FASHION ON CLIMATE

HOW THE FASHION INDUSTRY CAN URGENTLY ACT TO REDUCE ITS GREENHOUSE GAS EMISSIONS

IMPRINT

This report is authored by McKinsey & Company (McKinsey) in partnership with Global Fashion Agenda (GFA). Through a multi-year strategic knowledge partnership, Global Fashion Agenda and McKinsey aim to present research and a fact base on the priorities of the *CEO Agenda* and to guide and mobilise fashion executives in taking bold action on sustainability.

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ABOUT GLOBAL FASHION AGENDA

Global Fashion Agenda is the foremost thought leadership and advocacy forum for industry collaboration and public-private cooperation on sustainability in fashion. The non-profit organisation is on a mission to mobilise and guide the fashion industry to take bold and urgent action on sustainability. Global Fashion Agenda is behind yearly guidelines, reports such as the CEO Agenda and the leading business event on sustainability in fashion, Copenhagen Fashion Summit, which has been spearheading the movement for over a decade.

ABOUT MCKINSEY & COMPANY

McKinsey & Company is a global management consulting firm deeply committed to helping institutions in the private, public and social sectors achieve lasting success. McKinsey supports clients in fashion and beyond on a wide range of sustainability related themes with a strong impact orientation. This ranges from executing broader sustainability transformation programmes to more targeted efforts on decarbonisation, circular business models and sustainable packaging. McKinsey & Company is a Strategic Knowledge Partner to GFA, with the joint aim to accelerate the pace and impact of the fashion industry's transformation towards sustainability.

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PREFACE

When COVID-19 erupted this year, it highlighted the interconnectedness of our lives and the inherent uncertainty surrounding global economies, businesses and humankind. Similarly, the protests associated with the Black Lives Matter movement have increased the pressure to solve social issues that pervade large parts of society and the fashion industry. This turbulent year has heightened awareness of the many challenges the fashion industry is facing, including in supplier relationships, greenhouse gas (GHG) emissions, employment structures, overproduction and wastage.

These systemic issues are also apparent in the looming threat of climate change, which is set to create accelerating socioeconomic impacts over the coming years. If we fail to take coordinated action on the greenhouse gas (GHG) emissions causing climate change, we can expect to see increasingly common crises such as heatwaves, rising sea levels and damage to ecosystems that are vital to our future.

This year marks a milestone in the industry's journey to restrict global warming to the 1.5 degress targeted by the Paris Climate Change Agreement.[1] To date, only around 50 fashion companies have committed to the science-based targets aligned with the agreement.[2, 3]

As a significant contributor to climate change, the fashion industry needs to act now to cut its GHG emissions.[4] The onus is on fashion leaders to move from a moderate decarbonisation trajectory to a significantly more ambitious one. With that challenge in mind, it has never been more important to explore the emissions status quo and to understand in detail how various decarbonisation scenarios may play out.

This report presents an analysis on the fashion industry's GHG emissions and outlines areas in which players can focus their efforts to meet climate targets. By triangulating GHG emissions data, analysing current and accelerated trajectories, and quantifying the gap to meeting the Paris targets, it offers insight into the industry's potential for decarbonisation and presents recommendations for moving forward.

The report addresses stakeholders that include brands, retailers, manufacturers, citizens, investors, and policy makers to play their part in putting the fashion industry on the 1.5-degree pathway. Only by daring to change, collaborate and embrace new ways of operating can we, together, transform the industry and create prosperity for people and communities while working within planetary boundaries, protecting biodiversity and minimising the industry's contribution to global warming.

“TWO THIRDS OF CONSUMERS SAY IT HAS BECOME EVEN MORE IMPORTANT TO LIMIT CLIMATE CHANGE FOLLOWING COVID-19.”[5]

RISING EXPECTATIONS ON SUSTAINABILITY

COVID-19 is having a significant effect on the fashion industry, disrupting value chains, closing many of the world’s retail outlets and creating a new level of public awareness over health, safety and the fragility of the planet. It has forced brands and upstream players to take difficult decisions every day, from managing cash flows, to rethinking distribution models and acting to protect the health of employees and consumers alike.

At the same time, consumers are becoming increasingly engaged with sustainability topics, including social issues and climate change, as evidenced by movements such as Friday’s for Future.[6] Many are showing their willingness to rethink how, when and what they buy.[7]

Sustainability issues are also attracting increasing attention at executive level. Some 50% of fashion executives in a recent opinion poll indicated that sustainability has moved up the agenda in recent months.[8] A rising number of asset and wealth managers have mandates that prioritise companies that pass sustainability thresholds.[9] Moreover, COVID-19 has spurred policy makers to refocus on sustainability, with various regional and national authorities tying post-COVID recovery efforts to sustainability objectives.[10, 11]

EXECUTIVE SUMMARY

Since the Industrial Revolution, GHG emissions have contributed to atmospheric warming that has lifted global temperatures by around 1.1 degrees, with significant regional variations.[12, 13] The warming has precipitated more frequent and severe risks, including flooding, fires, droughts and storms, leading to socioeconomic impacts on, e.g. liveability and workability, food systems and natural capital. With temperatures set to continue their upward trajectory, it is likely these adverse impacts will become more severe over the coming years.[14]

This research shows that the global fashion industry produced around 2.1 billion tonnes of GHG emissions in 2018, equalling 4% of the global total.[15] This is equivalent to the combined annual GHG emissions of France, Germany and the United Kingdom.[16] Around 70% of the fashion industry's emissions came from upstream activities such as materials production, preparation and processing. The remaining 30% were associated with downstream retail operations, the use-phase and end-of-use activities.[17]

Adding to the challenge of reducing its GHG footprint is the expectation that the fashion industry will continue to grow as a result of shifting population and consumption patterns. If no further action is taken over the next decade beyond measures already in place, the industry's GHG emissions will likely rise to around 2.7 billion tonnes a year by 2030, reflecting an annual volume growth rate of 2.7%.[18]

EXECUTIVE SUMMARY

This research analyses two scenarios for the industry's abatement efforts:

1. **Current pace trajectory.**[19] If the industry continues to embrace current decarbonisation initiatives at the current pace, emissions will be capped at around 2.1 billion tonnes a year by 2030, around the same as they are now. This would leave levels at nearly double the maximum required to stay on the 1.5-degree pathway.[20]

2. **Accelerated abatement.**[21] To align with the 1.5-degree pathway over the next 10 years, the fashion industry should intensify its efforts. In practice, that means embracing accelerated abatement, which is estimated to reduce annual emissions to around 1.1 billion tonnes, around half of today's figure.[22] The immediate focus of accelerated abatement should be upstream operations, where around 60% of emissions savings are possible, in particular from increased use of renewable energy, through collaborative efforts supported by brands and retailers. Actions relating to brands' own operations have the potential to deliver around 20% of the reduction, with the remainder coming from changes in consumer behaviour. By 2030, these efforts will need to have created a significantly reformed fashion landscape, in which, for example, one out of five garments are traded through a circular business model.

The good news for the fashion industry is that many of the required actions can be delivered at a moderate cost. Around 90% of the accelerated abatement can be delivered below a cost of around USD50 per tonne of GHG emissions.[23] Around 55% of the actions required will lead to net cost savings on an industrywide basis. The remaining actions will require incentivisation in the form of consumer demand or regulations to deliver abatement. Additionally, around 60% of the abatement will require upfront capital, where brands and retailers will need to support and collaborate with value chain players to invest for the long-term benefit of society and the environment.[24]

The scale of change required implies a need for bold commitments. Stakeholders throughout the value chain should be willing to make bold commitments, followed by equally bold actions, transparency, collaboration and joint investment. Brands and suppliers need to step up engagement with policy makers, support the roll out of renewable energy and drive end-of-use collections for recycling.[25]

Beyond 2030, the challenge becomes even greater. To stay on the 1.5-degree pathway, the industry needs to go beyond this vision of accelerated abatement to fundamentally redefine business models and current imperatives of economic growth and rising consumerism. For a prosperous future and an habitable earth, the industry's ingenuity and creative spirit will be required to decouple value creation from volume growth and to move from commitments to actions.

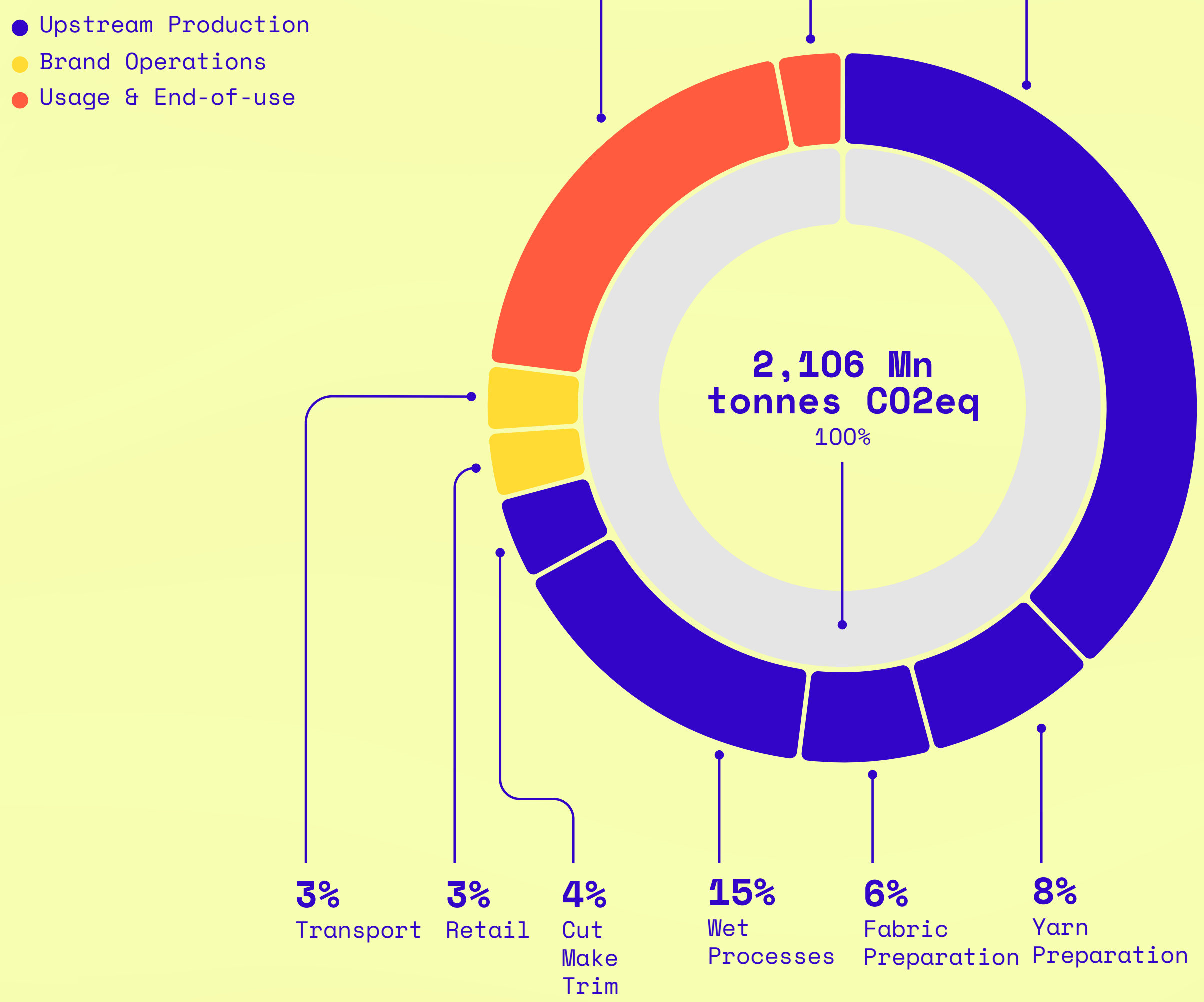
BASELINING THE FASHION INDUSTRY'S GHG EMISSIONS

THE STATUS QUO ON INDUSTRY EMISSIONS AND ABATEMENT EFFORTS

The fashion industry accounts for around 4% of emissions globally, equivalent to the combined annual GHG emissions of France, Germany and the United Kingdom.[26, 27] More than 70% of the emissions come from upstream activities, particularly energy-intensive raw material production, preparation and processing.[28] The remaining 30% are generated by downstream activities such as transport, packaging, retail operations, usage and end-of-use.[29]

"THE FASHION INDUSTRY ACCOUNTS FOR AROUND 4% OF GLOBAL GHG EMISSIONS"

APPAREL AND FOOTWEAR VALUE CHAIN GHG EMISSIONS IN 2018



BASELINE CALCULATION METHODOLOGY

To determine the industry's baseline emissions, we leveraged a bottom-up analysis using proprietary data. The calculation took into account the entire fashion industry's value chain, including downstream usage and end-of-use stages. However, it did not include secondary activities such as fashion shows or the back-office emissions of individual companies.

The calculations considered the volume of garments produced, used and disposed of in a given year to develop an annualised emissions baseline, rather than a lifecycle analysis. The analysis is based on the annual volume of fibres used to meet garment demand for the year 2018 and data on emissions intensity of raw materials from various sources.[30] We analysed the energy consumption and emissions intensity of key value chain stages across production and consumption countries,[31] using third-party data, as well as proprietary energy mix and emissions data from McKinsey's "Global Energy Perspective" and "Energy Insights" reports.

The baseline calculation was triangulated using a top-down analysis of reports on the industry's emissions. The triangulation exercise indicated emissions ranging from 3% to 10% of global emissions. The disparity was largely driven by the sensitivity of the baseline emissions calculation to energy consumption and energy mix assumptions, as well as the scope of value chain stages included in the analysis.

BASELINING THE FASHION INDUSTRY'S GHG EMISSIONS

With no further abatement action beyond that already taking place, emissions will rise by around a third to some 2.7 billion tonnes in 2030, assuming a relatively speedy post-COVID-19 economic rebound and continued growth thereafter (in line with industry forecasts).[32 33]

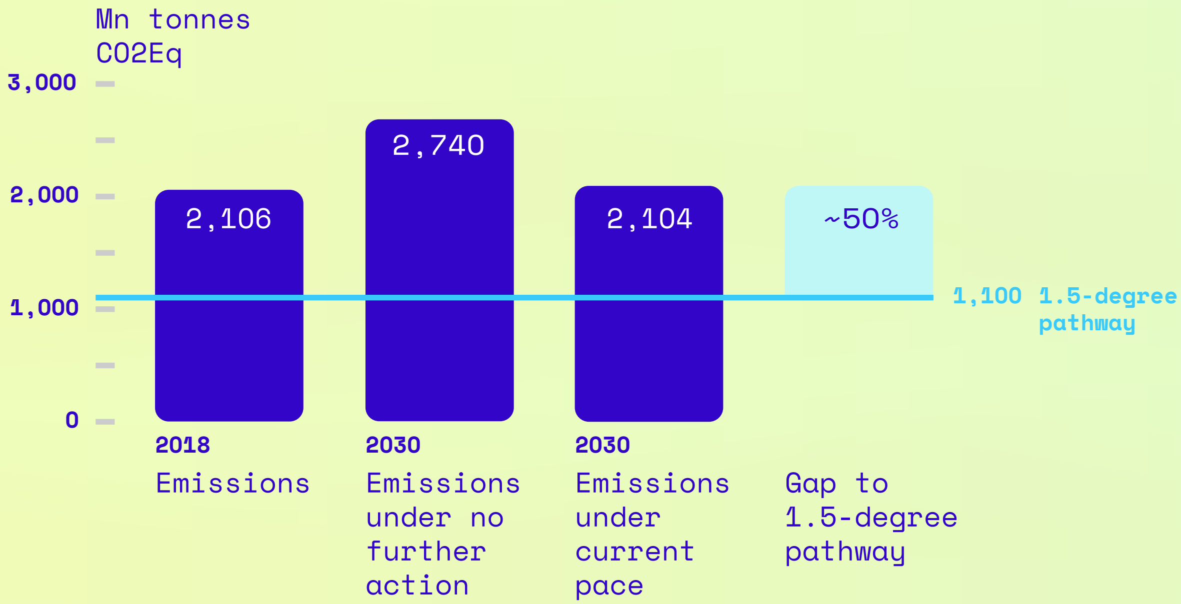
Current pace. If abatement efforts continue to expand at the current rate, the industry can maintain GHG emissions at 2.1 billion tonnes in 2030. In net terms, this represents an abatement potential of around 636 million tonnes.

Around 43% of that potential is associated with decarbonised production and process efficiency improvements, including initiatives across spinning, weaving and knitting; shifting away from wet towards dry processing; transitioning from coal to electric energy; and increasing use of renewable energy across the value chain.[34] Other elements include reduction of overproduction and manufacturing process wastage, greater use of circular business models, and consumer-led changes such as reduced washing and drying. If emissions reductions continue on the current trajectory, these can offset the additional emissions that will be created by the industry's growth up to 2030. However, these will not be sufficient to put the industry on a 1.5-degree pathway.

To track a path to 1.5 degrees, the industry will be required to accelerate its efforts over the coming decade, reducing emissions by half to around 1.1 billion tonnes by 2030.[35] This will require the industry to accelerate abatement actions, including scaling up and intensifying current decarbonisation approaches.[36]

"UNDER ITS CURRENT TRAJECTORY, THE FASHION INDUSTRY WILL MISS THE 1.5-DEGREE PATHWAY BY 50%."

EMISSIONS ABATEMENT ASSUMING NO FURTHER ACTION OR INDUSTRY DECARBONISATION CONTINUES AT CURRENT PACE



THE INDUSTRY'S ACCELERATED ABATEMENT POTENTIAL

ACCELERATED ABATEMENT TO PUT THE INDUSTRY ON THE 1.5-DEGREE PATHWAY

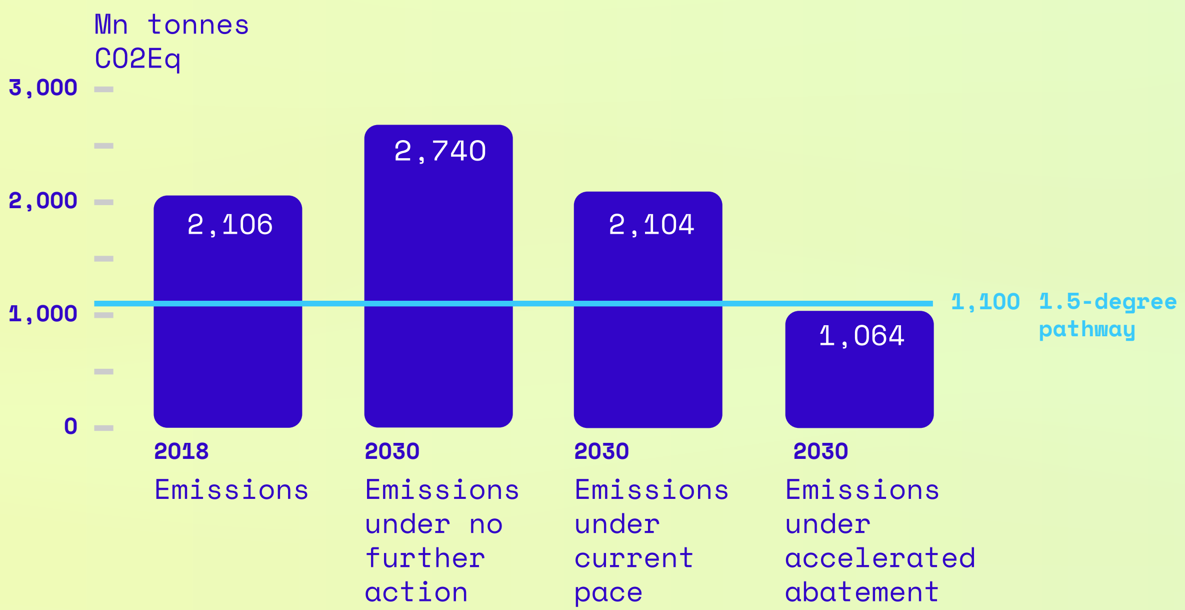
Accelerated abatement. Under an accelerated abatement scenario, the industry can reduce emissions to around 1.1 billion tonnes in 2030, putting it on the 1.5-degree pathway. We define accelerated abatement as the effort required to move the industry from 2.7 billion tonnes of emissions under the no-further-action baseline to 1.1 billion tonnes in 2030.[37]

Accelerated abatement is achievable through many of the same levers that are currently being used to cut emissions, but on an expanded scale or with a higher level of adoption.[38] The primary drivers of accelerated abatement will be brands and retailers, which can affect change in their own operations, support value chain participants in their decarbonisation efforts and create opportunities for consumers to make sustainable consumption choices. It will require concerted and committed action in three areas:

- **Reducing emissions from upstream operations**
- **Reducing emissions from brands' own operations**
- **Encouraging sustainable consumer behaviours**

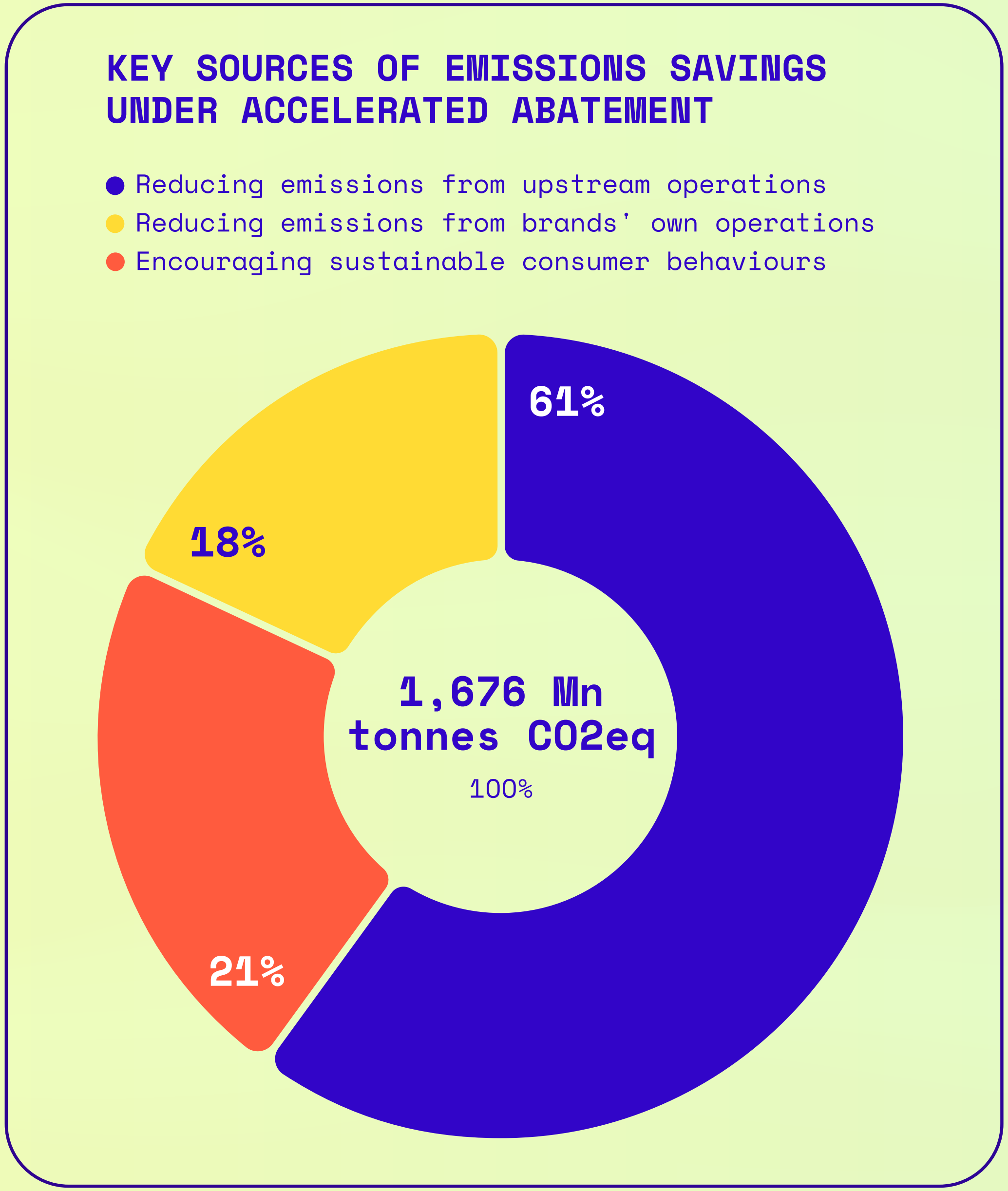
"OVER THE NEXT DECADE, THE INDUSTRY CAN CUT ITS COLLECTIVE GHG FOOTPRINT IN HALF FROM CURRENT LEVELS."

EMISSIONS ABATEMENT ASSUMING ACCELERATED INDUSTRY DECARBONISATION



THE INDUSTRY'S ACCELERATED ABATEMENT POTENTIAL

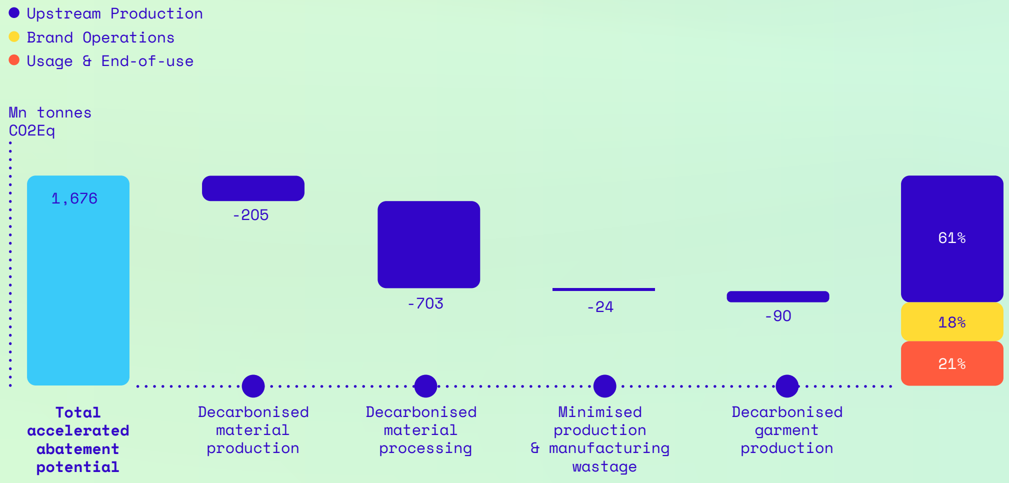
"60% OF THE ACCELERATED ABATEMENT POTENTIAL LIES IN DECARBONISING UPSTREAM OPERATIONS, 20% LIES IN BRANDS' OWN OPERATIONS, AND 20% RELIES ON ENCOURAGING SUSTAINABLE CONSUMER BEHAVIOURS"



REDUCING EMISSIONS FROM UPSTREAM OPERATIONS

THE DECARBONISATION OF UPSTREAM VALUE CHAIN ACTIVITIES HAS THE POTENTIAL TO DRIVE 61% OF THE AMBITIOUS 1.7 BILLION TONNES OF ACCELERATED ABATEMENT POTENTIAL IN 2030.

EMISSIONS SAVINGS WITHIN UPSTREAM PRODUCTION UNDER ACCELERATED ABATEMENT



Decarbonised material production could reduce annual GHG emissions by 205 million tonnes. This assumes around 20% of energy efficiency improvements for polyester production, based on technology improvements within machinery, and an around 40% reduction in fertiliser and pesticide usage in cotton cultivation, due to improved farming practices such as targeted spreading.[39] Fertilisers are a significant source of nitrogen-linked GHG emissions, while pesticides emit carbon during manufacturing. They account for around 70% of GHG emissions in conventional cotton cultivation.

Decarbonised material processing could deliver 703 million tonnes of GHG emissions savings through renewable energy and efficiency improvements. This assumes a 5% efficiency gain in spinning, weaving and knitting stages, for example through motor and air pressure modifications in machinery. It assumes a shift from wet to dry processing and adoption of processing technologies that consume less energy.[40, 41] Additionally, the analysis assumes the use of 100% renewable energy in processing stages, supported by brands and retailers.[42]

Minimised production and manufacturing wastage could deliver 24 million tonnes of GHG emissions savings. This assumes a 1-2 percentage point improvement in the waste generated in the transition from fibre to textiles and in cutting waste in the garment manufacturing stage through better design and modern cutting techniques.[43]

Decarbonised garment manufacturing could deliver 90 million tonnes of GHG emissions savings. This assumes a 30% energy efficiency improvement across heating, ventilation and air conditioning-related equipment and an around 20% efficiency improvement in sewing machines through new technologies and equipment upgrades.[44] Additionally, the analysis assumes the use of 100% renewable energy in the garment manufacturing stage, supported by brands and retailers.[45]

ENABLE ENERGY EFFICIENCY IMPROVEMENTS AND ENERGY TRANSITIONS

Under an accelerated abatement scenario, energy efficiency and energy transition levers can deliver around 1 billion tonnes of GHG emissions abatement in 2030 across the value chain. Around 45% of savings can be derived from efficiency improvements in raw material production, preparation and processing, while 39% will be associated with the transition to renewable energy. The remaining 16% could be delivered by switching from coal energy boilers to electric boilers for synthetic material production.

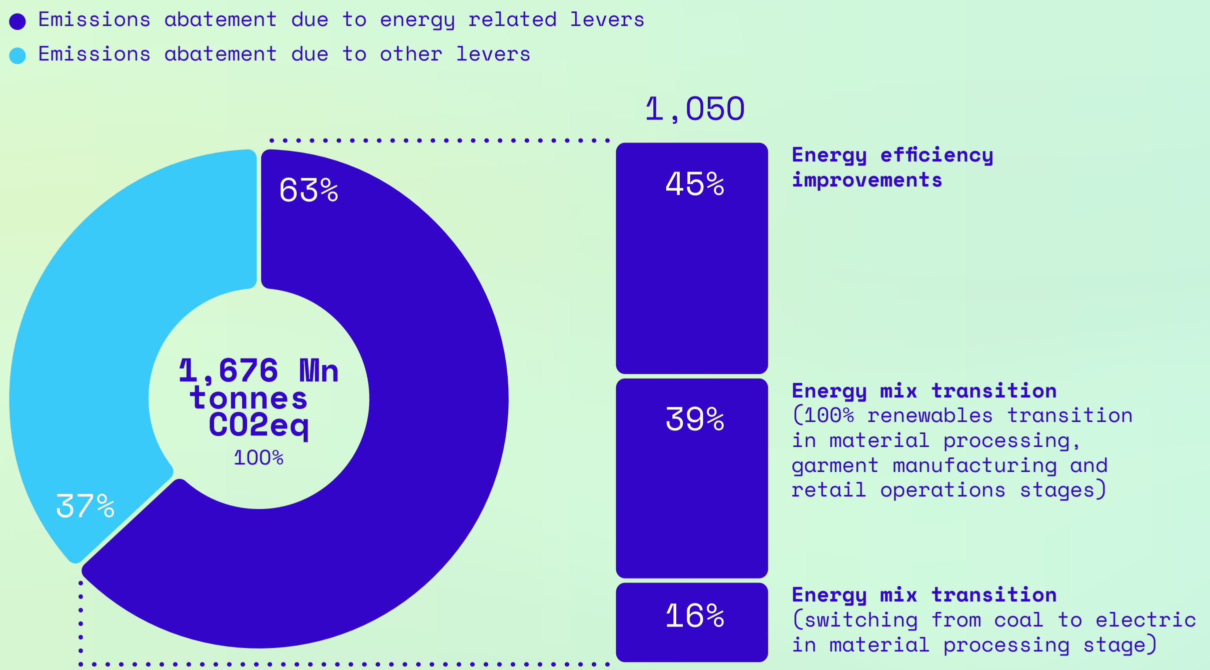
Brands and retailers play a key role in supporting the energy transition of upstream operations. One promising avenue is through power purchase agreements (PPA) in supplier countries. These are long-term contracts to purchase energy during the contract period. To make the investment case viable and to secure financing for a new renewable power asset and long-term (10-20 years) offtake agreement, brands can offer their probable higher credit rating to secure more favourable terms. Power purchase agreements are currently not available in Bangladesh and Turkey, but they are seeing rising use in other major supplier countries, including China, India and Vietnam.

Another option for brands is to support the purchase of unbundled Energy Attribute Certificates. These instruments verify that 1 MWh of renewable electricity was generated by a sustainable power source and fed back into the grid. While value chain players are able to purchase these certificates, brands can offer support by incentivising or rewarding purchases. Widely available in China, India and Turkey, they are starting to appear in Bangladesh, Indonesia and Vietnam.

Overall, the longer-term picture on renewable energy is encouraging. Corporate groups such as the RE100 are driving the agenda to grow renewable energy sourcing and brand-supported action could significantly contribute to accelerating the energy transition in supplier geographies.[46]

"SOME 63% OF ACCELERATED ABATEMENT POTENTIAL LIES IN ENERGY EFFICIENCY AND THE TRANSITION TO CLEANER ENERGY SOURCES."

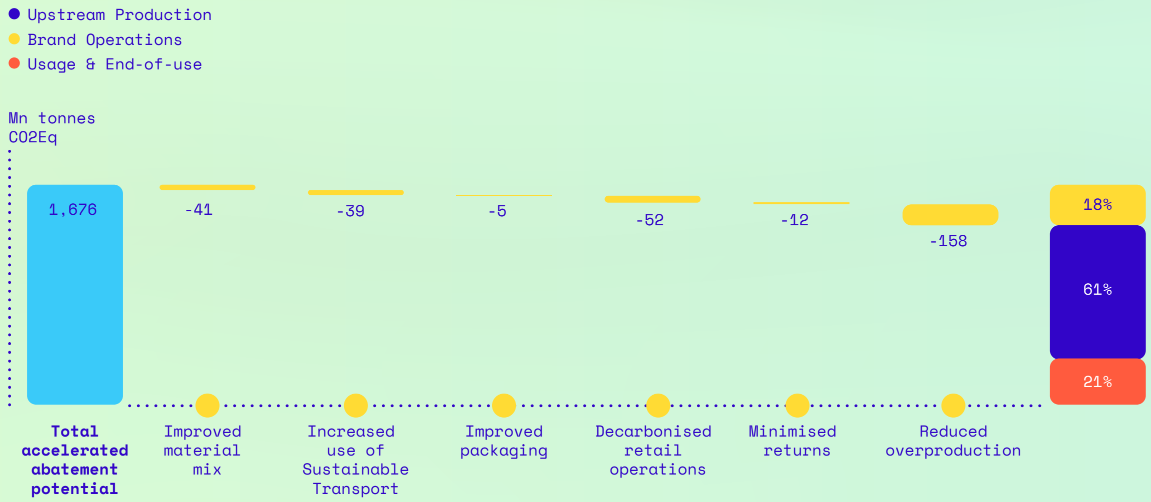
ENERGY RELATED EMISSIONS ABATEMENT



REDUCING EMISSIONS FROM BRANDS' OWN OPERATIONS

DECARBONISATION LEVERS WITHIN BRANDS' DIRECT OPERATIONS CAN DRIVE AS MUCH AS 18% OF THE ACCELERATED ABATEMENT POTENTIAL.

EMISSIONS SAVINGS WITHIN BRAND OPERATIONS UNDER ACCELERATED ABATEMENT



Improved material mix could deliver 41 million tonnes of GHG emissions savings. The impact of this lever will be dependent on the level of adoption assumed. Due to limitations around economics and scaling, this accelerated abatement analysis assumes just 20% of recycled polyester (rPET) usage and an 11% adoption of alternatives such as organic, recycled or bio-based textiles by 2030 (see: Embracing sustainable materials).

Increased use of sustainable transport could deliver 39 million tonnes of GHG emissions savings. This assumes a recalibration to 90% sea transport and 10% air transport across the industry, compared with 83% sea transport and 17% air transport at present.[47] This is achievable through measures that include rapid digitisation, investments in more demand-focused regional supply chains and nearshoring.[48] Additionally, it assumes 90% electrification of the B2C light transport fleet, supported by regulatory incentives and improvements in battery technology.

Improved packaging could deliver 5 million tonnes of GHG emissions savings. This assumes material mix improvements, such as a 20 percentage point increase in recycled content usage in corrugated boxes and 80% recycled low-density polyethylene content in polybags through improved material functionality and lower production costs. Additionally, it assumes weight reduction in corrugated boxes based on a cut in the number of layers from five to three, and a reduction in polybag weight by around 20% through improved design.

Decarbonised retail operations could deliver 52 million tonnes of GHG emissions savings. This assumes a 40% reduction in energy consumption across heating, ventilation and air conditioning equipment in retail operations, an 80% energy efficiency improvement by switching to LED lighting and a transition to 100% renewable energy across retail operations.

Minimised returns could deliver 12 million tonnes of GHG emissions savings. This assumes a reduction in e-commerce returns rates from 35% to 15%, through a combination of technological improvements on predicting size and fit and consumer behavioural change to reduce purchases with an intent to return.[49]

Reduced overproduction is a key lever that could reduce emissions by around 158 million tonnes in 2030. Due to overproduction, some 40% of garments are currently sold at a markdown.[50] A 10 percentage point reduction in industrywide overproduction,[51] for example through technology investment to support demand forecasting and stock management or regulatory incentives, could deliver this abatement.[52]

EMBRACING SUSTAINABLE MATERIALS

Sustainable materials help reduce upstream emissions, for example due to cleaner production processes or use of recycled materials over virgin materials. Organic cotton is around 50% less emissions intensive than conventional cotton, due to the limited use of pesticides and fertilisers and more advanced farming practices.53 rPET is around 40% less emissions intensive than regular polyester because of material recycling and closed-loop production methods.54 Sustainable man-made cellulose fibres like Modal and Lyocell produce around half the emissions of conventional fibres of this type due to closed-loop production methods.55

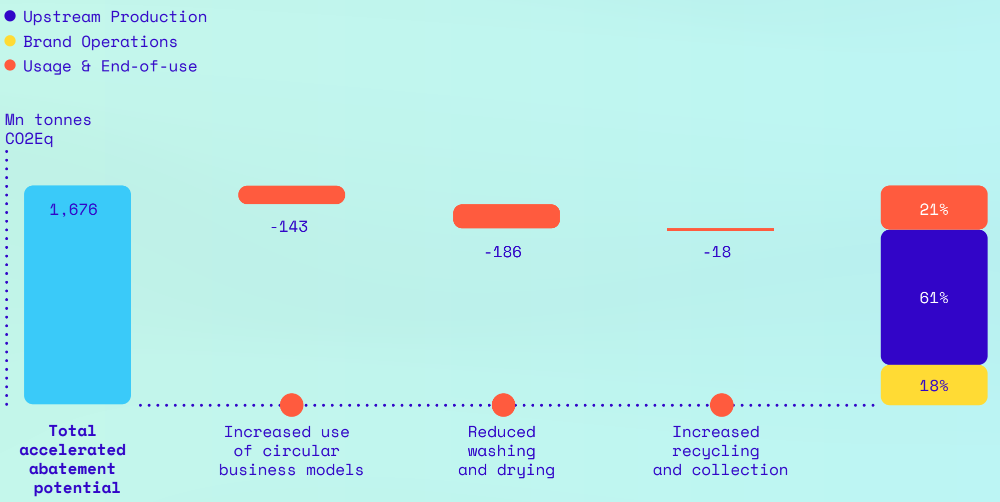
The net emissions abatement potential of sustainable materials is dependent on the level of adoption, and there are challenges in that respect. In the case of organic cotton, the yields in the transition phase toward organic certification are lower compared to conventional cotton. This has a direct impact on farmers' revenues. If brands and suppliers cannot compensate for that loss, organic cotton production is unlikely to increase significantly over the next decade. In the case of rPET, the industry has historically been dependent on rPET from plastic bottles, but supply is increasingly pressured by demand from the packaging industry. This could limit the fashion industry's share of rPET to around 20% in 2030. Alternative material choices include bio-based polyester and closed-loop rPET, but commercial-scale solutions are nascent and cost prohibitive for many players. Similarly, in the case of sustainable man-made cellulose fibres, commercial-scale production is limited due to nascent recycling technology.56

A key unlock over the coming years will be the ability of industry players to scale up the adoption of sustainable materials while driving down costs in comparison to traditional materials, as well as fostering changes in designer mindsets to promote sustainable materials in product design. More frequent use of sustainable materials will also have an impact on other factors, including water consumption, water pollution, land and fertiliser use, and eutrophication. That is why it should continue to be a priority abatement lever as the technology matures.

ENCOURAGING SUSTAINABLE CONSUMER BEHAVIOURS

"AROUND 21% OF ACCELERATED ABATEMENT POTENTIAL IS DIRECTLY RELATED TO CONSUMER ACTIONS IN THE USE PHASE AND END-OF-USE PHASE, ENABLED BY CONSCIOUS CONSUMPTION AND NEW INDUSTRY BUSINESS MODELS"

EMISSIONS SAVINGS WITHIN USAGE AND END-OF-USE UNDER ACCELERATED ABATEMENT



Circular business models, including fashion rentals, re-commerce, repair and refurbishment could enable the industry to cut around 143 million tonnes of GHG emissions in 2030.[57] Consumers are vital to realising this abatement potential. The analysis found that, to align with the 1.5-degree pathway, by 2030 we need to live in a world in which one in five garments are traded through circular business models (see: Promoting circular business models).

Reduced washing and drying could deliver an additional 186 million tonnes of reductions if consumers changed their behaviour in the use phase, for example by skipping one in six washing loads, washing half of loads at below 30 degrees, and substituting every sixth dryer usage with open-air drying. This requires brands and retailers to adapt their offerings, for example through better care instructions and sustainable material choices.

Increased recycling and collection could drive annual emissions abatement of around 18 million tonnes. These levers would reduce incineration and landfill, moving the industry towards a closed-loop-recycling (CLR) operating model. CLR is a key topic within circularity. Currently less than 1% of used products are recycled back into the fashion industry's value chain.[58] To achieve accelerated abatement, we expect advancements in chemical textile-to-textile recycling, the development of sorting and textile blend identification technologies, higher incentives for brands to enable CLR and consumers to support this adoption.

"BY 2030, WE NEED TO LIVE IN A WORLD IN WHICH 1 IN 5 GARMENTS ARE TRADED THROUGH CIRCULAR BUSINESS MODELS."

PROMOTING CIRCULAR BUSINESS MODELS

Circular business models are key decarbonisation levers because of their ability to extend product life, enable recycling and reduce the need for new and finite resources in production. Circular approaches could deliver around 143 million tonnes of GHG emissions savings in 2030, with every percentage point increase in market share saving around 13 million tonnes. Beyond 2030, the adoption of circular business models will need to continue to grow for the industry to stay on the 1.5-degree pathway.

The primary vehicle for circular models is currently re-commerce, representing around 7% of the market.[59] Still, over the coming decade, resale segments, including consignment shops, managed marketplaces and peer-to-peer marketplaces, could grow at over 10% the compound annual growth rate (CAGR),[60] amid soaring demand among GenZ and Millennials consumers who support the models' eclecticism, value proposition and sustainability.[61] Re-commerce will likely represent 12% of the market by 2030, based on the accelerated abatement analysis.

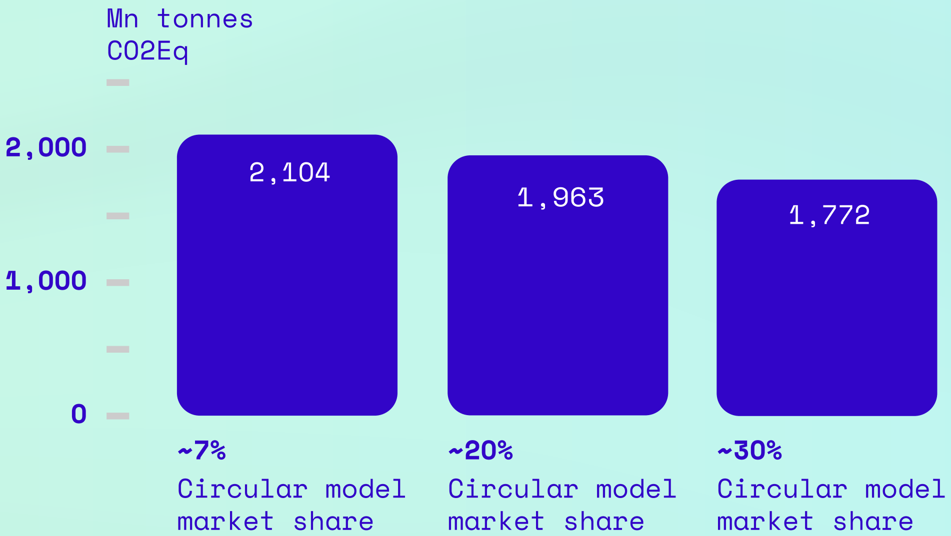
GenZ and Millennials, particularly those living in urban areas, are expected to drive the demand for rental models.[62] Conversely, brands will be key players in driving refurbishments as they innovate around overstock and deadstock.[63] Similarly, the repair lever assumes the willingness of brands and retailers to introduce professional repair services in select product categories[64] and that consumers will choose to repair products when supported to do so.[65]

The analysis assumes that re-commerce models can extend average product life by 1.7x, based on average length of second-hand ownership.[66] The rental model is assumed to extend product life by 1.8x, based on the average number of rentals during a product's lifetime.[67] Repair models offer a more modest 1.35x extension, assuming professional repairs.[68] Finally, refurbishment has the potential to double lifetime extension, reflecting potential brand and manufacturer collaborations around up-cycling.

To achieve accelerated abatement, brands will need to reimagine, and potentially recalibrate, their business models. Rental and re-commerce models, for example, will require new logistical capabilities. Repair and refurbishment models will require garment-making skills, either inhouse or outsourced. As demand grows, brands will need to implement circular business models in collaboration with retailers and upstream value chain players or risk losing both control of their products and the value they hold after sale

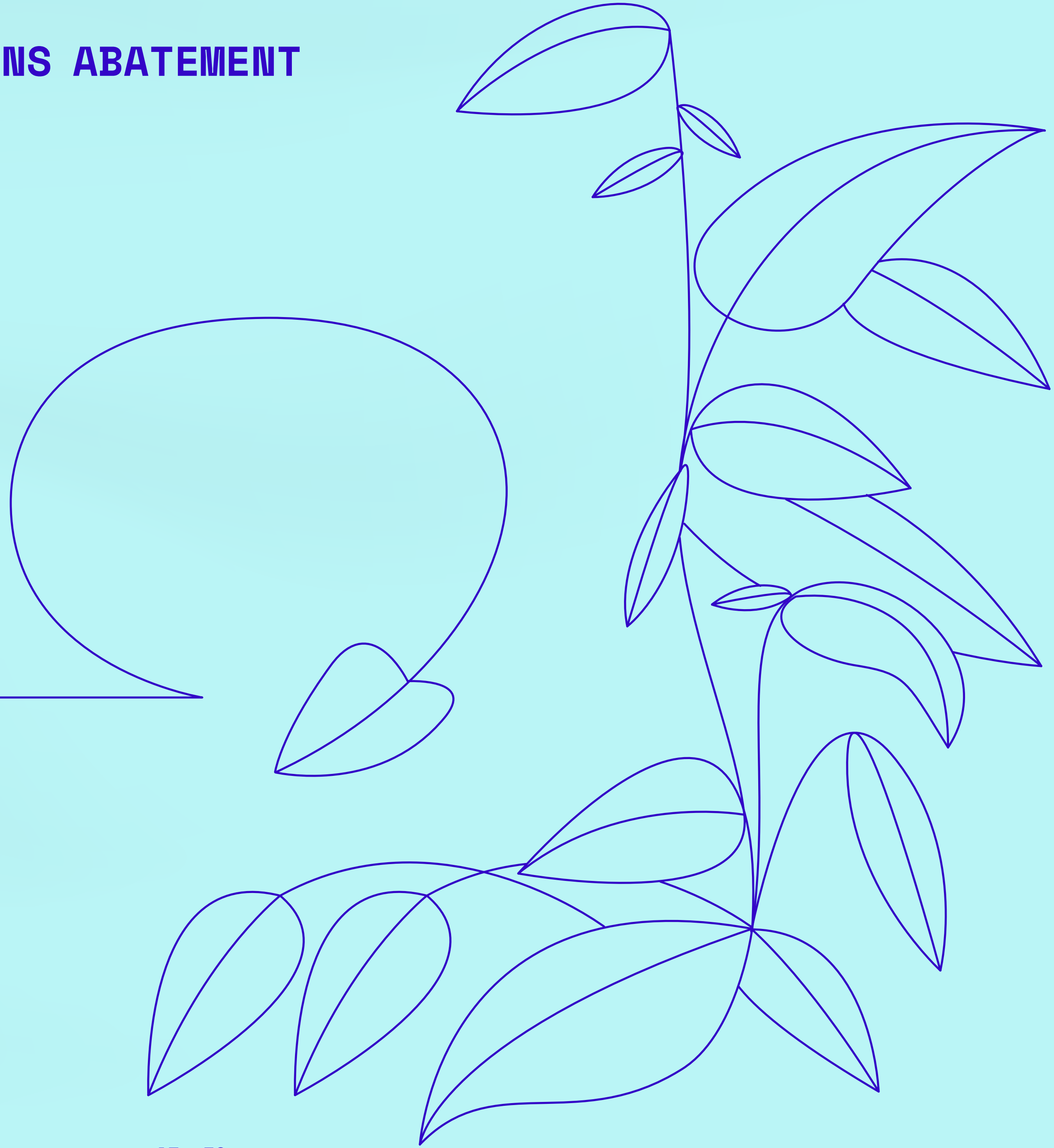
“AS DEMAND GROWS, BRANDS WILL NEED TO IMPLEMENT CIRCULAR BUSINESS MODELS IN COLLABORATION WITH RETAILERS AND UPSTREAM VALUE CHAIN PLAYERS OR RISK LOSING BOTH CONTROL OF THEIR PRODUCTS AND THE ADDITIONAL VALUE THEY HOLD AFTER SALE.”

EMISSIONS SENSITIVITY TO CIRCULAR BUSINESS MODEL ADOPTION



1% increase in circular model market share **reduces emissions by 13 Mn tCO2e**

THE ECONOMICS OF EMISSIONS ABATEMENT

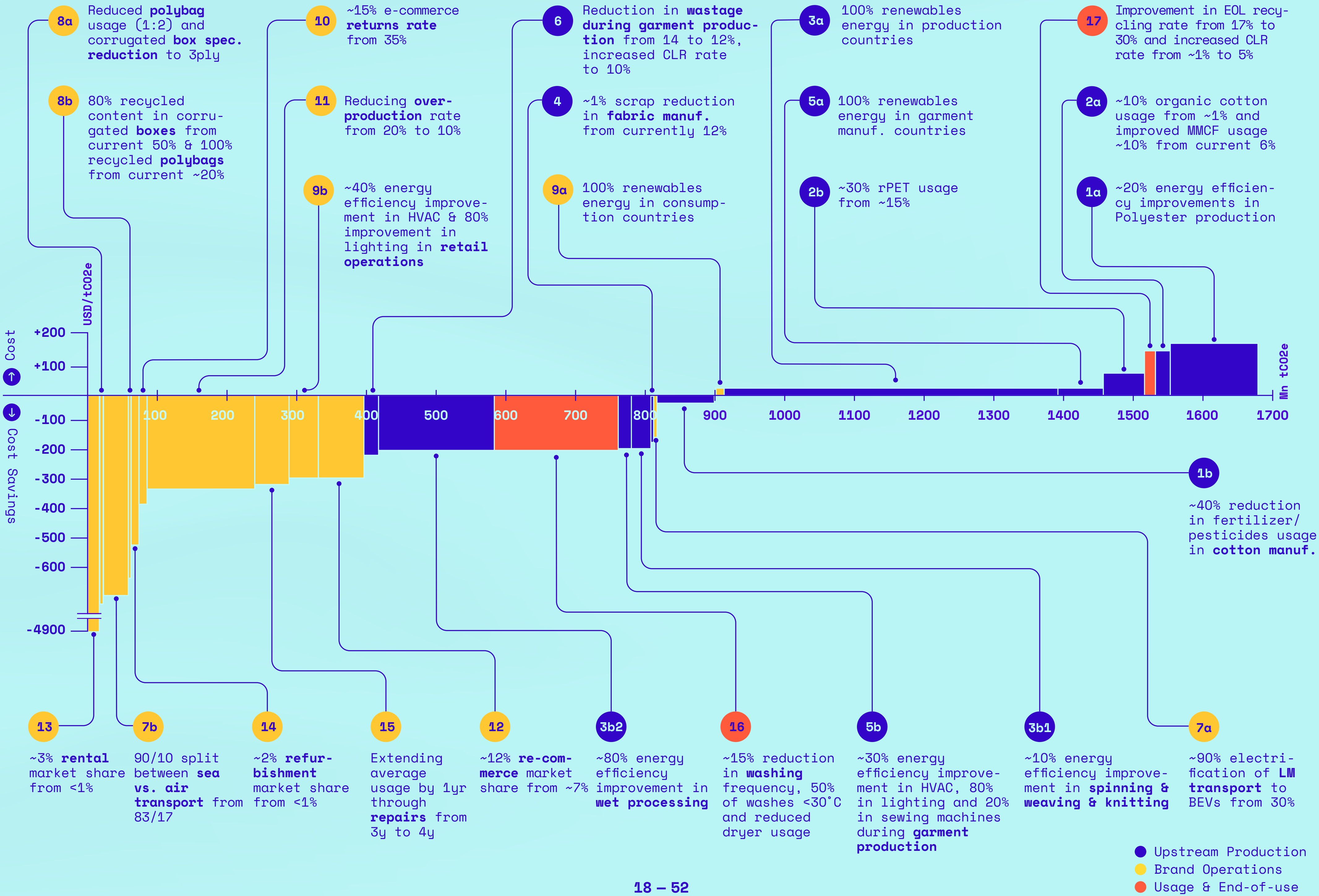


THIS REPORT QUANTIFIES THE ECONOMICS OF ACCELERATED ABATEMENT, COMPARING NECESSARY INVESTMENTS AND RESULTING SAVINGS, BASED ON A HOLISTIC FASHION INDUSTRY GHG EMISSION ABATEMENT COST CURVE.

THE CURVE, WHICH IS ALREADY WIDELY USED IN OTHER INDUSTRIES, HIGHLIGHTS POTENTIAL ABATEMENT LEVERS AND QUANTIFIES THEIR IMPACTS AND COSTS.

IN ESTABLISHING THE COST CURVE, THE REPORT AIMS TO SPARK INDUSTRY-LEVEL DIALOGUE AROUND POWERFUL DECARBONISATION LEVERS AND SUPPORT INDIVIDUAL BRANDS IN DEFINING THEIR OWN ABATEMENT CURVES AND ROADMAPS.

FASHION INDUSTRY COST CURVE UNDER ACCELERATED ABATEMENT



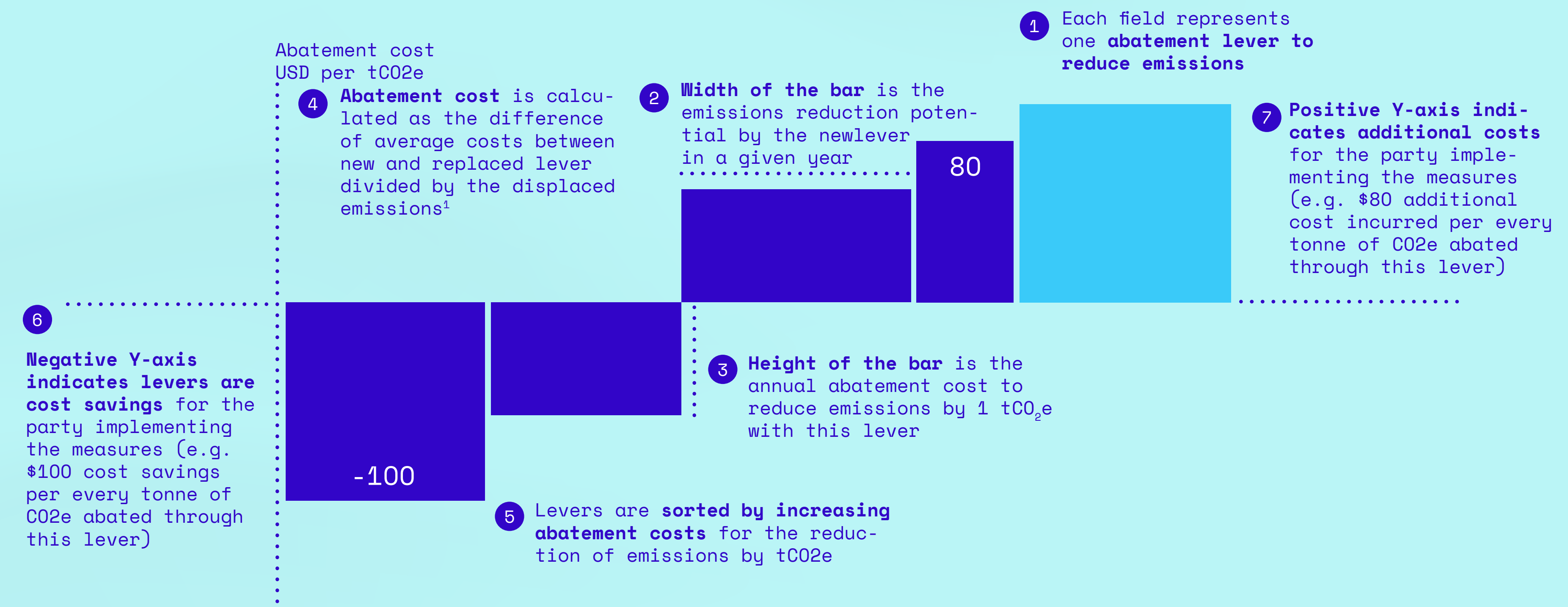
THE ECONOMICS OF EMISSIONS ABATEMENT

HOW TO READ A COST CURVE

To understand the economics behind the decarbonisation levers, we use an industry-level cost curve analysis. This tool enables a visualisation of lever abatement potential and economics, providing an integrated perspective on economic viability. The cost curve looks different for each stakeholder and brand, depending on product mix, sourcing country, and historical abatement progress. It encompasses the end-to-end value chain, from material and garment production to retail, product use and end-of-use. It does not incorporate effects such as the GHG emissions from fashion shows and the back-office operations of individual companies.

Each bar on the cost curve represents a decarbonisation lever. The bar width represents the abatement under that lever in one year. The costs on the y-axis are calculated as annual additional cost savings or spending required to save 1 tonne of GHG emissions through a given lever.[69] They include an annualised depreciation charge relating to the upfront capital expenditure (capex) needed to implement the lever, where applicable.

A negative value on the y-axis indicates levers are cost savings (e.g. USD100 cost savings per every tonne of GHG emissions abated through the lever), while a positive y-axis value indicates additional costs to achieve the level of abatement.



The good news for the industry is that around 55% of the levers required to achieve the accelerated abatement of 1.7 billion tonnes of GHG emissions in 2030 generate savings on an industrywide basis.

For example, using 90% sea and 10% air transport, achievable through increased process digitisation, better planning and regional supply chains or nearshoring, could deliver more than USD600 of cost savings per tonne of GHG emissions abated. Reducing polybag use by half and capping corrugated boxes at three ply can deliver similar savings. Cutting the rate of e-commerce returns from the current 35% to 15%, for example through data-driven analysis of consumer purchasing behaviours and standardised sizing guidelines, can save nearly USD360 per tonne of GHG emissions abated.

Some abatement levers create costs that outweigh their savings. The increased use of sustainable materials is likely to incur positive costs given current technologies and resulting economics. Recycled polyester (rPET) fabric is likely to incur costs in the range of USD60 per tonne of GHG emissions abated. A 15 percentage point improvement in end-of-use recycling is likely to incur costs of around USD140 per tonne of GHG emissions abated. Still, 89% of abatement can be achieved at a cost of less than USD50 per tonne of GHG emissions, a relatively modest amount compared with other industries.[70]

"ABATEMENT REQUIRES INVESTMENT, BUT AROUND 55% OF THE LEVERS SAVE MONEY FOR THE INDUSTRY OVERALL."

THE ECONOMICS OF EMISSIONS ABATEMENT

The likelihood that any particular lever will be implemented is not solely determined by its cost. There may be other factors at play, including misalignment of incentives, impact on brand image, joint commitments or regulatory requirements. The transition to renewable energy is likely to incur around USD20 per tonne of GHG emissions abated costs, mainly due to the upfront capex required for back-up battery storage and other infrastructure.

However, this could be offset by government or brand-led incentives (see: Energy transitions). End-of-use recycling requires sizeable upfront capital investment, both to develop CLR technology and to build recycling infrastructure. Regulatory incentives such as the European regulation on waste recycling and reuse under the Waste Framework Directive may support investment.[71] Equally, the promise of cost savings is not a guarantee of implementation feasibility. A requirement for significant upfront capital allocation may, for example act as a disincentive. In these situations, value-sharing arrangements among value chain players can help re-align the incentives required to catalyse action.

On the fashion industry abatement cost curve, around 60% of the accelerated abatement requires upfront capex, of which around 30% leads to a cost savings net of the investment requirement. Most levers in this category are focused on energy efficiency, where accrued savings outweigh the initial investment. However, given the fragmented nature of the value chain, individual companies may not be able to afford sizeable upfront investments by themselves. In these scenarios, brands and retailers may consider co-financing solutions or sharing financial incentives to distribute the potential savings. Despite the economics, around a fifth of abatement measures, including the adoption of circular models, reduction in washing and drying frequency, as well as end-of-use recycling, are primarily contingent on consumer choice. At a minimum, these levers will require a change in behaviour beyond the intention to support decarbonisation efforts. Recent consumer sentiment surveys indicate growing support that could lead to real action.[72] However, brands should do as much as possible to offer a compelling proposition, for example through innovative business models to encourage participation in circular models and end-of-use recycling.

"GIVEN THE FRAGMENTED NATURE OF THE UPSTREAM FASHION INDUSTRY VALUE CHAIN, COLLABORATION IS NEEDED TO FINANCE UPFRONT INVESTMENTS."

ROLES OF ECOSYSTEM ACTORS TO REACH THE 1.5-DEGREE PATHWAY

BASED ON THE ANALYSIS, THERE ARE PRODUCTIVE AND COST-EFFECTIVE STRATEGIES THAT CAN PROPEL THE INDUSTRY TOWARDS LOWER GHG EMISSIONS. PLAYERS MUST CONTINUE CURRENT EFFORTS, FROM MODERNISING AND DECARBONISING OPERATING MODELS, TO ENGAGING WITH CONSUMERS, SUPPORTING VALUE CHAIN TRANSFORMATIONS AND PURSUING COLLECTIVE SOLUTIONS. MOREOVER, BRANDS HAVE A ROLE TO PLAY IN DRIVING VALUE CHAIN DECARBONISATION THROUGH EQUAL PARTNERSHIPS WITH OTHER STAKEHOLDERS.

"TARGETS NEED TO BE SET BY BRANDS AND RETAILERS FOLLOWING A COMMON STANDARD AND IN COLLABORATION WITH THEIR UPSTREAM PARTNERS TO ENSURE CONSISTENT ACTIONS ARE TAKEN TO ACCELERATE INDUSTRY DECARBONISATION EFFORTS."

BRANDS AND RETAILERS

Prioritise emissions transparency and set targets. In addition to continuing existing efforts to drive decarbonisation, brands and retailers should prioritise transparency and should track, analyse and benchmark performance in their own operations. As a starting point, brands and retailers should analyse their own specific abatement curves, which will help them focus on key levers and define or adjust their decarbonisation roadmaps. They should set science-based targets in line with the Paris Agreement and develop clear timelines and governance structures that will support operationalisation of climate strategies.[73]

Engage in transparent consumer communication. Brands and retailers should leverage existing joint initiatives to set standards on labelling and provide digestible information to consumers at point of sale.[74] Transparent communication about challenges and successes are likely to increase brand loyalty and foster consumer engagement.

Introduce circular business models. Brands and retailers also have a role to play in enabling levers such as circular business models. If brands are able to engage with consumers about their expectations and needs, for example in relation to demand for durable, high-quality, recyclable products, there is an opportunity to expand market share in the growing circular business segment.[75]

Drive sustainable product design and innovation. Additionally, brands should drive sustainable decision-making at the design stage, with the aim of driving sustainable material usage, minimising production waste and encouraging end-of-use recycling. On an industrywide basis, brands and retailers should consider pre-competitive investment in research-dependent areas such as alternative materials.

ROLES OF ECOSYSTEM ACTORS TO REACH THE 1.5-DEGREE PATHWAY

UPSTREAM VALUE CHAIN PLAYERS

Coordinate decarbonisation efforts. Factories, material producers and other upstream players must be fully involved in and committed to decarbonisation programmes. Brands and retailers should support value chain players in tracking, analysing and benchmarking their carbon emissions and enhancing transparency. Useful tools include abatement cost curves and the Higg Facility Environmental Module.[76] Moreover, brands and retailers should aim to coordinate their decarbonisation efforts with key value chain partners to ensure alignment in targets and actions. Standardised target setting could help minimise inefficiencies and help value chain players deliver coordinated decarbonisation activities.

Develop equal partnerships. Brands and value chain stakeholders have an opportunity to work closely and develop equal partnerships, particularly by assessing purchasing practices and incentivising value chain players on decarbonisation activities. Following COVID-19, all stakeholders have an opportunity to re-prioritise relationships with partners who are similarly committed to sustainable practices.

Collaborate on energy transition efforts. Brands have a key role to play in supporting the implementation of efficiency improvements along the value chain. Co-investment and sharing of financial incentives through long-term partnerships are potentially effective strategies to drive change. Brand support can also be instrumental in facilitating the transition to renewable energy, particularly in key supply countries.

POLICY MAKERS

Drive sustainable practices and consumption. Policy makers have a vital role to play in driving decarbonisation across the industry, and governments have already begun incentivising sustainable practices and responsible consumption. For example, in 2019, the European Commission communicated the European Union (EU) Green Deal policy framework to accelerate decarbonisation across member states.[77] Also, in 2019, France announced a ban on the destruction of unsold fashion goods, to be implemented by 2023.[78]

Incentivise key decarbonisation levers. Additionally, policy makers can play a role in supporting specific levers and driving investment. For example, the 2020 EU Circular Economy Action Plan lays out a policy framework to support sustainable products, services and business models that reduce waste production, including levers such as landfill and incineration taxes and requirements for recycled content that will stimulate the development of the EU market for secondary raw materials.[79]

Engage with industry players. Going forward, similar to efforts at the 2019 United Nations Framework Convention on Climate Change (UNFCCC) COP 25 conference in Madrid, policy makers have an opportunity to increase engagement with industry players, enabling them to shape views on emissions-related topics and to support policy making and regulation that will enable accelerated abatement.[80]

ROLES OF ECOSYSTEM ACTORS TO REACH THE 1.5-DEGREE PATHWAY

INVESTORS

Encourage decarbonisation efforts. Due to the positive link between environmental, social and governance (ESG) performance and financial performance, ESG factors are playing an increasingly prominent role in decisions around mergers, acquisitions, and divestitures.[81, 82] Investors therefore have an inherent interest in driving their portfolio companies towards accelerated abatement, adoption of science-based targets and accountability on decarbonisation efforts.

Drive emissions transparency within portfolio companies. Investors should encourage transparency on full value chain emissions and promote the use of standardised sustainability assessments such as the Higg Brand and Retail Module within their portfolios.

Support sustainability focused innovation. Additionally, investors can allocate capital towards innovative players looking to develop solutions towards key decarbonisation challenges such as closed loop recycling (CLR), towards sustainable material development and also demand prediction models that can reduce overproduction.

CONSUMERS

Act on sustainability intentions. Consumers must play their part in driving industry decarbonisation efforts through their purchasing decisions. When provided with information, consumers may prefer products with lower emissions footprints, such as those made with low-carbon materials. Consumers can also embrace circular business models to extend the life of fashion products and reduce production-related emissions.

Adopt sustainable usage and end-of-use behaviours. During the use-phase, consumers can take better care of products by reducing washing and drying. This improvement in behaviour can deliver as much as an 11% abatement in emissions under the accelerated abatement scenario. Consumers also have a role to play in recycling products, which can reduce incineration and landfill, and promote CLR across global markets.

BEYOND 2030: DECOUPLING VALUE FROM VOLUME GROWTH

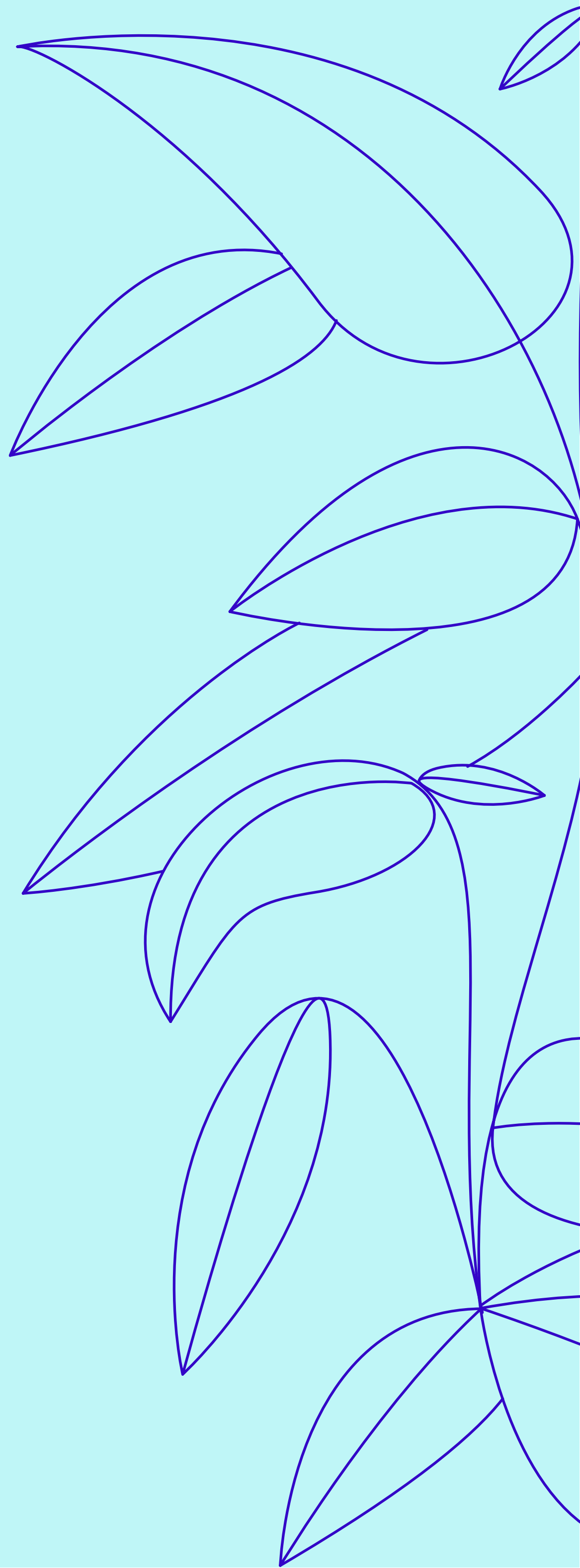
In 2030, almost 62% of remaining GHG emissions (659 million tonnes) after accelerated abatement levers have been applied, are likely to come from the raw material production of the value chain, where abatement is especially difficult without a move towards fully organic materials and at-scale adoption of sustainable materials.[83] To remain on the 1.5-degree pathway beyond 2030, the industry will need to think radically and embrace business model transformation to deliver sustainable outcomes.

Brands and retailers will need to decouple from the current volume-driven measures of success and unlock new sources of value through collaboration with their value chain partners. Increased investor focus on companies with clear ESG value propositions is already encouraging companies to consider new definitions of success.[84]

For example, brands and retailers could offer products that are made to order, which would reduce the volume of garments that can only be sold at significant discounts and thereby add volume, and emissions, without contributing much value. If the industry could reduce the share of stock sold at a discount by 15 percentage points, it would achieve a volume and emissions decline of about 10% without any impact on value growth.

Similarly, companies could decouple volume growth from value growth by enabling the acceleration of circular business model adoption. The accelerated abatement analysis assumes volume growth in line with industry forecasts and an increase of circular business model market share to around 20%. This implies a volume growth of around 2.1% per annum, compared with a 2.7% per annum if the circular business model adoption stays at current levels. However, with a clear consumer value proposition, which could drive margins similar to existing business models, brands can continue to capture value from the circular models without the growth in volume and resulting emissions.

To remain on the 1.5-degree pathway, the industry would need to imagine a world with smaller individual wardrobes consisting of higher value, longer life pieces, complemented by a flourishing re-commerce and rental market, and ample access to repair and refurbishment services. While volume growth in this world could taper, these new consumer needs provide significant value capture opportunities for players who can combine deep customer insight with the capacity to change their way of serving customers.



THE FASHION INDUSTRY'S SUBSTANTIAL CONTRIBUTION TO GLOBAL GHG EMISSIONS ALSO CREATES AN OPPORTUNITY TO INSTITUTE REAL CHANGE. IN A POST-COVID-19 WORLD, THERE IS A CHANCE FOR BRANDS TO TAKE RESPONSIBILITY, UNDERSTAND THEIR OWN EMISSIONS AND ABATEMENT LEVERS, COLLABORATE WITH PARTNERS TO DECARBONISE THE VALUE CHAIN AND WORK WITH STAKEHOLDERS TO BUILD A LESS EMISSIONS-INTENSIVE PRODUCT LIFECYCLE. THIS WILL BECOME CRITICAL BEYOND 2030, WHEN THE INDUSTRY NEEDS TO FIND NEW WAYS TO DECOUPLE VOLUME GROWTH FROM VALUE GROWTH TO STAY ON THE 1.5-DEGREE PATHWAY. IN AN HISTORIC YEAR, THE ECONOMIC AND ETHICAL DRIVERS HAVE NEVER BEEN STRONGER. WHICH IS WHY NOW IS THE TIME FOR DECISION MAKERS TO DEEPEN THEIR UNDERSTANDING OF GHG EMISSIONS AND TO ACCELERATE THEIR RESPONSE.

APPENDIX: METHODOLOGY AND ENDNOTES

KEY DEFINITIONS

Fashion industry: The combined apparel and footwear industry and its value chain players.

Industry value chain: The analysis looks at the fashion value chain from raw material production, processing, manufacturing, transport and retail to product use and end of use. It does not take into account emissions related to secondary activities such as fashion shows and the back-office operations of individual companies in the value chain.

Timeframe: 2018 was established as the baseline year for the emissions impact calculations. Analysis was then conducted to forecast annualised emissions in 2030.

Production countries: The analysis uses the top five global apparel production countries as a proxy for energy consumption and processing. These countries are China (61% of production), Vietnam (15%), India (11%), Bangladesh (7%) and Turkey (6%).[85]

Consumption countries: The analysis uses USA and EU energy consumption data across downstream and use phases as proxies for the consumption countries.[86]
GHG emissions: The report uses the CO2 equivalent (CO2eq) metric measure to compare the emissions from various greenhouse gases based on their global-warming potential by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming impact. The metric unit tonne was used to denote 1,000Kgs of CO2eq units.

No further action: Refers to estimates of potential GHG emissions over the next decade if the fashion industry continues production in line with growth forecasts and makes no additional decarbonisation efforts beyond those in place in 2018. This establishes a starting point to represent the industry's current GHG emissions intensity, scaled to 2030 industry volume growth expectations. It implies 2.7% industry volume growth (CAGR) through 2030, adjusted for COVID-19 impact on growth.

Current pace trajectory: Refers to estimates of the potential for emissions reduction if the fashion industry continues its production in line with growth forecasts and continues to scale its decarbonisation efforts at the current pace. This implies 2.3% industry volume growth (CAGR) through 2030, reflecting volume reduction in new production due to increasing market share from circular business models.

Accelerated abatement: Refers to estimates of the potential for emissions reduction if the industry continues its production in line with growth forecasts and significantly accelerates its decarbonisation efforts across the selected levers. This is not a forecast of where the industry is heading but is an analysis of how much additional abatement could be captured realistically by 2030. It represents the levers stakeholders should consider today, to both reach the current trajectory and to accelerate beyond it. The level of abatement is calculated as the effort required to move from no further action emissions levels to the accelerated abatement trajectory. This implies 2.1% industry volume growth (CAGR) through 2030, reflecting accelerated adoption of circular business models.

Marginal abatement cost curve: An established tool used to understand the decarbonisation potential of levers available within an industry and the economics of the levers by comparing investments needed against savings and gains. The analysis looks at the cost curve from a fashion industry standpoint, rather than the point of view of a single stakeholder.

OVERVIEW OF THE METHODOLOGY

Emissions baseline: This is calculated as a bottom-up value-chain emissions baselining exercise that takes into account the volume of garments produced, used and disposed of in a given year. The analysis uses the volume of fibres used to meet garment demand for 2018 and the energy consumption and emissions intensity of raw materials per processes involved in each stage of the value chain.[87] The apparel industry emissions figure is scaled up to reflect the combined apparel and footwear industry emissions based on 2018 emissions split between the two segments.[88]

Industry growth analysis: The analysis is based on post COVID-19 growth scenarios for the apparel fashion and luxury sector by McKinsey Global Institute. The analysis looks at several growth scenarios, taking into consideration the severity of the COVID-19 impact, potential future resurgence, the public health response and the effectiveness of government economic interventions. The selected scenario ("virus contained, growth rebound") is expected to have a limited negative impact, with growth rebounding by Q1 2021. This results in a ~30% drop in demand in 2020, followed by a growth rebound of ~3% in 2021 compared to 2019.

2030 1.5-degree pathway target: The fashion industry's 2030 emissions pathway of 1.1 billion tonnes of GHG emissions was calculated based on the 1.5-degree Intergovernmental Panel on Climate Change (IPCC) report scenario[89] and the bottom-up calculation of the fashion industry's share in global emissions (see Methodology section: Emissions baseline). As per the IPCC report, half of available 1.5-degree pathways indicate that global emissions in 2030 should be in the range of 25-30 billion tonnes of GHG emissions. The mean of this range was used as a base for the global 1.5-degree pathway. To calculate the fashion industry's target, a 4% share of global emissions[90] was applied to the global target, which resulted in the 2030 1.5-degree pathway of 1.1. billion tonnes of GHG emissions.

Abatement cost: This is the cost required to reduce emissions by 1 tonne of CO2eq using a selected decarbonisation lever. This is calculated as the difference of average costs between a new and replaced lever divided by the displaced emissions. This takes into account the annual additional operating cost (including annualised capex depreciation charges for the upfront investments) and the potential cost savings from operations, when compared to the replaced lever. The calculations do not include transaction costs, subsidies, explicit CO2 costs, taxes or impact on the economy.

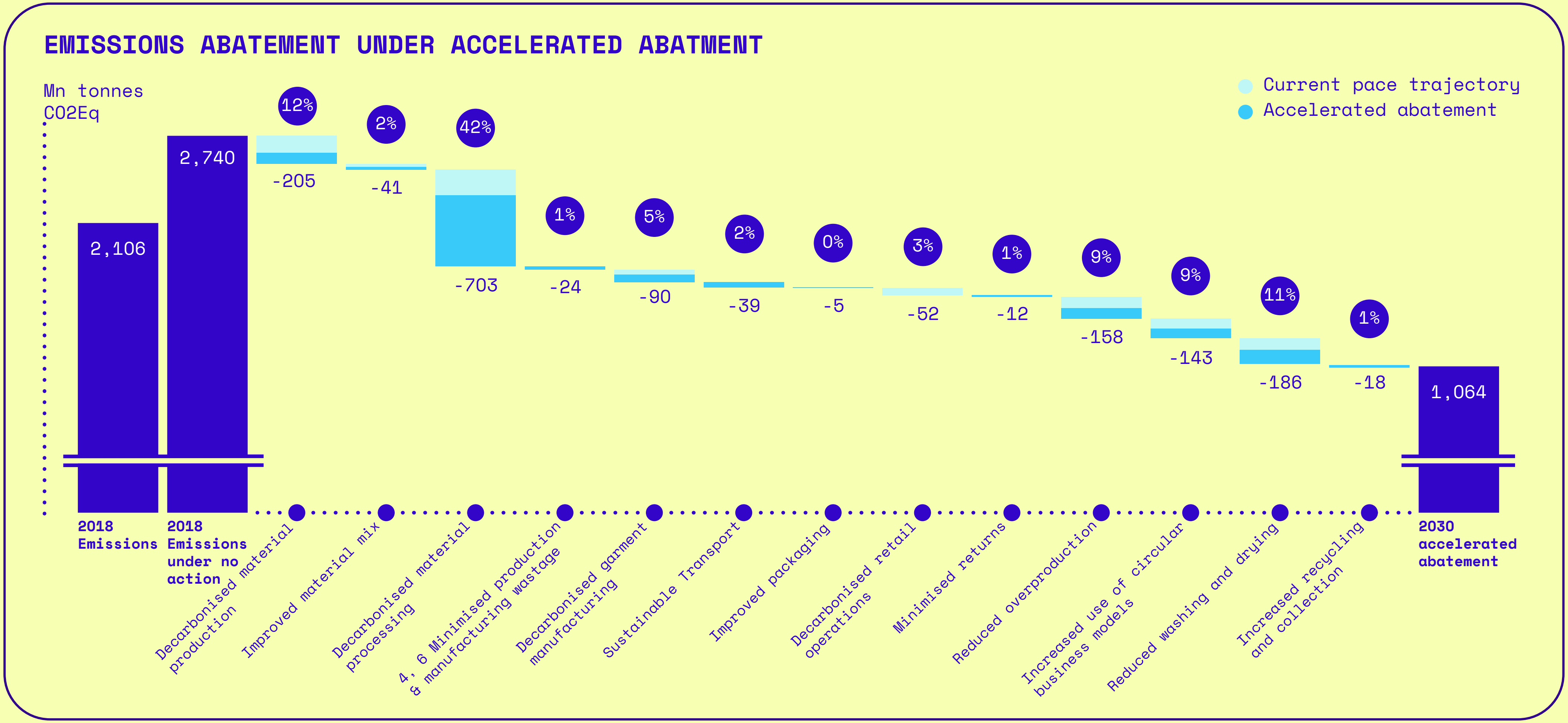
Abatement potential: The analysis looks at the abatement potential of 17 levers across the fashion value chain. Within each lever, assumptions are made about the level of decarbonisation that could be achieved under both the current trajectory and accelerated abatement conditions (see below: Key assumptions).

SUMMARY OF FASHION INDUSTRY[1] ABATEMENT POTENTIAL

Analysis	Emissions, Mn T CO2eq	Emissions % change vs 2018	Emissions % change vs 2030 No Further Action	Implied Volume CAGR[2]
2018 Baseline	**2,106**			
2030 No Further Action[3]	**2,740**	**+30%**		**2.7%**
2030 Current Pace Trajectory	**2,104**	**0%**	**-23%**	**2.3%**
2030 Accelerated Abatement	**1,064**	**-50%**	**-60%**	**2.1%**

1 – Fashion industry includes apparel and footwear industries, 2 – Total apparel volume (linear + circular volume demand). Emissions were modeled under Quantis assumption that apparel makes 83% of total apparel and footwear emissions3 – established as a analytical reference for 2030 emissions based on expected industry growth rate Source: Consolidated model on 22 June 2020

ABATEMENT CONTRIBUTION OF ANALYSED DECARBONISATION LEVERS



KEY ASSUMPTIONS BEHIND THE ANALYSED LEVERS

GARMENT LIFE STAGES		POTENTIAL LEVERS	
Upstream value chain	Raw material production	1 **Decarbonised material production** Improvements across the production & cultivation of key materials e.g. Cotton, Polyester & Viscose	2 **Improved material mix** Decarbonization through improved mix of alternatives for existing materials and introduction of new materials
	Material preparation & processing	3 **Decarbonised material processing** Improvements in energy mix and efficiency in processing	4 **Minimised production wastage** Reducing waste generated in the processing stages
	Product manufacturing	5 **Decarbonised garment manufacturing** Improvements in energy mix and efficiency across manufacturing countries	6 **Minimised manufacturing wastage** Reducing waste generated in the manufacturing stages
Transport & distribution	Sustainable transport	7 **Increased use of sustainable transport** Improvements in fuel mix, energy efficiency of fleets and operational improvements	8 **Improved packaging** (manufacturing through retail) Decarbonization through carbon friendly material mix and reduction of packaging usage
Retail	Operations	9 **Decarbonised retail operations** Improvements in energy mix and efficiency across retail	11 **Reduced overproduction** Reducing waste generated due to unsold stock in retail
		10 **Minimised returns** Decarbonization by limiting retail returns (retailer & consumer)	
	New business models	12 **Increased use of rentals models** Promotion of subscriptions or one-time rental offerings	14 **Introduction of refurbished / upcycled products** Promotion of re-furbished / upcycled product offerings
		13 **Increased use of re-commerce models** Promotion of 2nd-hand sales (direct or through platforms)	15 **Introduction of product repair services** Promotion of repair services to extend product life
Product use	Washing and drying	16 **Reduced washing & drying** Reduced washes and improved care (e.g. temperature selection)	
End-of-use	Recycling and collection	17 **Increased recycling & collections** Increased recycling & collections to minimize incineration without recovery and landfill	

1. DE-CARBONISED MATERIAL PRODUCTION

LEVER NAME	KEY ASSUMPTIONS	SOURCES
1. De-carbonised material production: Improvements across the production and cultivation of key current materials	**Current pace trajectory** Polyester: ~20% energy efficiency improvements for polyester due to switch from coal to electric boilers and condensate recovery with an adoption rate of +20% from current levels Cotton: ~20% reduction in fertiliser and pesticides usage due to targeted pesticide use and improved farming practices **Accelerated abatement** Polyester: ~20% energy efficiency improvements for polyester due to switch from coal to electric boilers with an adoption rate of +40% from current levels Cotton: ~40% reduction in fertiliser and pesticide usage due to substantially improved sustainable farming practices	Institut für Textiltechnik, RWTH Aachen University; Economic Research Service, United States Department of Agriculture
	Economics Increased operating costs in polyester production due to annual capex charge for 100KW capacity boilers with 15-year lifetime, partially offset by the efficiency gains in substituting coal boilers (70% efficiency) for electric boilers (95% efficiency); accelerated replacement rate assumed, with 50% of the lifetime remaining on coal boilers. Cotton: operating cost savings from reduced fertiliser and pesticide use was incorporated	McKinsey & Company, Sustainability Insights team; UK Department for Environment, Food and Rural Affairs, 2007; Federal Reserve: Economic Data, 2018

2. IMPROVED MATERIAL MIX

LEVER NAME	KEY ASSUMPTIONS	SOURCES
2. Improved material mix: De-carbonisation through the use of alternative or new materials	**Current pace trajectory** Assumptions based on historic adoption rates and major player commitments, i.e., organic cotton overall market share of ~1%, recycled cotton market share of <1%, rPET market share of ~13% and bio-based synthetics market share of <1%. Total man-made cellulose fibres share of ~7%. **Accelerated abatement** Organic cotton overall market share of ~2%: this takes into account reduced production and certification costs due to economies of scale and significant leading player commitments to fund the transition phase Recycled cotton market share of ~1% assuming improvements in recycling technologies. Sustainable man-made cellulose fibres (e.g. Modal, Lyocell) market share of ~5%, replacing conventional cotton demand due to lower yield arising from organic cotton **transition** rPET market share of 20% assuming growth in mechanical recycling and technology driven economies of scale in chemical recycling Bio-based synthetics market share of ~3% assuming regulatory interventions	Textile Exchange: Organic Cotton Market Report, 2019; Institut für Textiltechnik: RWTH Aachen University; Citi Research: Global Apparel Retail, 2020; Independent Commodity Intelligence Services
	Economics Increased operating costs due to higher price of organic cotton compared to regular cotton and rPET and bio-based synthetics compared to regular synthetics	Federal Reserve: Economic Data, 2019; IHS Markit database, historical data

3. DECARBONISED MATERIAL PROCESSING

LEVER NAME	KEY ASSUMPTIONS	SOURCES
3. Decarbonised material processing: Improvements in energy efficiency, transition to renewable energy and reduced chemical use	**Current pace trajectory** Energy efficiency assumes ~5% energy consumption improvement for spinning, weaving and knitting through motor and air pressure improvements with +20% adoption rate; ~80% efficiency improvement in wet processing with an adoption rate of +15% of condensate recovery improvements Energy mix assumptions based on largest production countries pursuing country-level base case 2030 energy transition scenarios towards renewable energy Chemical use assumes ~15 percentage point reduction in chemical use due to more efficient technology usage (e.g. washing machine with spraying unit) with an adoption rate of ~5% across the industry **Accelerated abatement** Energy efficiency assumes ~5% energy consumption improvement for spinning, weaving and knitting improvements adopted across the industry; ~80% efficiency improvement in wet processing technology towards dry technology (e.g. laser dyeing jeans) with an adoption rate of +60% Energy mix assumptions based on suppliers in largest production countries pursuing 100% renewables energy transition, assisted by brands and retailers, more swiftly than the country-level energy transition Chemical use assumes ~50% percentage point reduction in wet processing due to new advanced Econtrol dyeing technologies and bifunctional or polyfunctional dyes, with an adoption rate of 20% across the industry	McKinsey: Global Energy Perspective, 2019; EnerData: Energy transition scenario analysis, 2019; Palamutcu: Electric energy consumption in the cotton textile processing stages, 2010; Kant: Textile dyeing industry and environmental hazards, 2012; Institut für Textiltechnik: RWTH Aachen University
	Economics Increased operating costs for renewables energy usage: assumes additional costs related to battery storage and other renewables infrastructure, despite price parity in most markets Assumes capex expenses for weaving, knitting and spinning improvements (e.g. improvements in ring spinning, humidification plants) and wet processing (e.g. automatic steam control valves, recovery of condensate in wet processing plants)	Hasanbeigi: Energy-efficiency improvement opportunities for the textile industry, 2010; Palamutcu: Electric energy consumption in the cotton textile processing stages, 2010; Institut für Textiltechnik: RWTH Aachen University

4. MINIMISED PRODUCTION WASTAGE

LEVER NAME	KEY ASSUMPTIONS	SOURCES
4. Minimised production wastage: Reducing waste generated in the processing stages	**Current pace trajectory** Assumes marginal 1% improvement in the current ~3% wastage from fibre to textile stage as the practice is already relatively optimised Improved wastage collection rate +10% to avoid landfill and incineration **Accelerated abatement** Assumes better incentivisation in production markets to increase wastage collection rate by +30%	The Fiber Year Consulting: The Fiber Year Report, 2019; Institut für Textiltechnik: RWTH Aachen University; expert input
	Economics Reduced operating costs due to less disposal or incineration and savings from using less virgin fibre	Institut für Textiltechnik: RWTH Aachen University; Reverse resources: Creating a digitally enhanced circular economy, 2017

5. DECARBONISED GARMENT MANUFACTURING

LEVER NAME	KEY ASSUMPTIONS	SOURCES
5. Decarbonised garment manufacturing: Improvements in energy mix and efficiency across garment manufacturing countries	**Current pace trajectory** Assumes ~30% reduction in energy consumption across heating, ventilation and air conditioning (HVAC) technology, with +15% adoption rate; ~80% energy improvement in lighting by switching to LEDs, with +20% adoption rate; ~20% energy improvement in sewing machines through new technology, with +10% adoption rate Energy mix assumptions based on country-level base case 2030 energy transition scenarios towards renewable energy **Accelerated abatement** Assumes +30% increase in adoption rate in HVAC efficiency improvements, +40% increase in adoption rate of LEDs and +30% increase in adoption rate of improved sewing machine technology due to increased upfront funding support availability Energy mix assumptions based on suppliers in production countries pursuing 100% renewables energy, assisted by brands and retailers	U.S. Department of Energy: Office of Scientific and Technical Information, 2018; Selco Foundation: Energy efficiency & energy conservation measures for sewing machines, 2017; Institut für Textiltechnik: RWTH Aachen University; EnerData: Energy transition scenario analysis, 2019; McKinsey: Global Energy Perspective, 2019
	Economics Reduced operating costs due to lower energy consumption; initial capex needed for energy improvement measures for lighting, sewing machine and HVAC solutions	Selco Foundation: Energy efficiency & energy conservation measures for sewing machines, 2017; U.S. Department of Energy: Office of Scientific and Technical Information, 2018; Institut für Textiltechnik: RWTH Aachen University

6. MINIMISED MANUFACTURING WASTAGE

LEVER NAME	KEY ASSUMPTIONS	SOURCES
6. Minimised manufacturing wastage: Reducing waste generated in garment manufacturing stage	**Current pace trajectory** 2 percentage point improvement in wastage rate (from ~14% today to 12%) due to better designer education and modernised cutting machines; +20% improvement in waste collection expected, preventing landfilling or incineration; +5% improvement in closed-loop-recycling (CLR) driven by advancements in sorting technology **Accelerated abatement** Assumes wastage limitation to unavoidable scrap only (~5%) through better design and fabrics; +40% improvement in waste collection assuming better training and incentivisation of factory employees; +10% improvement in CLR driven by better incentivisation, along with investment in textile blend identification and recycling technology	The Fiber Year Consulting: The Fiber Year Report, 2019; Institut für Textiltechnik: RWTH Aachen University; expert input
	Economics Reduced operating costs due to less disposal and incineration	Institut für Textiltechnik: RWTH Aachen University

7. INCREASED USE OF SUSTAINABLE TRANSPORT

LEVER NAME	KEY ASSUMPTIONS	SOURCES
7. Increased use of sustainable transport: Changes in modes of transportation and improvements in fuel mix	**Current pace trajectory** Transport mode mix assumes 2% shift in sea vs air transport, resulting in 15% air and 85% sea transport due to increased digitisation of value chain practices Electrification assumes the EU and China continue to lead the transition, driven by regulation in the form of emission targets (EU) and subsidies (China), resulting in battery electric vehicles (BEVs) making up to 5% of heavy-duty trucks (HDTs), 12% of medium-duty trucks (MDTs) and 30% of light commercial vehicles (LCVs) used in B2B and B2C transport91 **Accelerated abatement** Transport mode mix assumes ~7% shift in sea vs. air transport, resulting in 10% air, 90% sea transport through rapid digitisation and investments in more demand-focused regional supply chains or nearshoring Electrification assumes ~90% of LCVs used in last mile will be electrified and ~7% of HDTs and 17% of MDTs will be electrified due to continued incentives and improved battery life and suitability for heavy payloads	IHS Markit database, historical data; McKinsey: Global Energy Perspective, 2019; McKinsey: Center for Future Mobility; expert input
	Economics Reduced operating costs due to shift from more expensive air freight (4x) to sea freight and operational cost savings from moving to BEVs (upfront capex assumes 5-year lifetime and ~40% salvage value)	McKinsey: Center for Future Mobility; expert input

8. MINIMISED PACKAGING

LEVER NAME	KEY ASSUMPTIONS	SOURCES
8. Minimised packaging: De-carbonisation through material mix improvements and minimised material usage (manufacturing through retail stages)	**Current pace trajectory** Material mix assumes +10 percentage point increase in recycled content usage in corrugated boxes and 50% recycled LDPE content in polybags through increased brand commitments Material usage assumes ~20% weight reduction in corrugated boxes by reducing number of layers from five to four and the use of two garments per polybag among ~40% of the market through improved folding techniques **Accelerated abatement** Material mix assumes +20 percentage point increase in recycled content usage in corrugated boxes and 80% recycled LDPE content in polybags through improved material functionality and economics Material usage assumes ~40% weight reduction in corrugated boxes by reducing number of layers from five to three and the use of two garments per polybag among ~80% of the market; reduction in polybag weight by ~20% through improved material functionality	Ellen MacArthur Foundation: New Plastics Economy Global Commitment Report, 2019; Weideli: Environmental analysis of US online shopping, 2013; expert input
	Economics Operational cost savings due to price of recycled vs. virgin corrugated boxes and reduction in polybag usage	Expert input

9. DECARBONISED RETAIL OPERATIONS

LEVER NAME	KEY ASSUMPTIONS	SOURCES
9. Decarbonised retail operations: Improvements in energy mix and efficiency	**Current pace trajectory** Assumes ~40% reduction in energy consumption across HVAC due to new technology, with +40% adoption rate; ~80% energy consumption improvement by switching to LEDs, with +20% adoption rate Energy mix assumptions based on country-level base case 2030 energy transition scenarios towards renewable energy in key consumption countries **Accelerated abatement** Assumes +70% increase in HVAC improvement adoption rate; +30% LED lighting adoption rate due to increased brand awareness and transparency Energy mix assumptions based on 100% renewable energy usage by brands and retailers	U.S. Department of Energy: Office of Scientific and Technical Information; Institut für Textiltechnik: RWTH Aachen University; EnerData: Energy transition scenario analysis, 2019; McKinsey: Global Energy Perspective, 2019
	Economics Reduced operating costs due to lower energy consumption; some initial capex needed for energy improvement measures for lighting and HVAC at stores, warehouses and distribution centres	U.S. Department of Energy: Office of Scientific and Technical Information; Institut für Textiltechnik: RWTH Aachen University

10. MINIMISED RETURNS

LEVER NAME	KEY ASSUMPTIONS	SOURCES
10. Minimised returns: Decarbonisation by limiting wastage due to retail returns	**Current pace trajectory** Assumes a 5 percentage point improvement in e-commerce returns rate (from 35% to 30%) based on technological improvements to reduce returns due to size and fit issues; ~20% e-commerce share of apparel today and ~45% in 2030; ~3-5% of returns are not fit for resale **Accelerated abatement** Assumes a 20 percentage point improvement in e-commerce returns rate (from 35% to 15%) based on a combination of technological improvements on predicting size and fit and behaviour changes from consumers to reduce purchases with intent to return	Shopify: The plague of ecommerce return rates and how to maintain profitability, 2019; Zalando: Returns management case study, 2020; expert input
	Economics Lower operating costs due to reduced waste, incineration and return handling costs	Expert input

11. MINIMISED STOCK WASTAGE

LEVER NAME	KEY ASSUMPTIONS	SOURCES
11. Minimised stock wastage: Reducing waste generated due to unsold retail stock	**Current pace trajectory** Assumes 5 percentage point improvement in industry average overproduction (from ~20% to ~15%), defined as unsold stock following sales and discounts, due to investments in forecasting technology and better production planning tools; 5 percentage point improvement in (up/down/re)-cycling (from ~75% to ~80%) through increased awareness; ~5 percentage point improvement in CLR from 1% to 5% driven by advancements in sorting technology **Accelerated abatement** Assumes 10 percentage point improvement in overproduction (from ~20% to ~10%) due to investments in more demand-focused supply chains and forecasting technology; 10 percentage point improvement in (up/down/re)-cycling (from ~75% to ~85%) through improved availability of in-house recycling technology, reduced recycling costs and better recycling journey transparency; ~10 percentage point improvement in CLR from 1% to 10% through technology advancement in textile blend identification and recycling technology	Ellen MacArthur Foundation, A New Textile Economy, 2017; Netherlands Ministry of Foreign Affairs Centre for the Promotion of Imports from Developing Countries: The European market potential for recycled fashion, 2020; expert input
	Economics Lower operating costs due to reduced overproduction and reduced cost of stock disposal	Dotdash: The balance small business website; Ellen MacArthur Foundation, A New Textile Economy, 2017; expert input

12. INCREASED USE OF RENTAL MODELS

LEVER NAME	KEY ASSUMPTIONS	SOURCES
12: Increased use of rental models: De-carbonisation through the adoption of subscriptions or one-time rental offerings	**Current pace trajectory** Assumes growth in market share at ~11% CAGR to ~0.2% based on recent growth in market share; the rental model extends product life by 1.8x based on the average number of rentals during product lifetime **Accelerated abatement** Assumes market share growth to ~3% based on increased adoption of rental models among urban population; ~60% of population will be based in urban areas, with ~25% willing to rent clothes and a ~1/3 intention-action gap among consumers	Business of Fashion: Luxury fashion rental platform Armarium to cease operations, 2020; Harvard Business Review: The elusive green consumer, 2019; Westfield: How we shop, 2020; Oxford: Our world in data, urbanization, 2019; expert input
	Economics Calculated based on two segments: luxury (60%) and mainstream (40%), subscription based with monthly fees ranging from USD50–135 for 4-6 garments rented per month; assumes garments are rented 10-20 times in their lifetime before being discarded; analysis considers two revenue streams: rental and subsequent sale of items; ~20% of garments assumed to be sold at 60% of their original price following rental; key cost drivers include garment acquisition (~20–25% of total costs), customer acquisition and retention (25-40%) and transportation (5–15%)	Business of Fashion: Luxury fashion rental platform Armarium to cease operations, 2020; expert input

13. INCREASED USE OF RE-COMMERCE MODELS

LEVER NAME	KEY ASSUMPTIONS	SOURCES
13: Increased use of re-commerce models: Promotion of 2nd-hand sales (direct or through platforms)	**Current pace trajectory** Assumes growth in market share to ~9%, largely based on accelerated growth expected in resale sub-segment vs. thrift sub-segment; resale currently represents quarter of the size of thrift, however growing ~5x faster; the analysis assumes re-commerce models to extend average product life by 1.7x based on average length of secondhand ownership **Accelerated abatement** Assumes market share growth to ~12% driven by increased willingness of younger generations to purchase more re-commerce garments; ~48% of GenZ and Millennials and ~35% of GenX are willing to buy secondhand, with a ~1/3 intention-action gap	Thredup: Resale Report, 2019; Cline: The Conscious Closet, 2019; expert input Harvard Business Review: The elusive green consumer, 2019; McKinsey: Consumer Sentiment on Sustainability and Fashion in the COVID Crisis, 2020
	Economics Calculated based on three segments: B2C (30%), P2P handling (35%), P2P no handling (35%); assumes garments are sold at ~60% of their original price; key cost drivers include garment acquisition (~30% of total costs), handling and transportation	Rent the Runway: public data; expert input

14. INTRODUCTION OF REFURBISHED / UPCYCLED PRODUCTS

LEVER NAME	KEY ASSUMPTIONS	SOURCES
14: Introduction of refurbished / upcycled products: Promotion of re-furbished / upcycled product offerings92	**Current pace trajectory** Assumes growth in market share to ~0.1% based on ~10-15% of brands offering refurbished products representing ~0.5-0.7% of their total revenues; the analysis assumes double lifetime extension, reflecting the professional, potentially brand-led upcycling inherent to the process **Accelerated abatement** Assumes growth in market share to ~2% based on ~20% of players increasingly using deadstock and overstock to develop refurbished products; deadstock levels of ~15% with ~30% being refurbishable and overstock levels of ~20% with ~25% being refurbishable	The Waste and Resources Action Programme (WRAP), Evaluating the financial viability and resource implications for new business models in the clothing sector, 2013; University of Michigan case study: Patagonia - encouraging customers to buy used clothing, 2012, Eileen Fisher: public data McKinsey: Consumer Sentiment on Sustainability and Fashion in the COVID Crisis, 2020; expert input
	Economics Assumes refurbished items are sold at par with new items; key cost drivers include labour costs (~50% of total costs)	Eileen Fisher: public data; expert input

15. INTRODUCTION OF PRODUCT REPAIR SERVICES

LEVER NAME	KEY ASSUMPTIONS	SOURCES
15: Introduction of product repair services: Promotion of repair services to extend product life	**Current pace trajectory** Assumes repair model adoption is largely driven by home repairs under current trajectory; repairs performed on garments within select categories, e.g. outerwear, jeans, dresses, shirts and suits; ~10% (~3 month) lifetime extension potential through home-based repairs (e.g. sewing a button, removing a stain and repairing a hem); ~60% of consumers willing to perform repairs, however, with a ~1/3 intention-action gap	The Waste and Resources Action Programme (WRAP): Valuing our clothes, 2017; Harvard Business Review: The elusive green consumer, 2019; expert input
	Accelerated abatement Assumes wider availability of repair models through professional repairs offered by brands and retailers; lifetime extension of ~35% (~1 year) driven by professional repairs; 15-20% of brands offering repair services on the selected categories of garments	The Waste and Resources Action Programme (WRAP): Valuing our clothes, 2017; expert input
	Economics Assumes the categories selected for repair are on average ~20-30% more expensive vs. average garments, depending on the category; key costs involve labour for repairing (~40-50% of costs), transportation, material and handling costs	Expert input

16. REDUCED WASHING AND DRYING

LEVER NAME	KEY ASSUMPTIONS	SOURCES
16: Reduced washing and drying: Decarbonisation through reduced washes and improved care during the use phase	**Current pace trajectory** Assumes consumer awareness driven improvements across washing and drying behaviours, largely in Western countries; ~10% reduction in washing per kg of clothes, driven by behavioural changes; better temperature selection driving ~5 percentage point improvement in cold wash (below 300C) selection (from ~25% to ~30%); +10 percentage point improvement in average load size; ~2 percentage point reduction in average dryer usage driven by reduction in US consumer behaviour towards combination dryer or air dryer usage; does not include ironing-related emissions **Accelerated abatement** Assumes accelerated consumer awareness and associated changes in behaviour across major consumption markets; ~15% reduction in washing per kg of clothes, driven by Asian consumers (currently the highest washing frequency); ~25 percentage point improvement in cold wash selection; +10 percentage point improvement in average load size (washes at ~80% appliance capacity); +5 percentage point improvement in dryer usage; does not include ironing related emissions	Wilson College of Textiles: Quantifying apparel consumer use behaviour in six countries, 2019; Biointelligence Service: Environmental improvement potential of textiles, 2009; Procter & Gamble: Sustainability Report, 2013; The Waste and Resources Action Programme (WRAP): A carbon footprint for UK clothing and opportunities for savings, 2012; Laitala: A literature review for life cycle assessment, 2017
	Economics Reduced energy costs due to reduced washer and dryer usage	The Waste and Resources Action Programme (WRAP): A Carbon footprint for UK clothing and opportunities for savings, 2012; Wilson College of Textiles: Quantifying apparel consumer use behaviour in six countries, 2019; McKinsey: Energy Insights team

17. INCREASED RECYCLING & COLLECTIONS

LEVER NAME	KEY ASSUMPTIONS	SOURCES
17. Increased recycling & collections: Decarbonisation through increased recycling and minimised incineration without recovery and landfill	**Current pace trajectory** Assumes +8 percentage point improvement in post-consumer garment recycling rate (from ~17% today) through continued technology investments and innovation; +5% improvement in CLR driven by advancements in sorting technology **Accelerated abatement** Assumes ~30-40% post-consumer garments will be recycled through a combination of changing attitudes, improved recycling infrastructure and textile waste-related regulations; +10% improvement in CLR driven by better incentivisation along with investment in textile blend identification and recycling technology	Ellen MacArthur Foundation, A New Textile Economy, 2017; Netherlands Ministry of Foreign Affairs Centre for the Promotion of Imports from Developing Countries: The European market potential for recycled fashion, 2020; European Commission: EU waste management and recycling regulation, 2008; expert input
	Economics Assumes additional cost impact due to upfront capex related to collection infrastructure, e.g. collecting bins, sorting or recycling machines and associated labour costs	Institut für Textiltechnik: RWTH Aachen University; Wittmann Recycling, used clothing containers and textile recycling, 2020

ENDNOTES

1 Signed in 2016 the UNFCCC Paris Climate Change Agreement deals with greenhouse gas emissions mitigation, adaptation and finance. Its long-term goal is to keep the increase in global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C

2 The Science Based Targets initiative is a partnership between CDP, UN Global Compact, WRI and WWF that provides companies with a clearly defined pathway to future-proof growth by specifying how much and how quickly they need to reduce their GHG emissions

3 Based on the science-based targets initiative website data; companies filtered for “textiles, apparel, luxury goods”, June 2020

4 Existing estimates indicate that the fashion industry contributes between 3% and 10% of global emissions

5 Friday’s for Future is an international movement of school students who take time off from class on Fridays to participate in demonstrations to demand action from political leaders to take action to prevent climate change

6 Consumer sentiment on sustainability and fashion in the COVID-19 crisis, McKinsey, May 2020

7 Consumer sentiment on sustainability and fashion in the COVID-19 crisis, McKinsey, May 2020; Annual earth day survey, Kearney, April 2020

8 Participant poll: GFA – McKinsey ‘Sustainability in Fashion’ Apparel, Fashion & Luxury Executive Webinar, n >300, June 2020

9 Europeans make record investments in sustainable funds, Financial Times, January 2020

10 European Commission: EU budget powering the Recovery Plan for Europe, May 2020

11 Taiyang News: Renewables find mention in COVID-19 economic Stimulus package of Japanese government; April 2020

12 All mentions of GHG emissions in this report are shown in CO2 equivalent (CO2eq) metric. This is used to compare the emissions from various GHG based on their global warming potential by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming impact

13 NASA GISTEMP (2019) and Nathan J. L. Lenssen et al., “Improvements in the GISTEMP uncertainty model,” Journal of Geophysical Resources: Atmospheres, June 2019, 124(12)

14 Climate risk and response: Physical hazards and socioeconomic impacts, McKinsey, January 2020

15 See appendix: Methodology, acknowledgements and endnotes for further details on the bottom-up calculation of the industry baseline

16 Oxford University: Our World in Data, using emissions data from the global carbon project. Refers to 2017 CO2 emissions figures from the UK (0.5Bn tonnes), Germany (1.1Bn tonnes), France (0.5Bn tonnes), converted to CO2 equivalent units and scaled-up to 2018 using the population growth rate from the World Bank

17 Based on annualized emissions baseline analysis, use phase would represent a larger share in lifecycle assessment analysis

18 See appendix: Methodology, acknowledgements and endnotes for further details on industry growth analysis and no-further-action analysis

19 See appendix: Methodology, acknowledgements and endnotes for further details on current pace trajectory

20 See endnote 1

21 See appendix: Methodology, acknowledgements and endnotes for further details on accelerated abatement

22 Throughout this report, we refer to the additional abatement needed for the industry to reach the 1.5-degree pathway as accelerated abatement, which refers to the industry accelerating beyond its current abatement trajectory to meet the 1.5-degree target in 2030

23 See appendix: Methodology, acknowledgements and endnotes for further details on industry cost curve analysis

24 Analysis based on fashion industry cost curve (see appendix: Methodology, acknowledgements and endnotes), looks at the societal benefit of the analysed decarbonisation levers, which means it is not a view on financial impact from the stakeholder point of view

ENDNOTES

25 Policy Hub – Circularity for Apparel and Footwear: Recommendations for Green Recovery in the European Apparel and Footwear Industry, June 2020. The Policy Hub is a collaborative effort between Sustainable Apparel Coalition, Federation of the European Sporting Goods Industry and Global Fashion Agenda

26 Further details on calculation methodology in the deep-dive box

27 See endnote 16

28 Includes raw material cultivation and extraction as well as yarn/fabric preparation and wet processing stages

29 This is an annualised emissions analysis, not a lifecycle analysis of a garment; as a result the usage-phase emissions differ vs. lifecycle analysis results

30 Fibre volumes based on the Fiber Year Report, Material specific emissions based on multiple sources, see appendix: Methodology, acknowledgements and endnotes

31 Top production countries include: China, Bangladesh, Vietnam, Turkey and India; major consumption countries include US and EU; UN Comtrade: Imports and exports of apparel industry, 2019

32 We use this as the analytical starting point for 2030 emissions for both the current trajectory and accelerated abatement scenarios. No further action therefore represents the emissions level due to industry growth assuming no further action is taken

33 Post COVID-19 growth scenarios are based on Apparel Fashion & Luxury sector, McKinsey Global Institute analysis. The analysis is based on the “virus contained, growth rebound” scenario and an implied industry CAGR of 2% per annum till 2030. See appendix: Methodology, acknowledgements and endnotes for further details

34 See appendix: Methodology, acknowledgements and endnotes for assumptions on each of the levers analysed

35 The 1.1 billion tonne target was calculated based on the 1.5-degree IPCC report scenario and our bottom-up calculation of the fashion industry’s share in global emissions, see appendix: Methodology, acknowledgements and endnotes on calculation of 1.5-degree target for the fashion industry

36 See appendix: Methodology, acknowledgements and endnotes for further details

37 The total required abatement is calculated from the no-further-action emissions level, as the 2030 emissions abatement is based on a set of assumptions around the levers, which may not materialise

38 See appendix: Methodology, acknowledgements and endnotes for a full list of the abatement levers analysed and the assumptions behind accelerated abatement scenario calculations

39 Targeted spreading is the targeted application of fertilisers and pesticides, which increases spraying efficiency to reduce the amount of spillage

40 Such as laser technology and dry chemical dying processes replacing wet processing

41 Such as machines with spraying units to optimise dying processes, automatic steam control and recovery of condensate in wet processing

42 Assumes brand-led support to implement on-site renewable generation, on-site and off-site corporate power purchase agreements and Energy Attribute Certificates, in addition to ongoing country-level transitions to renewable energy; see energy transition deep dive for further details

43 Marginal improvements expected in fibre-to-textile production phase as the lever is already relatively well optimised (current industry average is around 3% wastage), with widespread usage of defect tracking and wastage reduction systems. Improvements largely expected in cutting waste improvement in the garment manufacturing stage (current industry average is around 14%)

44 HVAC and lighting represent ~70% of energy consumption in manufacturing, and sewing machines consume ~20% of energy. Jananthan: Comparative study of energy assessment from apparel industries, 2006

45 See energy transition deep dive for further details

46 A coalition of 240+ leading companies committed to using 100 % renewable electricity

ENDNOTES

47 Currently estimated to be ~83% sea transport and ~17% air transport across the value chain Calculated assuming an air-freight CAGR of 5.5% p.a. on the 2014 baseline (92/8 sea vs. air split) from EU Commission. EU Commission: Environmental improvement potential of textiles, 2014; Maritime Executive: Global Freight demand, May 2019

48 The practice of transferring operations closer to consumption countries. Popular nearshore markets include countries in the Americas, Turkey and Eastern Europe; McKinsey & Company: Is apparel manufacturing coming home?, October 2018

49 52% of returns are due to size/fit concerns; Shopify: Return Magic survey, N>800,000 Shopify customers, 2017; Zalando: Returns management case study, 2020

50 Edited.com 2019 analysis of share of product offering sold at a discount

51 Defined as the level of stock that is unsold following sales and discounts

52 In 2019 France introduced a ban on the destruction of unsold fashion goods, to be implemented by 2023, which prohibits discarding unsold products that are non-perishable, such as apparel and footwear. http://www.assemblee-nationale.fr/dyn/15/dossiers/lutte_gaspillage_economie_circulaire

53 University of California, Santa Barbara: Reducing greenhouse gas emissions through materials innovation in the apparel industry,2019

54 Textile Exchange: Preferred Fibre and Materials Market Report, 2017

55 Modal and Lyocell could potentially be produced with up to 50% less emissions than generic viscose. Lenzing Group: Sustainability Report, 2019; C&A Foundation

56 Citi Research: Global Apparel Retail - Sustainability to challenge the fashion world order, January 2020

57 Circular business models extend product life and therefore reduce the need for new resources in producing virgin materials. Refer to the appendix: Methodology, acknowledgements and endnotes on the replacement rates assumed for garment in circular models

58 Ellen MacArthur Foundation: A new textile economy, 2017

59 Calculated based on ThredUp 2019 Resale report market values for 2018, adjusted for the US share of the total apparel market

60 Compound annual growth rate

61 ThredUp: Resale market report, 2019

62 60% of the Gen-Z and Millennial population is assumed to be based in urban areas, with 25% of them indicating a willingness to rent clothes. Westfield: How we shop, 2020; Oxford: Our World in Data, Urbanization, 2019

63 GFA survey on deadstock and overstock during COVID-19 crisis, N=24, April 2020

64 Categories include outerwear, jeans, dresses, shirts and suits

65 WRAP: Valuing our clothes, 2017

66 Elizabeth Cline: The conscious closet, 2019

67 Expert input from rental model executives

68 WRAP, Valuing our clothes, 2017; expert input from circularity experts and repair business executives

69 Costs do not include transaction costs, subsidies or explicit CO2 costs, taxes or consequential impact on the economy (e.g. advantages from technology leadership).

70 Based on expert input on decarbonisation pathway and the economics of industry-level cost curves

71 EU Directive on waste, May 2018 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0851&from=EN

72 McKinsey & Company: Consumer sentiment on sustainability and fashion in the COVID-19 crisis, May 2020

73 See endnote 1

74 For example, the Higg Tools from the Sustainable Apparel Coalition

75 Consumer sentiment on sustainability and fashion in the COVID-19 crisis, McKinsey & Company, May 2020

76 Higg Facility Tools by the Sustainable Apparel Coalition for measuring the social and environmental performance of their facilities

ENDNOTES

77 European Commission: EU Green Deal communication, December 2019 https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

78 French National Assembly: Law on Circular Economy and the Fight Against Waste 2020, http://www.assemblee-nationale.fr/dyn/15/dossiers/lutte_gaspillage_economie_circulaire

79 European Commission, Circular Economy Action Plan, 2020 https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

80 UNFCCC COP25 Communique: Fashion Industry Invites Governments to Collaborate on Climate Action https://unfccc.int/climate-action/sectoral-engagement/global-climate-action-in-fashion/fashion-industry-charter-for-climate-action/communique-fashion-industry-invites-governments-to-collaborate-on-climate-action

81 McKinsey & Company: Why ESG is here to stay, May 2020

82 Financial Times: Companies with strong ESG scores outperform, study finds, August 2018

83 Includes recycled materials or innovative materials with low emissions or other sustainability dimension impact

84 McKinsey & Company: Why ESG is here to stay, May 2020

85 UN Comtrade Database, filtered for 'textiles; worn clothing and other worn articles' and 'articles of apparel and clothing accessories, of leather or of composition leather', 2018

86 UN Comtrade Database, filtered for 'textiles; worn clothing and other worn articles' and 'articles of apparel and clothing accessories, of leather or of composition leather', 2018

87 The Fiber Year Consulting: The Fiber Year Report, 2019

88 Apparel assumed to represent ~82% combined apparel and footwear industry emissions based on Quantis: Measuring Fashion Report 2018

89 IPCC: Global warming of 1.5°C, 2018

90 4% share of apparel and footwear emissions in global emissions is based on the bottom-up calculation of fashion industry GHG footprint

91 Weight class definitions: US: Heavy-duty trucks (HDT): class 8 (>15t), Medium-duty trucks (MDT): class 4-7 (6-15t); Light commercial vehicles (LCV): class 1-3 (<6t), excluding pick-up trucks below 3.5t; EU: HDT >16t, MDT: 7.5-16t, LCV: <7.5t; CN: HDT >14t, MDT: 6-14t, LCV: <6t – does not include buses

92 Upcycling goes beyond simple enhancements like adding a patch/personalisation

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