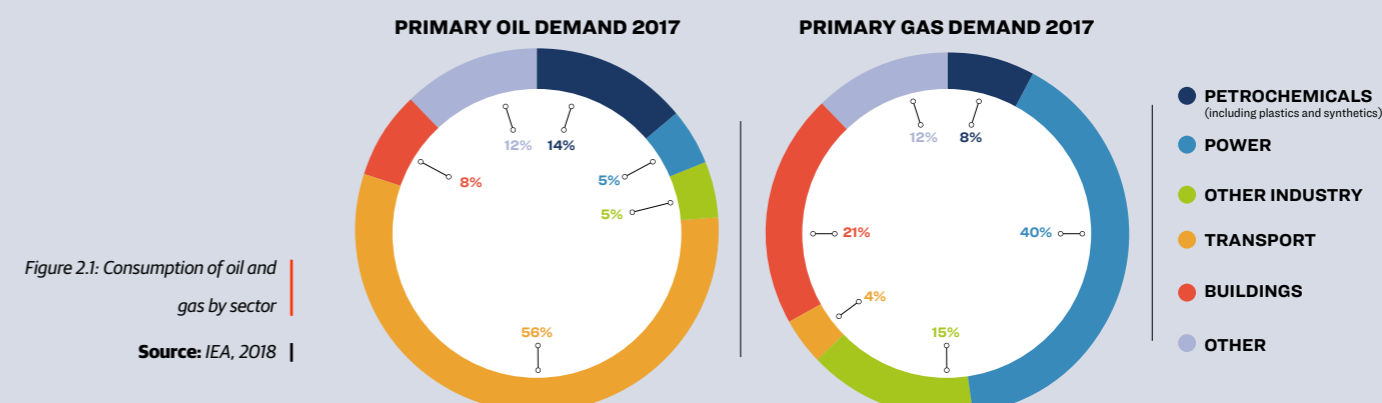


Figure 2.1: Consumption of oil and gas by sector
Source: IEA, 2018

ESTIMATED CONSUMPTION OF PLASTIC BY END-USE SECTOR (LEFT) AND RESIN (RIGHT)

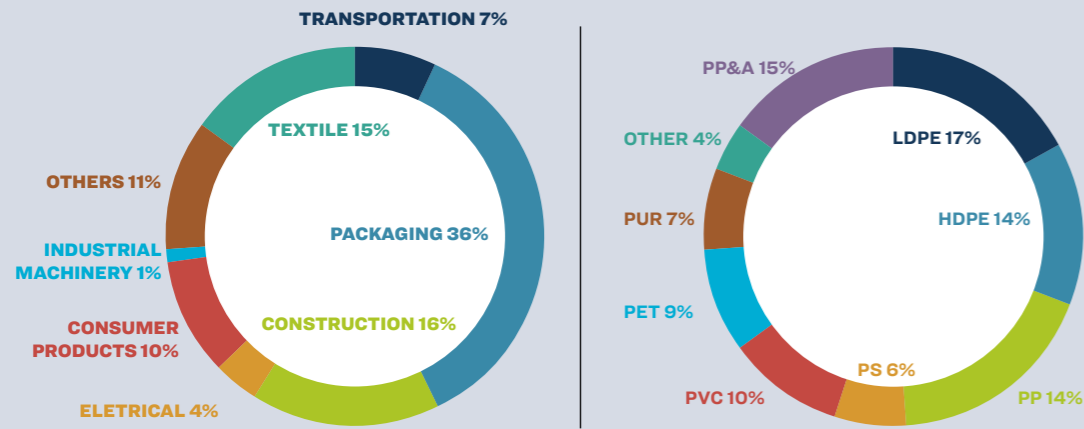


Figure 2.2: Consumption of plastic by end-use sector
 Source: IEA, 2018

In the US a significant share of plastic production (and hence plastic fibres) comes from hydrocarbon gas liquids (HGL).⁶² Meanwhile in China plans are afoot to produce textile fibre from abundant coal supplies. Recently, there have been reports of a \$20 billion investment by Chinese chemical company Hengli in a project to convert coal into polyester yarn.⁶³ Hengli, one of the world's largest polyester yarn producers, aims to have this project up and running by the end of 2025 in Shaanxi province, and its plan is to convert 20 million tonnes of coal into an annual output of 9 million tonnes of chemicals and polyester.⁶⁴ In 2019, around 12% of Chinese ethylene production was derived from coal, although the specific process to produce polyester has not yet been commercialised. According to Reuters, 'coal-based chemical plants typically emit three times more carbon dioxide and waste water for each unit of production, compared to oil-based chemical plants, and require oil at \$45-\$50 a barrel to break even.'⁶⁵

A proportion of fossil fibre production in the US is derived from the abundant gas produced by fracking. Fracking releases large quantities of methane⁶⁶ - a potent greenhouse gas - which, some argue, makes fracked gas as bad in climate terms as coal.⁶⁷ In addition, the process uses large quantities of toxic chemicals, many of which are endocrine disruptors and carcinogens, and other substances that cause severe health problems in communities around fracking sites.⁶⁸ The Stand.earth Research Group uncovered major supply chain links between US fracked gas and polyester producers supplying the global apparel industry.⁶⁹ They were able to track fracked gas coming from Texas and Pennsylvania to Ineos, a major European importer of ethane and manufacturer of polyester. Stand.earth estimated that around one-third of Ineos' output ends up as polyester fibre used by the fashion industry, including by Indorama Ventures, one of the world's largest polyester producers,⁷⁰ which has been reported to supply big fashion brands including Zara and Adidas.^{71,72} Our own research reveals that Reliance Industries, a major producer of polyester, has two active joint ventures with oil and gas companies Chevron and Ensign, exploiting shale reserves in the Marcellus deposits (Pennsylvania) and the Eagle Ford shale play in the Permian Basin (Texas). In 2019-2020, the two joint ventures together drilled 62 wells and put 51 wells into production.⁷³ This is in addition to Reliance's domestic gas production, for example the 230 wells extracting coal-bed methane that it operates in the Sohagpur Coalfield of Madhya Pradesh.⁷⁴

2.1. Betting on growth

The oil and gas industry is betting on growth in plastic production as a key future revenue stream, as demand for oil from the energy and transport sectors declines.⁷⁵ According to Carbon Tracker, plastics account for two-thirds of current oil demand in the petrochemical sector (9% of total oil demand) and represent all recent growth in demand for oil.⁷⁶ BP's energy scenario presumes 95% of future growth in oil demand will come from plastic production, while according to the IEA such production petrochemicals will constitute up to 50% of growth in oil demand by 2050 and 4% of projected growth in gas demand.⁷⁷ According to the IEA this leads to a direct increase in CO2 emissions from the sector of around 30% between 2017 and 2050,⁷⁸ while the EMF claims that by 2050 GHG emissions from plastics could increase threefold.⁷⁹

Carbon Tracker explains that there is a huge risk of stranded assets, as the petrochemical industry plans for 4% annual capacity growth and a further \$400 billion of investment in new capacity, while the growth in demand may in fact be much slower.⁸⁰ This risk of overcapacity and stranded assets is very real: according to the IEA, last year the increase in ethylene capacity was 60% higher than the rise in ethylene demand, and this trend could continue in the future.⁸¹

As explored in Chapter 1, plans are also on the way to massively expand production of synthetic fibres for the textile industry. Such investments from the textile industry are out of step with what is needed to put the planet on a 1.5-degree global heating trajectory and phase out fossil fuels, and are totally at odds with commitments by major fashion brands to cut their carbon footprints.

To achieve net zero emissions globally by 2050, it is critical that the plastic sector, including the textile industry, reduces its GHG emissions to zero by that date.⁸² Reducing the textile industry's reliance on fossil-fuel-based fibres is a key aspect of this transition.



Air pollution from an industrial site
 Credit: Pexels

BOX 2.2: How the fashion industry is fostering fossil-fuel-based clothing

A frequently overlooked factor driving the recent growth in the production and consumption of polyester has been the 'sustainable apparel' sector's marketing of this fabric as more sustainable than natural fibres such as cotton. According to a 2020 market report by Businesswire, *'advantageous properties of Polyester over cotton, substitute, act as one of the key factors driving the demand. Increasing popularity of sustainable man-made fibres coupled with reducing consumption of cotton in textile industry is likely to drive the market over the forecast period'*.⁸³

On closer inspection, many industry-run initiatives in the textile sector which proclaim to address apparel's harmful environmental impact do so through their assessment or scoring of polyester as a more 'sustainable fibre' than naturally derived fibres. From the GFA and the Sustainable Apparel Coalition's (SAC) Higg Index to Kering's Environmental Profit & Loss (EP&L) tool, they all assert that plastic fibres are more sustainable than natural fibres.

The SAC's Material Sustainability Index (MSI), which compares the sustainability of different fibres, assesses that, of the 22 textiles rated, elastane is better than 82% of other fibres, and polyester is better than 73%. Silk, on the other hand, is better than 0%; alpaca wool is better than only 5%; and cotton is better than 9%. However, scrutinising the publicly available part of the methodology reveals that the Higg MSI only looks at the impacts of fibres from cradle to gate – that is to say, from production to sale – and does not address what happens in the use and end-of-life stages, when microfibre pollution takes place, and the majority of clothes end up incinerated, dumped in the environment or in landfill.

After a significant backlash from the wool, leather and silk industries in 2020 for maligning the sustainability of natural fibres,^{84,85,86} the SAC has decided to abandon the single score system used in the Higg MSI in favour of a more comprehensive system, the details of which are unknown as yet.⁸⁷ However, the assessment parameters (and the lack of transparency) for different fibres are likely to stay the same, and therefore so are the fundamental problems associated with this tool.

The Higg MSI is also at odds with a study by the Water Footprint Network from 2017,⁸⁸ which found that polyester's water footprint is in fact seven times that of cotton – not significantly less, as suggested by some other assessments. The report states that 'the water footprint of polyester can be as high as 71,000 cubic metres

per tonne of fibre', in comparison to 10,000 cubic metres per tonne for cotton. The Higg MSI on the other hand estimates that the global average water footprint of conventional cotton fabric (score of 57.1) is 43 times of that of polyester (score of 1.32). The MSI claims the global average impact of polyester is 36.2/kilo, in comparison to 101/kilo for conventional cotton.

Kering's 2019 interactive EP&L, an innovative tool Kering has developed to measure and quantify the environmental impact of its activities, and the activities of the wider luxury sector, claims that the impact of polyester sourced in Taiwan is just under €0.08/kilo and a little over €0.02/kilo for polyester 'extracted' in India or Spain. In comparison, Zimbabwean cotton, which is entirely rain-fed and isn't mechanised, has an impact of €64.00/kilo (almost entirely from water consumption). Meanwhile, Chinese organic cotton, almost entirely from water-scarce Xinjiang, and produced with some of the highest average levels of irrigation on the planet, has an impact of less than €0.50/kilo.

These assessments are being used to make concrete decisions around future fibre production. For example, brands signing up to the GFA Pulse intend to replace 30% of their cotton with polyester by 2030,⁸⁹ which – according to their own report – would achieve a reduction in harmful impact worth €18 billion per annum.

In the meantime, no brand or initiative addresses the harmful impact of the oil and gas feedstock that underpins all plastic fibres, or the increasing role that plastics are playing in shoring up fossil-fuel consumption and opening up new revenue streams for the fossil-fuel industry. Major brands and initiatives in the apparel sector have also tended to downplay the issue of microfibres, in the absence of a clear, market-ready solution. Instead of tackling the problem at source by addressing the use of plastic fibres, they are trying to shift the focus towards reducing fibre release – through fabric design, washing clothes less frequently or retrofitting washing machines with filters.

Fashion brands also remain blatantly opaque about the volumes, types and suppliers of synthetic fibres that they use. We found almost zero brands that transparently disclose the percentage of different fibres in their portfolio – even though we understand that companies signing up to WRAP's Sustainable Clothing Action Plan need to collect and report this data. Similarly, signatories of the EMF's New Plastics Economy Global Commitment,⁹⁰ which brings together 500 players,

including fashion brands, 'united by the goal of tackling plastic pollution at its source' only focus on plastic packaging, ignoring plastic in the guise of fibres. Their efforts reportedly included action by brands – such as H&M, ASOS, Inditex and Superdry – to fight plastic pollution by removing plastic hangers, polybags, plastic windows and packaging. All this does nothing to address the big plastic elephant in the room – the more than 60 million metric tonnes of plastic fibres produced every year to feed their

collections.⁹¹ It is unclear whether these brands understand that tackling the plastic pollution crisis requires curtailing plastic overproduction by the fossil-fuel industry, or whether they are more interested in consumer-facing reputational band-aids. The majority of fashion industry efforts in this field appear to involve a thinly veiled cover-up of the scale of the problem or greenwashing their actions in relation to tackling plastic pollution.



An incinerator for mixed waste in Sweden

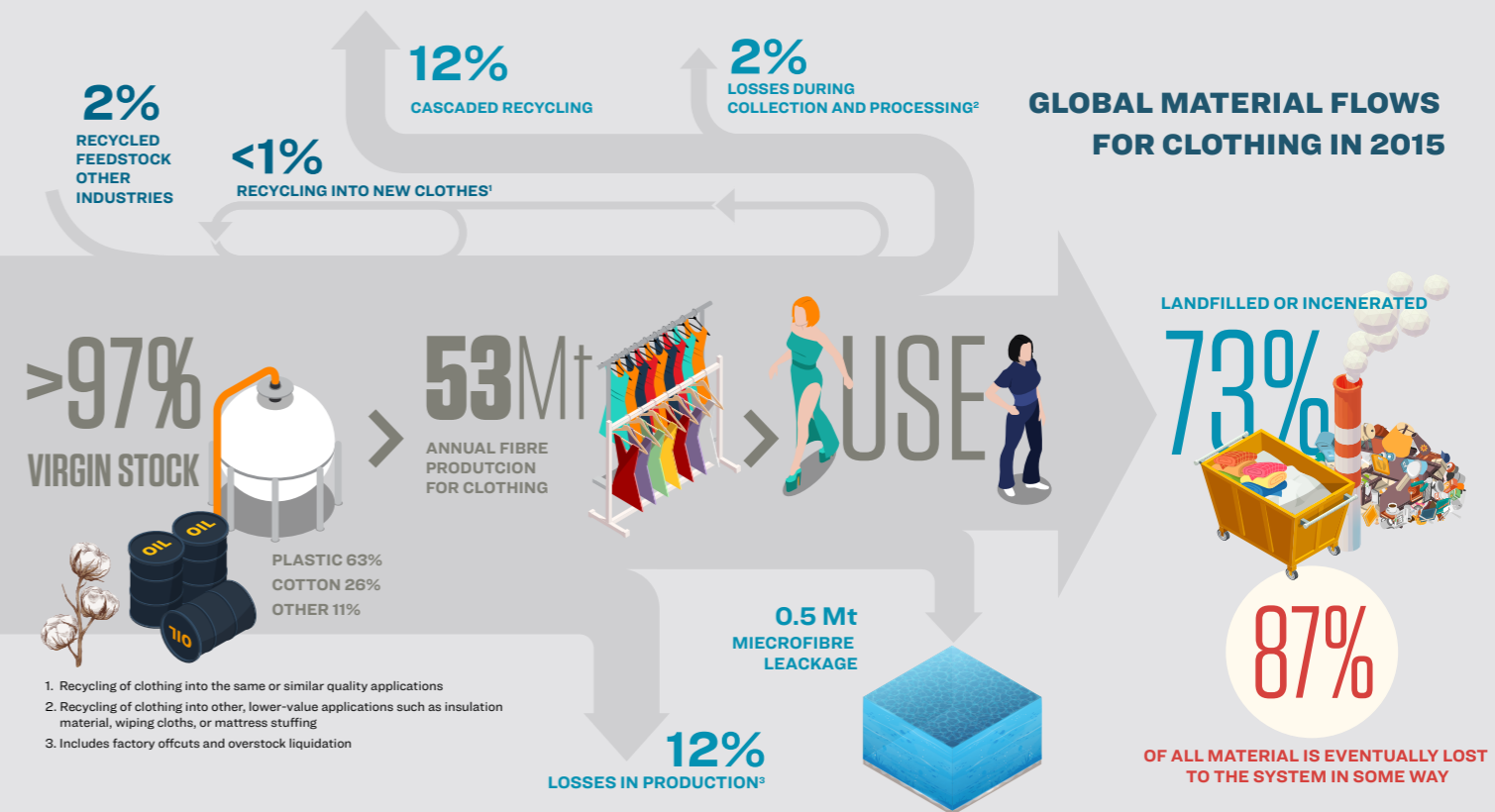
Credit: Will Rose



3. End of life: The growing challenge of clothing waste

Increasingly when clothes are sold it's a one-way ticket to trash. The prevailing fast-fashion system has us buying more clothes, using them less and throwing them away more than ever before. A staggering 87% of all material in the clothing system is lost in some way: the majority is burnt or landfilled, with the rest accounted for by process losses, losses during collection, microfibre release and 'overstock liquidation'. When downcycling is taken into account, for uses such as stuffing, rags and insulation after which the material is usually landfilled or incinerated, this figure rises to 99%. Fibre-to-fibre recycling is miniscule, representing between 0.1% and 1% of material use, either from offcuts during processing or as post-consumer waste.⁹²

Source: A New Textiles Economy (2017) Ellen MacArthur Foundation



3.1. Landfill and incineration

Of a total of 48 million tonnes of clothing produced in 2015, the final destination for 73%, or 35 million tonnes, was landfill or incineration, with 70% of that being landfilled and the remaining 30% incinerated.⁹³ Roughly one garbage truck of clothes is landfilled every second across the world.⁹⁴ Much of this will gradually rot down over hundreds of years, releasing microfibres, leaching toxic chemicals into soil and groundwater, and releasing methane into the atmosphere. In the EU, consumers discard about 11kg of textiles per person per year.⁹⁵ In total, 16 million tonnes of textile waste is generated each year in the EU,⁹⁶ equalling about €6.9 billion in value,^c much of which is landfilled or burnt.



If it is not landfilled, clothing is usually incinerated, and the number of incinerators in countries such as China, the US and the UK is increasing to tackle the waste crisis.⁹⁷ Not only are large amounts of GHG emitted during clothing production, but carbon and toxic chemicals are released when clothing waste is burnt. This is particularly egregious in the case of overstock liquidation, representing an average of 3% of total stock,⁹⁸ whereby luxury brands and high-street retailers - including H&M, Nike, Louis Vuitton, Urban Outfitters and Bestseller among others^{99,100} - burn brand-new unused and unsold products to prevent the clothes being sold cheaply.

| Landfill site in Kpone, Ghana
| Credit: The OR Foundation

Apparel waste is seen as a preferable fuel for incinerators, and this is increasingly the end-of-life route for textiles as clothing quality declines and resale options are limited. In Germany the incineration rate for clothes increased from 8% to 12% between 2013 and 2018,¹⁰¹ and in 2017 a power plant in Sweden converted from coal and oil power generation to using waste, including clothes from H&M.¹⁰² The plant claimed this was part of a push to be fossil-fuel free by 2020, while switching to plastic and clothing waste, largely produced from fossil fuels.

Despite the claims of some brands that the process is environmentally friendly due to energy recovery,¹⁰³ in reality only 3-5% of the energy used for garment manufacture can be recovered in a waste-to-energy incinerator.¹⁰⁴ Energy produced in this way also has significantly higher climate effects than that from conventional power plants, such as those fuelled by gas.¹⁰⁵ In addition, it is becoming increasingly clear that to stay below 1.5 degrees of global heating, the energy sector needs to completely decarbonise; therefore incineration will not be a viable option for the fashion industry in the medium term.

Emissions from incineration include many heavy metals, acid gases, particulates and dioxins, which are all extremely harmful to human health, and contribute to various cancers, birth defects, lung and respiratory disease, stroke and cardiovascular disease - to name but a few.¹⁰⁶ Even at the high-tech end, where incinerators claim greater controls on emissions and pollution, a large body of evidence demonstrates significant short- and long-term negative effects for workers, communities and ecosystems, and the unavoidable problem of disposing of large quantities of toxic fly ash, sludge and effluent.¹⁰⁷

At the low-tech end of the spectrum, unwanted garments in low- and middle-income countries without formalised waste management infrastructure are either landfilled, dumped or destroyed through open burning and backyard fires, which is highly toxic and contributes to air pollution as well as a myriad of health problems. In fact, the ultimate end-of-life status for most second-hand clothes donated in high-income countries and sold to low- and middle-income countries is still to be landfilled or burnt.¹⁰⁸

3.1.1. Case study: Dead White Man's Clothes

A declining volume of clothing is suitable for second-hand sale in the country where it is collected, a fact likely to be directly related to the proliferation of cheap, synthetic clothing. In the same way that high-income countries offload the burden of plastic waste by exporting it abroad, of the approximately 25% of clothes that are 'reused' or resold, 75% of this volume is destined for other countries - about 4 million tonnes per year. In reality, this clothing is not 'donated', as many assume, but sold at rates of €400-1,000 per tonne.¹⁰⁹

Market workers sorting
second hand jeans in
Kantamanto Market, Ghana

Credit: The OR Foundation |



^c Based on the 2017 average textile price of £431/tonne - <https://www.letsrecycle.com/prices/textiles/textiles-prices-2017/>



Kantamanto Market in Ghana is one of the largest second-hand clothing markets in West Africa, taking in 15 million items every week. The Dead White Man's Clothes project,¹¹⁰ which takes its name from the Akan expression 'Obroni Wawu', seeks to understand what happens to our clothes when they're sent abroad for resale. In fact, most clothing in Kantamanto comes not from dead white people, as was once assumed by locals, but from fast fashion's huge overproduction and overconsumption by living consumers. The project estimates that 40% of clothing in bales arriving in Kantamanto is immediately discarded as waste - either too worn or dirty to be sold - and then landfilled, burnt or dumped in rivers and waterbodies.

The levels of waste and low quality of garments make it very hard for retailers in the market to turn a profit, with only 16% managing to do so, and many workers do back-breaking work for very little income.¹¹¹ Although good-quality second-hand garments are an important source of clothing for many people in low- and middle-income countries, the sheer volume can be an economic burden, undermining local apparel production, to the extent that in 2016 a block of East African counties (Burundi, Kenya, Rwanda, South Sudan, Tanzania and Uganda) enacted a ban on second-hand clothing imports in order to boost their local industries.¹¹² Examples such as Kantamanto demonstrate the extremes of excess associated with fashion overproduction and overconsumption, and highlight that the resale of clothes, particularly given the increasing use of synthetics and the declining quality of garments, merely pushes the problem elsewhere and often onto the communities least well equipped to deal with the fallout.

Dumped clothes washed up on Kojo beach, near Accra, Ghana

Credit: The OR Foundation

BOX 3.1: The invisible curse of microfibres

Every time clothes are used, they release microfibres. This is particularly problematic during washing when a single wash cycle releases an average of 9 million microfibers into wastewater treatment plants,¹¹³ but also occurs through abrasion when clothes are being worn and during disposal. In the wastewater system, it is estimated that less than 50% of microfibres are filtered out (to be burnt, landfilled or spread on agricultural land in sewage sludge for fertiliser, another source of soil-based microfibre pollution),¹¹⁴ with those remaining entering directly into the marine environment.¹¹⁵ A recent study into microplastic pollution around the North Pole discovered that more than 73% of microfibre pollution is from polyester fibres that resembled PET from textiles.¹¹⁶

There are three main issues with microfibres. Firstly, they are small enough to be ingested by organisms in both terrestrial and marine environments,¹¹⁷ both harming the organisms directly and subsequently entering into the food chain. Microfibres, even those originally from natural fibres, come pre-contaminated with harmful chemicals such as flame-retardants and plasticisers, many of which are known carcinogens and endocrine disruptors.¹¹⁸ Secondly, microfibres and microplastics can absorb pollutants such as heavy metals, hazardous chemicals, neurotoxins and harmful pathogens, transferring them into the food chain and also increasing the chances of disease in certain environments such as coral reefs.¹¹⁹ There is evidence of longer-term attrition of ecosystem health caused by microplastics depleting the energy levels and reproductive success of marine animals.¹²⁰ Thirdly, microfibres are very hard to capture. It is estimated that 500,000 tonnes of microfibres enter wastewater every year from washing - the equivalent of 50 billion plastic bottles.¹²¹ More than half of all microfibre pollution evades treatment and enters the environment, and concentrations of microfibres are found to be higher near treatment outlets.

We know little about the direct health implications of microfibre pollution for humans, which is concerning given that it is present in over 80% of tap water as well as products such as beer and salt.¹²² We also breathe in at least 13,000 to 68,000 plastic microfibers from our clothing, carpets, curtains, and other textiles per year.¹²³ Invisible and ubiquitous, microfibres have been found at more than 2,000 metres below sea level and in the remote Arctic as well as closer to home - in our lung tissue, stools and stomachs, and they may even be able to cross the blood-brain barrier.¹²⁴ Worryingly, a recent study even found microplastics present in the placentas of unborn babies,¹²⁵ and preliminary findings from The Plastic Soup Foundation show that the presence of nylon microfibres in the lungs hinders development in parts of the lung tissue.¹²⁶ More research is needed to explore both the direct effects of microplastics and the knock-on effects of the toxic bioaccumulation of chemical additives on human health.

Given the fashion industry's concerted efforts to shift towards more synthetic fibres, the issue of microfibre pollution is only going to worsen. Cheap clothes made from plastic fibres are much less robust, and garments from some fashion brands have been found to start disintegrating after only a few washes.¹²⁷ This is highly concerning considering that the volume of clothing and footwear being produced is set to increase by 81% to 102 million tonnes per year by 2030.¹²⁸ By



Microfibres under a microscope
Credit: The Plastic Soup Foundation

2050, microfibres entering the ocean could total in excess of 22 million tonnes, equivalent to two-thirds of current annual synthetic clothing output.¹²⁹

Brands have been focusing their efforts on end-of-pipe solutions such as Patagonia's Guppy Friend, a bag that limits the release of microfibres during washing (after which microfibres must be disposed of and may still enter the environment anyway), or by retrofitting washing machines with filters such as those provided by PlanetCare, where the microfibre waste collected is reused as insulation.¹³⁰ Pre-washing clothes before sale can help to reduce shedding, but such efforts focus solely on microfibre release during washing, rather than also looking at shedding during use. Brands are also reluctant to face up to the nexus of the overproduction of synthetics and microfibre release, and refuse to reduce their overreliance on plastic fibres, which could properly address the root cause of the issue. Instead of acting to tackle this major health and environmental issue, fashion companies turn a blind eye to microfibre release and the damage it does, and continue to downplay this in the sustainability assessments of synthetic fibres.

3.2. Recycling

12% of post-use clothing is sent for 'cascaded recycling' or downcycling to applications of lower value, such as building insulation, flocking, cleaning rags and carpet padding. Estimates for the percentage of fibre-to-fibre recycling range from 1% to as little as 0.1%.¹³¹ The reasons for this are multiple. Firstly, with cheap fossil fuels and virgin synthetics, it's simply uneconomical for most brands to buy large volumes of recycled content or invest in the right technology. Secondly, due to this lack of investment, there are very few viable fibre-to-fibre recycling processes that have reached commercial scale. And finally, the prevailing linear fast-fashion model is not designed with end of life or recycling in mind, let alone longevity or repair. As such, clothing is often made from blended textiles (e.g. polycotton or mixtures of polyester and wool) which are incompatible with most recycling technologies.¹³² In addition, few countries have the systems in place to cost-effectively collect and sort clothes as clean waste streams on a large scale.

Nevertheless, brands may soon be left with little choice but to address end of life for clothes, with governments starting to act on the issue of textile waste. Beyond the aforementioned ban on imported textiles in East Africa, in January 2020 France moved to ban the practice of overstock burning through its new anti-waste law,¹³³ while European legislation on waste obliges countries to put in place separate collection of textile waste by 2025. But our research indicates that much more ambitious legislation is needed to put the wasteful fast-fashion industry on track towards true circularity (see our recommendations in Chapter 4). To help achieve this progress, policymakers and consumers should call out greenwashing and false solutions, such as recycled polyester from plastic bottles.

| Bales of clothing for recycling or resale

| Credit: Martin de Jong



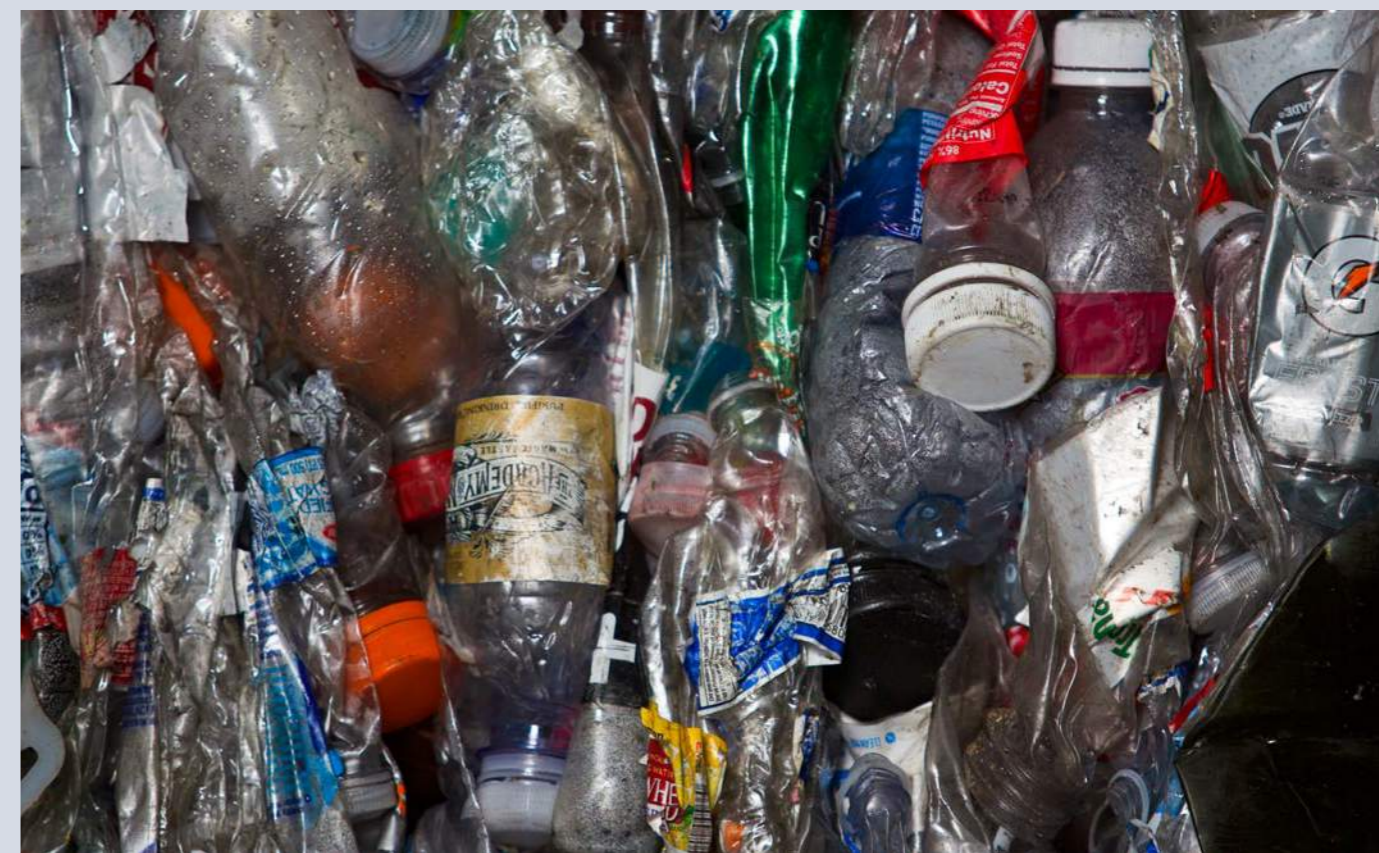
BOX 3.2: The one-way street from plastic bottles to so-called sustainable clothes

As sustainability has crept up the agenda of consumer concerns, brands have been quick to tout their eco-credentials through their use of recycled polyester in clothing and their investment in fibre-to-fibre recycling technology. The largest 14 multi-sector/apparel brands, including H&M, C&A, Kering, Levi-Strauss & Co, and Marks and Spencer, used 2% of all recycled polyester in 2018 of around 14% total availability.¹³⁴

Furthermore, almost all recycled polyester comes from recycled PET bottles, and the total share of recycled polyester has increased from 9% to 14% in the space of a decade.¹³⁵ This is problematic on two counts. Firstly, PET bottles are mostly able to be recycled in a closed-loop bottle-to-bottle recycling system, if collected through clean collection streams, such as through deposit return systems (DRS). Diverting bottles from a closed-loop system and turning them into polyester for clothing is a one-way ticket to landfill or incineration, and risks perpetuating downcycling, when in fact countries could be upgrading their collection systems. This leads us to the second problem, which is brands greenwashing their image by using bottles, fishing nets or ocean plastic to make their clothes. While these products may help raise awareness of how much recyclable material is thrown out or ends up in the ocean, making garments out of plastic waste will not even approach stemming the plastics crisis, and does very little to stop the flow of plastics into the environment in the

first place.¹³⁶ It seems this approach arises less from brands' concern for circularity and more from the added cachet of using 'materials with a story' in their apparel.

Judging by their announcements, many brands would have us believe they are moments away from 'closing the loop' on fashion and achieving 'true circularity' for the industry – a promise that is still very far from being fulfilled in reality. Many new commitments or projects are launched with great fanfare and pledges to 'go circular', such as H&M's Looop project, whereby shoppers can supposedly see their clothes recycled in real time in the Looop machine where the material is shredded, mixed with virgin material and reproduced as a new garment, albeit in a paler colour.¹³⁷ Typically for polyester, cotton and wool fibre, the maximum percentage of fibre-to-fibre recycled material that can be used is only 20–30%, the rest being made up of virgin material.^{138,139} At such a small scale and with significant technological obstacles to overcome, it is unlikely that these solutions will be a silver-bullet solution to fast fashion's problems in the short to medium term. Furthermore, technologies like these do nothing to reinvent linear, throwaway business models, and may even encourage users to buy more clothes or throw away garments sooner, in the belief that they can be recycled in a magic machine.



| A bale of PET bottle for recycling at a redemption centre in California, USA

| Credit: Les Stone

Additionally, market restrictions mean brands may not be able to deliver on promises of recycled content.

A ban in China on importing solid plastic waste for recycling, initiated with the National Sword Policy in 2018 and continuing into 2021 with a series of other policy measures, has created issues with both supply and cost competitiveness of recycled fibre derived from PET.¹⁴⁰ Data from the China Chemical Fibers Association shows that China imported 2,166,700 tonnes of PET waste and scraps in 2017. In 2018, after the National Sword Policy, the import volume dropped to 13,620 tonnes, a decrease of 99.37% – a supply gap of more than 2 million tonnes that

left manufacturers struggling to meet demand and pushed the price of recycled materials above that of virgin materials.¹⁴¹

Data from market researcher, Tecnon OrbiChem, reflects that recycled polyester production will grow, but may in fact continue to represent just below 8% of total production by 2030.¹⁴² With new legislation introducing mandatory recycled content in packaging such as bottles coming into force in several jurisdictions across the world, competition for recycled PET from other sectors will also increase.

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WORLD POLYESTER FIBRE PRODUCTION: VIRGIN FIBRE, FIBRE FROM RECYCLING 2010-2030

THOUSAND METRIC TONS

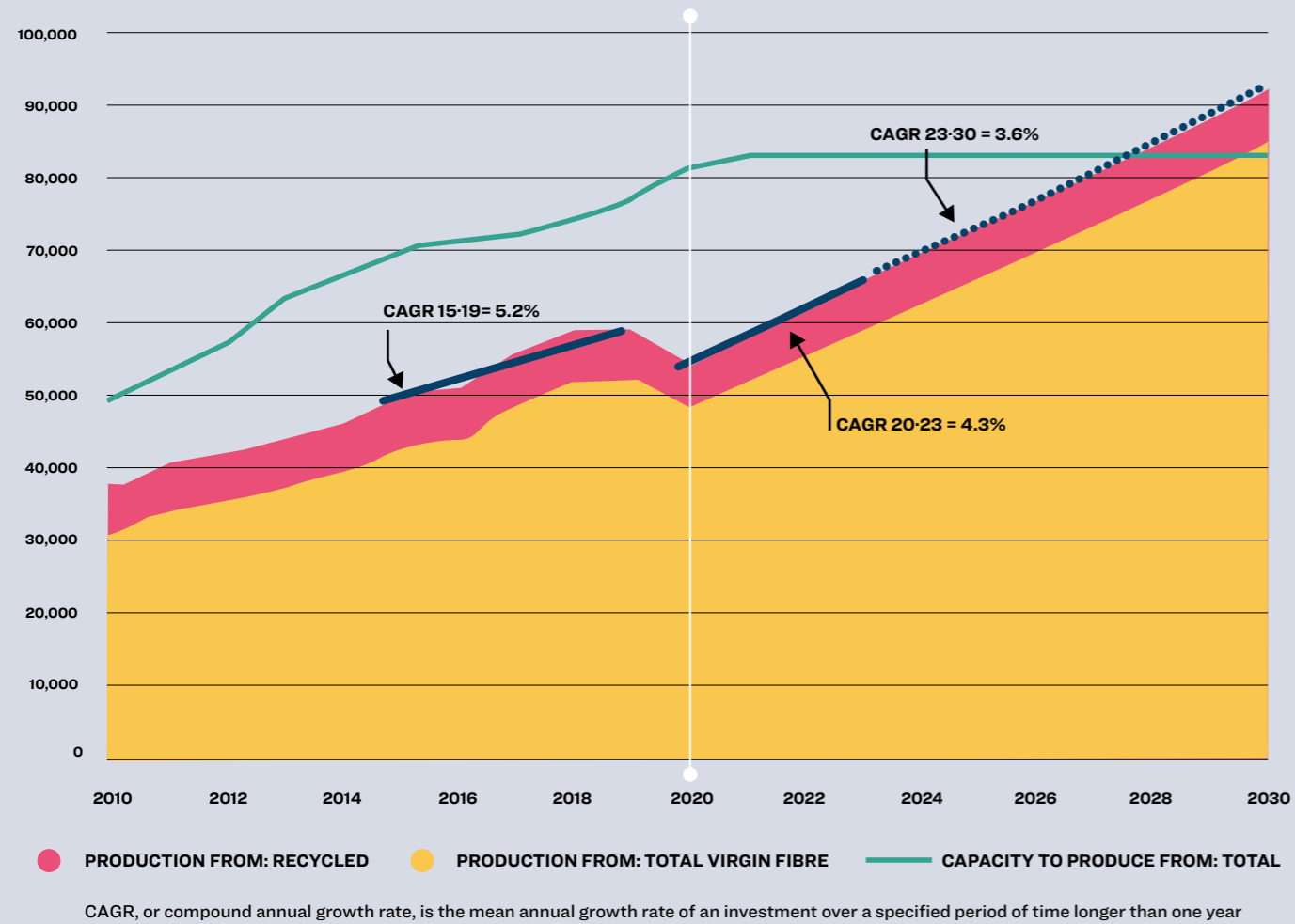


Figure 3.1: World polyester fibre production: virgin fibre, fibre from recycling 2010-2030
 Source: Tecnon OrbiChem (2021) World Synthetic Fibres Database - Strategic Market Overview.

4. Conclusion and recommendations

This report has shown that the rapid growth in the use of synthetic fibres, fuelled by the fast-fashion industry and the exponential growth in the consumption of clothing it drives, is putting serious pressure on the environment. It could also have significant unintended consequences for human health, in terms of the toxic release of microfibres and chemicals at all stages of life-cycle. It is of paramount importance that countries adopt progressive legislation to reverse the trend towards ever-greater consumption of polyester and other synthetic fibres, and to implement wider measures to regulate the fossil fashion business model that pays scant regard to workers and planetary boundaries. The Covid-19 pandemic has revealed the cracks in the fashion industry's faulty, short-termist business model, but the crisis also represents an opportunity for change. Fashion brands have to become accountable for what happens in their supply chains, and they must shoulder full responsibility for what happens to their clothes at the end of life – in line with the polluter pays principle.

The current avalanche of labels, certifications and initiatives in the textile sector remain only voluntary and, even in the best-case scenario, cover just a small percentage of brands' collections. As this report has shown, when it comes to the circular economy, these claims fall flat, as the only circular step that these brands are taking at scale is the use of recycled polyester from plastic bottles. True circularity would dictate that this plastic be maintained in a closed loop to be recycled back into plastic bottles, instead of downcycled to synthetic fibres – for the most part a one-way street to landfill or incineration.

Most sustainability initiatives in the sector actually ignore the critical sustainability issues of the fast-growing use of synthetic fibres and the associated flood of microfibres into the natural world, and instead continue to promote polyester as a more sustainable option. As investigated in our earlier report *The false promise of certification* (2018), these voluntary initiatives also fail to enforce greater transparency (e.g. regarding the share of synthetic fibres in a brand's portfolio), nor do they take a holistic approach to sustainability (e.g. by reducing the growing per capita consumption of clothes), thereby providing cover for unsustainable companies and practices to proliferate.¹⁴³

In addition to industry initiatives and certification schemes, several regulatory and voluntary measures set up at a national level have tried to lay foundations to tackle the adverse environmental and social impacts of the textile sector. These include a French law on the duty of vigilance, the UK Modern Slavery Act, the Dutch child labour due diligence law, the Dutch agreement on sustainable garments and textiles, and the German partnership for sustainable textiles. A raft of reports detailing the underwhelming results of these measures^{144,145,146} indicate that relying solely on national legislation to regulate a global industry is deficient and too fragmented to address the full scale of the challenges of increasingly globalised supply chains.

Where voluntary industry initiatives have clearly failed, pressure has been mounting on the EU in the past few years to fill the vacuum by pioneering ambitious legislation to tackle the textile industry's pollution. In December 2019, the European Commission presented the European Green Deal, which would guide the transition to sustainability in the textile sector, among others.¹⁴⁷ In 2020, as part of the Circular Economy Action Plan, the European Commission announced that it would develop a comprehensive EU strategy for textiles to boost the 'EU market for sustainable and circular textiles, including the market for textile reuse, addressing fast fashion and driving new business models'.¹⁴⁸ In January 2021, the European Commission finally initiated the process by launching a roadmap for the future EU strategy for sustainable textiles.¹⁴⁹ The objective of the strategy is to ensure that the textile industry recovers from the Covid-19 crisis in a sustainable way and applies circular economy principles to production, products, consumption, waste management and secondary raw materials.

As this report has shown, the historic and projected growth of synthetic fibres is a key driver of the prevailing unsustainable fast-fashion business model and also one of the major obstacles standing in the way of a circular economy. Unless we move away from this model, we will be entirely unable to cope with clothing waste and its environmental ramifications, as well as with the climate implications of the industry's growing reliance on fossil fuels. For this reason, the European Commission should adopt measures to slow down the rate of consumption of clothes, which is inherently unsustainable, and increase the quality of materials (e.g. through mandatory eco-design measures), which should then be separately collected, reused, repaired and ultimately recycled in a viable and environmentally benign fibre-to-fibre process. Special attention should be paid to increasing the transparency of supply chains and obliging companies to adopt due diligence with regard to human and labour rights and to preventing environmental violations in their operations and those of their suppliers.

BOX 4.1: EU citizens want to see fundamental changes in the textile sector

Support for fundamental changes in the sector also comes from EU citizens. Public opinion surveys tellingly show a lack of trust in companies' green claims and the need for better accountability. According to a Eurobarometer survey carried out in December 2019:

- nine in ten (88%) EU citizens thought that clothing should be made to last longer;
- 77% thought clothing should only be made from materials that can be recycled;
- nine in ten (88%) are worried about the environmental impact of microplastics;¹⁵⁰
- 4 out of 5 (81%) EU citizens said that, while many clothing products claim to be environmentally friendly, they do not trust these claims; and
- 87% thought there should be stricter rules when calculating environmental impact and related claims.¹⁵¹

4.1. Covid-19: An opportunity for systemic change in the fashion industry

Covid-19 has given the fashion industry an opportunity for systemic change across the sector. Many companies are striving to bounce back to 'normal'. However, a fossil fashion industry that thrives on overconsumption, low quality products, deep-rooted inequality in supply chains and mountains of textile waste - worth €6.9 billion each year only in the EU - should not be considered normal. It is time to rethink this business model, and build back a better, more sustainable, more resilient fashion sector with more responsible supply chains.

This is a crucial time for policymakers to step up and tackle the global impact of fast fashion, by disentangling the fashion industry from fossil fuels and making sure the industry shifts to responsible production based on

the use of sustainable fibres. The aim of the upcoming EU strategy is for the textile industry to recover from the Covid-19 crisis in a sustainable way. As such, it is paramount that the European Commission ensures that public money provided as part of any Covid-19 recovery package is spent on changing the sector and curbing fast fashion, rather than perpetuating the current model that is catastrophic for the environment.

4.2. Specific recommendations for the EU textile strategy

The EU is currently consulting on how to frame its comprehensive EU textile strategy to boost the market for sustainable and circular textiles. We believe that this strategy should be framed around the following key recommendations:

1. Encourage the use of non-toxic, circular materials and introduce eco-design measures to prevent material mixing and blends and to eliminate substances of concern, all of which hinder circularity. Ensure that any legacy toxic chemicals are eliminated to prevent recycling them into new products. Chemicals should be regulated in groups (rather than individual chemicals) to avoid regrettable substitution of one toxic chemical with another.
2. Set out strategies and measures to reduce pollution from the shedding of microfibres from synthetic fibres, as suggested by Science Advice for Policy by European Academics (SAPEA).¹⁵² One of such strategy should be the reduction of the use of synthetic fibres, in line with precautionary principle.
3. Introduce a tax on virgin plastic, which should also cover the use of virgin synthetic fibres in the textile industry. Do not incentivise the use of plastic packaging (such as PET bottles) as a feedstock for recycled polyester fibres in the textile industry, as such items should be collected, reused and recycled in a closed loop.
4. Set up extended producer responsibility (EPR) schemes for different types of textiles (e.g. clothing, carpets^D and mattresses), where producers are responsible for the management and costs of the end-of-life treatment of products they place on the market. The Commission should investigate the best way to set up such schemes to ensure a market shift towards higher-quality, more durable fashion that takes into account eco-design, the elimination of substances of concern (including microfibres) and durability (via longer warranties and specific targets for recycling and reuse). It should also encourage recyclability and reuse through eco-modulated fees.
5. With regard to collection and sorting, according to the updated waste legislation, the Commission has to consider setting targets for the reuse and recycling of textiles, while member states have to put systems in place to collect textiles separately by 2025.¹⁵³ However, given that many current textiles are low-quality blends that cannot easily be reused or recycled, much more ambitious action is needed.
6. Encourage and incentivise new business models that support product-as-service models, such as clothes rental schemes, and promote reuse and repair systems. The Commission should explore other ways to slow down the fast-fashion industry.
7. Set production standards for manufacturing that encourage better production models across fashion supply chains, for example along the lines of the EU's Best Available Technologies (BAT) standards.
8. Ensure that EU support for the recovery of the fashion sector from the Covid-19 crisis is conditional on companies' achievement of carbon reduction targets, and a clear plan to reduce the industry's dependence on fossil fuels and cheap disposable materials not fit for recycling.

^D For a model EPR scheme for the carpet industry, we have commissioned research from Eunomia Consulting on the EU policy toolkit for carpet circularity, which is available here: <https://www.eunomia.co.uk/reports-tools/policy-toolkit-for-carpet-circularity-in-eu-member-states/>

4.3. Specific recommendations for the EU due diligence legislation

1. The EU should adopt mandatory due diligence legislation which will make it a legal requirement for companies to identify, prevent, mitigate, track and account for environmental, human rights and governance risks and impacts.
2. Due diligence should also mandate high levels of transparency, as companies are often able to hide human rights violations and pollution scandals behind opaque supply chains and via third-party outsourcing in their supply chains.
3. Due diligence should also include transparent grievance mechanisms and access to remedy for victims of business-related adverse impacts.¹⁵⁴

4.4. Specific recommendations for the EU agenda to address green claims and empower the consumer

1. The Commission should prevent companies from making unsubstantiated green claims, particularly related to their use of recycled polyester from plastic bottles and the share of recycled polyester in their products. (Most recycling technologies available today still require the input of virgin material, while some calculation methods allow the share of recycled content to be overstated.)
2. Specific rules should address the proliferation of certification and labelling schemes in the sector. To prevent overstated claims of sustainability by fashion brands, only the most ambitious, robust and full life-cycle schemes should be allowed.

4.5. Recommendations for fashion brands and retailers

1. Move away from the unsustainable fast-fashion model.
2. Commit to phasing out synthetic materials based on fossil feedstocks. Provide transparent information about the current use of different fibres and a viable trajectory and targets for the reduction of fossil-fuel-based fibres, and switch to more sustainable alternatives. This should include clear positions on the use of other materials.
3. Provide full, publicly accessible transparency about the factories from which textiles are sourced, including all stages of the supply chain back to raw material suppliers, and not just 'tier one' and 'tier two' factories.
4. Set ambitious climate and circularity targets that apply across all production ranges and cover the entire supply chain.
5. Offer repairs to customers, together with longer warranties to promote durability of textile products and encourage reuse.
6. Invest in viable fibre-to-fibre recycling technologies that address potential negative sustainability issues upfront. Also invest in the separate collection of used textiles for reuse, repair and recycling.
7. Openly express support - and advocate - for progressive legislation to improve circularity in the industry (e.g. mandatory EPR schemes), encourage peers to do the same and leave any industry initiatives that oppose, delay or undermine progressive legislation - including its implementation.
8. Ensure any voluntary commitments or initiative the company makes/joins are ambitious and do not lead to greenwashing.

4.6. Recommendations for consumers/citizens

Through purchasing decisions, citizens have an opportunity to send a clear message to the fashion industry that they care about the impacts that the production of their clothes has on people and the environment.

Using their purchasing power, citizens can:

1. refrain from compulsive shopping and buy only what they really need;
2. buy only from brands that have made clear commitments to transparency in their supply chains, and to sustainable sourcing and production of all their materials and garments, and which have a clear plan to phase out their dependence on fossil-fuel-based fibres;
3. write to brands, asking them to be more transparent and disclose their polyester and other textile suppliers;
4. play a powerful role in raising awareness of the issues surrounding fast fashion, and use their voices to highlight issues such as greenwashing, exploitative practices, environmental harm and unsustainable consumption.

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