Unfit, Unfair, Unfashionable

Resizing Fashion for a Fair Consumption Space

HotorCool

Report

Unfit, Unfair, Unfashionable

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Revision note: A previous version of this report had some errors which have now been corrected. The new ISBN number issued for this corrected version is for differentiation. None of the corrections affect the overall messages of the report.

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SUSTAINABLE fashion CONSUMPTION NETWORK

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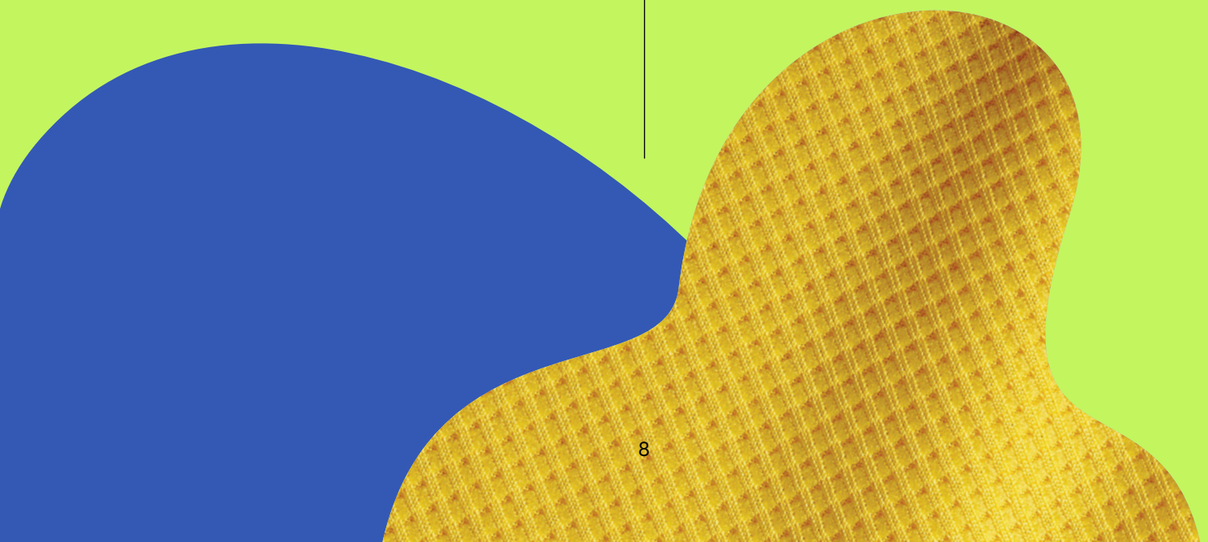

About this report

Current trends in fashion consumption, in particular fast fashion, cannot be maintained if we aim to achieve a fair and just transition to climate neutrality (i.e., net zero greenhouse gas emissions). Mounting scientific evidence reveals the vast extent of negative environmental and social impacts associated with fashion consumption, as well as the differing responsibilities of consumers in high- and low-income countries and groups.

This report contributes to filling the knowledge gap that arises from prevailing climate scenarios related to fashion. These scenarios tend to underplay the potential contributions of lifestyle changes to mitigating greenhouse gas emissions and instead focus entirely or mainly on developing new technologies and on changes in production. The report also assesses and exposes misconceptions around the climate impacts of practices that are often considered effective solutions for reducing the carbon footprint of fashion. Analysis of practices such as clothing donations and exports of second-hand clothing reveals environmental impacts that are not often considered but that are potentially net negative.

The report links changes in fashion lifestyles to measurable impacts on climate change, in line with the aspirational target of the Paris Agreement to keep the average global temperature rise below 1.5 degrees Celsius. This 1.5-degree lifestyles approach examines greenhouse gas emissions and reduction potentials using consumption-based accounting, which covers both direct emissions in a country and the embodied emissions of imported goods. The report analyses fashion lifestyle carbon footprints in the G20, which represent a heterogeneous mix of high- and middle-income countries playing different roles in the production and consumption of global fashion. It also establishes an equity-based footprint target for per capita fashion consumption for 2030 (Figure ES1).

Furthermore, the report analyses the carbon footprints of different income groups within the G20 countries, revealing the extent of inequalities in carbon emissions and in levels of fashion consumption.

The report discusses fashion “sufficiency”, extending the concept of a fair consumption space to fashion and making quantitative estimates within the available carbon budget for G20 countries to keep their fashion consumption footprints below the 1.5-degree target. The fair consumption space concept describes an equitable opportunity space within which we can meet our needs (Figure ES2). This space is set between an environmental ceiling that respects the climate planetary boundary, and a social floor that is defined by sufficient consumption levels for all as well as other aspects of dignity and wellbeing not addressed in this report.

Current trends in fashion consumption, in particular fast fashion, cannot be maintained if we aim to achieve a fair and just transition to climate neutrality.

Figure ES1. Carbon footprints from fashion consumption in the G20 countries, and equity-based 1.5-degree target for 2030

Targets, gaps and inequalities

Based on the conservative estimate that 4% of global emissions come from fashion, the global fashion industry would have to bring down its emissions to 1.1 billion tonnes of carbon dioxide equivalent (CO_2e) to be on the 1.5-degree pathway by 2030. This corresponds to a reduction in greenhouse gas emissions of 50% to 60% compared to levels in 2018.

For each country in the analysis, the footprint gap between current and sustainable target levels of emissions from fashion consumption was determined for the year 2030. To bridge this gap, five different solutions for reducing the footprint of fashion were assessed, estimating the potential impacts from these solutions based on various adoption rates in each country.

Analysis in the report shows important gaps between current fashion consumption footprints and targets. The per capita footprint target for 2030 is exceeded in 14 of the 19[1] surveyed G20 countries, indicating that rapid and radical reductions in fashion consumption are needed. Estimates of current average per capita footprints by country were calculated as of 2020 and projected to 2030 by considering expected changes in population and gross domestic product (GDP).

Accordingly, the 2030 average carbon footprints of fashion consumption for the G20 countries, measured in CO_2e and ranked from highest to lowest, are: 503 kg (Australia), 390 kg (Japan), 387 kg (United States), 374 kg (United Kingdom, UK), 373 kg (South Korea), 335 kg (Canada), 329 kg (South Africa), 311 kg (Mexico), 276 kg (Saudi Arabia), 266 kg (Germany), 254 kg (Italy),

1 The European Union is a member of the G20 but is not included in the analysis.

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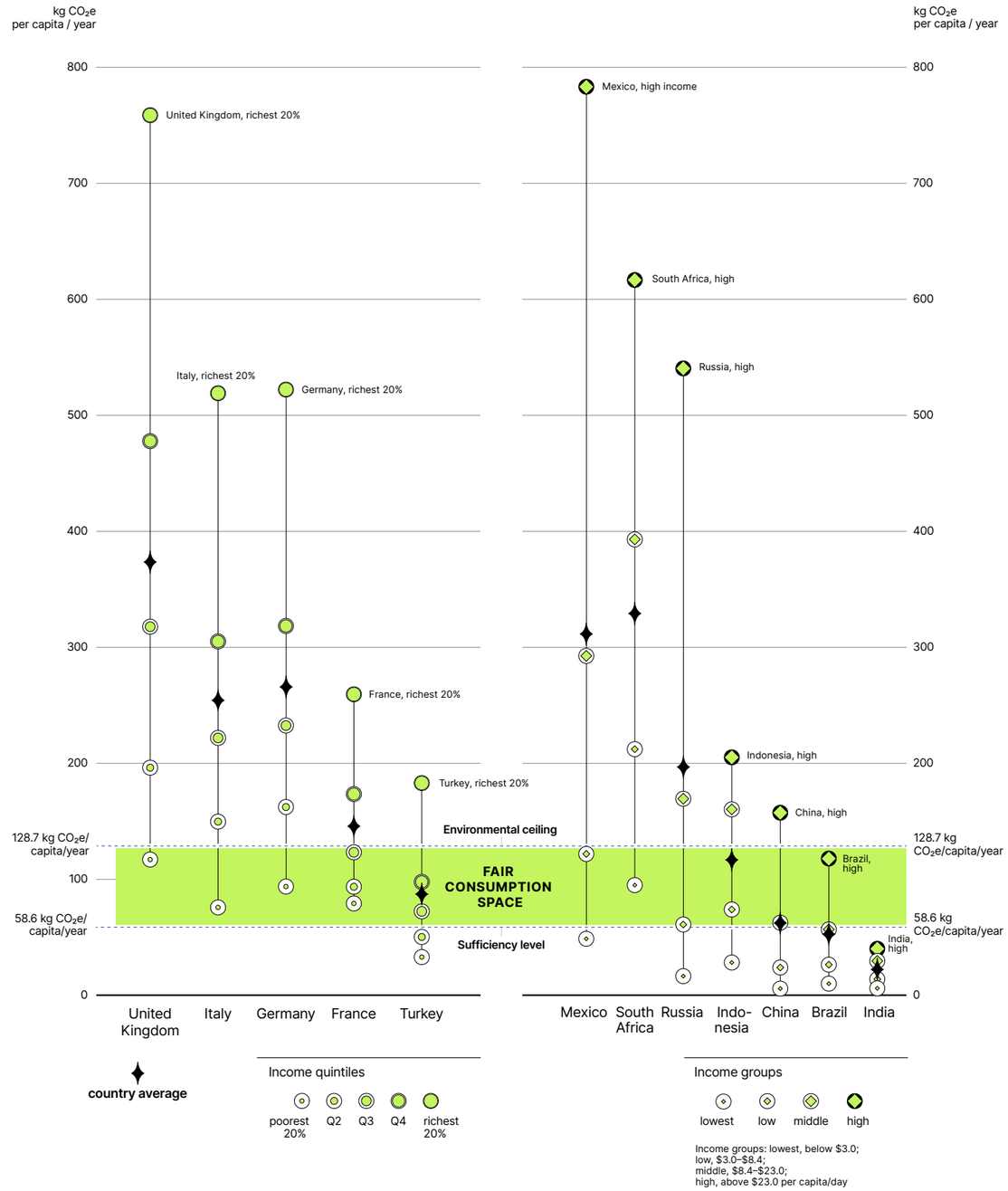
Figure ES2. A fair consumption space for fashion



211 kg (Argentina), 197 kg (Russian Federation), 146 kg (France), 117 kg (Indonesia), 87 kg (Turkey), 62 kg (China), 53 kg (Brazil) and 22 kg (India) (Figure ES1).

In comparison to these consumption footprints, we need to aim for a per capita fashion consumption footprint target of 128.7 kg of CO_2e by 2030 to comply with the 1.5-degree aspirational target of the Paris Agreement (Figure ES1).

The footprint gaps between current fashion lifestyles and the target show that footprints need to be reduced by 60% on average by 2030 among the G20 high-income countries (Australia, Canada, France, Germany, Italy, Japan, Saudi Arabia, South Korea, the UK and the United States). The upper middle-income countries (Argentina, Brazil, China, Mexico, the Russian Federation, South Africa and Turkey) need to reduce their footprints by over 40% by 2030. The lower middle-income countries (India and Indonesia), meanwhile, have a positive carbon budget for fashion lifestyles, meaning that their carbon footprint of fashion consumption is below the 1.5-degree target.

However, fashion lifestyles and their impacts are not the same for everyone, within and across countries. Among the G20 countries, Australia has the highest footprint, at 503 kg of CO_2e per year, resulting from average consumption of around 27 kg of new clothing per year and clothing discards of around 23 kg. At the other end among G20 countries is India, which, despite rapidly rising consumption levels and an expanding middle class, has the lowest per capita fashion consumption footprint at 22 kg of CO_2e per year, less than 5% that of Australia.

The report also shows that these average values are affected by the high consumption levels of top income groups within countries. A representative sampling of G20 countries shows that the lowest income quintile is responsible for 6%-11% of the total carbon footprint, the second quintile for 10%-13%, the third quintile for around 17%, the fourth quintile for 24%-26%, and the highest income quintile for 36%-42%. On average, the emissions of the richest 20% were 20 times higher than the emissions of the poorest 20%. This ratio varies substantially across countries, consistent with levels of income inequality.

According to this analysis, the richest 20% would have to reduce their footprint by 83% in the UK, 75% in Italy and Germany, and 50% in France, considering a few representative countries.

These numbers point to why interventions at the national level would fail if they do not affect consumption by the richest 20% – who, in addition to their direct impacts, also influence the aspirations of others.

Solutions and scenarios

Three scenarios were developed for each country, focused on: 1) changes in the efficiency of upstream production and in brand and retail operations, 2) sufficiency solutions and behaviour change, and 3) a combination of efficiency and sufficiency approaches, in order to realise system change along the entire life cycle of garments.

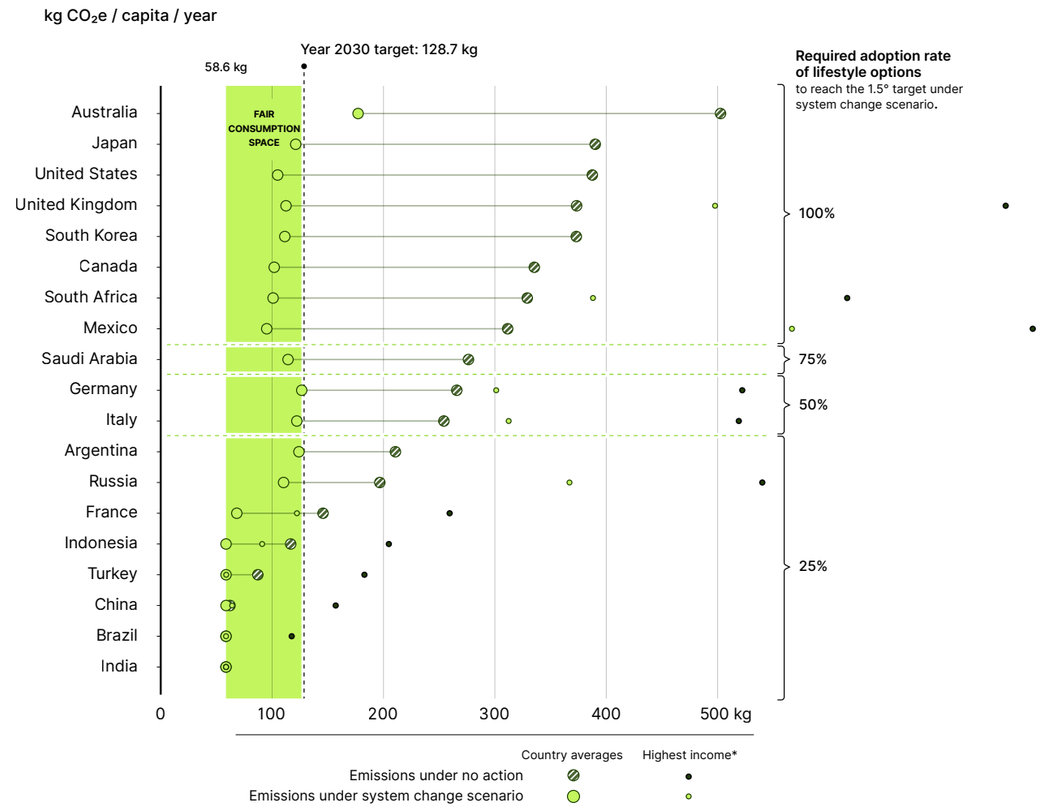
The scenarios show indicative pathways for achieving the 1.5-degree target for fashion by 2030. The results indicate the need for an integrated approach that combines production- and consumption-focused solutions for achieving climate mitigation targets for fashion. They call for further exploring the impacts of sufficiency lifestyles and how they can be enabled through efficiency improvements and innovative business models.

Solutions for enabling 1.5-degree fashion lifestyles will require three parallel types of efforts:

- absolute reductions in high-impact consumption (such as reducing purchases of new clothing);
- modal shift towards more sustainable options (such as buying second-hand garments instead of new); and
- efficiency improvements (such as switching to less carbon-intensive fibres).

The analysis considers five specific consumption-oriented solutions: reducing purchases of new garments, increasing use-time, reducing washing and drying, buying second-hand and responsibly disposing. The results indicate that the two solutions with large emission reduction potential are reducing purchases of new garments and increasing use-time. Responsibly disposing, reducing washing and drying, and buying second-hand showed more limited reduction potentials. The magnitude of impacts of different solutions would depend on their adoption rates by the public and on structural elements such as the national energy mix, infrastructures and prevailing social norms.

Figure ES3. Fashion consumption carbon footprint in 2030 under the current trajectory and under the system change scenario



*) Highest income is the footprint of the high income group for Mexico, South Africa, Russia, Indonesia, China; of the richest 20% of the population for UK, Italy, Germany, France, Turkey. No income group data for unmarked countries.

Fashion consumption is highly unequal *between* and *within* countries.

SECTION I

Unfashionable consumption

1

The “black box” of fashion consumption

1.1 Unfit, unfair, unfashionable

Recent trends in fashion consumption are clear: we are consuming more fashion and at a faster rate than ever before, while paying increasingly less for it and weaving a dirty tapestry of social and environmental impacts.

Consumption of apparel, footwear and accessories globally has doubled since 2000 (Ellen MacArthur Foundation, 2017). Prices for apparel have decreased consistently over the past three decades in the G20 countries. From the mid-1990s to the mid-2010s, clothing prices dropped more than 30% in the European Union (EU) (EEA/Eionet, 2019) and more than 50% in the United Kingdom (UK). During the same period, the price of clothing relative to other consumer goods fell by over 80% in South Africa, 70% in Germany, 40% in Brazil, the Russian Federation, and India, and 20% in China (Coscieme, Samtani and Pulawska, 2020).

In 1995, households in the G20 spent on average around 6% of their total expenditures on clothing and footwear; by 2021, this share was only around 4%. Reductions in the share of clothing expenditures range from less than 1% in Australia and the UK to over 6% in Japan, with most of the G20 countries showing a spending share that is between 2% and 3% less today than in the mid-to-late 1990s. Total expenditures on clothing vary even more within the G20, with the top 10% of income earners spending on average around 20 times more than the bottom 10% (Oswald, Owen and Steinberger, 2020).

Lower prices have contributed to increasing per capita sales of clothing globally. Between 1996 and 2012, the average amount of clothing purchased per person in the EU increased 40% (Šajn, 2019), and in 2019 the average European consumed around 27 kilograms (kg) of textiles and clothes (EEA/Eionet, 2019). Per capita and total consumption levels of garments are expected to keep rising, reaching 102 million tonnes globally by 2030 (McKinsey & Company and GFA, 2020).

Increasing consumption volumes have coincided with a drop in the duration of use (use-time) of garments (Ellen MacArthur Foundation, 2017). Consumers now buy more apparel but use it for much shorter periods than they did 20 years ago (Laitala and Klepp, 2015). For example, today less than 30% of UK wardrobes are estimated to be actively in wear (WRAP, 2020). This rapid pace of turnover is possible in part because both the production and disposal of garments happen away from the eyes of consumers. Such “distancing” is a consequence of the push by countries and manufacturers to minimise the costs of production (Princen, 2002).

Distancing and the unfair value chain of fast fashion

Globalised fashion value chains are a striking example of the dark side of global markets. The ongoing race to the bottom reinforces global divides and perpetuates the dominance of industrialised economies.

On the one hand, consumers in high-income countries are shielded from the conditions of abuse, exploitation, and poverty under which garments are made, and from the toxic soil and water pollution near textile factories and the associated health impacts on workers and residents. These upstream impacts are typically externalised to low-income countries that have weak legislative frameworks for environmental and social protec-

tion. The very existence of the popular campaign "Who made my clothes?"– run by Fashion Revolution since 2014 in the Global North – attests to how detached consumers of fashion in high-income countries are from the products they buy.

Most fashion consumers also fail to see the downstream effects of their overconsumption. A vast second-hand market of unwanted clothes from high-income countries, facilitated by charities and second-hand resellers, has grown at an unprecedented rate in the past 10 years (thredUP, 2019). This is due mainly to increasing exports to the African continent and to some Asian and Latin American countries. At the end of life, vast quantities of primarily synthetic garments end up in open landfills, in waterways, and in the open sea, causing environmental damage (EEA, 2020).

Consumers in high-income countries are well insulated from the negative impacts of their choices, which allows for the proliferation of a mentality of fast and disposable fashion. They continue to overconsume, relying on (and sometimes unaware of) the broken, exploitative system. Meanwhile, the high dependency of some low-income countries on fashion exports, and the risk of harming the livelihoods of millions of workers, has led to a stall in policy dialogues on the need to reduce fashion overconsumption in high-income countries. Overall, there is a lack of political will to explore the reductions in demand and the effects on production that are necessary enablers of a fair transition to a sustainable fashion system.

1.2 The climate cost of fashion consumption

The frantic pace of fast fashion – and the rapid growth in "ultra-fast" fashion retail online – have a high environmental price, from pollution of soil, air, and waterways, to water and land use (Niinimäki et al., 2020). Among the many impacts, this report focuses specifically on climate change. In Europe, for example, consumption of clothing, footwear and household textiles is the fourth largest contributor to greenhouse gas emissions, after housing, transport and food (EEA/Eionet, 2019).

Estimates of the global emissions from fashion vary from 2% (Sadowski, Perkins and McGarvey, 2021), to 4.8% (McKinsey & Company and GFA, 2020), to 8% (Quantis, 2018), and up to 10% (United Nations Climate Change, 2018). This uncertainty exists due to the lack of reliable data, industry transparency and peer-reviewed scientific research. However, even the most conservative approximations place fashion among the top players in the global market and suggest that changing how we produce and consume garments has important implications for achieving international climate goals.

Emissions from fashion are expected to surge nearly 50% by 2030 (United Nations, 2019), and the whole fashion sector is expected to use more than a quarter of the world's carbon budget by 2050 (Ellen MacArthur Foundation, 2017). If no action for decarbonisation of fashion is taken, the fashion sector will be emitting an estimated 2.7 billion tonnes of carbon dioxide equivalent (CO_2e) in 2030 (McKinsey & Company and GFA, 2020).

According to the Global Fashion Agenda, around 70% of fashion's annual emissions occur in the production and processing stages, 10% in transport and retail, whereas 20% are generated in the use phase (McKinsey & Company and GFA, 2020). Other estimates point to the use phase as responsible for between 14% (Sandin, Zamani and Peters, 2019) and 40% (Beton et al., 2014) of the climate change impacts of fashion. Part of this variation depends on the type of fibre considered, which largely influences the allocation of emissions along the life cycle. For example, for cotton-based clothing, the highest emissions occur in the use phase and are generated by energy use during washing and drying (Rana et al., 2015).

Social and environmental impacts of fashion do not end at the moment of purchase. The fashion industry represents only one part of the global fashion system. Other parts of the system include the practices, processes and material flows related to the consumption and post-consumption phases of a garment's life span. While how we produce garments undoubtedly has major implications for their carbon footprints, how clothing is used and what happens to it at the end of life is equally important (Bates Kassetly and Baumann-Pauly, 2022; Laitala and Klepp, 2015).

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The case of fashion is not an exception. More generally, sustainability approaches that are focused mainly on production tend to overshadow the evidence that lifestyles and consumption patterns are essential pieces of decarbonisation pathways (Akenji et al., 2021; Costa et al., 2021; Shigetomi et al., 2020). These approaches perpetuate a belief in technological solutions (McLaren and Markusson, 2020) and diminish the sense of urgency around the needed rapid reductions in greenhouse gas emissions from different domains or sectors of consumption (Dyke, Watson and Knorr, 2021; Young In and Schumacher, 2021).

Very few academic research studies on fashion consumption to date have offered a quantitative analysis of the impacts or the potential for mitigating greenhouse gas emissions from changing fashion consumption and disposal patterns (Mistra Future Fashion, 2019). A few reports address consumption-focused solutions only in passing (Ellen MacArthur Foundation, 2017). Even the most recent approaches on innovative and circular business models fail in addressing fashion overconsumption (EEA/Eionet, 2021).

While new ways of selling and consuming fashion certainly hold potential for reducing carbon emissions, an analysis of rebound effects of, for example, second-hand or service-based business models is limited (Siderius and Poldner, 2021). Also lacking is an assessment of the needed reductions in overconsumption in high-income countries and groups. Although overall understanding of the impacts and potential of consumer-focused solutions in fashion is growing, it remains sparse.

Despite the dearth of data and evidence, advocacy groups that work in the areas of fashion, sustainability, and environmental and social justice routinely offer lists of changes that consumers can implement in their own lives to reduce the impacts of their fashion consumption (e.g., Fashion Revolution Fanzines). Some of these options are based on untested assumptions and include recommendations analysed in this report, such as prioritising second-hand purchases and reducing washing and drying cycles.

1.3 Measuring fashion consumption impacts and setting targets

Setting targets and developing pathways for a shift to a more sustainable fashion system is an essential first step towards change. Several existing reports and studies explore pathways to reduce the carbon footprint and broader unsustainable impacts of fashion. However, these studies focus primarily on production and on the fashion industry (Ellen MacArthur Foundation, 2017; McKinsey & Company and GFA, 2020; Sadowski, Perkins and McGarvey, 2021).

For example, the *Fashion on Climate* report by the Global Fashion Agenda proposes a "carbon budget" for the fashion industry for 2030 to stay in line with the Paris Agreement goal to keep global warming below 1.5 degrees Celsius (°C) (IPCC, 2022; McKinsey & Company and GFA, 2020). The analysis is global in scale and covers the entire fashion value chain. However, it lacks a specific focus on household emissions and on the reduction potential from lifestyle changes.

A consumption-focused analysis is a valuable addition to the literature. It can support consumers and policy makers by demonstrating how specific changes in lifestyles, as well as tailored policy interventions that change the enabling factors that determine fashion consumption (Box 1), could lead to direct or induced emission reductions across the entire fashion value chain.

The present report addresses those gaps and complements existing fashion and climate approaches by focusing on integrated solutions for emission reductions in the context of the 1.5-degree target of the Paris Agreement. The analysis measures the per capita carbon footprints of fashion consumption in the G20 countries and outlines a "fair consumption space" for fashion where overconsumption levels are reduced and sufficiency levels are realised.

Notably, this report takes a consumption-based accounting approach, mainly because this offers a more effective research methodology that allows for understanding bottom-up perspectives, shows aggregate environmental impacts, and more clearly demonstrates social issues such as inequality. Recommended interventions stemming from the analysis are careful to avoid consumer scapegoatism, or putting disproportionate responsibility for change on the shoulders of everyday consumers (Akenji, 2014).

A sustainability transition in the fashion sector would first and foremost require drastic changes from the industry itself – in some instances with the needed push of radical policy interventions by governments, and with the pressure or guidance of organisations. However, changes in lifestyles are also key. Although direct reductions from individual lifestyle changes might tend to be comparatively small, the overall impact of demand-side measures can be vast, deriving from both the cumulative effect of individual changes en masse, and the induced impact across the supply chain.

Box 1. Research reveals media companies as drivers of fast fashion consumption

Many media companies declare their support for tackling the climate challenge, yet their own broadcasting and reporting practices contradict these good intentions. The media economy is dependent on advertisers, reputation and clicks. Fashion media are particularly tied up with fashion brands – they provide access to fashion shows, representatives, and influencers, but most importantly, they often advertise in the fashion press. Reputation is on the line, too – one must be a prophet of novelty in the world of fashion consumption. It is a challenge for fashion editors and writers to reiterate the message that "the most sustainable wardrobe is the one you already have" in multiple variations.

In the first-ever analysis of a large sample of UK fashion media publications, voices, and influencers, more than 1,000 artefacts were studied (Denisova, 2021). The sample included weekly and monthly fashion magazines, fashion websites, newspaper sections (broadsheet and tabloids), popular blogs and the most followed Instagram fashion influencers, as well as the social media accounts of prominent television personalities. The research revealed the dominance of a pro-shopping agenda and a minimal share of climate-conscious coverage. Five patterns of fashion communication were distinguished:

1 *Red carpet dream.* Occasion wear does not dominate the wardrobes of most people, yet it takes up significant space in fashion magazines. In the likes of *Vogue*, *ELLE*, *Marie Claire*, and *Grazia*, around 40% of content is about special occasion outfits. While it is well known that fashion magazines serve an aspirational function, the exaggerated interest in less practical clothing makes sustainability a far-away goal. Gossip weeklies in the UK *(OK! HELLO!)* demonstrate an even larger share of gowns, cocktail dress and red carpet-worthy ensembles (55%).

Similarly, some of the more striking tropes in the communications of Instagram influencers are the presentation of life as a holiday, and access to prestigious places and crowds. Top fashion influencers – Chiara Ferragni, Kim Kardashian, Emily Ratajkowski, Kendall Jenner – enjoy a massive audience, with each of these celebrities attracting a following of between roughly 20 million and 150 million persons.

Most of them do not promote clothing directly – apart from Kim Kardashian – yet their lifestyle is about holidays, parties, romance, and access to money and elites. In this context, new clothes and creative outfits become emblems of the environment that they are a part of. They also use sexualised imagery, proving an old advertising maxim that "sex" is a strong driver for attracting and promoting consumption.

2 *Promotion by the editorial team.* The editorial coverage in fashion media commonly emphasises being "obsessed" with the "must buys" of the season. In the fashion pages of *Cosmopolitan*, *ELLE*, *Grazia*, *HELLO!*, *Heat* and others, many articles pretend to speak directly from the personal opinion of the editorial team. This creates a fake intimacy and the perception (likely illusory) that fashion journalists buy new clothes all the time. It is rare to see praise of the items that one already has – with the exception of some specific writers in *The Guardian* and *Refinery29* – despite the fact that this would be a more sustainable choice to declare. It is not uncommon for the editorial team to advise their audience to "buy it" or "do this", with *Marie Claire* and *Grazia* being the most likely to include such instructive language.

3 *Language of religion, mental health and tech.* The words "upgrade" or "update" formerly were reserved for technology reviews, yet now they are often applied to fashion. In our tech-rich societies, this terminology creates the feeling of a tangible change that clothes can bring to one's life. Another persistent trait of fashion communication is the vocabulary of mental health, self-help and mindfulness. *Vogue* even applies the jargon of mindfulness and coaching techniques by advising on accessories that "project confidence". Meanwhile, the classic trope of fashion media – the "must have" – is retaining its spot in the media sun.

4 *Direct links to products.* The tabloids in the study sample (*The Sun*, *Daily Mirror* and *Daily Mail*) feature a remarkably high presence of affiliated links – i.e., direct links to the webpage where a reader can buy the product. For some publications, the presence of such links reached 100 percent, revealing the extent of commercialisation of the media coverage on fashion. Frequently, even the language of commissioned fashion articles resembles a press release, with low objectivity and a strong drive to promote the product.

Curiously, digital-first publications are sometimes more considerate of the commercialised reputation that affiliated links can bring. Some of them – such as *Man Repeller* – use plenty of affiliated links, while others – such as *Refinery29* – only feature them in a less than a fifth of coverage, thus retaining objectivity and journalistic integrity.

5 *Sustainable as a small trend.* Sustainable coverage does appear in most of the publications in the sample. However, it occupies a small niche. Some of the more climate-conscious voices emerge from modern, centre-left media that are targeted at young and middle-aged women, such as *Refinery29* (journalist Georgia Murray), *Stylist* and parts of *The Guardian* (editor Jess Cartner-Morley). Although these are drops in the ocean, they drive the pivot to sustainable awareness and give practical instructions to the audience.

Advice on restyling existing wardrobes has some presence in the coverage, but this never totals more than a third of the fashion advice. Restyling is appearing more often in fashion shoots, where they tend to include pieces from the editor's or model's own wardrobe mixed with the new outfits of the season.

Several other examples of sustainable coverage – crowdfunded fashion, ethical brands, recycling, clothes renting – are gaining momentum. However, these are often restricted by prohibitive costs (a dress from a sustainable brand can cost as much as GBP 100-200) or by a user's skill in using thrift shops and second-hand platforms such as Depop, eBay and Vinted. These solutions may not be for everyone.

The consumption paradigm overwhelmingly dominates the fashion media landscape. This may be attributed to the business model of the media outlets and to a need to maintain the reputations of trendsetters, a cornerstone of fashion. Because fashion is about novelty, it is challenging for a media that is focused on consumption to reject, redefine or repackage excitement about clothing in a way that does not cause damage to the environment.

2

Adjusting the speed of fashion

2.1 Fashion in 1.5-degree lifestyles

The Intergovernmental Panel on Climate Change (IPCC) has reinforced the need to urgently and drastically limit global warming to 1.5°C above pre-industrial levels as our best chance to mitigate the worst effects of the climate crisis (IPCC, 2022). Achieving the 1.5-degree target would greatly reduce the risks and impacts of climate change, including ecosystem collapse, extreme temperatures, heavy precipitation events, agricultural and ecological damages from droughts, and sea-level rise.

The goal "to limit global warming to well below 2°C, preferably to 1.5°C" was adopted by 196 governments, including all G20 country governments, as part of the legally binding Paris Agreement. Meeting this target requires rapid and drastic reductions in greenhouse gas emissions in all areas of production and consumption and achieving net zero emissions globally by the middle of the 21st century.

Based on the conservative estimate that 4% of global emissions come from fashion, the fashion industry would have to bring down its emissions to 1.1 billion tonnes of CO_2e to be on the 1.5-degree pathway by 2030 (McKinsey & Company and GFA, 2020). This corresponds to a reduction in greenhouse gas emissions of 50% to 60% compared to levels in 2018.

To ensure that the temperature limits of the Paris Agreement are met, per capita targets for fashion-related emissions are determined by distributing the remaining carbon budget on an equitable basis across the global population (Akenji et al., 2021). Accordingly, a per capita budget of 128.7 kg of CO_2e per year is calculated and can be used to assess emission reductions from fashion consumption in line with the 1.5-degree target.

The G20 countries[2] are analysed in three categories, based on the size of their economy: high-income countries (Australia, Canada, France, Germany, Italy, Japan, Saudi Arabia, South Korea, the UK and the United States); upper middle-income countries (Argentina, Brazil, China, Mexico, the Russian Federation, South Africa and Turkey); and lower middle-income countries (India and Indonesia).

The per capita carbon footprint of fashion consumption varies substantially across the G20 (Figure 1), and it generally follows GDP and average income levels. High-income countries show an average per capita footprint of 330 kg of CO_2e per year, upper middle-income countries of 179 kg of CO_2e per year and lower middle-income countries of 69 kg of CO_2e per year.

Around 84% of the greenhouse gas emissions embodied in fashion consumption occur in upstream production, from fibre cultivation to garment tailoring and finishing (Figure 1). The share of emissions in upstream production is lower in middle-income countries, where consumption levels of new garments tend to be lower, use-times longer, and recycling rates lower, leading to higher shares of impact during the use and disposal phases.

The emission levels from upstream production depend on global market flows and on structural factors in producing countries. These factors include environmental regulations and standards, the prevalent technologies at all stages of production (from fibre cultivation to manufacturing), the national energy mix, and the reach of export, among others.

2 The study covers 19 of the 20 G20 countries; the European Union is a member but is excluded from the analysis.

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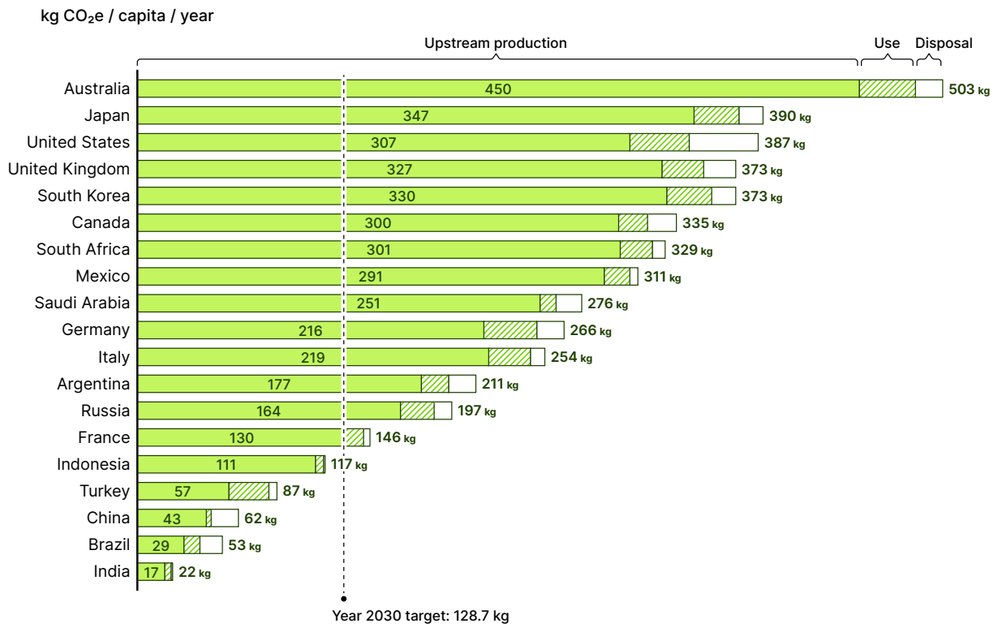
Figure 1. Carbon footprint from fashion consumption in the G20, and equity-based 1.5-degree target for 2030



The emission levels from the use phase vary widely in the G20 countries. This reflects the combined effect of electricity and water consumption levels and the energy mix of each country. For example, the low carbon footprint of use in China (2 kg of CO_2e per person per year, or only 4% of the country's total fashion consumption footprint) is largely explained by very low levels of electricity use, which offset the carbon-intensive coal-based national mix. In contrast, the carbon footprint of garment use in Turkey or the Russian Federation is much higher (more 20 kg of CO_2e per person per year, or 29% and 11% of the total footprint, respectively), since higher levels of electricity use occur in the context of an energy mix based vastly on fossil fuels.

Water consumption is the largest contributor to the carbon footprint of garment use in Canada, Japan, South Korea and the United States. The use of detergent tends to play a minor role, contributing less than 1 kg and up to 4 kg of CO_2e, except in Japan where it amounts to 8 kg of CO_2e per person per year.

Globally, most disposed garments end up incinerated or in landfills, depending on national regulations and on waste management practices. Both of these disposal modes for garments have a substantial and comparable impact in terms of greenhouse gas emissions (Ecoinvent, 2022). Hence, the climate impact of garment disposal in the G20 is explained mostly by variations in the amount of garments wasted per year. The highest carbon footprint from disposal across the G20 is in the United States (33 kg of CO_2e per person per year) followed by Canada and the UK (around 15 kg each). The lowest carbon footprints of disposal are in India and Indonesia (0.7 kg each) followed by France (2.9 kg), Mexico and Turkey (around 3 kg each).

In this report, the carbon footprint of fashion disposal includes emissions generated from the transport and disposal of the share of exported second-hand clothes that end up directly in landfills or are incinerated at their destination (around 30% of the total volume) (Cobbing et al., 2022). These emissions account for, on

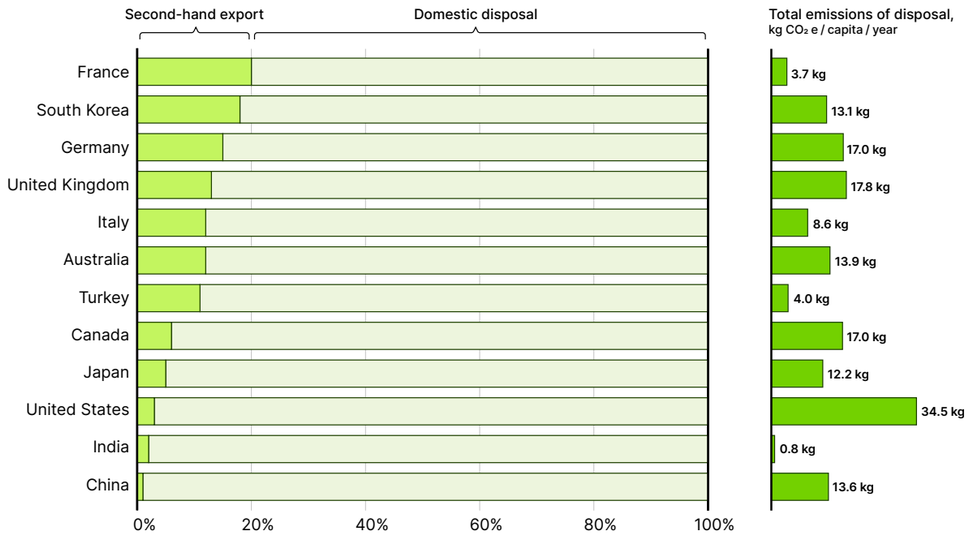
average, around 20% of the total footprint of disposal in France; around 15% in Australia, Germany, Italy, South Korea, Turkey and the UK; and around 6% in the G20 as a whole (Figure 2).

Among the G20 countries, Australia has the highest footprint from fashion consumption (503 kg of CO2e per year) and is the second highest consumer of textiles per capita in the world. Annually, the average Australian consumes around 27 kg of new clothing and discards around 23 kg (Australian Government DCCEEW, 2022). India is the G20 country with the lowest per capita carbon footprint from fashion consumption (22 kg of CO2e per year). Despite rapidly rising consumption levels and an expanding middle class, more than 175 million people in India (around 14% of the total population) remain below the international poverty line, living on less than USD 1.9 (PPP 2011) per day.

Notably, France shows the lowest per capita carbon footprint from fashion consumption among high-income G20 countries. The country has enforced ambitious policies for reducing the environmental impact of textile use and in particular disposal. These include a law banning companies from destroying returned or unsold garments (Republic of France, 2020) and mandatory carbon labels for clothing and textiles (Fibre2Fashion, 2021). Moreover, an extended producer responsibility (EPR) framework, implemented since 2017, requires all textiles and clothing producers in the French market to take responsibility for the recycling / proper disposal of their product (Bukhari, Carrasco-Gallego and Ponce-Cueto, 2018).

To bring down fashion consumption emissions to levels compatible with the 1.5-degree target, the needed reductions range from 12% for France to 74% for Australia (Figure 1). Excluding France, reductions in high-income countries range from 49% (Italy) to 74% (Australia). Most upper middle-income countries are above the 1.5-degree budget for 2030. For these (South Africa, Mexico, Argentina and the Russian Federation), the needed reductions are estimated in the range of 35% to 61%. Emissions in all lower middle-income countries are below the 2030 budget.

Figure 2. Carbon footprint from direct disposal of exported second-hand clothes as a share of the total footprint from garment disposal in the G20



Note: Countries with a carbon footprint share from second-hand exports lower than 1% are not shown.

Box 2. One item, one material

Polyester seemed for years like the wonder fabric, strong and easy to manipulate, colour and use in manufacturing. But its use has been storing up a mountain of waste that does not degrade under normal circumstances and polyester micro fragments are now throughout our marine life food chain through washing (EEA, 2022). Research into refuse dumps along the River Thames in London from the early and mid 20th Century reveal items made from synthetic materials still ready to wear in perfect condition. But polyester also recycles well and can - and should - be reused entirely. Reuse of polyester has not been as prevalent as it could be largely because of the way clothing is designed; most items containing polyester also have other constituents, making it hard to recover and reuse.

Some companies - particularly those in sports and outerwear, where polyester has been dominant and does not have a low-value image - have started to crack this issue through designing single material items. This means a minimum of removal of perhaps a zip-pul is all that is needed to recycle an item. Highly visible labelling then asks wearers to keep the item as long as possible, to resume and to pass it on before finally recycling. Conscious design that builds in long-term use and end-of-life recycling could work well if supported by policy to reduce waste and mandate recycling through design.

2.2 Inequality in fashion consumption

Based on data available for a subset of the G20 countries on the share of expenditures on clothing from different income groups (Oswald, Owen and Steinberger, 2020), it is possible to shed light on inequality in carbon emissions from fashion consumption. This analysis is based on two different classifications of income distribution, thus limiting comparability among results for different groups of countries.

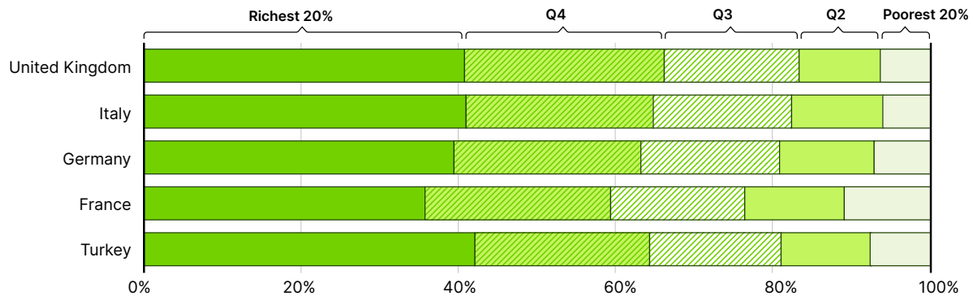
For the first grouping, expenditure data for fashion were available for quintile income groups for France, Germany, Italy, Turkey and the UK (Figure 3). For the second grouping, expenditure data were available for Brazil, China, India, Indonesia, Mexico, the Russian Federation and South Africa based on four specific income groups: lowest (below USD 2.97 per capita per day), low (between USD 2.97 and USD 8.44 per capita per day), middle (between USD 8.44 and USD 23.03 per capita per day) and high (above USD 23.03 per capita per day) (Figure 4). For both groupings of countries, the results show very prominent levels of inequality in carbon footprints.

For the first group of countries analysed, there was a consistent distribution of the share of the total carbon footprint among different income groups. Across these countries, the lowest income quintile is responsible for 6%-11% of the total carbon footprint, the second quintile for 10%-13%, the third quintile for around 17%, the fourth quintile for 24%-26% and the highest income quintile for 36%-42%. Considering per capita estimates, the richest 20% in the UK have the highest carbon footprint (759 kg of CO2e), yet Italy shows the highest level of inequality, measured as the top-bottom ratio of the carbon footprint (Italy 6.9; UK 6.5; Germany 5.6; Turkey, 5.6; France 3.3) (Figure 5).

In the UK, Italy, and Germany, the only income group with a remaining carbon budget by 2030 is the lowest quintile. France and Turkey show more equal per capita distributions. In France, the fourth and fifth quintiles exceed the 1.5-degree carbon budget, while the third quintile is very close. In Turkey, only the richest 20% exceed the available budget.

In the second group of countries analysed, the different income groups considered do not represent equal shares of the population. These are based on global income distribution data, which rank the global population by income per capita. The lowest consumption segment corresponds to the bottom half of the global

Figure 3. Share of fashion consumption carbon footprint from income quintiles in selected G20 countries



Total carbon footprint from income quintiles, kg CO_2e / capita / year

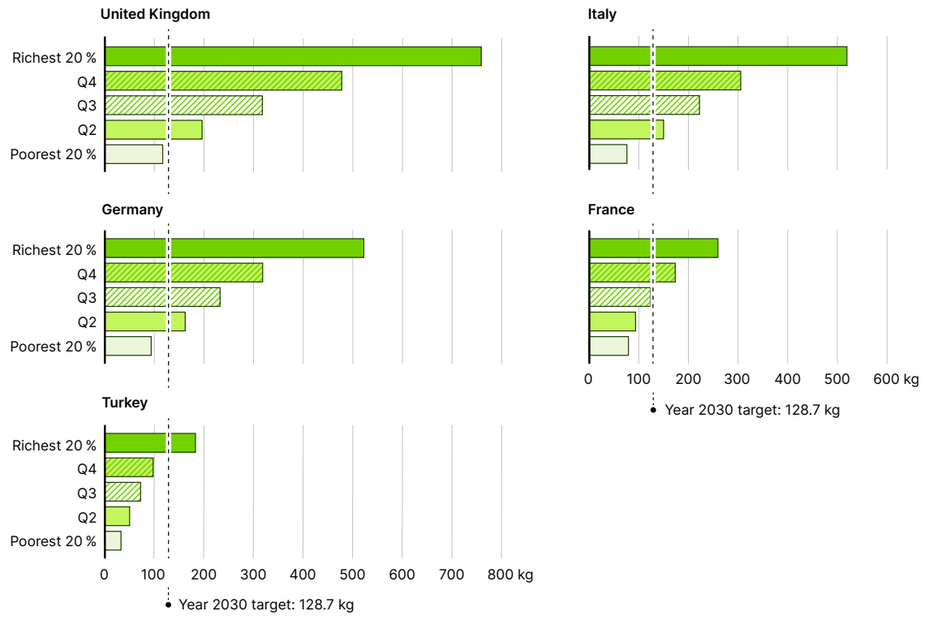
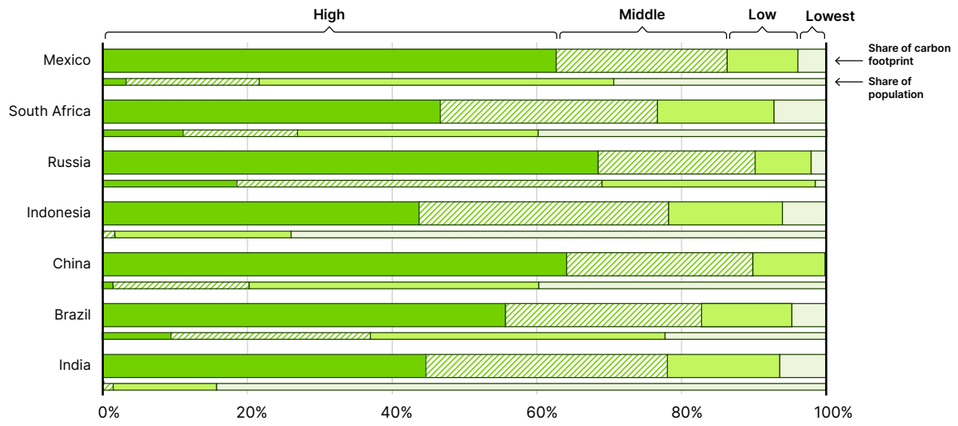
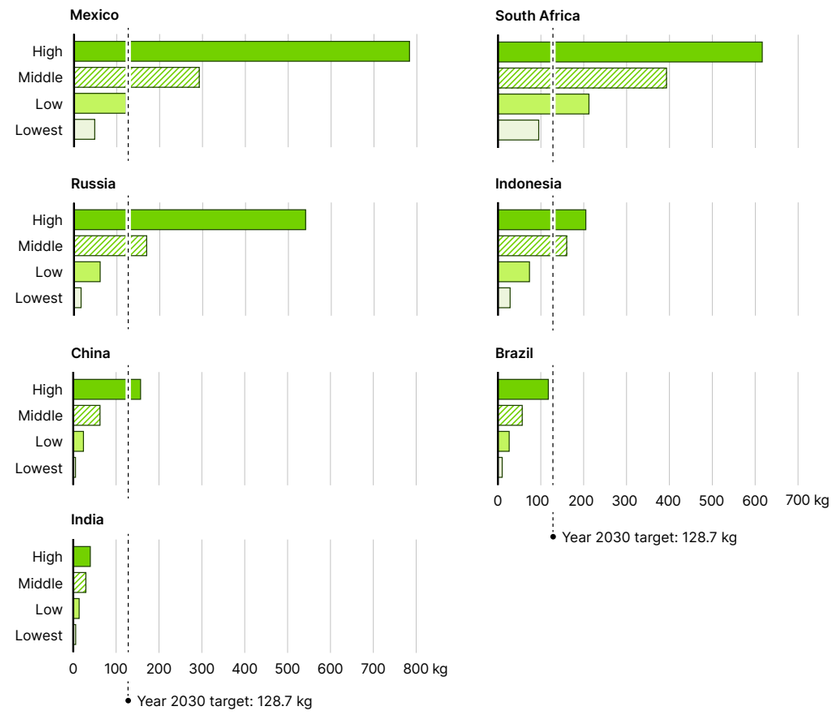


Figure 4. Share of fashion consumption carbon footprint from different income groups in selected G20 countries



Total carbon footprint from different income groups, kg CO_2e / capita / year



Note: The figure shows the following income groups (on a per capita per day basis): lowest, below USD 2.97; low, between USD 2.97 and USD 8.44; middle, between USD 8.44 and USD 23.03; higher, above USD 23.03.

distribution, or the 50th percentile and below; the low consumption segment to the 51th through 75th percentiles; the middle consumption segment to the 76th through 90th percentiles; and the higher consumption segment to the 91st percentile and above (World Bank, 2022). Accordingly, the income values that define each group are constant across countries, allowing for meaningful per capita comparisons.

In South Africa, only the lowest income group is below the 1.5-degree budget for 2030. In Mexico, the Russian Federation, and Indonesia, the lowest and low-income groups are below the budget. In China, the lowest, low- and middle-income groups are below the budget. In Brazil and India, all income groups are below the budget, with the high-income group in Brazil relatively close (118 kg of CO_2e).

Considering these income groups and subsets of G20 countries, the top-bottom ratio of the carbon footprint of fashion consumption ranges from 6.9 for Italy to 3.3 for France for the first group of countries, representing the ratio of the richest 20% to the poorest 20% (Figure 5a). For the second group of countries, the top-bottom ratio ranges from 32.8 for the Russian Federation to 6.5 for South Africa, representing the ratio between the higher (above USD 23.03 per capita a day) and lowest (below USD 2.97 per capita a day) income groups (Figure 5b).

High-income groups in Mexico and South Africa have a carbon footprint from fashion consumption that is higher than the average calculated for high-income countries such as Australia and the United States.

These results highlight the different share of responsibility of different income groups with regard to climate change impacts. They also point to different degrees of lifestyle changes required from different income groups for achieving climate mitigation targets.

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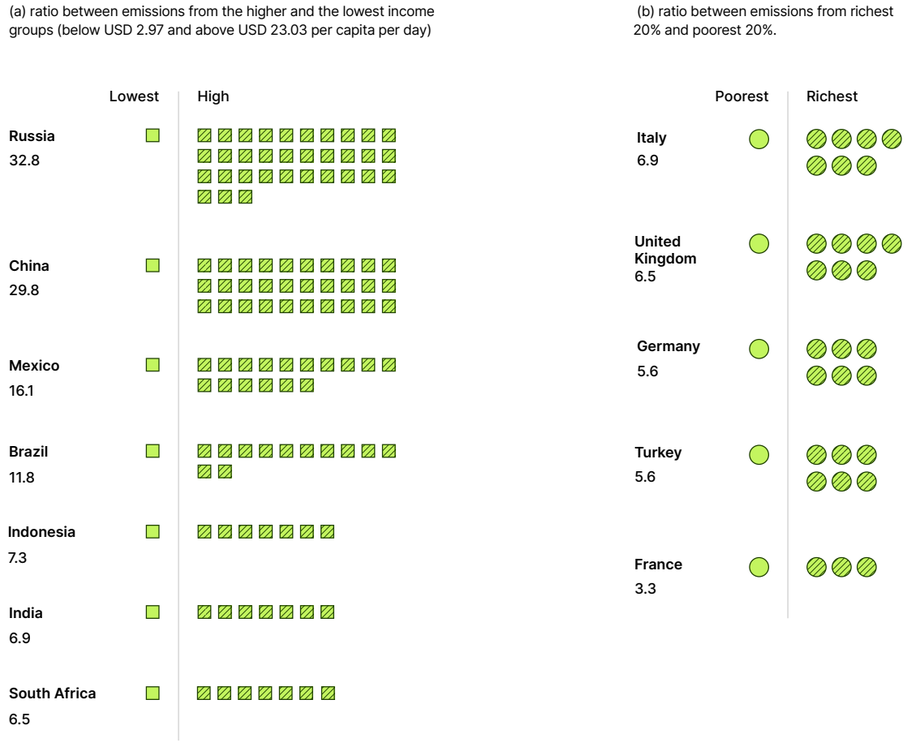
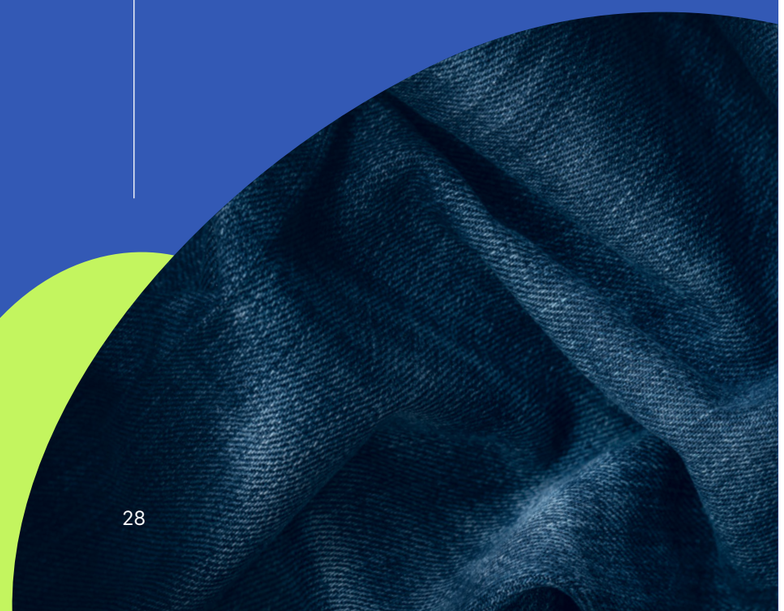
Figure 5. Top-bottom income ratio of fashion consumption emissions in the G20



While the richest 20% in the UK emit 83% above the 1.5-target, *74% of people in Indonesia live below sufficiency consumption levels of fashion.*

SECTION II

Slowing down fast fashion



3

How to slow down fashion by 2030

3.1 Solutions for fashion in 1.5-degree lifestyles

Current approaches to climate change mitigation that aim for carbon neutrality and net zero goals tend to prioritise improvements in technology and efficiency, while disregarding or downplaying reductions in consumption levels and the adoption of alternative modes of consumption (Akenji et al., 2021).

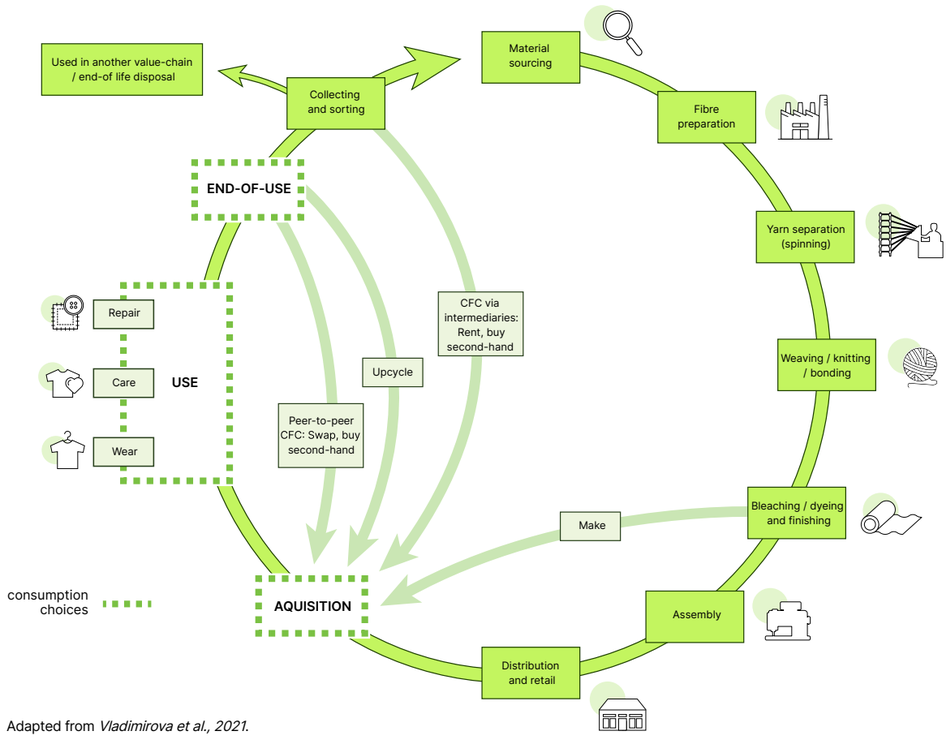
More recent circular economy approaches to climate change mitigation and fashion have placed increased attention on reducing emissions by adopting circular business models based on recycling, upcycling and reuse (among others) (Coscieme et al., 2022). These approaches integrate alternative consumption modes, such as sharing or leasing, into technology and efficiency improvements. They focus on aspects of consumption behaviour and policy approaches as ways to enable climate change mitigation in the fashion industry.

Despite the contributions of the circular economy towards reducing rates of emissions from fashion, however, circular approaches still fail to include absolute reductions in fashion overconsumption as a possible solution to the climate crisis. To fill this gap, the present report explores solutions throughout the life cycle of garments, with a special focus on lifestyles and including reductions in consumption levels.

The solutions considered can be grouped based on the garment ′s life cycle stage of implementation (Figure 6). The emission reduction potential of solutions at the stages of upstream production and brand and retail operations are based on calculations from the *Fashion on Climate report* (McKinsey & Company and GFA, 2020). These include solutions for *Decarbonised material production*, *Decarbonised material processing*, *Minimised production and manufacturing wastage*, *Decarbonised garment production*, *Improved material mix*, *Increased use of sustainable transport*, *Improved packaging*, *Decarbonised retail operations*, *Minimised returns* and *Reduced overproduction*. Taken together, these solutions would reduce emissions by 57.5 to 155.5 kg of CO_2e per capita per year, respectively, based on the current pace of decarbonisation and on an accelerated scenario (Table 1).

In the present report, five specific lifestyle options are assessed for each country of the G20. These lifestyle options are selected with the aim of covering most of the alternative modes and practices considered in the sustainable fashion literature with regard to all phases of consumption in the garment life cycle, i.e., acquisition, use and end-of-use (Figure 6). The reduction impacts of these lifestyle options are estimated based on data from scientific literature and original calculations.

Figure 6. Options for sustainable fashion consumption in the textile value chain



Adapted from *Vladimirova et al., 2021.*

Table 1. Per capita carbon footprint reductions from solutions implemented in upstream production and in brand and retail operations

Life-cycle stage	Solution	Emission savings under current pace decarbonisation (kg CO_2e / capita)	Emission savings under accelerated pace decarbonisation (kg CO_2e / capita)
Upstream production	**Decarbonised material production**	**8.9**	**24.0**
	Decarbonised material processing	30.4	82.2
	Minimised production and manufacturing wastage	1.0	2.8
	Decarbonised garment production	3.9	10.5
Brand and retail operations	**Improved material mix**	**1.8**	**4.8**
	Increased use of sustainable transport	1.7	4.6
	Improved packaging	0.2	0.6
	Decarbonised retail operations	2.3	6.1
	Minimised returns	0.5	1.4
	Reduced overproduction	6.8	18.5
Total		**57.5**	**155.5**

The five lifestyle options assessed in the report are as follows:

Reducing purchasing of new clothes – reducing the amount of garments purchased as new. Avoiding purchasing new garments reduces the carbon footprint of consumption by an extent equal to the total life cycle emissions of the amount of garments not purchased.

Increasing use-time – extending the average life of clothing by nine months, which is estimated to generate a 25% annual reduction in the carbon footprint (WRAP, 2017). The use-time of clothes can be extended by different means, including swapping, repairing or better caring for garments. While some of these practices can be facilitated by circular business and collaborative consumption models, they are also influenced by a variety of idiosyncratic wear practices and a mindset that characterises an emotional relationship with clothing that is steeped in meaning.

Reducing washing and drying – avoiding one out of every three washes and washing at 30°C, thus reducing the carbon footprint of the energy, detergent and water used.

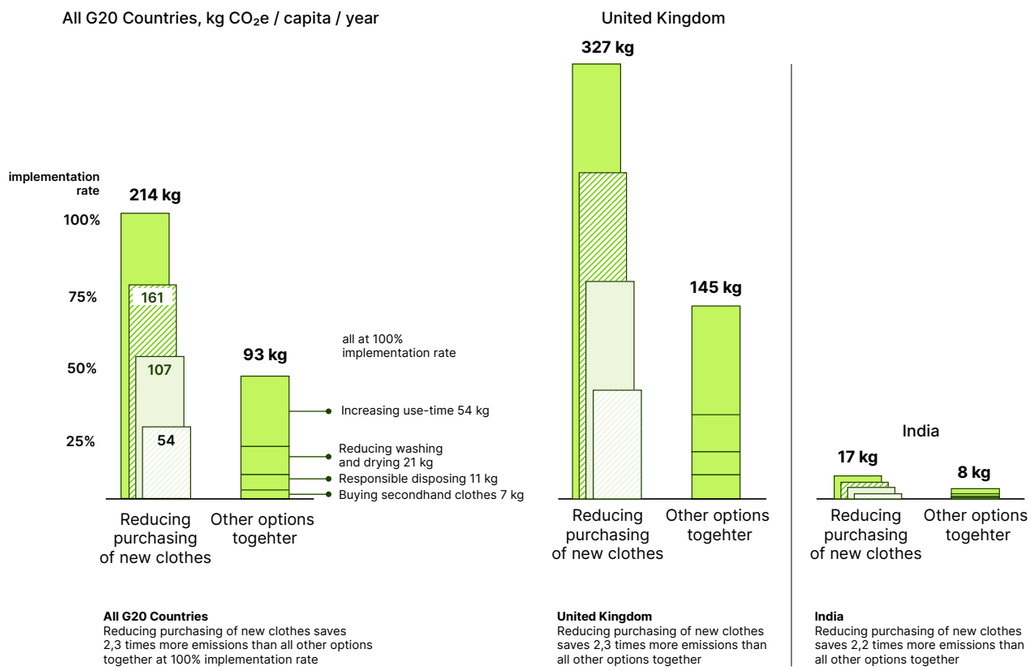
Buying second-hand clothes – purchasing used and resale clothes instead of new ones. Buying one used garment instead of new would save an estimated 0.3 kg of CO_2e per capita per year (thredUP, 2019).

Responsibly disposing – disposing of used garments in ways that avoid landfilling and incineration, including recycling and upcycling. Adopting this lifestyle option reduces the carbon footprint of consumption by an extent equal to the emissions from landfill and incineration of the same amount of garments.

The impacts of all five lifestyle options were reported to the country level, considering national consumption data and carbon intensity (Figure 7). These reflect location-based factors such as the average characteristics and sourcing of garments consumed; the composition of the national energy mix; the average amount of energy, water and detergent used for washing; and the share of end-of-life garments disposed of in landfill and incineration.

The emission reductions required to achieve the 2030 target (e.g., reductions of 49-74% in high-income countries, excluding France) highlight the need

Figure 7. Estimated average per-capita carbon footprint reduction impacts of low-carbon lifestyle options



All G20 Countries
Reducing purchasing of new clothes saves 2,3 times more emissions than all other options together at 100% implementation rate

United Kingdom
Reducing purchasing of new clothes saves 2,3 times more emissions than all other options together

India
Reducing purchasing of new clothes saves 2,2 times more emissions than all other options together

Box 3. The Shrinking Wardrobe

During the pandemic many people confined to their own living space began to notice just how much unnecessary stuff they had accumulated. Much of this was clothing, often hanging unworn for long periods. Clearouts became common - some inspired by the Youtube phenomenon Marie Kondo, a Japanese woman passionate about the concept of "*danshari*" or de-cluttering. The king of danshari is *Fumio Sasaki*, who lives in a 30 square metre room that houses all his 150 possessions - a level of consumption that is normal across much of the world but unusual in high-consuming populations.

This is not a new concept but one that has so far remained a niche activity. Reducing fashion consumption seems to require significant self discipline, the ability to ignore advertising and often a system to help keep you on track - like a clothing diet. American campaigner Courtney Carver started *Project 333* back in 2010 as a "minimalist fashion challenge that invites you to dress with 33 items or less for 3 months". In 2014, Texan blogger Caroline Joy started *Unfancy* – Mindful Style to record a journey as she engaged in a year-long challenge to try to live with a small and structured closet of 37 pieces. The *10×10 challenge* encourages participants to use 10 items for 10 days, and was started in 2015 by Canadian Lee Vosburgh, who went on a 30-day shopping fast and came up with an experiment to help her be more creative with the clothes she already had.

These early niche influencers have been joined more recently by numerous *pundits* advocating *quality* over *quantity* as a way of reducing consumption. The difference today is that these issues are starting to make their way into the mainstream via online rental services. Whether this will actually reduce consumption or simply add to the range of shopping options remains to be seen.

to prioritise high-impact carbon reduction solutions and lifestyle options, maximising synergies and minimising trade-offs among them.

The impacts of the different lifestyle options were assessed considering different implementation and adoption rates. Implementation rates refer to the share of garments for which each option is implemented. Adoption rates refer to the share of the population adopting the lifestyle option at a given implementation rate. For example, an implementation rate of 50% for "increasing use-time" implies that use-time is increased for 50% of all clothes owned by an individual. An adoption rate of 25% for the same option would mean that this is adopted by 25% of the national population.

Assuming full adoption rates, *reducing purchasing of new clothes* is the lifestyle option with the highest emission reduction potential for all countries of the G20 (214 kg of CO_2e per person per year on average). Reducing new clothing purchases by 50% would result in average annual emission savings of 144 kg of CO_2e per capita in high-income countries. A reduction of 75 % would lead to savings of 216 kg of CO2e per capita (161 kg of CO2e per capita for high-income countries). The second lifestyle option with the highest impact[3] is *increasing use-time* (54 kg of CO_2e per person per year on average). In the G20, extending the average use-time of all clothes in use in a year by 50% would avoid emissions of around 27 kg of CO_2e per capita per year. Extending the average use-time of garments by 75% would result in savings of 40 kg of CO_2e per capita.

The other lifestyle options – *reducing washing and drying*, *responsibly disposing* and *buying second-hand clothes* – show substantially lower emission reduction potentials (39 kg of CO_2e per person per year on average). In the G20, *reducing washing and drying* by avoiding one in every three washes and washing at a temperature of 30°C would reduce yearly emissions per capita by 21 kg on CO_2e on average. *Responsibly disposing* of 75% of end-of-life clothes would avoid the emission of 8.4 kg CO_2e. *Buying second-hand clothes* for 100% of garment purchases would save over 7.2 kg of CO_2e.

3.2 Carbon budget scenarios

The reduction potentials of solutions along the garment life cycle were used to develop scenarios for each of the G20 members to meet the target of 128.7 kg of CO_2e per capita at the country level by 2030. These scenarios reflect the equal distribution of the 1.5-degree carbon budget across the global population, thus highlighting the fact that those countries that have higher average fashion carbon footprints must assume a greater responsibility for implementing solutions to reduce emissions.

In addition to country-level responsibility, the scenarios stress the importance of enabling change at both the individual behaviour level and the systems level. In this line of enquiry, three scenarios were developed: an efficiency scenario that explores the decarbonisation potential of fashion production and retail; a sufficiency scenario that prioritises sufficiency and lifestyle change solutions; and a system change scenario that integrates both efficiency and sufficiency approaches.

All three scenarios are based on the aggregated reduction impacts of different solutions, considering possible overlaps. Accordingly, the carbon reductions presented in the scenarios are different from the sum of the reduction potentials of solutions. For example, reducing purchases of new garments will affect the reduction potential of solutions focused on the use phase, such as reducing washing and drying or increasing use-time, as these solutions will affect a reduced number of garments.

The system change scenario represents the more efficient way to meet the 1.5-degree target by 2030 in the G20. The scenario considers decarbonisation of the fashion industry at a realistic current pace, and changes in lifestyles in line with the sufficiency scenario. In the system change scenario, all countries will meet the target, with the sole exception of Australia.

These results indicate the need for an integrated approach that combines production- and consumption-focused solutions for achieving climate mitigation targets for fashion. The results call for further exploring the impacts of sufficiency lifestyles and how they can be enabled through efficiency improvements and innovative business models.

Efficiency scenario

Efficiency improvement refers to decreasing emissions by replacing technologies with lower-carbon ones while making only minimal changes in the amount consumed or used – such as in energy-efficient vehicles, appliances or housing. Regarding fashion, improving efficiency along the garment life cycle entails the use of new materials and production techniques that result in a reduced carbon footprint yet similar output. It also entails increasing the use of renewable energy across the fashion value chain and transitioning from fast fashion to circular business models. From a fashion consumption perspective, an efficient lifestyle thus implies choosing more sustainable materials and brands, avoiding purchasing clothes that have a high carbon footprint from manufacturing and shipping, avoiding returning unwanted garments, and so on.

Current trajectory

If efforts to decarbonise fashion's upstream production and brand and retail operations continue to grow at the current rate, emissions generated during these phases could be reduced by around 492 million tonnes of CO_2e globally (McKinsey & Company and GFA, 2020). In the G20, this would translate to a reduction of 57.5 kg of CO_2e per person, leading to one additional country (France) meeting the 1.5-degree target, alongside the countries whose fashion consumption footprints are already below the target.

Accelerated decarbonisation

If decarbonisation efforts are accelerated, emissions from upstream production and from brand and retail operations could be reduced by around 1.3 billion tonnes of CO_2e globally (McKinsey & Company and GFA, 2020). These reductions would largely come from a lower carbon footprint of materials production and processing, and by reducing overproduction by means of more effective demand forecasting and stock management technologies. In the G20, this accelerated decarbonisation would lead to a reduction of 155.5 kg of CO_2e per person, leading to six additional countries meeting the 1.5-degree target (France, Argentina, Germany, Italy, Saudi Arabia and the Russian Federation).

3 Except for the case of Turkey, where the second most impactful lifestyle option is reducing washing and drying.

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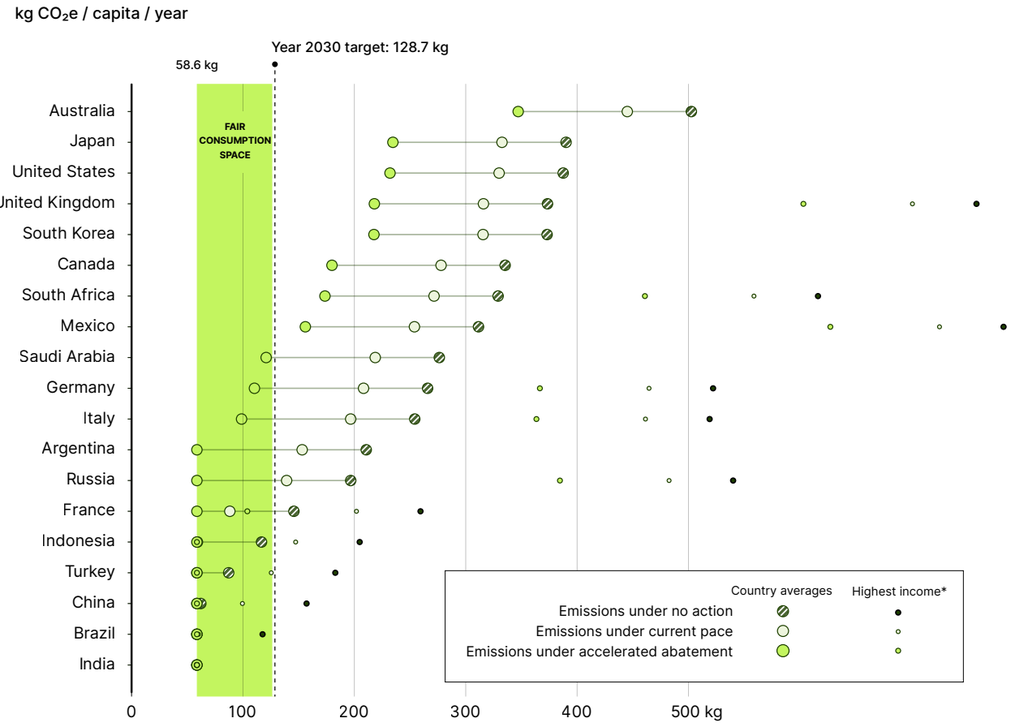
Figure 8. Fashion lifestyle carbon footprint in 2030 under the current trajectory and under the accelerated decarbonisation efficiency scenario



*) Highest income is the footprint of the high income group for Mexico, South Africa, Russia, Indonesia, China; of the richest 20% of the population for UK, Italy, Germany, France, Turkey. No income group data for unmarked countries.

Sufficiency scenario

During the last decade, the emerging minimalism, sufficiency and slow fashion movements have encouraged consumers to buy fewer garments or to purchase higher-quality garments that can be used for a longer time. A sufficiency lifestyle can be defined as a set of habits and patterns of behaviour that follow "the choice out of free will to limit expenditure on consumer goods and services, and to cultivate non-materialistic sources of satisfaction and meaning" (Etzioni, 1999; p. 620). Pursuing a sufficiency lifestyle can be related to decreasing workload, income and consumption levels with the aim of increasing wellbeing (Aidar and Daniels, 2020; Chhetri, Stimson and Western, 2009; Muster, Iran and Münsch, 2022).

The sufficiency scenario presented in this analysis aims to capture emerging trends opposing fast fashion and to estimate the climate impact of sufficiency lifestyle options for achieving the 128.7 kg of CO_2e per capita budget by 2030 in the G20.

Through minimalism or decluttering, consumers adopting a sufficiency lifestyle decrease (sometimes radically) the amount of garments they own. These processes are considered in the sufficiency scenario by accounting for the reduction in carbon footprint obtained from buying fewer new garments (not second-hand garments) per person per year.

Assuming that no other solution is implemented at any stage of the garment life cycle, and considering average carbon footprints for the G20 high-income countries, reductions of more than 60% (and up to 75%) in the amount of purchased garments would be needed in these countries to achieve the 1.5-degree target.

Focusing on the richest share of the population, reductions of around 80% in the amount of purchased garments are needed in the UK, Italy, and Germany (rich-

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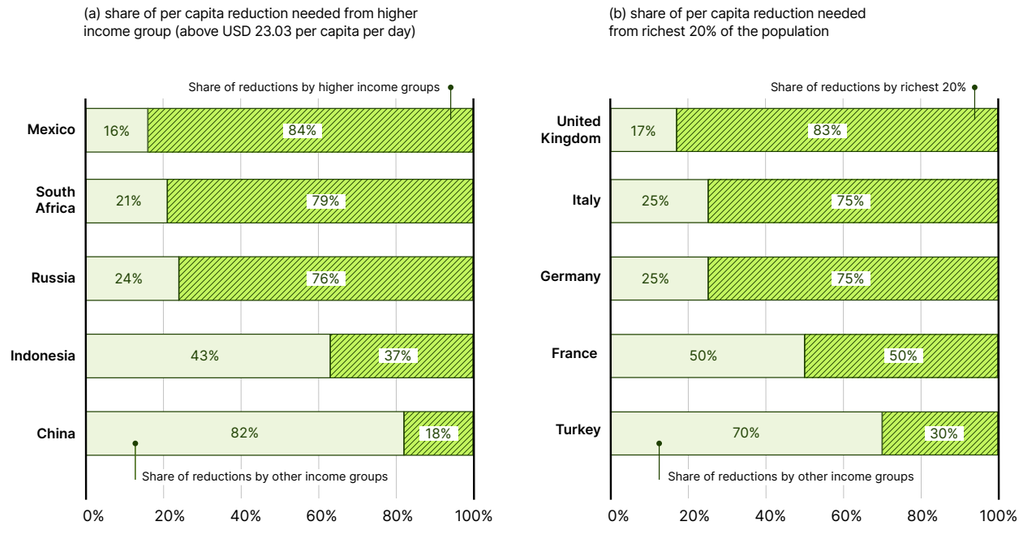
Figure 9. Reduction needed in the carbon footprint of fashion consumption from top income groups in the G20 to achieve the 1.5-degree target by 2030

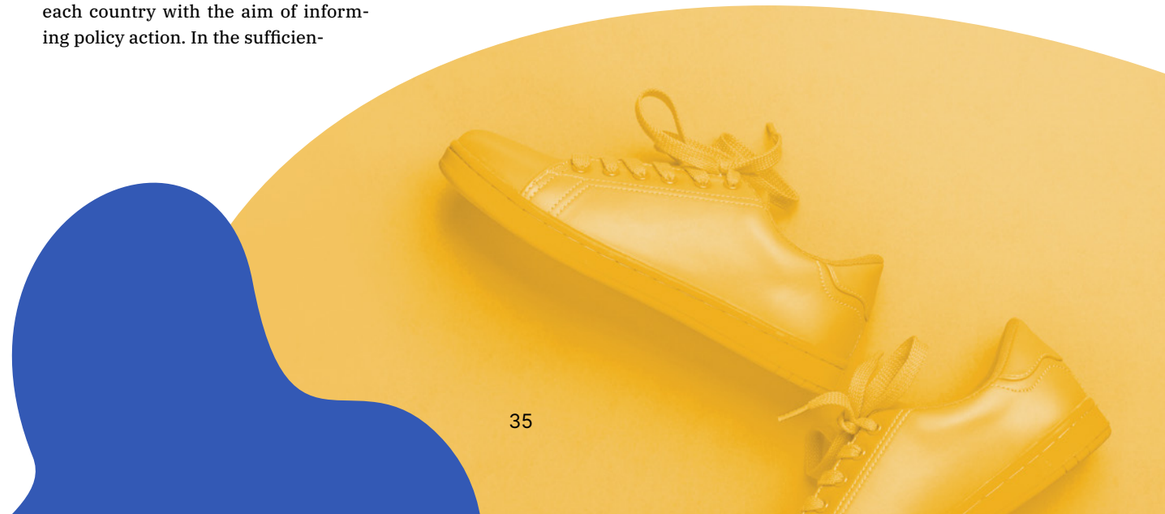


est 20%) and in Mexico, South Africa, and the Russian Federation (higher income group, i.e., above USD 23.03 per capita per day), if no other solutions are implemented. Based on the same assumption, reductions needed from top income groups are more modest but still sizable in France (50%), Indonesia (37%), Turkey (30%) and China (18%) (Figure 9).

The sufficiency scenario is based on achievable implementation rates of different lifestyle options. Adoption rates are also assessed to calculate emission reductions on the basis of the share of the population adopting an option (e.g., 50% of the population reducing washing and drying). Minimum adoption rates to meet the 1.5-degree target are calculated for each country with the aim of informing policy action. In the sufficiency scenario, all G20 countries except Australia, Canada, Japan, Mexico, Saudi Arabia, South Africa, South Korea, UK and the United States will meet the 1.5-degree target.

Reduced purchasing of new clothes

A more realistically achievable implementation rate of this lifestyle option can be estimated from research on people's wardrobes and everyday clothing use practices. Based on a recent survey (de Wagenaar, Galama and Sijtsema, 2022), consumers own many **inactive garments** in their wardrobes, with an estimated 25% of owned clothes left unused. The study found no significant differences



in the amount of inactive clothing across France, Germany, Italy, Spain, the Netherlands, the UK, India and the United States. Another study (Maldini et al., 2017) found that the average share of unused garments was 28% in the Netherlands and 30% in Germany.

This points to an approximate estimate that reducing garment purchases by 25-30% would have no effect on the fulfilment of clothing needs. Other research has suggested a more radical cutting of garment purchases. For example, an estimated 75% decrease in the purchase of new garments is deemed required to respect global environmental planetary boundaries (Cornell, Häyhä and Palm, 2021; Fletcher and Tham, 2019).

Adopting a conservative estimate, the sufficiency scenario assumes that consumers in high-income countries are willing to consider **reducing their purchases of new clothes** by 30% compared to current levels. Similar reductions would bring down fashion consumption to levels higher than average consumption levels in 2010 in most high-income countries, and to levels only about 10% lower than in 2010 in France and Japan. On this basis, it is assumed that 30% of new purchases can be excluded easily without affecting consumer needs and without any substantial difference in daily clothing use practices.

Buying second-hand clothes

Sufficiency lifestyles are often aligned with emerging circular business models for fashion that include (but are not limited to) re-use schemes that help extend garment life spans, such as buying second-hand, renting and swapping (EEA/Eionet, 2021). While accounting for an increasing share of wardrobes, **second-hand clothes** still represent only around 5% of total fashion purchasing in most countries, and less than 10% even in countries such as Denmark, where second-hand clothing is relatively popular (EEA/Eionet, 2019; Gray, 2017).

Outlook and demand forecasts for the apparel market to 2030 point to a general increase in second-hand clothing sales of between 2% and 11%, depending on the source considered and countries analysed (Future Market Insights, 2022). Assuming a 10% growth in demand and considering that 10% of clothing on average was purchased as second-hand in 2020, the sufficiency scenario estimates that second-hand garments would account for 20% of total purchased clothes in the G20 by 2030.

Increasing use-time of garments and reducing washing and drying

Besides second-hand resale, the **use-time of garments** can be extended through repairing, swapping, and purchasing more durable garments, as well as through better caring for them. Considering the rapid decline in use-time that characterises recent fast fashion trends, the sufficiency scenario assumes that extending the use-time of garments by nine months depends mainly on consumers' willingness to keep and wear clothes for longer.

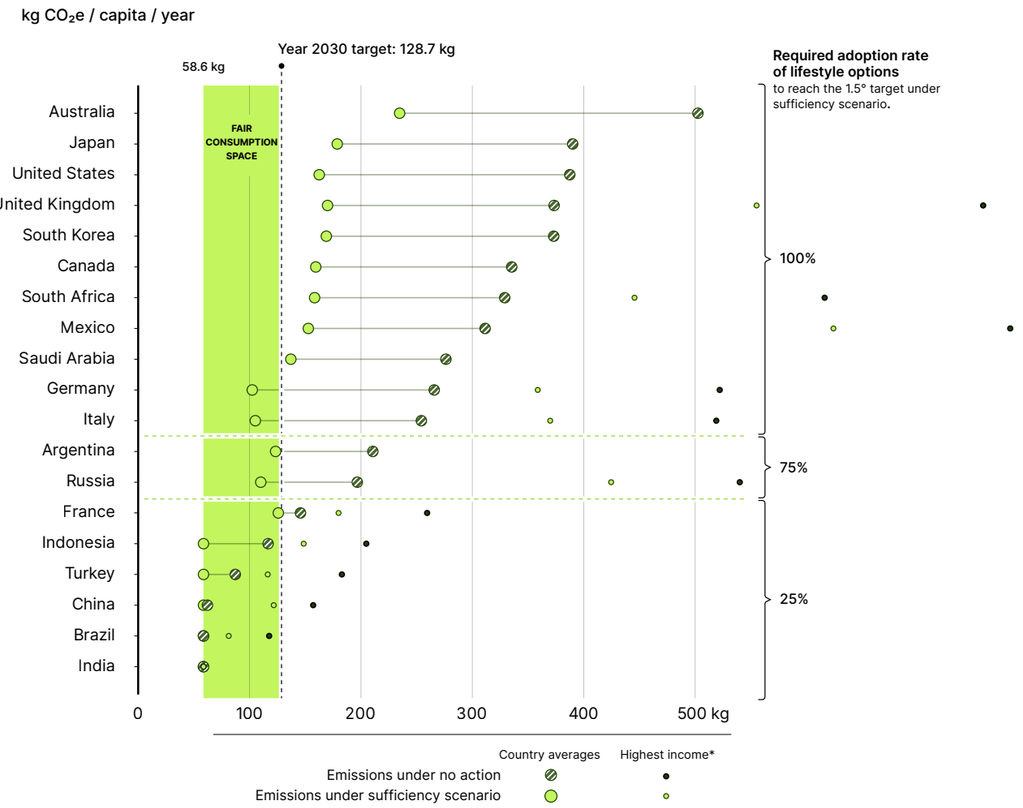
Accordingly, the sufficiency scenario assumes a high implementation rate of 90% for increasing use-time, meaning that most people have the opportunity to extend the use-time of 90% of their clothes by nine months. Based on similar logic, the scenario also assumes an implementation rate of 90% for **reducing washing and drying**, given that implementing this option depends largely on a consumer's willingness to do so, rather than on any major structural barriers to this action.

Responsibly disposing of garments

Globally, 80% or more of **end-of-life garments** are landfilled or incinerated, and the share of garments recycled into products of similar quality is as low as 1% (Ellen MacArthur Foundation, 2017). In the EU, 18% of clothing is reused or recycled, most of which is downcycled to lower-quality products such as cleaning cloths or is used in insulating material (EEA/Eionet, 2019; Ellen MacArthur Foundation, 2017).

Projected recycling rates suggest that the share of garments recycled worldwide could reach 30% to 40% by 2030 through a combination of changing attitudes, improved infrastructures and better regulations (McKinsey & Company and GFA, 2020). The sufficiency scenario is based on an implementation rate of 30% for *responsibly disposing*, assuming a change in attitudes and considering the current low rates of recycling in the G20.

Figure 10. Fashion lifestyle carbon footprint in 2030 under the current trajectory and under the sufficiency scenario



*) Highest income is the footprint of the high income group for Mexico, South Africa, Russia, Indonesia, China; of the richest 20% of the population for UK, Italy, Germany, France, Turkey. No income group data for unmarked countries.

Summary results

By implementing the above sufficiency lifestyle options at the selected rates, five additional G20 countries will meet the 1.5-degree target, alongside the countries whose fashion consumption footprints are already below the target. The additional countries that will achieve the target are Germany and Italy (with a full adoption rate), Argentina and the Russian Federation (with a 75 % adoption rate), and France (with a 25 % adoption rate) (Figure 10).

System change scenario

The efficiency and sufficiency scenarios respectively highlight: 1) the individual role of low-carbon solutions at the stages of production and retail, and 2) behaviour change contributions to reducing the carbon emissions from fashion consumption. Considering both scenarios, only between one and six additional G20 countries will achieve the 1.5-degree target for fashion by 2030, alongside the five G20 countries whose average consumption emissions are already below 1.5-degree compatible levels.

It is unrealistic to expect efficiency improvements and lifestyle changes to occur independently, in particular considering the role that changes in production and retail have as potential enablers of low-carbon lifestyles. Therefore, a system change scenario is needed, combining projected reductions from the current trajectories of the efficiency and sufficiency scenarios.

Efficiency improvements and sufficiency lifestyles

The system change scenario considers an emission reduction of 57.5 kg of CO_2e per capita across all coun-

tries under the current pace of decarbonisation of upstream production and brand and retail operations (i.e., efficiency improvements) (Table 1). Reductions from adopting sufficiency lifestyles are added to the emission savings from decarbonisation, considering the same implementation rates used in the sufficiency scenario.

Based on these assumptions, in the system change scenario all G20 countries will meet the 1.5-degree target by 2030, with the only exception being Australia. In Australia, per capita emissions from fashion consumption will still exceed the target by 48.5 kg of CO_2e, requiring a decarbonisation of the fashion industry at double the current rate and an adoption rate of lifestyle options of 95% or higher.

Adoption rates of sufficiency lifestyles under system change

Because the system change scenario also considers efficiency improvements, adoption rates of lifestyle options are reduced for some of the G20 countries compared to the sufficiency scenario. Specifically, in the system change scenario, the needed adoption rate of lifestyle options for Argentina and the Russian Federation is only 25%, compared to 75% in the sufficiency scenario; the rate for Germany and Italy goes from full adoption (100%) down to 50% comparing the two scenarios. A full adoption rate of lifestyle options is needed for all additional countries that will meet the target in the system change scenario. The only exception is Saudi Arabia, with a 75% adoption rate.

These results highlight how structural changes in production and consumption systems enable the adoption of sufficiency lifestyles.

3.3 Assessing lifestyle change needed from different income groups

The system change scenario represents the most effective scenario to meet the 1.5-degree target by 2030 in the G20, considering national average carbon footprints (Figure 10). However, full adoption rates for the analysed lifestyle options may be considered unrealistic and do not account for the different scale of effort required by individuals with different consumption and income levels. To provide a more detailed picture of the needed adoption rates of lifestyle options throughout society, the study assessed the adoption rates for different income groups in the G20 countries using available data.

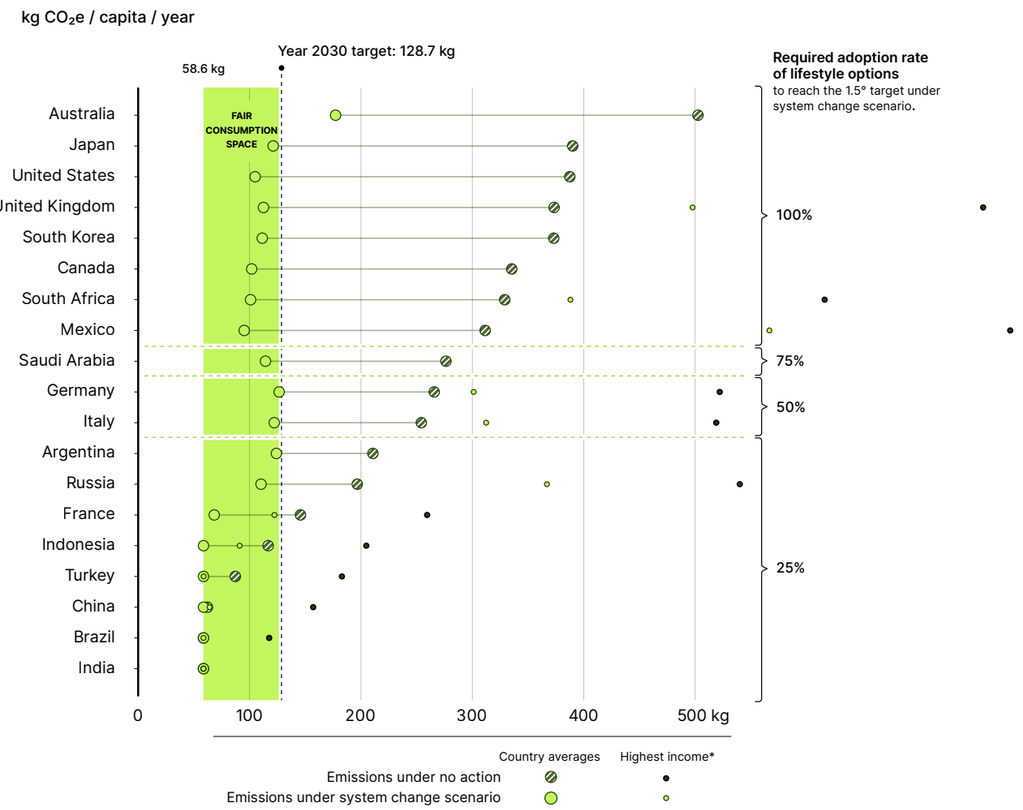
The findings indicate that reductions are needed from high-income groups even in some of the countries where the average fashion carbon footprint is below the 1.5-degree budget. In China, for example, the fashion carbon footprint in the high-income group (above USD 23 per capita per day) would have to be reduced by 23% (28.4 kg of CO_2e per capita per year), while all the other income groups in the country remain below the 1.5-degree budget. Considering the emission reductions in the system change scenario, this will be achievable if high-income individuals have a 25% adoption rate of the lifestyle options.

In Indonesia, the fashion carbon footprints of both the middle-income group (between USD 8.4 and USD 23 per capita per day) and the high-income group exceed the 1.5-degree budget – by 25% and 60%, or 31.5 kg and 76.1 kg of CO_2e per capita per year, respectively. Meeting the target would require a 25% adoption rate of the lifestyle options in the middle-income group, and a 50% adoption rate in the high-income group. In Turkey, the fashion carbon footprint per capita of the top income quintile exceeds the 1.5-degree budget by 42% (54.2 kg of CO_2e per capita per year), requiring a 25% adoption rate of the lifestyle options. For Brazil and India, the fashion carbon footprint of all income groups is consistently below the 1.5-degree target.

In France, individuals in the bottom three quintiles of income distribution showed a carbon footprint below the 1.5-degree level. However, individuals in the fourth quintile would have to reduce their carbon footprint by 35% (44.7 kg of CO_2e per capita per year), requiring a 25% adoption rate of the lifestyle options. Meanwhile, reductions needed from individuals in the top quintile were considerably higher, at 130.7 kg of CO_2e per capita per year – requiring a full (100%) adoption rate of the lifestyle options. Because it is unrealistic to assume that all of the richest 20% of France's population will adopt 1.5-degree fashion lifestyles, this quintile could potentially reach the target with a 75% adoption rate – but only if the decarbonisation of fashion production and retail also follows an accelerated pace, generating 20% more reductions between 2020 and 2030 than under the current trajectory.

In Germany, Italy, Mexico, and the Russian Federation, the richest 20% or the higher income group (above USD 23 per capita per day) will not be able to achieve the 1.5-degree target, even assuming full (100%) adoption rates of the lifestyle options and accelerated decarbonisation of the fashion industry. These groups show extremely high fashion carbon footprints, exceeding their national averages by 173, 184, 438, and 238 kg of CO_2e per capita per year, respectively. Meeting the 1.5-degree target in these top income groups would require implementing the lifestyle options at much higher rates than are required for lower income groups. In particular, this would mean reducing the purchasing of new garments by over 75% and obtaining an equally high share of the remaining garments second-hand, while also assuming an accelerated decarbonisation of production and retail.

Figure 11. Fashion lifestyle carbon footprint in 2030 under the current trajectory and under the system change scenario



*) Highest income is the footprint of the high income group for Mexico, South Africa, Russia, Indonesia, China;of the richest 20% of the population for UK, Italy, Germany, France, Turkey. No income group data for unmarked countries.

In Germany, the carbon footprints of the second and the third quintile also exceed the target, with required adoption rates of the lifestyle options of 25% and 50%, respectively. Footprints of the fourth quintile could be reduced under the 1.5-degree budget by adopting the lifestyle options at a 75% rate and assuming a 20% acceleration in decarbonisation efforts compared to the current trajectory.

Similarly, in Italy, the carbon footprints of the second and third quintiles could be reduced below the 1.5-degree budget by adopting the lifestyle options at a 25% rate. For the fourth quintile, reductions to meet the target will require a 75% adoption rate of the lifestyle options and a 13% acceleration of decarbonisation efforts.

In Mexico and the Russian Federation, adoption rates of 75% and a 25%, respectively, are needed to bring the carbon footprint of the middle-income group (between USD 8.4 and USD 23 per capita per day) below the 1.5-degree target.

South Africa and the UK are characterised by particularly high carbon footprints in the middle- and high-income groups (South Africa) and in the fourth and top quintiles (UK). In both countries, even adoption rates of the lifestyle options of 95% or more, accompanied by accelerated decarbonisation efforts, will not be enough to reduce the carbon footprint of fashion consumption of these income groups below 1.5-degree levels. In order for these groups to reduce their footprints in line with the 1.5-degree carbon budget, further solutions would have to be implemented across the fashion life cycle.

4

A fair consumption space for fashion

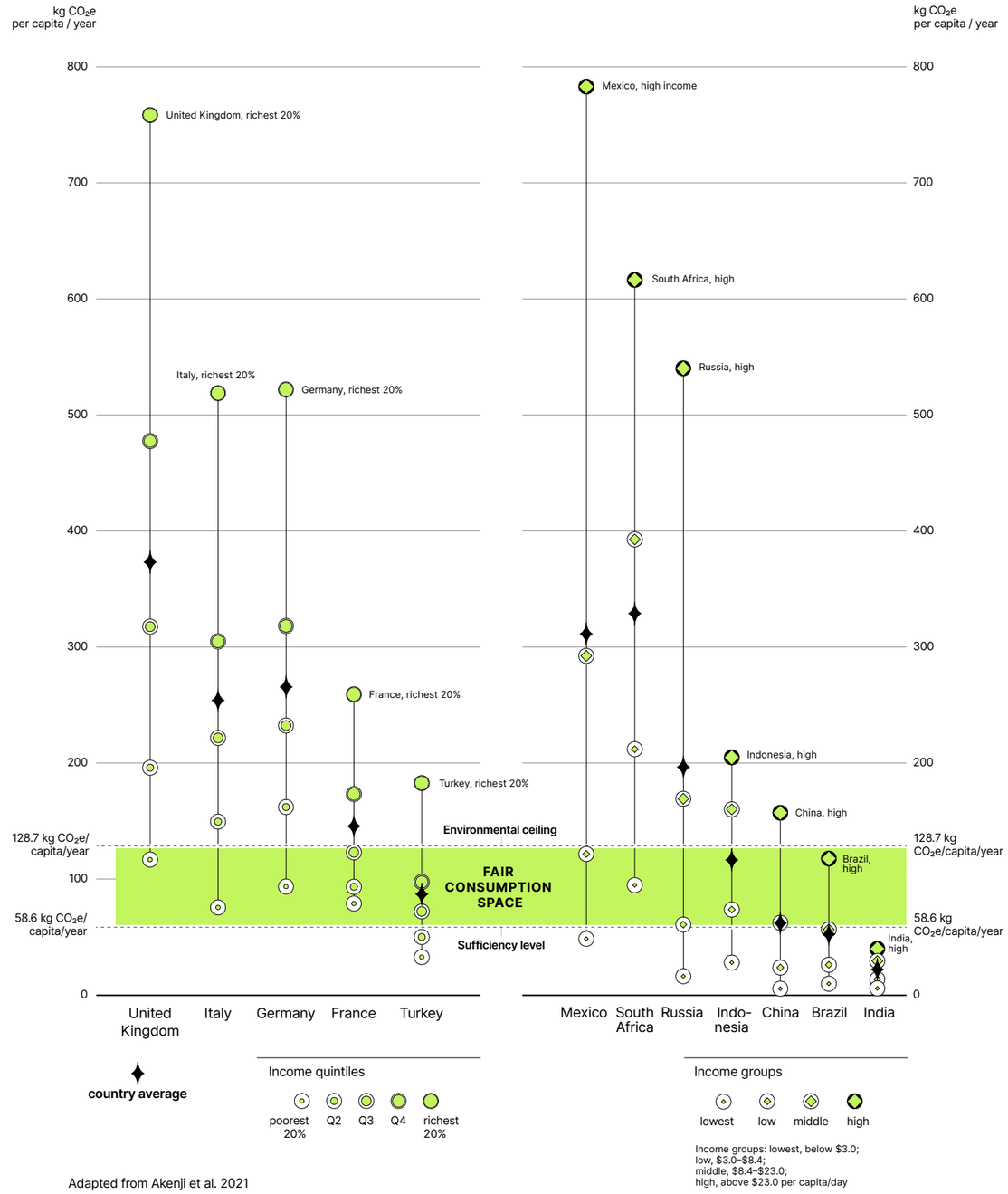
The equity-based approach to allocating per person carbon budgets for achieving the 1.5-degree aspirational target of the Paris Agreement implies higher reductions in carbon emissions from individuals that have higher carbon footprints. For this, we apply the concept of a "fair consumption space". This is defined as a space where consumption levels stay below environmentally unsustainable levels yet above sufficiency levels that allow individuals to fulfil their basic needs (Figure 12) (Akenji et al., 2021).

From a climate impact perspective, the 2030 carbon budget of 128.7 kg of CO_2e per capita can be used as the upper emission limit, or environmental ceiling, for keeping fashion consumption aligned with the Paris Agreement's goal of keeping global warming within 1.5°C above pre-industrial levels.

Regarding sufficiency levels, the amount of carbon emissions associated with fashion consumption for achieving basic needs could be estimated considering different needs in different contexts.

This section presents estimates of sufficiency levels and a quantification of a fair consumption space of fashion for the countries of the G20. Furthermore, the efforts required from different income groups to stay within the fair consumption space are assessed.

Figure 12. A fair consumption space for sustainable lifestyles



Adapted from Akenji et al. 2021

4.1 Sufficiency fashion levels: the 1.5-degree wardrobe

One key question that contributes to defining socially acceptable levels of fashion consumption is what would be the minimum amount of clothing sufficient to fulfil a person's dressing needs if all items are put to active use. This can be estimated from research published over the years. In the 1950s, a guide for good dressing for an adult woman living in a city referred to 42 pieces of garments (excluding accessories and underwear) as being enough to cover a whole year's needs for different types of garments (Saramäki, 2013; Valuch, 2021). In the 1960s, an average French wardrobe consisted of around 25 outfits, and 40 pieces in total.

More recent studies suggest that the average wardrobe size has increased substantially since the 1950s and 1960s. For example, Maldini (2019) found that the wardrobe size in the Netherlands varies from 70 pieces up to 429 pieces (excluding undergarments) and proposed a total of 80 pieces as the sufficient amount to fulfil wearing needs.

Following this approach, this report considers a total of 74 garments (including shoes) in active use as the sufficiency level in a two-season country, and a total of 85 garments in a four-season country (Figure 13). These values aim to represent an individual with average needs and would differ depending on the different wearing contexts that an individual may face – for example, workwear, homewear, sports, festive and outdoors (Saramäki, 2013).

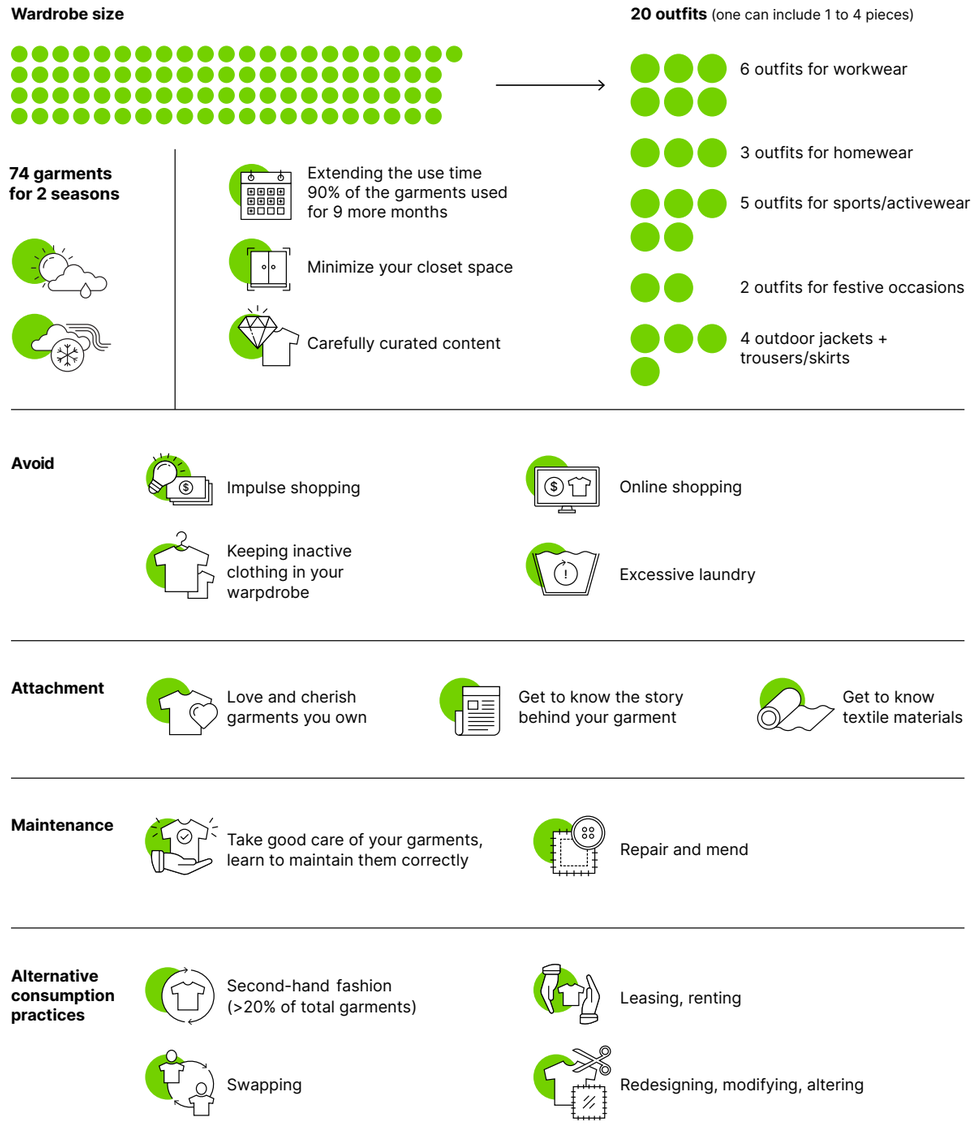
Besides quantifying the number of garments owned to fulfil sufficiency needs, a fair consumption space for fashion requires a reduced carbon footprint of garments, considering the entire life cycle. This implies slower consumption, more conscious consumption, avoiding impulse purchasing, extending the garment use-time, and favouring second-hand and rented fashion instead of buying new (Figure 13). In other words, for sufficiency fashion consumption levels to be achievable for all, the ways we produce and consume fashion would need to change.

Although trends and newness are at its core, fashion consumption needs to be re-framed as a functional service rather than as an emotional experience in order to avoid overconsumption. The emotional aspects intrinsic to experiencing fashion, changing garments and experimenting with self-expression could be filled by other practices such as providing skills for modifying or mending one own´s clothes, using upcycled materials and changing the attitude towards fashion aesthetics (i.e., new is not always the best choice).

In this vein, the present report calculates the carbon footprint of sufficiency fashion consumption levels based on the system change scenario and its associated implementation rates for the five lifestyle options

The equity-based approach to allocating per person carbon budgets for achieving the 1.5-degree aspirational target of the Paris Agreement implies higher reductions in carbon emissions from individuals that have higher carbon footprints. For this, we apply the concept of a *"fair consumption space"*.

Figure 13. Sample composition and size demonstration for a sufficiency wardrobe, and suggestions for achieving fashion sufficiency



and for the decarbonisation of production and branding and retail operations. Accordingly, maintaining a sufficiency wardrobe would generate around 58.6 kg of CO_2e per capita per year on average across the G20, corresponding to around 45% of the available carbon budget for fashion consumption by 2030.

4.2 Fair consumption spaces for fashion in the G20

Considering the 1.5-degree carbon budget by 2030 and the average carbon footprint of sufficiency fashion consumption levels in the G20, a fair consumption space for fashion is defined as a space where life cycle emissions from fashion are kept between 58.6 kg and 128.7 kg of CO_2e per capita per year.

In the G20, fashion carbon footprints can be reduced below 128.7 kg of CO_2e per capita by 2030 by following the pathways described in the system change scenario. However, these pathways would not lead to meeting the target in the case of Australia, where higher implementation rates of lifestyle options and further fashion industry decarbonisation efforts are required.

Considering projections to 2030, two of the G20 countries show average levels of fashion consumption below the sufficiency minimum. These are Brazil (very close to the minimum with 53 kg of CO_2e per capita) and India (further away, with 22 kg of CO_2e per capita).

Looking at the carbon footprints of different income groups, the fair consumption spaces for fashion in the G20 vary broadly. For example, in the high-income G20 countries that have available data, even the bottom income earners show consumption levels above sufficiency. However, for both Italy and France these levels are relatively close to sufficiency, at 76 kg and 79 kg of CO_2e per capita per year, respectively.

In the G20 middle-income countries, fashion consumption levels for most of the bottom income groups are below sufficiency limits. For example, in Turkey, the carbon footprints of the first and second income quintiles are below sufficiency levels, signalling that people in these income groups may not be able to fulfil sufficiency wearing needs. Similarly, in China the lowest and low-income groups show average consumption levels below sufficiency; this is also the case for the lowest income groups in Mexico, the Russian Federation and Indonesia.

In Brazil and India, the gaps between current and sufficiency levels across income groups are more widespread. In Brazil, only high income groups exceed sufficiency levels of fashion consumption, whereas in India all of the income groups show consumption levels below sufficiency. Across all countries, more refined data and analysis of carbon emissions from extremely high-income earners (e.g., the top 1%) are needed to provide a more comprehensive picture of inequalities in fashion consumption and to understand the overall society´s distribution in the fair consumption space.

Unfit, Unfair, Unfashionable
Resizing Fashion for a Fair Consumption Space

Box 4. That Old Favourite Shirt

The most environmentally friendly piece of clothing is one you already have - especially if you have had it for a long time and have taken care of it. The danger with fashion of any kind is the desire for the new, encouraged by advertising. ***Extended use of a garment*** can make a useful contribution alongside other forms of consumption reduction, which means buying quality items, ***taking care of them***, mending them if they fail and swapping them only for other secondhand clothes.

The rise in online clothes swapping platforms has been meteoric, with names such as Thredup, Poshmark, The Real Real and Depop joining Ebay. The French designed resale firm Vinted created a market of 22 million people in just one year through an app for peer to peer mobile sales of secondhand clothing. The caveat here is that selling old clothes in order to buy new is not a sustainable option; the commitment to secondhand needs to be total, with better regulations to prevent dumping of secondhand clothes either domestically or through exporting.

Maintenance of existing clothes can, however, be fun and offer opportunity for creative work, community activity and family cohesion - learning to sew, embroider, knit or crochet can help intergenerational communication while reusing resources and reducing consumption. The Japanese art of ***visible mending***, known as “sashiko”, uses simple stitching to strengthen and embellish old clothing. ***Darning socks*** is a skill that almost died and is now seeing a revival, often in bright contrasting colours.

SECTION III

The way forward

5

Transforming fashion

Global fashion production and consumption is highly unequal. On the one hand, consumption is higher and rising in high-income countries that are net importers of garments. On the other hand, this is fuelling a race to decreasing production costs and worsening working conditions in low-income countries.

The scenarios analysed in this report show how changes in both the fashion industry and consumer behaviour are needed to reduce the carbon footprint of fashion below levels compatible with a 1.5-degree future. In this context, existing frameworks of system change and enablers and barriers for sustainable lifestyles can help guide an assessment of factors and tools for transforming fashion.

A recent brief by the United Nations Environment Programme, *Enabling Sustainable Lifestyles in a Climate Emergency*, applied the Attitudes-Facilitator-Infrastructure framework for system change (Akenji and Bengtsson, 2022). "Attitudes" reflect intention, such as pro-sustainability behaviour or lack thereof, not only by citizens but also by businesses and policy makers. "Facilitators" are enablers, which make it easier to translate intentions or willingness into action. "Infrastructure" includes soft and hard infrastructure that typically needs considerable investments and lasts for a long time; thus, it predetermines action patterns or lock-ins. Significant changes in unsustainable fashion are more likely to happen when all three are present and work in conjunction with each other to reinforce sustainability (Akenji and Chen, 2016).

Another framework, "Six Conditions of Systems Change" (Kania, Kramer and Senge, 2018), highlights six interdependent conditions that contribute to maintaining unfair and unsustainable production and consumption. These conditions are: mental models, relationships and connections, power dynamics, resource flows, practices and policies[4]. Mental models are articulated similarly to Attitudes in the Attitudes-Facilitator-Infrastructure framework, and both frameworks highlight the overriding role of policies.

For this report, we discuss three aspects that need to be addressed going forward: attitudes, power dynamics and policies. One little-explored area in the black box of unsustainable fashion is power dynamics in the supply chain, in particular the dominant influence of big brands on policy and consumption patterns and their failure to address the social and environmental impacts of the fashion industry. While this report does not analyse power dynamics in detail, it is an important aspect to draw attention to.

4 Practices and Resource Flows are not addressed in this section, as they are covered widely in the fashion literature (see, for example: EEA/Eionet, 2019; Ellen MacArthur Foundation, 2017; McKinsey & Company and GFA, 2020). Relationships & Connections are also not addressed directly, as this goes beyond the scope of this report.

5.1 Changing attitudes

As this report has shown, moderate tweaks to the current fashion system are insufficient to meet climate targets. This means that consumers must substantially change what and how much fashion they acquire, as well as the way they acquire it. Realising such changes is a steep but necessary challenge.

One of the most significant attitudes to be created and reinforced involves more strongly coupling clothing production and consumption with environmental degradation and social injustice. Research suggests that many consumers are either unaware or have a poor understanding of the extent of environmental impacts of clothing (Gwozdz et al., 2017). This is partly because these impacts are mostly hidden from consumers and because information about these impacts is limited (for example, to the use of an environmental/climate footprint label; Box 5) (Henninger, 2015; Taufique et al., 2022).

The lack of high-quality information on the environmental impacts of clothing products has also resulted in the development of imprecise or inaccurate heuristics (i.e., mental rules of thumb) for how to identify environmentally friendly clothing products (e.g., organic cotton may be used as an indicator of environmental friendliness). This may result in well-meaning consumers acquiring clothing that does not deliver the envisioned environmental benefits (Nielsen et al., 2022). Improving information about the environmental impacts of clothing, particularly when this information is presented to consumers during key moments of decision making, may increase the likelihood of environmental considerations influencing acquisition decisions (Nielsen and Hofmann, 2021).

One attitude to transform is the strong link between clothing and personal identity. As our "second skin", clothing functions as a form of non-verbal social communication that can showcase a person's identity, tastes and individuality (Banister and Hogg, 2004; Kodžoman, 2019). While this psychological function of clothing is not inherently problematic, the close link between a person's clothing and identity may reinforce frequent and unsustainable clothing consumption and amplify materialistic aspects of clothing.

This is especially prevalent among consumers who attach psychological, social and/or cultural value to recurrently following fashion trends. For example, research shows that fashion-oriented consumers are more likely to shop frequently, to purchase new over second-hand clothing items, and to generally report lower levels of subjective wellbeing compared to consumers who have a more stable clothing style (Evans, Grimmer and Grimmer, 2022; Gupta, Gwozdz and Gentry, 2019; Gwozdz et al., 2017).

As discussed extensively in this report, greater diffusion of second-hand clothing is a necessary element for transforming the fashion system, provided that the second-hand items are purchased instead of and not in addition to new clothes. The diffusion of second-hand clothing, however, currently faces perceptual challenges for which concrete solutions must be developed. Second-hand clothes shopping is stigmatised in many countries and may be associated with belonging to lower social classes (Henninger et al., 2021; Iran, Geiger and Schrader, 2019). Securing widespread uptake of second-hand and recycled clothing requires confronting prevailing mental models that are biased in favour of acquiring new clothing.

Not only does the type of acquired clothing need to change, but also the mode of acquisition. While the linear and fast fashion business model still reigns in the fashion industry, alternative approaches are increasingly emerging across the world in an attempt to address the industry's negative social and environmental impacts. The alternative business models vary considerably, with some clearly diverging from the conventional approach to clothing acquisition, and others being more compatible with the prevailing model (Nielsen, Gwozdz and Steensen Nielsen, 2018). Examples of the former include clothing libraries, fashion rental and leasing, and swap markets (Henninger et al., 2021; Henninger, Bürklin and Niinimäki, 2019; Iran, Geiger and Schrader, 2019; Pedersen and Netter, 2015). Examples of the latter include online reselling platforms, take-back systems and in-store repair services (Hvass, 2015; Pedersen, Gwozdz and Hvass, 2018).

Although the business models that profoundly diverge from the conventional approach arguably hold the greatest environmental promise (Zamani, Sandin and Peters, 2017), they currently struggle to reach the mainstream clothing market, in large part due to limited financial capital and human resources (Pedersen and Netter, 2015). Consequently, they remain predominantly niche markets. Overall, the existing evidence suggests that although the transformation of the fashion system likely requires shifting to alternative acquisition modes, this shift is currently not happening and is unlikely to occur without the implementation of ambitious policies and initiatives (EEA/Eionet, 2021).

Box 5. Opportunities for the EU to rethink fashion eco-labels

Although many types of eco-labels are available within the fashion industry, they are not readily adopted, in part because consumers' "trust in labelling is evasive" (Arnett, 2019). Key challenges identified in the literature are a lack of awareness of eco-labels from the consumer side and inconsistencies in the standards that eco-labels adhere to and subsequently base their claims on (Morris et al., 2021). Most labels focus on either environmental or social aspects of sustainability, with a minority covering both. With sustainable fashion consumption being a very complex process in the first place, having eco-labels that cover only partial aspects of sustainable consumption can further contribute to consumer frustrations.

Recently, the European Commission proposed the Product Environmental Footprint (PEF) system, meant to be adopted by 2023. The PEF measures the environmental impact that a product has on the natural environment, with a focus on overcoming trust issues by providing transparency and trustworthy information (Strzyżyńska, 2021). It aligns with the concept of the "sustainability passport", which seeks to provide credible information that carefully discloses sustainability aspects and thus overcomes the act of greenwashing (misleading claims about green credentials) (HM Treasury, 2021).

While the idea behind the PEF is a positive move towards standardising labels, the scheme has been criticised for being incomplete. For example, it has been highlighted that the PEF "currently downplays or excludes critical environmental impacts and does not reflect the EU's own sustainability and circularity goals" (Fibre2Fashion, 2022). This refers to environmental impacts such as micro-plastic pollution, which has attracted media attention only more recently (Yan et al., 2020), as well as the impacts of oil-based synthetic fibres (and the lack of attention to regenerative fibres with more positive impacts). These areas may not have been sufficiently covered due to timing, as the PEF was tested during 2013-2018.

With the PEF currently not encompassing all aspects, there has been concern that consumers, even when following the guidance, could be misled and accidentally contribute to negative environmental consequences, thereby acting against the European Green Deal (Strzyżyńska, 2021).

5.2 Changing power dynamics

The analysis presented in this report highlights how transforming fashion demands progressive and wide-ranging actions across actors (Ellen MacArthur Foundation, 2017; Niinimäki et al., 2020). These actors – including producers, manufacturers, retailers and consumers – can all influence the realisation of the needed transformation and the speed at which it may occur. Major fashion companies, in particular, have disproportionate power over how and which clothing products are manufactured and offered to corporate and household consumers; over the pricing, quality and environmental impacts of products; and over which services (if any) are offered to consumers to extend the longevity of clothing products. They also actively influence which products are demanded by consumers (e.g., through advertisement).

Other actors, likewise, hold power to affect change. For example, fashion magazines exist to shape and diffuse fashion trends and to promote clothing consumption. Together with multinational fashion companies, they also largely reinforce a system of symbolic obsolescence by artificially promoting rapidly recurring collection cycles and never-ending consumption. To break the cycle, power dynamics in the supply and demand of clothing can be shifted to accelerate the transition to a more sustainable fashion system.

Changing power dynamics in fashion supply

Aligning fashion consumption with the 1.5-degree target cannot happen without fundamentally rethinking how clothing is produced, manufactured, acquired and disposed of. While household consumers play an important role in clothing acquisition and disposal, they cannot directly influence which clothing products and services are available to them. By contrast, supply chain actors directly influence clothing supply and its environmental impacts, by determining product design, garment composition, fibre production, garment manufacturing, logistics and retailing. Decisions taken at each stage of the clothing life cycle have environmental implications and can have downstream effects on clothing use, maintenance and disposal (Niinimäki et al., 2020; Sohn et al., 2021).

Despite the complexity and global dispersion of the fashion supply chain, power and control is highly skewed towards Western-owned fashion companies. These companies also hold considerable political power. Due to their economic wealth, they can affect, counteract or ideally promote environmental legislation across countries. Their political power is particularly strong in the low-income countries where most clothing production and manufacturing is centred. Because fashion companies are major employers, it affords them considerable political leverage, which to date has mainly been used to counteract ambitious environmental (and human rights) legislation.

To achieve the level of changes outlined in this report, a more equal redistribution of power and control across the supply chain is a strong requirement. The power of multibillion-dollar companies such as Inditex, Nike and H&M must be diffused by stronger regulation of how they produce and design clothes, the practices they put in place with manufacturing companies (typically located in low-income countries), and their logistic and distribution activities, including how products are offered to consumers and at what price.

Reducing purchases of new clothes is the most effective action to reduce the carbon footprint of fashion consumption.

Changing power dynamics in fashion demand

Fashion companies have a (short-term) financial interest in promoting continuous and ever-increasing consumption, which they seek to realise through various avenues including marketing activities (e.g., advertising, product placement, fashion weeks). The larger and wealthier the fashion company, the greater is its power to reach target groups and ultimately affect clothing demand.

However, other actors equally seek to influence clothing consumption, including fashion and lifestyle magazines, social media influencers, industry groups and think tanks, athletes, and other celebrities. These actors often have financial ties to the fashion industry and widely promote rapidly shifting trends through shaping what is considered “out-of-fashion”. Although counterexamples exist and are slowly increasing in number, most of today’s influencers actively reinforce the current fashion system.

Fashion magazines historically greatly influenced the nature and diffusion of fashion trends. While their power is still significant, the emergence of social media has produced a whole new generation of fashion influencers whose power to influence consumption depends mainly on their number of followers/readers and their centrality within the fashion system (e.g., links to fashion companies, designers and other industry actors). While these influencers primarily perpetuate the existing system, they may be key actors for transforming the fashion industry, for example by helping to diffuse low-impact clothing products and alternative ways of acquiring clothing.

As shown in this report, transforming fashion in the G20 countries necessitates reducing and shifting the demand for clothing. Here, household, corporate and public consumers play a key role. The largest share of global clothing consumption can be attributed to household consumers in high-income countries. However, even within these countries, there is substantial heterogeneity in the scale of consumers’ consumption levels.

As confirmed through the report analysis, clothing consumption generally correlates with income, with high income groups purchasing more clothing. At the same time, wealthier consumers can more powerfully affect positive change (IPCC, 2022; Sohn et al., 2021). For example, they are more likely to be role models for other people, allowing them to influence trends; to hold influential positions within fashion organisations or organisations that can influence clothing trends or consumption; and to have large funds available to invest in companies or organisations that either reinforce or seek to change the fashion system.

While household consumers represent a key target group, corporate and public institutions are also important consumers of clothing. Unlike household consumers, they often acquire clothing in large quantities and can therefore be promising target groups for initiatives aiming to reduce or shift clothing consumption. For example, public institutions can, through green public

procurement, financially support fashion companies that offer low-impact clothing products and services (Bratt et al., 2013; Hall, Löfgren and Peters, 2016).

Similarly, large corporations that, for example, purchase clothing for their employees can specify environmental performance criteria for their purchases, which due to the large quantity may greatly lower the associated greenhouse gas emissions and other environmental impacts. Finally, public institutions and corporations can support or develop environmental labelling initiatives that effectively account for and communicate the climate and/or environmental impact of clothing products to end users (e.g., Taufique et al., 2022).

5.3 Policy approaches for fair and sustainable fashion

A fair consumption space for fashion requires both that consumption levels to fulfil basic dressing needs are met for all, and that overconsumption of fashion is discouraged. This can be done, for example, by reducing the number of garments purchased, switching to circular business models, and incentivising upcycling, recycling and waste reduction (Akenji and Bengtsson, 2022).

To shift fashion footprints to levels within a fair consumption space, governments, including in the G20, have a formidable task ahead: reducing fashion overconsumption, addressing consumption inequalities between high- and low-income groups, and ensuring that policies lead to overall more sustainable fashion systems from an environmental, social and economic perspective simultaneously. This requires bringing fashion lifestyles within a fair consumption space, meaning that over-consumers will need to reduce their consumption to within biophysical limits, while under-consumers use some of the freed-up consumption space to increase their own consumption to ensure wellbeing and dignity (Akenji et al., 2021).

Increasingly, innovative policy approaches are being discussed to meet the challenge of climate change mitigation in line with the reductions needed to meet the 1.5-degree aspirational target of the Paris Agreement. One such approach is "choice editing", which involves setting standards for filtering in or out sustainable or unsustainable options in the range of products and services available on the market (Akenji and Bengtsson, 2022). While from a business or brand perspective, choice editing is done based on profitability, from a government perspective it can be done to eliminate unsafe products or products that have a high environmental footprint. It represents a particularly effective approach because it makes unavailable some choices and can potentially phase out underlying unsustainable production practices.

Choice editing of unsustainable fashion can be approached through three interlinked types of policy:

Edit out: Use transparent criteria to make high-carbon intensive and harmful fashion options less attractive, to restrict access, or to remove them from the market entirely to stay within the carbon budget.

Edit in: Introduce sustainable fashion alternatives and encourage rapid social innovation to increase the availability of low-carbon options and make regenerative and wellbeing fashion the default choice.

Ensure *equitable access:* This option ensures that poorer segments of society are not disadvantaged by the sustainability transition and that everyone can meet socially accepted levels of fashion and has access to wellbeing opportunities.

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Table 2. Applying choice editing to unsustainable fashion consumption – examples of actions

	Edit out harmful consumption options	Edit in sustainable options	Create equitable access to ensure wellbeing needs
Attitudes 	Establish stricter rules on how sustainability claims can be used in advertising to counter greenwashing. Discourage the promotion of unsustainable fashion behaviours in popular culture (e.g., films, television series) using guidelines attached to governmental funding or licensing for film production.	Use public figures as ambassadors in awareness campaigns to normalise repeated and longer use of garments instead of frequent purchases of new ones. Promote local fashion production and extended use and reuse through awareness raising campaigns. Educate entrepreneurs on sustainability impacts and skills related to circular business models and increasing garments' lifespans.	Collaborate with clothing producers to includecredible social justice and sustainability messages on clothing. Help create a positive image for sufficiency-based fashion approaches, including collaborative consumption, especially non-monetary exchanges that increase access to used garments by more vulnerable social groups.
Facilitators 	Outlaw the destruction or disposal of unsold clothing items by brands and shops, and regulate the practice of planned obsolescence and other wasteful practices. Set up a system and dedicated unit to monitor and refute unsubstantiated claims, and investigate illegal and unethical practices. To pay for this, ensure a penalty system for non-compliance and raise taxes on garment producers. For example, tax or ban (imported) garments on the basis of (non)recyclable content.	Require brands to report on consumer-facing circular business activities (e.g., second-hand resale programmes, repair and take-back schemes). Require life-cycle assessments of produced garments and alternative services, and provide support to small sustainable businesses (including repair, share, second-hand and locally produced).	Set industry quotas for use of commons – e.g., land size, water, energy – and regulate for waste generation by industry. Set binding minimum safety and ethical standards, and complementary targets for sustainability and health concerns.
Infrastructure 	Ban free returns and next-day delivery options in order to minimise impulse purchases and returns of unfit garments. Ban exports of second-hand items, to facilitate local job creation in sorting, repair and second-hand fashion retail.	Require businesses (as part of extended producer responsibility schemes) to set up centres or agreements with tailors and train them for repair and redesign of their clothing items. Prioritise circular business models (make-to-order, take-back schemes and brand-offered repair services, and second-hand retailers) through allocation of premium and more visible business locations.	In partnership with industry, create certified overstock clothing centres for unsold fashion items – with discounted pricing or donation programmes to more vulnerable social groups. Establish design hubs and (community) centres for re-purposing and re-design of used clothes. Introduce uniforms or standardised dressing guidelines in high-pressure social and institutional settings such as schools.

Adapted from *Akenji and Bengtsson, 2022.*

Box 6. Opportunities for improving the EU Strategy for Sustainable Textiles

The EU Strategy for Sustainable Textiles is an important step to leverage many different tools for reducing the environmental impact of clothing and other textiles. The Strategy aims to tackle various challenges in the textile sector by addressing issues such as fast fashion, the problem of synthetics and the need for Extended Producer Responsibility (EPR). However, from a critical perspective, it shows several limitations.

The main weakness is that the sector's overall challenge of accelerating overproduction is not seriously addressed. The Strategy does not present solutions to combat the explosive increase of synthetic textiles and does not aim to reduce this 'out of control' growth. Continued growth is a particular challenge for the fashion industry, as the large increase in the number of clothing cannot continue if textiles are to be considered truly circular with fewer resources being extracted.

As stated in the Strategy, the trend that garments are used for shorter periods before they are disposed of, contributes to unsustainable patterns of overconsumption and overproduction. The Strategy labels this trend under 'fast fashion' and connects it to low prices, fast changes in the latest trends and inferior quality of the products. To mitigate this trend, the Strategy introduces mandatory Ecodesign requirements to extend the life of textile products. Increased durability will also enable circular business models as clothing more easily can be reused, repaired and rented. Longer product lifespans and considering the use phase of clothing is essential for achieving more sustainable clothing consumption. However, longer product lifespans will not solve the problems of overproduction, as research on the use of clothing shows that clothing is rarely purchased as a replacement for discarded garments (REFs). On the contrary, acquisition and disposal are connected but independent processes and the quantity and purpose of garments owned drives this relation. If the lifespan increases, without a decrease in purchases, the size of the wardrobe and the discarding of fully useable clothing will increase. The Strategy comes up short on this, as it assumes that increased quality will lead to clothing being used for longer by the first owner.

Furthermore, the goal of the Strategy is to an extent narrow and seen through the eyes of the mass-producing industry. It appears that the EU envisions a future for textiles where the best scenario is that textiles are recycled. However, findings from research including this report indicate that there are limited environmental benefits to be gained from recycling (REFs).

Missing from the Strategy is the only real alternative to the global mass-producing industry: small-scale, local production. Textiles are very complex products, socially, aesthetically, functionally and technically. If overproduction continues, longer lifespan for textiles or other measures to increase the utilization rate for individual garments, will not substantially contribute to reduced emissions nor to lower environmental impacts. The measures mentioned in the Strategy are not aimed at solving the main issue of overproduction and overconsumption, and are thus not enough for achieving the goals of sustainable and circular textiles.

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If no other actions are implemented, such as repairing/mending, washing at lower temperatures, or buying second-hand, ***purchases of new garments should be limited to an average 5 items per year*** for achieving consumption levels in line with the 1.5-degree target.

SECTION IV

Conclusions

This report has presented key evidence for understanding where and how to transform fashion consumption to achieve international climate targets in the countries of the G20. The report highlights how huge inequalities in carbon emissions observed in other consumption areas characterise fashion consumption as well. The results further stress how essential equity-based approaches are for solving the climate crisis, and how responsibility for our collective carbon footprint is unequally distributed across countries and income groups.

The scenarios presented in this report outline pathways for resizing the footprint of fashion consumption to fit in a fair consumption space. The analysis takes an important first step in defining this space by quantifying both the sufficiency consumption level and the climate threshold of the 1.5-degree carbon budget by 2030 for fashion.

Sufficiency approaches that focus on reducing purchases of new clothes have clearly emerged as the most effective solutions for reducing fashion's footprint. Their effects largely surpass what is achievable through efficiency improvements along the fashion value chain and through other consumption-focused solutions, such as reducing washing and drying or responsibly disposing of clothes. While the latter still are fundamental actions for transforming fashion, policies and other enablers have to be implemented to address over-consumption directly. By focusing predominantly on efficiency and technological improvements, we will likely fail to achieve the needed reductions in carbon emissions.

A system change approach is required, transforming not only upstream production but also the use and disposal of garments. This can be achieved by aligning the purposes and behaviours of all actors, from big brands to institutions to consumers.

The report presents evidence of the negative environmental impacts of practices that are often seen as sustainable, specifically donations of clothes that are then exported as second-hand. The results of this analysis show how a substantial share of exported second-hand clothes ends up directly in landfill or is incinerated, with associated carbon emissions. These impacts should be considered together with the environmental benefits of such practices.

The needed changes in fashion consumption can be realised by transforming the structures that hinder or enable consumption choices. The report presents examples of policies for editing out less sustainable fashion while editing in more sustainable alternatives. These policies could drive changes in predominant modes of consumption and power dynamics to make more sustainable fashion the most available, affordable and trending option.

An aspect that is not explored in the report but that is of critical importance is the power of (and within) the fashion industry. The black box of unsustainable fashion maintains a lack of transparency, ensuring that the public is kept away from critical data and examination. The gripping influence of big brands on policy processes and citizens has ensured that dominant and financially profitable patterns are maintained with only marginal, often greenwashing, changes to assuage public concerns. These power dynamics are influential towards the quantitative results of this report and account for failure by the industry to take responsibility and address the social and environmental costs of unsustainable fashion.

Towards a Fair Consumption Space: *Buy less, buy better, share and share better*

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Annex I

Notes and Methods

Consumption- versus production-based accounting

This report adopted a consumption-based accounting method for estimating the carbon footprint of fashion consumption. This consumption-based method better reflects the emissions associated with a population's standard of living than the production-based accounting method (also referred to as territorial-based accounting) that is used in countries' official reporting to the United Nations Framework Convention on Climate Change (UNFCCC).

Production-based accounting covers only direct emissions from domestic production activities within the geographical boundaries and offshore activities under the control of a country, and does not consider emissions embodied in traded goods (Boitier, 2012; Moore, Kissinger and Rees, 2013). Conversely, consumption-based accounting covers household carbon footprints from domestic sources and emissions embodied in imported goods while excluding emissions embodied in exported goods. Compared to production-based accounting, it can be considered a better measure of the global climate impacts associated with individuals' consumption and lifestyles (Akenji et al., 2021).

In this report, one exception was made on excluding emissions from exported goods for the case of exported second-hand garments. As further detailed below, the emissions associated with transport and the direct disposal of these garments at the destination were accounted for in the carbon footprint of fashion consumption of the exporting country.

Consumption expenditure data and calculations

This report estimates carbon footprints associated with fashion consumption primarily based on final consumption expenditure data on clothing and footwear. For most of the countries analysed, these data were retrieved for the year 2020 (or the most recent year available) from the National Accounts of the Organisation for Economic Co-operation and Development (OECD). For the following countries, consumption data on clothing (and in some cases footwear) were obtained from national statistical offices: Argentina, Australia, Brazil, China, India and Saudi Arabia (all consumption data are from the years 2014-2020).

Expenditures on clothing and footwear were projected to 2030 by considering expected changes in population and gross domestic product (GDP). The population projections used are from the United Nations World Population Prospects (UN DESA, 2019), while the GDP projections used are from the Shared Socioeconomic Pathways database of the International Institute for Applied Systems Analysis (considering scenario SSP2) (Fricko et al., 2017; IIASA, 2022).

Carbon footprint calculations

To calculate the "cradle to customer" carbon footprints associated with fashion consumption, expenditures were multiplied by carbon intensities that represent the amount of carbon dioxide equivalent emitted during different life-cycle stages of wearing apparels. These intensities account for emissions occurring during the **production of fibre and other materials, the finishing and tailoring of apparel items, transport**

and **packaging.** Carbon intensities were retrieved for most countries from ecoinvent v3.8, except for Saudi Arabia (ecoinvent v3.4) and South Africa (Arndt et al., 2013).

The carbon footprints of the **use and disposal phases** of garments were calculated for each country as follows, and added to the "cradle to customer" footprint:

- To calculate the emissions generated during the use phase, relevant data on the electricity, water and detergent consumption related to washing machine use were retrieved from Pakula and Stamminger (2010), considering frequent wash temperature, load size per wash, and number of yearly machine cycles per person in each country. These values were then multiplied by the respective carbon intensities from ecoinvent v3.8 and totalled to calculate the carbon footprint of the use phase.

- The carbon footprint of garment disposal was estimated based on data on textile waste and share of disposal mode from multiple sources, including Eurostat, national statistical offices, OECD statistics, and research articles and reports (Aggarwal, 2021; Buyukasalan, 2015; US EPA, 2018; WRAP, 2019). Carbon intensities of different disposal modes were retrieved from ecoinvent v3.8.

The carbon footprints of **exported second-hand garments** were calculated from Comtrade data on the volume of exported "worn clothing" (UN Comtrade, 2022). Emissions generated during the transport of exported garments were calculated for each country of the G20 considering the average distance from origin to destination for the top 10 destination countries in terms of exported volumes, and considering both shipping and inland transport (lorry). The relative carbon intensities of different transport modes were retrieved from ecoinvent v3.8.

Apparel quantity calculations

To convert expenditure data to number of items, the average price of new and second-hand garments in each country was estimated. Average prices consider prices of one pair of jeans, one summer dress in a chain store, one pair of running shoes (mid-range) and one pair of men's leather business shoes (Numbeo, 2022). Prices were adjusted excluding value-added tax (VAT). Prices of second-hand garments were calculated as 40% of prices for new garments.

Per capita expenditure calculations

To estimate the carbon footprint of fashion consumption from different income groups, expenditures of "wearables" per capita were obtained from Oswald, Owen and Steinberger (2020). Expenditure data for different income groups were available for the following subset of G20 countries: Brazil, China, France, Germany, Indonesia, India, Italy, Mexico, the Russian Federation, South Africa, Turkey and the UK.

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