Foreword from La Rhea Pepper

Rise to the Challenge

We are thrilled to launch our 2018 report demonstrating even more growth over the last year in the preferred fiber and materials landscape. I never tire of hearing of new innovation and this year’s report is packed full of exciting stories of new entrants and advancements across the portfolio of preferred fiber and materials. We are seeing more and more innovation in alternative feedstocks, including biobased and recycled content and, while its early days, these may one day take over from the traditional fiber sources that we depend upon today. Our report presents information on recycled options emerging in all fiber categories, indicating that the circular economy is gaining importance, but overall market share of recycled materials is still low, particularly in fiber-to-fiber recycling. We are asking you to be even more ambitious in setting and delivering your sustainability targets that will slow consumption, save resources, and close the textile loop. If we are serious about shifting from a fossil carbon based sector to a circular one we need to embrace innovations that reduce and reuse waste, and regenerate farm land. The findings from this market report make us more determined than ever to look for opportunities to deliver the Sustainable Development Goals (SDGs), and so we are renewing our commitment to the industry to provide the best available data and analysis on the availability of preferred fiber and materials. By doing so, we hope to encourage the industry to build a portfolio of preferred fibers and materials, continue to switch out risky feedstock sources, and use sustainability standards and traceability systems to drive up quality across the board. We know we are unified by our deep passion about the vibrancy of the sector and its leading role in the sustainable textile journey. We believe exchanges with like-minded people from all parts of the value chain are the best way to transform the industry and that a more connected community will have greater collective impact than anyone of us can achieve alone. As a result, we will continue to provide an environment that will bring the industry together, creating space for dialogue and progress through training, practice sharing, and the encouragement of invention. We are very excited about facilitating a community connected by common themes and look forward to your input and help in linking the sector for greater impact.

La Rhea Pepper
Managing Director, Textile Exchange

Call to action

- **SET TARGETS**
  Join an Textile Exchange Industry Challenge and commit to transitioning your fiber usage to a preferred option. Set quantitative, time-bound targets to help track progress.

- **KNOW YOUR SUPPLY PARTNERS**
  Tracing all the way back to your farmers, and feedstock suppliers means you can more actively manage your risks and opportunities.

- **SUPPORT INNOVATION**
  Looking for innovative ways to do great things? Invest in research, technologies, and initiatives that will result in sustainability gains for all, and bring scale.

- **TAKE A PORTFOLIO APPROACH**
  There’s no one size fits all to building your preferred fiber and material supply base, different PFMs offer different opportunities.

- **BENCHMARK YOUR PROGRESS**
  Are you moving fast enough? Ahead or behind the curve? The PFM Benchmark helps you gain insight and focus efforts.

- **JOIN A WORKING GROUP**
  None of us can do this alone. Pre-competitive exchanges, with like-minded people from all parts of the value chain, are the best way to transform the industry.

- **TAKE YOUR SEAT AT THE TABLE**
  Attend one or more of the in-person PFM Round Tables held at our annual conference.

Cover Page Photo: Wools of New Zealand
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Welcome to the 2018 Preferred Fiber & Materials Market Report

Welcome to the 2018 Preferred Fibers & Materials Market Report (PFMR). We’ve made significant advances this year and are excited to share more preferred fiber volumes and certified facilities than ever before. There are also some important changes in the content that I would like to bring to your attention. From this year, the signature Textile Exchange Leaderboards will be published in our accompanying Preferred Fiber & Materials Benchmark report. These volume-driven “top 10” rankings, originate from the Textile Exchange Benchmark survey and are now listed in the Benchmark Report.

HOW TO READ THE PFMR:

Fiber sections

The report is organized by fiber categories: naturals (plant based), naturals (animal based), manmade cellulosics, and synthetics. You will know which fiber category you are navigating by the distinctive colorways in each section.

Within each fiber section the information is organized by:

- Conventional materials: production data and trends
- Preferred materials: virgin and recycled production data and trends
- Updates on suppliers and innovations
- Standards and certification
- Q&As with fascinating fiber experts

Key topics

Some of our updates and information are over-arching or cut across fiber categories, such as the Sustainable Development Goals, circularity, and microfibers. Textile Exchange is leading discussions on these important topics and continues to bring you the most up-to-date data and information.

Leadership and collaboration

We are committed to both leadership and collaboration – whether it is our own, our members, or together with like-minded partners and friends. You will find many examples of collaborative leadership throughout the report – from the latest on Textile Exchange Working Groups and Round Tables to other non-profits and experts’ platforms, many of them featuring in our “Insider Series” update for 2018.

We hope you enjoy our PFMR, and are as excited as we are about the continued improvement in data and content. This report is fast becoming the most comprehensive annual update you will find across the suite of preferred fibers and materials. As always we look forward to your feedback and support for our commitment to industry transformation.

Liesl Truscott
Director of Europe & Materials Strategy, Textile Exchange
Key findings

New preferred fibers and materials are emerging.

Manmade cellulosics see a particularly vibrant innovation landscape e.g. Refibra™, Naia™, Orange Fiber.

Biosynthetics such as biobased polyester, nylon and spidersilk are an important new emerging fiber category e.g. Fulgar’s EVO®, Bolt Threads’ Microsilk.

The number of leather alternatives is growing e.g. Modern Meadow’s Zoa™, Apple Peel Skin, Vegea.

The use of standards is increasing, and the availability of traceability systems is growing.

The number of facilities certified to sustainability standards is increasing e.g. Global Organic Textile Standard, Global Recycled Standard, Responsible Down Standard, and the Responsible Wool Standard.

New supply chain connectivity and traceability systems (including blockchain) are starting to change the way and speed in which we communicate, and share knowledge and data.

Circular economy gains importance but market shares remain low.

Commitment to circularity and closing material loops has increased e.g. Global Fashion Agenda’s 2020 Commitment Call.

The number of initiatives working on fiber-to-fiber recycling is increasing e.g. Re:newsbell, HKRITA, Infiniteed Fiber.

There are recycled fiber options in all fiber categories e.g. recycled cotton, wool, down, MMCs, polyester and nylon but the share of fiber-to-fiber recycling is still very low (estimated at below 1 percent by the Ellen MacArthur Foundation).

Textile regulations are creating debate and impacting the industry.

The ban on importing certain plastic waste including PET bottles to China has caused increasing prices and will result in a lower rPET production volume.

The ban of mulesing in New Zealand has led to a shift in the debate on mulesing beyond the national borders.

The proposals for synthetic textile labeling regulations in California and Connecticut, USA, have received major media and industry attention.

The year in numbers

The market for preferred fibers and materials is growing.

**Preferred Cotton**
- **19% market share**
- Share of preferred cotton fiber in 2017 was ~19 percent with growth in most of the major initiatives.

**Recycled Polyester**
- **14% market share**
- Share of recycled polyester in 2017 was around 14 percent. The longer term growth trend is facing challenges.

**Lyocell**
- **4.5% market share**
- Share of lyocell in 2017 was 4.5 percent. A growing market for preferred manmade cellulosics can be expected.

**Responsible Down Standard (RDS)**
- **696**
- Number of RDS certified sites increased from 539 in 2016 to 696 in 2017.

**Responsible Wool Standard (RWS)**
- **235**
- Number of RWS certified sites increased from seven in 2016 to around 235 in 2017.

**Responsible Leather Initiative**
- **350**
- New Responsible Leather Round Table attracted 350 stakeholders.
2017 Global fiber market

The big picture

In 2017, global fiber production exceeded 100 million mt resulting in the largest fiber production volume ever.

Global fiber production saw a tenfold increase from 1950 to 2017 from <10 million mt to over 100 million mt.

Synthetic fibers have dominated the fiber market since the mid 1990s when they overtook cotton and became the dominant fiber. With around 65 million mt of synthetic fibers, this fiber category made up approximately 60 percent of the global fiber production in 2017.

Polyester has a market share of around 51 percent of total global fiber production. More than 53 million mt of polyester is produced annually.

Cotton is the second most important fiber since synthetics took the lead in the mid 1990s. With around 26 million mt it has a market share of approximately 25 percent of global fiber production.

An increasingly important fiber category is manmade cellulosics (MMCs) with a global production volume of around 6.5 million mt and a market share of around 6-7 percent in 2017.

Wool has a market share of around one percent with a global production volume of a little over one million mt.

Other plant-based fibers including jute, linen and hemp, together have a market share of about five percent.

Silk and down have market shares of less than 1 percent.

The need to decouple growth from resource consumption gets more urgent every year.

The significant growth in fiber production results in a significant use of natural resources and a huge production of textile waste. There is a growing awareness of the urgent need for a more responsible use of resources, enabling growth without increased resource consumption. Innovation towards a circular economy and dematerialization can be seen in almost all fiber categories. Accelerating such initiatives will help to reduce the overall fiber footprint on the planet.
Plant-based Natural Fibers
Cotton
Preferred Virgin Cotton

From the niche to a market share of 19 percent, preferred cotton is gaining ground.

With a production of around 23 million mt in 2016/17, cotton had a share of around 24.5 percent of the total fiber market.(2)

The market share of preferred virgin cotton increased from six percent of the total cotton production in 2012/13 to 19 percent in 2016/17. This equals an increase in global production volume of preferred cotton from 1.4 million mt in 2012/13 to 3.8 million mt in 2016/17(3). It is expected that the market share of preferred cotton will increase to 24 percent in 2017/18.

The preferred cotton figures include cotton certified to the BCI Standard, ABRACA, myBMP, Cotton made in Africa, REEL, Cleaner Cotton, e3, organic and Fair Trade cotton.

The BCI standard without equivalents made up around 47 percent of all preferred cotton in 2016/17. All BCI cotton including its equivalents ABRAPA, Cotton made in Africa and myBMP made up around 87 percent of all preferred cotton. The Brazilian standard ABRAPA, is with a market share of 32 percent of all preferred cotton, by far the most used standard apart from the BCI standard and the most widespread BCI equivalent.(4)

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(1) These figures do not include recycled cotton. Please see the chapter “Recycled Cotton” for more information on recycled cotton.
(2) ICAC - Cotton: World Statistics 2018 and Textile Exchange compilation of total global fiber volume data (see “Global Fiber Market”).
(3) Please note that we report on the 2016-17 figures here since these are the latest reliable data on preferred cotton production, while the market data for the calendar year 2017 includes the cotton production volumes from the ICAC year 2017/18 to make reporting consistent with other reports. (4) ICAC - Cotton: World Statistics 2018, standard owner data received by mail or from their publications; compilation by Textile Exchange - overlaps of standards excluded.
Preferred Virgin Cotton

A closer look at the preferred virgin cottons

Better Cotton Initiative (BCI) cotton production including equivalents increased from 665,789 mt in 2012/13 to 3.26 million mt in 2016/17. The BCI Standard made up ~50 percent of all BCI cotton produced in 2016/17. The remaining ~50 percent of BCI cotton was produced according to the BCI equivalents ABRAPA, Cotton made in Africa and myBMP.

Cotton made in Africa (CmiA) production increased from 144,909 mt in 2012/13 to 495,839 mt in 2016/17.


Fair Trade cotton production reached 13,336 mt in 2016/17. 65 percent of all Fairtrade cotton was also certified to an organic standard.

Cleaner Cotton production increased from 258 mt in 2012/13 to 699 mt in 2016/17.

REEL cotton production was 13,890 mt in 2016/17.

The e3 cotton production decreased from around 578 thousand mt in 2015-16 to 42 thousand mt in 2016-17 due to negative climatic conditions.

The data are based on information from the standard owners which we have received by mail or from their websites. The production volumes include the total volume produced per standard including equivalents and overlaps with other standards.
Preferred Virgin Cotton

Directory: Where to find preferred cotton across the globe

This map locates the preferred cotton growing regions. A closer look at the African countries is provided on the next page. Preferred cotton was grown in 33 countries in 2016/17. The countries with the largest share of preferred cotton production - apart from Israel, Madagascar and Thailand - include Brazil, Kyrgyzstan, Tajikistan, as well as Burkina Faso, Cameroon, Mozambique, and Zambia(1).

Key
- Organic
- BCI Standard
- Cleaner Cotton
- REEL
- MyBMP (BCI eq.)
- ABRAPA (BCI eq.)
- Other

(1) The figures are based on the data received by the standard owners.
(2) In the USA, BCI, organic and Cleaner Cotton is produced. Organic and Cleaner Cotton have a market share of <1 percent and are thus not visible in the graph.
(3) In Peru, organic and REEL cotton is produced. Organic cotton has a market share of ~1.5 percent and REEL cotton of ~1 percent.
(4) In Brazil, ABRAPA and organic cotton is produced. The share of organic cotton is <1 percent and thus not visible in the graph.
(5) In Greece, the only preferred cotton which is grown is organic cotton.
(6) In Turkey, BCI and organic cotton are the preferred cottons grown.
(7) In Kazakhstan, the only preferred cotton which is grown is BCI.
(8) In China, BCI, organic and REEL are the preferred cottons grown.
(9) In India, BCI, REEL, organic and Fair Trade cotton are the preferred cottons produced. The figure shown here does not include Fair Trade cotton due to lack of country-specific data.

© TextileExchange | Page 11
Preferred Virgin Cotton

Directory: Spotlight on Africa

This map locates the preferred cotton growing countries in Africa. The countries with the largest share of preferred cotton production are Burkina Faso, Cameroon, Mozambique, and Zambia. As the largest program for sustainable cotton from Africa, CmiA certified 30 percent of cotton production in sub-Saharan Africa last year.

Key

- CmiA (=BCI eq.)
- BCI standard
- Organic
- Other

(1) Mali: organic cotton production <1 percent
(2) Burkina Faso: organic cotton production <1 percent; Fair Trade as well but not included in the figures due to lack of country specific figures
(3) Benin: only organic
(4) Senegal: only organic; Fair Trade also produced but no country specific data
(5) Uganda: also Fair Trade but no country specific data
### Preferred Virgin Cotton

Sustainability standards across the globe

<table>
<thead>
<tr>
<th>ORGANIC (+OCS/GOTS)</th>
<th>CLEANER COTTON</th>
<th>COTTON MADE IN AFRICA</th>
<th>REEL COTTON</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
<td>Sustaining health of soils, ecosystems and people</td>
<td>Cleaning up cotton in California</td>
<td>Sustainable African Cotton for a global textile industry</td>
</tr>
<tr>
<td><strong>Verification / certification (farm level)</strong></td>
<td>Verification (annual); certification by 3rd party</td>
<td>2nd party monitoring</td>
<td>Self-assessment and 3rd party certification on field and gin level</td>
</tr>
<tr>
<td><strong>Chain of custody</strong></td>
<td>Identity Preserved; Certification of Supply Chain</td>
<td>Bale identification system - USDA barcode on each bale</td>
<td>Mass Balance from spinning mill onward (hard identity from field to spinning mill); full traceability possible through Hard Identity Preserved (option)</td>
</tr>
<tr>
<td><strong>Product marketing</strong></td>
<td>In store marketing / on product label 3rd party certification label optional</td>
<td>Marketed and trademarked as Cleaner Cotton™</td>
<td>In store marketing/ on product labeling (own label or CmiA hangtag)</td>
</tr>
<tr>
<td>GMOs permitted?</td>
<td>No</td>
<td>Yes, but sold separately from non-GMO</td>
<td>No</td>
</tr>
</tbody>
</table>

**Focus**

**ORGANIC (+OCS/GOTS)**

- **Focus**: Sustaining health of soils, ecosystems and people.
- **Verification / certification (farm level)**: Verification (annual); certification by 3rd party.
- **Chain of custody**: Identity Preserved; Certification of Supply Chain.
- **Product marketing**: In store marketing / on product label; 3rd party certification label optional.
- **GMOs permitted?**: No.

**FAIR TRADE**

- **Focus**: To make trade fair, empower small scale producers and workers and to foster sustainable livelihoods.
- **Verification / certification (farm level)**: Certification by 3rd party.
- **Chain of custody**: Two models: (1) Classic - physically segregated and traceable, (2) Mass balance - physically traceable until spinner; CoC maintained through supply chain via online tool.
- **Product marketing**: On product and In store marketing. Third party certified (FAIRTRADE Mark).
- **GMOs permitted?**: No.

**BETTER COTTON INITIATIVE**

- **Focus**: To transform the market by making Better Cotton a sustainable mainstream commodity.
- **Verification / certification (farm level)**: Self-Assessment, 2nd Party and 3rd Party Verification.
- **Chain of custody**: Physical segregation farm to gin; Mass balance gin to retailer.
- **Product marketing**: On-product Claims Framework.
- **GMOs permitted?**: Yes.
Preferred Virgin Cotton

Supporting the transition

There are a number of initiatives supporting the transition towards preferred cotton. Collaboration and information are key for a successful uptake of preferred cotton.

Key news

Textile Exchange’s First Regional Organic Cotton Round Table West Africa was held in Koudougou, Burkina Faso in September 2018 in collaboration with Catholic Relief Services (CRS), USDA and SICOT. Further round tables include an annual event held in Izmir focusing on Turkey, Egypt and Central Asia as well as the Global Organic Cotton Round Table.

West Africa Organic & Fairtrade Cotton Coalition was launched at the International Cotton and Textile Conference (SICOT) in Koudougou, Burkina Faso. This coalition aims to establish reliable market access for tens of thousands of small farmer families in West Africa who are producing organic-fairtrade cotton and other organic crops.

Cotton 2040 launched CottonUp, a new Guide to Sourcing Sustainable Cotton in 2018. This guide provides practical information and resources to either start sourcing sustainable cotton or increase volumes.

Cotton and coffee industry working on joint indicators in Project Delta: The International Coffee Organization (ICO) and the Global Coffee Platform (GCP) are collaborating with the Better Cotton Initiative (BCI) and the International Cotton Advisory Committee – Social, Environmental & Economic Performance of Cotton (ICAC-SEEP) in order to develop a measurement and reporting framework that is applicable not only to the coffee sector but across different agricultural commodity sectors.

General information

Textile Exchange Microsite – aboutorganiccotton.org is a resource space dedicated to spreading the word about organic cotton.

Organic Cotton Accelerator is a multi-stakeholder initiative focused on creating a prosperous organic cotton sector which benefits everyone — from farmer to consumer.

Organic & Fair Cotton Secretariat (OFCS) - India: Representatives from the Indian organic cotton industry have agreed to set up a new organic and fair cotton secretariat to focus on industry policy, manage and identify resources and provide support services to accelerate the growth of the organic cotton sector.

CottonConnect is an enterprise with a clear mission to transform the cotton industry for good. CottonConnect delivers services to promote sustainable cotton agriculture and develop thriving lives and livelihoods. These include BCI, REEL Cotton Program, Organic, Farmer Business School and Women’s Empowerment.

Please see also Textile Exchange’s Organic Cotton Market Report 2018 for more information.
Q&A with Alison Ward

What excites you most about working with women in rural cotton communities?

The potential to improve the livelihoods in rural cotton communities really escalates when you work with women. When women are empowered to take care of themselves, make decisions, take charge of land and their finances, not only does their household income grow, the entire community economy benefits.

I have personally seen the benefits of taking a holistic approach when visiting CottonConnect’s Women in Cotton project, supporting 500 women farmers and adolescent girls in Gujarat, India. The program provides a background in literacy, numeracy, rights and health to enable women to take advantage of increased livelihood opportunities, both within cotton and through supplemental income running their own enterprises. Each time I visit, I can see a transformation in how the women have increased their knowledge and also developed the confidence to create thriving micro-businesses.

I am also excited to work with brands who look beyond the raw material they are buying and consider the social impacts. Kering and SuperDry have both invested in supporting women in organic cotton communities, with Kering adding Women’s Right and Life Skills training and Winter Crop Training to their Organic Cotton Farmer Training Program. This follows C&A Foundation’s pioneering initiatives to support a thriving organic cotton sector, for example by improving women’s business skills through the Farmer Business School.

As an implementation partner for BCI, enabling farmer training for multiple brand partners, it has been encouraging to see the power of these interventions, especially in one community where women were inspired to set up their own self-help group.

What are the areas where improvement is most needed?

Women play key roles in cotton farming but often do not receive the same training, support or pay as men. Our research found that without specific outreach efforts just 4 percent of women join any form of training program that can assist them in their roles as farmers and champions within their communities. So it is important to offer specific training for women to close the gender gap.

We must make sure women are not left behind in the current trend towards using technology, particularly mobile phones, as an enabler for agri-extension services. This means ensuring women have equitable access to and use of technology, as well as influence over how it evolves. It is usually the men in the household that have mobile phones, so men need to be encouraged to give women access to mobile phones.

Traceability and creating a demand for sustainable cotton continues to be important, which is why it is encouraging to see the commitment from the companies signing the Sustainable Cotton Communiqué to use 100 percent sustainable cotton by 2025.

Why are these problems so entrenched... what have you learned from other areas where you have worked?

When meeting with women in the Cocoa Life program in Ghana, I learned about the importance of creating harmonious communities and the need to include men in any training to empower women to avoid creating conflict. Societal changes take a number of years before you begin to see movement.

It is essential for growing communities to be resilient, and so they are often nervous of changing practices that could affect their crop and income. They might not change all the practices at once or wait to see if something works with a neighbouring farmer first. Understanding this, and building the confidence in a program, is key for adoption of sustainable practices.

Tell us a story of where CottonConnect’s intervention has made a difference. How can we replicate, scale, and build on this success?

A great example is CottonConnect’s work with Primark and the Self-Employed Women’s Association (SEWA). The Sustainable Cotton Program, based on CottonConnect’s REEL Cotton program, trained 1,251 female cotton farmers in the Gujarat region in India in its first three years. The program trains female farmers...
in sustainable farming methods so they minimize the impact on their local environment and improve their livelihoods through increased income.

Farmers participating in the program recorded significant results. By the third year of the program, they saw an average profit increase of 247 percent, a reduction of input costs by 19.2 percent, 40 percent reduction in the use of chemical fertilizer, 44 percent reduction of chemical pesticide usage, and a 10 percent water usage decrease.

Since the outcomes of the program far exceeded expectations, Primark decided in 2016 to substantially scale up the initiative to train an additional 10,000 women farmers over the next six years. In total, over 6,000 farmers have either received, or are currently receiving, training as part of the program. The farmers are connected directly with Primark’s supply chain and the cotton is used in its first sustainable cotton product, a range of women’s pyjamas. It’s incredible to have this level of transparency from farmer to garment.

I saw the personal side of the story when I visited a family in Gujarat where the wife was involved in the program and the father and daughter were enrolled in a Farmer Business School, part of the REEL Cotton program. With the wife’s increased profit, she had bought a motorbike for her husband and he was so proud of her. It was great to see the education and benefits cascading through the family.

We are in a great place to build on this success and scale up. It’s always been my focus to drive women’s participation and it’s rewarding to see that we now have 49,500 women enrolled in our agronomic and social programs including India, Pakistan, China and Peru. We know our model works, we have created supply chain connectivity, and established a base from which to accelerate change. I am particularly excited to be expanding into Pakistan, with a new project working with 10,000 women.
Preferred Cotton

Commitments

The commitment of brands and retailers is key to accelerating the preferred cotton market.

The market for preferred cotton has been developed and shaped through the commitment of engaged individuals from its beginning.

To scale the preferred cotton market a Sustainable Cotton Pledge was initiated by the International Sustainability Unit (ISU) under His Royal Highness The Prince of Wales. Since the closing of the ISU in March 2018, it was agreed that Textile Exchange would take over the role of the initiative’s Secretariat.

38 major brands have pledged to achieve 100 percent sustainable cotton by 2025, an additional 25 brands since May 2017.

The 2025 Sustainable Cotton Challenge challenges retailers and brands to champion the greater use of sustainable cotton by aiming that 100 percent of the cotton from their supply chains comes from the most sustainable sources.

The brands that have committed to the 100 percent by 2025 pledge to date are: ASOS, EILEEN FISHER, Greenfibres, H&M, IKEA, Kering, Levi’s, Lindex, M&S, Nike, Sainsbury’s, F&F at Tesco, Woolworths, Adidas, A-Z, BikBok, Burberry, Burton Snowboards, Carlings, Coyuchi, Cubus, Days like This, Dressmann, Hanky Panky, House of Fraser, Indigenous Designs, KappAhl, Kithmandu, Mantis World, MetaWear, Otto Group, prAna, SkunkFunk, Timberland, Urban, Volt and Wow.

The pledge is still open and brands and retailers are invited to submit their commitments here.

Brands are also publicly committing to using 100 percent organic.

Examples are Nudie, Stella McCartney, all EILEEN FISHER cotton and linen will be organic by 2020.

Mantis World commit to 100 percent organic cotton by 2021.

C&A’s 2020 goal is for 100 percent of the cotton they use to be more sustainable. In 2017, 67 percent of the cotton C&A sold was either certified organic cotton or sourced as Better Cotton.

IKEA is committed to 100 percent sustainable cotton and reached this target in 2015. For IKEA sustainable cotton means that the cotton is either recycled or grown with less water, chemical fertilizer and pesticides.

H&M’s aim is for all cotton in their range to come from sustainable sources by 2020 – organic cotton, recycled cotton or Better Cotton.

By 2020, Levi’s aim to use 100 percent sustainable cotton, including 95 percent Better Cotton, plus a mix of organic cotton and recycled cotton.

adidas committed to using 100 percent Sustainable Cotton by 2018. For adidas, BCI is the primary standard.

Cotton Pledges Against Forced Labor

Over 250 industry brands and retailers have signed the Uzbek Cotton Pledge, committing to end the practice of forced labor in the cotton sector in Uzbekistan. Companies are now invited to sign the Turkmen Cotton Pledge to end government-sponsored forced labor in Turkmenistan’s cotton sector.

Examples of commitments:

Nudie committed to 100 percent organic cotton by 2017.

Stella McCartney commit to 100 percent organic cotton by 2020.

All EILEEN FISHER cotton and linen will be organic by 2020.

Mantis World commit to 100 percent organic cotton by 2021.

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Q&A with Dr. Jürgen Janssen

Dr. Jürgen Janssen
Head of the Secretariat of the Partnership of Sustainable Textiles

It’s been a big year for the Partnership, what are you most proud of?

In 2018, for the first time all members of the Textiles Partnership had to publish their roadmaps with their annual targets related to sustainability in textile supply chains. 116 members submitted their roadmaps with a total of 1,300 specific targets. This is a major step forward, as it means that many members have revealed detailed information for the first time. External experts have reviewed the roadmaps.

In addition, members submitted reports on the progress they made in 2017. From next year on, all members will publish the progress reports, too. The Textiles Partnership has also started strategic cooperation arrangements with several other European and international initiatives in the past year, including the Dutch Agreement on Sustainable Garments and Textiles, Sustainable Apparel Coalition, the ACT Initiative and Textile Exchange. Given the global nature of garment supply chains, for the Textiles Partnership as a national initiative it is crucial to cooperate with other players.

How does membership work and what are the unique benefits for members?

The Textiles Partnership is a multi-stakeholder initiative with some 130 members, including companies, business associations, NGOs, trade unions, standard-setting organizations and the German Federal Government. Company members include not only German, but also international brands and retailers. Members are required to take on their individual responsibility to improve environmental and working conditions along the textile and garment supply chain. This is reflected in the annual roadmaps and progress reports already mentioned. The unique feature of the Textiles Partnership is that it brings together a range of actors from different stakeholder groups pursuing the same goals. Within the context of so-called Partnership Initiatives, members have the possibility to participate in broader actions aimed at achieving systemic change on the ground in production countries. There are so far two Partnership Initiatives running, one focusing on labor conditions in spinning mills in Southern India and the other on chemical and environmental management in Asian factories. Finally, the Textiles Partnership provides a unique platform for mutual support and learning for our members.

Tell us more about how your sustainable cotton targets work?

The Textiles Partnership has agreed on mandatory targets regarding the use of sustainable cotton. At the individual level, all companies that purchase cotton have to increase the share of sustainable cotton annually from 2018 on. In addition, at the aggregate level, the collective target for the Textiles Partnership as a whole is to use at least 35 percent sustainable cotton by 2020, with 10 percent of the total volume required to be organic cotton. By 2025, the total proportion of sustainable cotton will then rise to 70 percent and the proportion of organic cotton to 20 percent.

You’ve been focusing on cotton primarily, which fiber(s) do you head to next?

In July, the new expert group of the Textiles Partnership on best available manmade fibers kicked off its work. The objective is to agree on minimum requirements for manmade fibers regarding raw material, production, product toxicity and end-of-life. In addition, the expert group will identify areas where members need support and guidance. The focus is on manmade cellulose fibers, synthetic fibers and biobased plastics.
Recycled Cotton

A closer look at recycled cotton

The Ellen MacArthur Foundation estimates that less than 1 percent of all clothing is recycled back into clothing\(^1\). Given the large amount of textiles produced every year, recycling is an important approach to address the textile waste issue as well as to save resources.

Recycling of cotton can either be done mechanically or chemically. Chemically recycled cotton is covered in the chapter on manmade cellulosics. Mechanically recycled cotton can be made from pre-consumer (also called post-industrial) materials such as leftovers from the production processes of the yarn, fabric or garment manufacturing or from post-consumer materials such as discarded cotton clothes.

The recycled staple fiber is of shorter length compared to virgin cotton fibers and thus more difficult to spin. Because of this, mechanically recycled cotton is often mixed with other materials such as polyester or manmade cellulosics. Recycled cotton attracts increasing interest for denim production.

94 companies representing 12.5 percent of the global fashion market have signed the Circular Fashion System Commitment, a call to action by the Global Fashion Agenda in June 2018. The companies have committed to take action on one or more of four immediate action points - one being to increase the use of post-consumer recycled fibers\(^2\).

Mechanical cotton recycling can be a low-input approach to recycling before the cotton is finally chemically recycled.

Impacts

Life Cycle Assessments (LCAs) show a significant reduction in primary energy use, climate impact and water use of recycled cotton compared to conventional cotton\(^3\).

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\(^1\) Ellen MacArthur Foundation (2017) - A New Textiles Economy
\(^2\) Global Fashion Agenda - Commitment Website
\(^3\) e.g. Wendelin (2016) - LCA on Recycling Cotton
Recycled Cotton
Who's doing what in recycled cotton?

Initiatives supporting the transition
The Alliance for Responsible Denim (ARD) is a collaboration between Made-By, Circle Economy and the Amsterdam University of Applied Sciences. The project “Post-Consumer Recycled Denim Standard” led by Circle Economy focuses on developing a preferred industry buying standard, defining a business model and road map for the introduction and scaling up of Post-Consumer-Recycled-Denim (PCRD) production.


Examples of suppliers
Artistic Milliners is a Pakistan based company producing post-consumer recycled cotton.
Belda Lloréns is a Spanish yarn manufacturer offering recycled yarns branded EcoLife®.
Geetanjali Woollens is an Indian company offering recycled cotton fiber and yarn.
Hilaturas Ferre has developed its RECOVER range of yarns and threads which are produced with 100 percent recycled fibers. These yarns contain a high percentage of mechanically recycled cotton, which is blended with recycled polyester from PET bottles. Read more in our Insider Series.

Martex Fiber offers Eco2cotton® which stands for recycled fiber made from pre-consumer fibers and clippings which are sorted by color and blended. The resulting cotton-like fluff can be used as a fill for stuffing and pads or for spinning new yarns. The regenerated fibers retain the color of the original textile, so less dyes and harmful chemicals pollute our planet. For yarns made with Eco2cotton®, other acrylic, polyester or eco fibers are added to enhance performance and color.

Velener Textil GmbH has won the Discover Natural Fibres Initiative (DNFI) Innovation in Natural Fibers Award for 2018. Its WECYCLED® system addresses the issue that 30 percent of yarn used in weaving mills, knitting mills and garment making remains unused. The remaining yarn is separated from the paper cone. The recycled fibers are blended with responsible virgin cotton into new yarn.

Photo: Ferre Kweskin
Other Plant-Based Fibers
Other Plant-based Fibers

A range of choices

Other plant-based fibers had a market share of around 5.5 percent of global fiber production in 2017\(^1\).

There is a diversity of other plant-based fibers produced but not all of them are used in the textile industry.

Beyond cotton other plant-based fibers include jute, kenaf, flax, sisal, ramie, kapok, abaca and hemp.

Jute has the largest market share of all other plant-based fibers at around 50-60 percent. The most important other plant-based fibers for the textile industry are flax (linen) and hemp.

It is estimated that more than eight million households are involved in the production of these other natural plant-based fibers\(^2\).

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\(^1\) Source: DNFI Website - Natural fibers production reaches 30 million mt published on 29th July 2017; plus Textile Exchange estimate for 2017 based on 2016 figures; total fiber volume calculated by Textile Exchange based on various sources (see chapter on Global Fiber Volume).

\(^2\) Source: DNFI Website - Natural fibers production reaches 30 million mt published on 29th July 2017.
Other Plant-based Fibers
Hemp, linen, and beyond

**Hemp**

Hemp for fibers is mainly grown in China but there are also emerging initiatives, for example in the United States.

Hemp requires fewer inputs and has a lower impact in cultivation compared to other fibers. A small number of suppliers offer organic and recycled hemp.

**Examples:**

**Hempfortex** is a main supplier of hemp textiles. This vertically integrated company uses hemp grown in China and manufactures yarn and knitted and woven fabrics made from hemp.

**Earth Alive Clean Technologies,** a leading Canadian Clean-Tech company, announced the launch of the **Clean Fiber Initiative** in 2018, a collaborative research project to improve the production of natural fiber crops in Canada and around the world. Earth Alive currently has hemp trials underway with conventional and organic growers in Canada, and the USA.

**9Fiber** is a USA based company dedicated to delivering innovative, responsible and sustainable solutions to cannabis and hemp biomass waste recycling. The 9Fiber patented solution™ converts unwanted waste material from the cannabis and industrial hemp industries into usable bast fiber and hurd to be used in a wide variety of products including fibers for the textile industry.

Research is underway into hemp and jute as feedstock for manmade cellulosics and even biobased leather.
Other Plant-based Fibers

Hemp, linen, and beyond

Linen

Flax is mainly grown in China and Europe.

Flax has a comparatively small environmental impact since it needs fewer inputs in cultivation than other natural fibers.

Some suppliers also offer organic linen which does not use any synthetic chemicals in production.

Examples:

Libeco is a Belgian-based company that collaborates with a group of growers of organic flax in France and processes this flax to organic linen products.

TERRE DE LIN is a French cooperative specialized in the production of textile flax (linen) from the seeds to the fiber. With 650 farmers and 240 employees the cooperative produces 15 percent of the world’s quality flax. Visit our Insiders Series for Q&A.

CRAiLAR Technologies is a Canadian cleantech company which has developed its proprietary CRAiLAR fiber processing technology. This enzymatic process transforms flax into soft fibers which are functionally equivalent to manmade cellulosics.

And beyond - nettle, lotus, kapok

Further plant-based fibers used in the textile industry include nettle, kapok and others. Innovators include Himalayan Wild Fibers which extracts textile fiber from a nettle plant that grows wild in the mountain forests of the Himalayas, Samatao Lotus Textiles which extracts the fibers from the lotus plant and FLOCUS™, a brand producing yarn blends and filling made with kapok.
Animal-based Fibers & Materials
Down & Feathers
The global production volume of down and feather is difficult to quantify. Rough estimates indicate that the global down and feather production volume has increased to more than 270,000 mt per year\(^1\). 70-90 percent of the down production comes from China\(^1\). The global down and feather market is highly fragmented with many small and medium producers.

Around 75-90 percent of the down comes from ducks, most other down comes from geese\(^2\).

Increasing concerns about the treatment of animals have led to the development of animal welfare standards for down. Key standards include the Responsible Down Standard (RDS), the Global Traceable Down Standard (TDS) and Downpass. These standards award and ensure that there is:

- no live-plucking
- no force-feeding
- broader animal welfare (depending on standard)

**Preferred Virgin Down**

**Production facts and figures\(^1\)**

The Responsible Down Standard

The Responsible Down Standard is gaining importance. The number of Responsible Down Standard (RDS) certified sites increased from 108 in 2014 to 696 in 2017\(^3\).

**Traceable Down Standard**

The number of Global Traceable Down Standard (TDS) certified sites increased from seven in 2016 to nine in 2017\(^3\).

**Downpass Standard**

The number of Downpass certified sites increased to 4500 in 2017. Due to a change in the standard system, a comparison with the previous year is not possible\(^3\).

\(^1\) Source: OIA - Priority Issues Brief: Down published in May 2016 - referencing EOG; communication with the EOG; cross-checked with other sources such as cn-down.com and FAO database, IDFL Info Worldwide Sources of Down and Feathers 2006. These figures do not include recycled down. For recycled down see the chapter on “Recycled Down”. \(^2\) Based on FAO database and conversations with industry experts \(^3\) Source: Data received by mail from the standard owners. Please note that these numbers include down processing sites.

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© TextileExchange | Page 27
Preferred Virgin Down

Directory: Where to find preferred down across the globe

This map locates key production regions and certified sites in 2017.

RESPONSIBLE DOWN STANDARD (RDS)

696 sites across 26 countries
Top 10 producing countries:
- China: 418
- South Korea: 92
- USA: 33
- Poland: 21
- Germany: 19
- UK: 14
- France: 12
- Hong Kong: 10
- Italy: 9
- Vietnam: 9

DOWNPASS

4,500 sites across 9 countries:
- China: 1,970
- Ukraine: 946
- Germany: 615
- France: 284
- Poland: 213
- Russia: 190
- Hungary: 143
- Ireland: 142

GLOBAL TRACEABLE DOWN STANDARD (TDS)

9 sites across five countries:
- USA: 3
- Vietnam: 3
- Bangladesh: 1
- China: 1
- Ireland: 1

Tip: How to find suppliers of preferred down

Check out the Textile Exchange database or contact NSF or Downpass for a list of certified suppliers of preferred virgin down.

(1) Please note that these figures include both down production and processing sites.
Preferred Virgin Down

Standards update

Responsible Down Standard (RDS)

In 2017, Textile Exchange initiated the revision of the RDS 2.0. This revision is expected to be completed by the end of 2018. Within the International Working Group, there are 31 voting member organizations and over 100 individual members of the group. You can read more about the revision on the standard’s website(1).

Downpass

The first version of the Downpass standard was completed in June 2016. As part of a continuous improvement process, a new version of the standard was developed in autumn 2016. The results of a public survey, as well as the feedback from animal welfare organizations, testing institutes, certification companies, NGOs and trade partners, flowed into this development. The revised standard is valid from January 2017 and stands for the exclusion of feathers and down from live animals, material from foie gras production as well as rearing control. In May 2017 the standard and the implementation rules were edited(2).

Global Traceable Down Standard (TDS)

There was no revision of the TDS in the reporting period(3).

In March of 2018, we traveled to China to visit the RDS supply chain in preparation for the upcoming revision. We partnered with two Certification Bodies: Control Union and IDFL to coordinate the visits, and we were accompanied by NSF International for some of the audits.

During our visit, we observed raising farms, slaughterhouses, hatcheries, and parent farms. While on our trip, we met a young family that owns a farm and has a contract to care for birds owned by a nearby slaughterhouse. They live in a small apartment attached to the shelter for the birds. They provide direct care for the flock of birds under their contract. They explained to us how they care for the birds, including details about handling, feed, access to water, and keeping the baby chicks warm in their early days. With each flock of birds, they also receive the feed, medicine, and books for record-keeping.

This trip highlighted the importance in providing training and education to farmers working with the standard, to ensure our goals are being met. We also plan to review several of the farm, slaughter, and transport criteria to ensure they are truly the highest possible level of animal welfare for the birds.

Anne Gillespie and Ashley Gill
Integrity & Standards Team, Textile Exchange

Preferred Virgin Down
Supporting the transition

There are a number of initiatives working towards preferred down. Collaboration and information are key for a successful uptake of preferred down.

Textile Exchange Preferred Down Working Group and Round Table supports the knowledge, understanding, and sustainable development of the preferred down market. The global working group was initiated by the European Outdoor Group (EOG) in 2014 and transitioned to Textile Exchange in 2018.


A down stakeholder survey was conducted in 2018 to find out more about the preferred down market. At the time of the report launch, the survey was still open. 59 participants including brands and retailers, suppliers and other stakeholders have submitted their answers by October 2018. The survey was designed by the European Outdoor Group in collaboration with Textile Exchange and the Down Round Table.


IDFL is the world’s largest down and feather testing institute with laboratories in the USA, Europe, China, and Taiwan. See Q&A on the next page.
Q&A with Matthew Lieber

Matthew Lieber
Managing Director, IDFL Europe

How are you working to make the down industry more sustainable?

Feather and down are naturally a very sustainable product – being a by-product of the meat industry which typically requires strict health and safety requirements. Consumer demand for transparency of products and the processes and inputs used to create them has led to the necessity for testing services that validate sustainable claims. IDFL provides help in understanding regulatory and market-driven sustainability testing requirements. Through evaluation and analysis, our testing data helps improve down/feather production processes and advance technology in ways that lead to better energy conservation and environmental practices. It also helps ensure product performance and safety compliance that builds consumer confidence in the market place. In 2008, IDFL developed the first down and feather traceability audit system to be used by suppliers and brands, it included best practices for traceability and verification of animal welfare. This system led to improved practices of traceability and transparency in the down and feather supply chain. In addition to our own audit systems, IDFL provides certification services for the Responsible Down Standard (RDS), Downpass, EDFA, and J-TAS. IDFL has conducted audits for entire textile supply chains.

Q

What are the biggest challenges when it comes to shifting the needle on down?

1. There always seems to be a constant challenge of verification of animal welfare practices – mainly focusing on force feeding and live-plucking, but also other practices involving handling and general health of the waterfowl. It is common knowledge now that live-plucking is a very small (＜1) percentage of the overall down and feather supply and is being actively prohibited by industry associations and global purchasers. The other animal welfare practices in question are usually not directly associated to the down / feather industry, but instead are related to the meat industry and their management of the waterfowl during raising / growing. The lack of active meat industry involvement in the feather and down industry lead to issues of transparency in matters of animal welfare.

2. Down is naturally a “green” sustainable product. However, there are sometimes chemical treatments and inputs used to enhance quality. Some of these unwanted treatments may lead to increased dust / allergens and poor performance which impact consumer confidence in down products.

3. Consumer demand for down products has been on the rise in the past few years which has also increased the price. This increase in demand combined with the impact of avian flu and other environmental policies, which decreases supply, cause price spikes and uncertainty in the market place. This uncertainty in price may lead purchasers to find other alternatives such as polyester or other synthetic fills.

4. Down and feather is sometimes presumed to be better quality with certain countries of origin. In the past, there have been incidents where claims on origin have been found incorrect. This has lead to purchasers wanting verification of the country of origin from suppliers in order ensure they are getting what they asked for.

Q

What progress are you seeing?

Though it is still challenge, as mentioned above, much progress has been made in the transparency and verification of animal welfare practices due to the active involvement of the feather and down industry and their impact on the meat industry through implementation of animal welfare standards. This impact has provided needed clarity and confirmation of the humane treatment of waterfowl that is typically regulated by the meat industry, but just less transparent. We have seen an increased capability in traceability and overall management systems and best practices. In terms of sustainability, there has been an increased demand of recycled down and feather. New technologies in down and feather processes and also fabric creations lead to high quality, fashionable finished products, especially in the garment fashion and outdoor industries. manmade fibers kicked off its work. The objective is to agree on minimum requirements for manmade fibers regarding raw material, production, product toxicity and end-of-life. In addition, the expert group will identify areas where members need support and guidance. The focus is on manmade cellulose fibers, synthetic fibers and biobased plastics.
Recycled Down

A closer look

It is estimated that in Germany alone, the bed feather processing industry generates around 950 mt of waste feathers \(^1\). Down recycling is an important approach to reduce resource consumption and address the waste feathers. Recycled down can be from pre- or post-consumer sources.

Recycling of these materials not only helps to divert waste from landfills and low-value pathways but also to save resources such as energy and water used in down production.

Standards

Standards used for recycled down include the Recycled Content Standard (RCS), Global Recycled Standard (GRS), and the SCS Recycled Claim. Further information on these standards is provided in the chapter on “Sustainability Standards”.

Examples

The USA based company **Downlite** launched a new innovation called Re/charged down in 2017, GRS certified post-consumer recycled down and feathers as part of their Sustainovation initiative. Downlite also offers RDS and TDS certified down.

The Spanish company **Navarpluma** offers 100 recycled recycled down branded NEOKDUN\(^®\) originating from the recycling of bedding/apparel finished products that have reached the end of their product life cycle. It also offers RDS certified down.

**Re:Down** is a company specialized in the down recycling made from post-consumer products. Re:Down produce a garden fertilizer from feathers that do not make the grade.

**Rohdex** is a supplier of down certified to RDS and Downpass as well as recycled down certified to the GRS.

\(^1\) European Down and Feather Association (EDFA)
Preferred Down

Commitments

The number of apparel, outdoor and home textile companies that have publicly committed to preferred down increases each year, with over 40 brands and retailers making public commitments to the Responsible Down Standard (RDS).

Examples for public commitments:

Columbia has committed to 100 percent RDS-certified down and feathers throughout its global line (excl. its Japanese subsidiary).

Esprit ensures that 100 percent of their down and feathers are sourced according to the Responsible Down Standard.

From Fall 2017, Tommy Hilfiger confirmed that all their down products will be certified to the Responsible Down Standard.

From Fall 2017 product season, all Patagonia’s virgin down was certified to the Global Traceable Down Standard (Global TDS), Advanced certification level by NSF International.

RDS - International Working Group

Around 30 brands, retailers, suppliers, certification bodies and NGOs are part of the Responsible Down International Working Group (RDS-IWG).

Suppliers engaged in the RDS-IWG include:

- Allied Feather and Down
- Downlite
- Navarpluma
- Sustainable Down Source

We’re excited that since we gifted the RDS standard to Textile Exchange and the industry, the RDS is now on its third revision with a group of diverse stakeholders contributing their expertise and feedback to further improve the standard.

James Rogers,
Director of Sustainability,
VF Corporation
Wool
With an annual production volume of more than one million mt, wool is the most important animal-based fiber. Sheep wool accounts for approximately 95 percent of all wool. Alpaca, Angora Rabbit, Camelhair, Cashmere, Guanaco, Llama, Mohair, Vicuna and Yak hair make up the other five percent.\(^1, 2, 3\)

While the global production has been declining over the years, the market share of initiatives such as the Responsible Wool Standard (RWS) is increasing. The number of sites certified to the RWS increased from seven in 2016 to 235 in 2017.

Since the RWS only launched in 2016, the market share is still low at below one percent of the global wool production.

The RWS ensures animal welfare (no mulesing and a broader concept of animal welfare based on the Five Freedoms of animals) and best practices in the management and protection of the land the sheep graze on.

Organic wool, while niche, is fairly well established. Organic wool makes up around one percent of the global wool production\(^4\).

In the UK alone, 18 out of 75 GOTS licensees produce or work with organic wool. These are across sectors and include the British Wool Marketing Board.\(^5\)

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\(^1\) These figures do not include recycled wool. Please see the section on “Recycled Wool” for information on recycled wool. \(^2\) CHRF based on NFU (3) DNFI - 50 million households produce natural fibers - published in July 2017 \(^4\) Based on FIbL data received by email on number of organic sheep and Textile Exchange data on Responsible Wool Standard compared to total number of sheep based on FAO database. \(^5\) Soil Association
Preferred Virgin Wool

Directory: Where to find wool certified to the Responsible Wool Standard (RWS)

This map locates RWS certified farms and wool processing sites in 2017.

RESPONSIBLE WOOL STANDARD (RWS)

15 COUNTRIES - 235 SITES incl.
161 sites involved in both farms and processing,
19 in farms only and
55 in the processing only

RWS-CERTIFIED FARMS
180 farms in six countries
• South Africa: 130**
• Uruguay: 28**
• Australia: 14 + 3** = 17
• New Zealand: 3*
• Argentina: 1
• USA: 1

RWS-CERTIFIED PROCESSING SITES
216 processing sites in 15 countries
• South Africa: 130**
• Uruguay: 28**
• China: 26
• USA: 6
• Argentina: 5
• Taiwan: 5
• Germany: 4
• Australia: 3**
• Italy: 3
• Bulgaria: 1
• Hong Kong: 1
• Japan: 1
• New Zealand: 1
• UK: 1
• Thailand: 1

Tip: How to find suppliers of preferred wool
Check out the Textile Exchange database for certified suppliers of RWS, OCS and recycled wool and the GOTS database for GOTS certified wool suppliers.

*Please note that due to incomplete data at the time of publication, the numbers for New Zealand do not include individual farms. The actual number of certified units is even higher.

**These sites are involved in farm and processing activities.
Preferred Virgin Wool

Standards update

Responsible Wool Standard (RWS)

The Responsible Wool Standard (RWS) has been registered as a quality assurance scheme within the Australian Wool Exchange (AWEX).

In a meaningful step towards integrating the RWS into existing trading models, the RWS has been registered as a quality assurance scheme within the Australian Wool Exchange (AWEX) wool auction trading system end of 2016. This step will allow woolgrowers and brokers in Australia to register their wool clips as RWS Certified and will appear in the auction catalogue as “RWS” so that wool buyers can easily identify RWS wool in the Australian auction system.

ZQ Merino Accreditation Program and RWS Alignment

Textile Exchange and The New Zealand Merino Company Ltd. recently signed a Memorandum of Understanding (MOU) detailing the alignment between the ZQ Accreditation program and the RWS. As a result of this agreement, wool grown under the ZQ Accreditation program (ZQ Merino and ZQ Premium Wool) can now be sold as RWS certified.

Ovis21 combines a Grassland Regeneration and Sustainability Standard and with the RWS.

Ovis21 is a network of more than 160 producers and 22 studs in seven Argentine provinces as well the south of Chile and Uruguay. The network includes over one million sheep. Ovis 21 promotes a culture of grassland regeneration and biodiversity so the land will sustain people, their businesses and communities. Their Grassland Regeneration and Sustainability Standard and the Rangeland Health Index covers these ambition. To cover the animal welfare as well, Ovis21 has adopted the Responsible Wool Standard (RWS).

Wools of New Zealand and RWS

Wools of New Zealand is owned by the people who grow the wool – farming families committed to sustainable practices and caring for the land so that it may be passed to future generations. Wools of New Zealand has been inspected and assessed according to the Responsible Wool Standard (RWS). The intended launch of new RWS approved consumer goods is in 2018. Wools of New Zealand has also worked with EU Ecolabel to develop the world’s 1st on farm accreditation system for greasy wool.

Fibershed - Climate-Beneficial™ wool

Fibershed is a California based organization which develops regional fiber systems that build soil & protect the health of the biosphere. Fibershed is the initiator of the Climate Beneficial Wool Program which is grounded in an effort to scale the implementation of Carbon Farming to create carbon sinks. The wool of the participants is marketed as Climate-Beneficial™ wool.

Governmental regulation

New Zealand bans sheep mulesing

New Zealand has become the first-wool producing country to officially ban sheep mulesing. The new regulation will go into effect on October 1, 2018.

Australia - shift in the mulesing debate

There was also a shift in the mulesing debate in Australia (see for example AWI on the next page).
 Preferred Virgin Wool

Supporting the transition

Sheep Wool


The International Wool Textile Organisation (IWTO) released a set of guidelines in 2017 designed specifically for conducting life cycle assessments on wool products. There have been major discussions on LCAs for wool. Wool often received negative LCA ratings because the use phase was often excluded, outdated data was used and the allocation mechanism for impacts on the meat and wool industry of multipurpose sheep was unfavorable for wool.

Australian Wool Innovation (AWI) published the report “Planning for a Non-Mulesed Merino Enterprise” in 2018. This report outlines the key learnings from a number of wool-growing enterprises that have moved to a non-mulesed enterprise. It is intended to assist other woolgrowers in their consideration and planning to also move to non-mulesed Merino.

Cashmere

There are a number of initiatives working towards preferred cashmere.

Examples include:

NOYA Fibers, The Nature Conservancy and a small group of passionate people are working to improve the future of the Mongolia Plateau region by developing a comprehensive grasslands management program, animal welfare and social programs that together produce the world’s finest cashmere while preserving Mongolia’s grasslands and maintaining the livelihood of herders and their families.

The Sustainable Fibre Alliance (SFA) is a non-profit international organization working with the extended cashmere supply chain, from herders to retailers. Their goal is to promote a global sustainability standard for cashmere production in order to preserve and restore grasslands, ensure animal welfare and secure livelihoods.

Palliser Ridge is totally committed to best practice. We are receptive to adopting any new initiative that is market driven to lift standards of animal welfare, farm management and the environment. RWS simply recognizes the efforts that we put into our land and by farming our animals in the most ethical way.

Kurt and Lisa Portas
Palliser Ridge Farm, NZ
Q&A with Federico Paullier

Federico Paullier, Managing Director, Chargeurs Luxury Materials

Q  What does certification mean to you?
From the beginning we embraced Textile Exchange’s Responsible Wool Standard (RWS). We help brands build and understand their wool fiber supply chains and the demand for RWS came from them. All four of Chargeurs Luxury Materials wool combing facilities are RWS certified locally in the USA, and globally in Argentina, China, and Uruguay which is monumental. Chargeurs “Wool Top” manufacturing operations are strategically located to deploy wool around the world from every wool producing region.

In parallel to working with RWS, Chargeurs Luxury Materials has developed a wool fiber brand proprietary standard called Organica launched in October 2017 that will use Blockchain technology for absolute certification, transparency, and verification. Organica Precious Fiber is an eco-friendly merino wool fiber brand applying 40 years of Chargeurs wool sourcing and combing operations experience with full traceability. The brand was born out of the passion of our wool business.

Q  What results have you seen so far?
The outdoor industry is an early adopter; we have a shared value system that works to protect and preserve the environment, animal welfare, and the livelihood of workers around the world. It is in our collective DNA to do the right thing. We are the main wool supplier for industry leaders such as Icebreaker and Smartwool among others. It’s just a matter of time before more fashion brands integrate this value system into their global wool fiber supply chains.

Q  Why is certification so important?
Certification guarantees integrity and verification. Chargeurs Luxury Materials has made significant investments in farm visits, training, and education. When we purchase certified wool, we pay a premium for it. The wool business as a whole is currently at a crossroads; the moment for making a choice has arrived. It needs to move away from commodity to sustainable diversity solutions.

Q  What are the main challenges?
Now is the time to put a stake in the ground, we need to collectively move forward and deliver upon the sustainable goals that brands have made for 2020 and beyond. Cycles are long, and a lot of work is still required for a responsible wool fiber supply chain. Chargeurs Luxury Materials has made significant investments in doing things the “right” way and brands need to understand there is a premium to best practices all the way at the beginning of the wool supply chain and the manufacturing processes.

Taken from Textile Exchange’s Insider Series.
Recycled Wool

A closer look

Recycled wool has a long tradition. The Italian district of Prato is a major producer of recycled wool where approx 22,000 mt of wool are recycled every year(1). Other major production centers for wool recycling are Panipat in India and China.

Recycled wool saves resources and diverts wool from landfills or other low-value pathways.

A LCA conducted for Nuova Fratelli Boretti (NFB) shows major savings in terms of energy, water and chemicals if mechanically recycled wool is compared to virgin wool(2).

Recycled Wool Seminar


Discussion on chemical testing of recycled wool

The Italian laboratory service provider Buzzilab focused on parameters for chemical safety assessments of recycled wool and made a Product Restricted Substances List (PRSL) proposal in the seminar on Recycled Wool hosted in Prato in June 2018.

New Recycled Wool Report

European Outdoor Group (EOG) and Greenroom Voice published the Recycled Wool Report in 2018.

Examples of suppliers

Geetanjali Woollens is an Indian company offering recycled wool fiber and yarn. The company has become a Textile Exchange member and was one of the early adopters of the supplier survey of Textile Exchange.

Novetex is a Hong Kong based company offering recycled wool fibers. The recycled wool is GRS certified.

Nuova Fratelli Boretti (NFB) is a Prato-based Italian company which has been working with regenerated textile raw materials since 1960. It is the founding partner of Re.Verso™, a trademark used for its re-engineered wool, cashmere and camel hair. The Re.Verso™ supply chain includes Green Line, a company responsible for sourcing and sorting of pre-consumer textile waste, NFB responsible for the selection and the mechanical recycling into fibers and selected strategic partners for the transformation into yarn, fabrics and knitwear.

Recycled standards

The key standard for recycled wool are the Recycled Content Standard (RCS), Global Recycled Standard (GRS), SCS Recycled Claim and Cardato Recycled for recycled wool from Prato in Italy.

Please see the page on “Sustainability Standards” for more information.

(1) Cardato Recycled website (2) Re-Verso.com
Preferred Wool

Commitments

An increasing number of brands and retailers are committing to the Responsible Wool Standard (RWS). Among the brands who have made public commitments to the Responsible Wool Standard, are H&M, Marks & Spencer, William-Sonoma, Inc., Patagonia, Eddie Bauer, REI, Eileen Fisher, Tchibo, Varner, Vaude, Coyuchi, Mountain Equipment Co-op, Deckers, Kathmandu, and Knowledge Cotton Apparel.

Among companies that have expressed support of the standard and are working toward implementation are LL Bean, Arc’teryx, Indigenous Designs, Nau, Point6 and prAna.

H&M is committed to use 100 percent Responsible Wool Standard certified wool in their products by 2022.

50 percent of all Esprit’s virgin sheep wool will be sourced according to the Responsible Wool Standard by 2022.

An increasing number of suppliers are committing to the Responsible Wool Standard (RWS) and/or organic wool.

There are many wool suppliers who have expressed their own commitment to the Responsible Wool Standard and/or organic wool, including: Rambler’s Way, Imperial Stock Ranch, New Merino Australia, Oviz 21, Chargeurs, ABMT Textiles, Lanas Trinidad and Lemprière.

Several other wool suppliers have participated in global training events with a focus on setting up an RWS supply chain.

Fuhrmann Argentina and the Shetland Organic Producers’ Group are examples of suppliers dedicated to 100 percent organic wool.

Important for the transition are the companies in the middle of the supply chain. A key player “in the middle” is Suedwolle.

I’m just letting our suppliers know that the time for discussion about the need or practicality of the RWS has passed… it’s time for action. The RWS is done, it’s credible, and is now being implemented within the wool industry. So adopt it, own it as part of your business practice, and confirm when we can buy it.

Greg Scott,
Director of Product Integrity,
Mountain Equipment Coop
Other Animal-based Fibers & Materials

Silk

Another important animal-based fiber is silk. Even though the market share is small, it is estimated that around 300,000 households are involved in the production of raw silk(1).

In 2017, around 80 percent of all silk was produced in China. The second largest producer was India with a market share of 18 percent(2).

Around 178,000 mt of silk was produced in 2017. The production volume of silk has doubled from 1990 to 2017 but saw a decrease over the last three years.

Preferred silk options includes organic, ahimsa, fairtrade and recycled silk.

The Chinese Company “Organic Textiles” (OTEX) is the only producer of organic silk in China and makes 30 mt of silk filament a year. Triaz GmbH supports this project and owns 50 percent of the company(3). See Textile Exchange’s Insider Series.

Other examples include the organic ahimsa silk project initiated by Coccocon in Jharkhand, India as well as an organic silk project in Meghalaya in India initiated by Seidentraum.

Standards

Standards used for preferred silk include IFOAM recognized organic standards, the Organic Content Standard (OCS), the Global Organic Textile Standard (GOTS) and the World Fair Trade Organization (WFTO). For recycled silk there is the Global Recycled Standard (GRS) and the Recycled Claim Standard (RCS).

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(1) DNFI website (2) FAO database and inserco statistics from the website (3) Textile Exchange Insider Series 2017 - information provided by Triaz GmbH.
Other Animal-based Fibers & Materials

Silk

“When we took over the conventional silk farm in 2011, the soil was completely dead. We replaced the use of chemicals with natural methods - compost, nets to protect the trees and neem-based biosprays. This has resulted in reclaiming the lost biodiversity in the region. In 2015, the first grass appeared. Now, we even cultivate rice there.”

-Chandra Prakash Jha, Founder of Cocccon

“Climatic change destroys the subsistence of rural tribes in north-east India. It is urgently necessary to create new possibilities for earning a living. A good chance is the silk rearing practiced by the women over centuries for their own needs. This will help the women and future generations to create a new livelihood. Our Private Public Partnership (PPP) project in collaboration with GIZ supports organic silk rearing in Meghalaya and a more sustainable and fair textile manufacturing industry.”

-Dr. Matias Langer, Seidentraum
Leather
Other Animal-based Fibers & Materials

Leather (animal)

The demand for more responsible and vegan leather is growing.

Global leather production is estimated at around seven million mt\(^1\). The hides and skins of over one billion animals are used for the leather production\(^1\). Concerns about the environmental impacts of livestock raising and leathemaking, and animal welfare, has led to an increasing awareness and demand for responsible and vegan leather.

Preferred leather options include organic, vegan and recycled leather.

Standards and initiatives

**Leather Working Group (LWG)**

The LWG is a 400 member, multi-stakeholder group that developed an environmental auditing protocol for tanneries. LWG audited tanneries represent approximately 20 percent of the world’s production of footwear leather and 16 percent of total leather volume.

**Launch of the Responsible Leather Round Table (RLRT)**

In response to demand from brands and retailers, Textile Exchange launched the RLRT, a multi-stakeholder platform which brought together 400 stakeholders including brands, suppliers, NGOs and special interest groups, with the goal to identify and drive best practices in the leather value chain. One of the primary activities of the RLRT will be the development of the Responsible Leather Assessment (RLA) tool.

**Global Forum on Responsible Leather**

The RLRT hosted its first ever global event, the Global Forum on Responsible Leather, in Ireland, parallel to the Global Roundtable on Sustainable Beef (GRSB) conference.

**Recycled Leather**

Around 800,000 mt of leather waste is produced annually\(^1\). Leather recycling helps to reduce this leather waste. While there are various suppliers of bonded leather, examples for advanced recycled leather are **RECYC LEATHER** and **Nike Flyleather**, an engineered material made by binding at least 50 percent reclaimed leather fibers together.

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\(^1\) FAO (2016) - World Statistical Compendium for Raw Hides and Skins
Other Animal-based Fibers & Materials

Leather alternatives (non-animal)

Alongside a growing interest in more sustainable animal-based leather and vegan synthetic leather alternatives, there is a growing number of initiatives developing innovative biobased or recycled leather options. Examples are:

Biobased “leather”

Fermentation based leather

Flokser’s biobased SERTEX is a 70 percent biobased material derived from corn made in collaboration with BioAmber and DuPont.

Malai is a biobased material grown on coconut water, which is a leftover from the coconut industry in South India, through fermentation of a bacterial culture. This jelly is harvested and enriched with natural fibers, gums and resins to create a more durable and flexible material.

Modern Meadow’s Zoa™ is a bioengineered material based on the protein collagen produced through fermentation from yeast in a lab with the support of biotechnology. Modern Meadow is currently collaborating with selected brands to launch their first products in 2019.

Provenance is a bioengineered material based on collagen as building blocks.

Mushroom based “leather”

Amadou Leather™ is a compostable mushroom material grown on recycled sawdust using existing edible mushroom cultivation techniques.

Bolt Threads - Mylo™ is developed from mycelium cells by creating optimal growing conditions for it to self-assemble.

MuSkin comes from the Phellinus Ellipsoideus, a parasitic fungus that grows in the wild and attacks the trees in the subtropical forests.

MycoWorks is grown rapidly from mycelium and agricultural byproducts in a carbon-negative process.

Byproduct based “leather”

Appleninealliance’s Apple Peel Skin is a vegan material which integrates organic apple peels into the skin of the material.

Fruitleather Rotterdam is currently developing a new, eco-friendly process that converts leftover fruits into durable, leather-like material, possibly strong enough to be used for shoes, handbags and other products.

Frumat’s Apple Skin is a vegan material derived from apple byproducts.

Piñatex® is made of fiber from the leaves of the pineapple plant.

Vegea uses grape marc, the seeds and the stalks of the wine grape bunch, which are left over after winemaking. From the seeds a bio-oil is extracted which is then polymerized using an innovative patented process. Vegea is currently working on the commercialization. Find out more in Textile Exchange’s Insider Series.

Hemp

Hemp Bio Leather is developed from hemp waste fiber residues - a by-product from the current local hemp, food and agriculture industry in Denmark.

Cork

Another biobased material increasingly used as a leather alternative is cork. Work is also being conducted on recycled cork.

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Manmade Cellulosic Fibers
Preferred Virgin Manmade Cellulosics

Production facts and figures

With an annual production volume of around 6.7 million mt manmade cellulosics (MMCs) have a market share of around 6.3 percent of the total fiber production volume\(^1\).

The global MMC fiber production volume has more than doubled from around three million mt in 1990 to around 6.7 million mt in 2017 and is expected to further grow in the coming years\(^1\).

MMCs include viscose, acetate, lyocell, modal and cupro. Viscose has a market share of almost 80 percent of the total MMC production\(^2\).

**Viscose** is the most important MMC with a market share of almost 80 percent of all MMC fibers and a production volume of around 5.2 million mt\(^1\).

**Acetate** has a market share of around 13 percent of all MMCs with a production of 0.8 million mt but it is mainly used for non-textile applications.

**Lyocell** market share increased from around three percent in 2016 to around 4.5 percent in 2017 with a production volume of roughly 0.2 million mt in 2016 and 0.3 million mt in 2017.

**Modal** has a market share of around three percent of the total MMC market with a production of around 0.2 million mt.

**Cupro** has a market share of less than one percent of the total MMC fiber market. The only supplier of cupro on the market is Asahi Kasei.

Preferred virgin MMC fibers are sourced from non-endangered certified forests and are manufactured more sustainably. This means chemicals, water and energy are properly managed to avoid pollution and human exposure.

Key standards on the feedstock level and for chain of custody include FSC and PEFC. For the pulp and fiber level standards such as the Material Health Standard and the EU Eco Label are used. ZDHC currently develops a new standard for the fiber production, guidelines for the pulp level may be developed at a later stage.

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\(^1\) Based on Lenzing data received by mail - based on The Fiber Year 2017 and 2018 and own estimates. Textile Exchange compilation of global fiber production see overall fiber market data.
Preferred Virgin MMCs

Forest and dissolving pulp certification

The number of viscose producers with endangered forest sourcing policies according to Canopy increased from three to 12 representing 35 percent to 80 percent of the global market from 2015 to 2018 (1).

Beyond sourcing from non-endangered forests it is important to source sustainably managed forest to avoid deforestation or biodiversity loss. FSC and PEFC are standards ensuring the sustainable management of forests.

FSC is currently working with key players in the industry to achieve the first complete certified textile supply chains which could allow consumer facing FSC labels on textile products.

At the FSC General Assembly in in Vancouver in October 2017, FSC showcased the first FSC fabrics. The fiber came from ENKA and the fabric from Ghezzi S.p.a. FSC hopes that they will have a full FSC supply chain with a label on the garment soon.

PEFC in partnership with UNICE/FAO have organized “Forests for Fashion” exhibition during High Level Political Forum 2018. The exhibition presented fashion created by young and established designers with the use of forest-based materials, originating from sustainably managed forests. The partnership was aimed at policy makers to highlight the value of the forests and the responsible sourcing solutions. The exhibit also launched a capsule collection that used the world's first PEFC-certified fabrics – closing the gap between sustainably managed forests and the final garment through monitoring each step of the supply chain. PEFC is continuing raising awareness on sustainable forest management and working in partnerships to support brands in closing the gap for responsible sourcing (2).

(1) CanopyStyle Impact Infographic received by mail
Preferred Virgin MMCs

Directory: Suppliers Map

This map locates the production sites of Lenzing and the Aditya Birla Group based on the Canopy Hot Button Issue 2017.

**SWEDEN**
- Aditya Birla Group
  - Domsjö Fabriker AB in Sweden. Capacity 250,000 tons of dissolving pulp

**CANADA**
- Aditya Birla Group
  - AV Cell and AV Nackawic, New Brunswick, Canada.
  - AV Terrace Bay, Ontario, Canada. (To be converted to dissolving pulp in future - capacity 280,000 tons)
  - Capacity 315,000 tons of dissolving pulp

**USA**
- Lenzing
  - Mobile, Alabama, USA. Capacity 50,000 tons of Lyocell (TENCEL®)

**AUSTRIA**
- Lenzing
  - Lenzing, Austria. Capacity 252,000 tons of viscose and modal
  - Lenzing, Austria. Capacity 67,000 tons of Lyocell (TENCEL®)
  - Heiligenkreuz, Austria. Capacity 66,000 tons of Lyocell (TENCEL®) staple fiber
  - Lenzing Austria. Capacity 297,000 tons of dissolving pulp

**CZECH REPUBLIC**
- Lenzing
  - Paskov, Czech Republic. Capacity 270,000 tons of dissolving pulp staple fiber

**UK**
- Lenzing
  - Grimsby, UK. Capacity 40,000 tons of Lyocell (TENCEL®) staple fiber

**TURKEY**
- Aditya Birla Group
  - Turkey (projected capacity of 120,000 tons of viscose staple fiber)

**CHINA**
- Aditya Birla Group
  - Birla Jingwei Fibers Company Limited, China. Capacity 72,000 tons of viscose staple fibers
  - Lenzing Nanjing (Joint venture with Nanjing NOFC), China. Capacity 178,000 tons of viscose

**THAILAND**
- Aditya Birla Group
  - Thai Rayon, Thailand. Capacity 140,000 tons of viscose staple fiber

**LAOS**
- Aditya Birla Group
  - Birla Lao Pulp and Plantation Limited in Laos (was expected to be in production in 2016, capacity of 200,000 tons of dissolving pulp)

**INDIA**
- Lenzing
  - Nagar in Madhya Pradesh, India. Capacity 110,000 tons of viscose staple fiber
  - Hanhar, Karnataka, India. Capacity 110,000 tons of viscose staple fiber
  - Kharach, Gujarat, India. Capacity 110,000 tons of viscose staple fiber
  - Birla Cellulose, Hanhar, Karnataka, India. Capacity 70,000 tons of dissolving pulp

**INDONESIA**
- Lenzing
  - PT. Indo-Bharat Rayon, Indonesia. Capacity 89,000 tons of viscose staple fiber

- PT. South Pacific, Indonesia. Capacity 323,000 tons (The largest viscose fiber plant operated by the Lenzing Group)


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Preferred MMCs

Supplier updates

Forests and Dissolving Pulp - Insights from major suppliers

_Sappi Forests_, a South African based part of the global Sappi Group, owns or leases 479,000ha with approximately 27.4 million mt of standing timber. Contracted supply covers a further almost 92,000ha. All wood grown on Sappi-owned land and a large proportion grown on plantations managed by Sappi, is Forest Stewardship Council® (FSC®)-certified. Approximately 140,000 hectares of the land is set aside and maintained by Sappi Forests to conserve the natural habitat and biodiversity found there, including indigenous forests and wetlands.

_Sappi Specialized Cellulose_, a division of Sappi, is the world’s largest manufacturer and seller of dissolving wood pulp (DWP). With a total global DWP capacity of 1.4 million mt, Sappi currently supplies 17 percent of global demand from three mills located in Southern Africa and North America. In 2017 confirmed plans and ongoing projects to significantly increase dissolving wood pulp capacity by 2020.

_Bracell_ including Bahia Specialty Cellulose (BSC) is one of the largest dissolving wood pulp producers in the world. Bahia Specialty Cellulose (BSC) operates over 150,000 hectares of plantation land in Brazil, of which approximately 84,000 hectares are planted with eucalyptus. At least 20 percent of their plantation land is reserved for High Conservation Value Forests (HCVF).

_Lenzing and Duratex_ announced in 2018 to build a 450,000 mt. dissolving wood pulp plant in Brazil in a joint venture. For the future operation, the two companies have secured a plantation of 43,000 hectares that will provide the FSC® certified biomass.

_Aditya Birla_, also known as a fiber producer, owns five dissolving pulp mills located in Sweden, Canada, India and Laos.

_Sateri_ is a global leader in viscose production and the largest maker of viscose fiber in China – with three mills and annual capacity of 800,000 mt. Sateri is committed that 100 percent of its purchased pulp will either be FSC or PEFC certified or sourced from controlled wood and all its viscose mills will complete cleaner production audits by 2020.
Preferred MMCs

Innovation in MMCs

Manmade cellulosics currently witness a very active innovation landscape. Being biobased and with a potential for closed loop systems, MMCs can play an important role in the growing market for circular and biobased fibers.

**Commercially available innovations:**

**Lenzing** started its production of LENZING™ ECOVERO™ fibers in 2017. The viscose fibers are derived from sustainable wood and pulp, coming from certified and controlled sources (FSC® or PEFC™ certified) and the fibers have been certified with the EU Ecolabel.

**Eastman’s Naia™**, launched in 2017, a di-acetate filament made from wood pulp responsibly sourced from sustainably managed plantations and produced in a near closed-loop chemical process.

**Birla** has received the Material Health Certificate Gold Level from the Cradle to Cradle Products Innovation Institute for its Spunshades Viscose Staple Fiber.

**In Development:**

**Mechanical MMC production process**

**Spinnova** is a Finnish R&D company developing an innovative mechanical approach to produce MMCs which replaces the use of chemicals.

**Microbial nanocellulose**

**Nanollose** is an Australian biotechnology company which has developed a MMC fiber which is derived using microbes that convert biomass waste products from the beer, wine and liquid industries into microbial cellulose. Nanollose currently is in the process to scale the production.

Many innovations are related to recycling and use of by-products from non-textile industries. Examples such as Lenzing’s Refibra™ can be found in the chapter on “Recycled” MMCs.”
Q&A with Annie Gullingsrud

Annie Gullingsrud
Fashion Positive Plus
Membership Lead

Q: What is Fashion Positive Plus?

Fashion Positive Plus is a membership group of apparel brands committed to the development and adoption of materials designed to provide the foundation of a circular economy for fashion.

Q: How do you identify key materials to work on?

We meet annually to identify new and traditional materials that may qualify as circular materials, i.e. those that have the potential to meet the Cradle to Cradle Certified Gold or Platinum level. We are conducting further due diligence to optimize these materials to ensure they qualify as circular materials and in accordance with the C2C Certified Standard at the Gold or Platinum level.

Part of our approach, and part of the C2C Certified Standard, is to assess the material and the location where the material is manufactured. Our process for traditional materials (viscose) identifies large suppliers used by many of our members so that we can ensure a more significant environmental impact and a sharing of time and effort. For viscose, we partnered with Canopy who ensured that our suggested suppliers meet the requirements of their strategies around supply chain transparency and to minimize deforestation.

Q: How does Fashion Positive support the development of preferred MMCs?

Viscose and recycled cellulosics from post-consumer waste have been identified as pre-competitive materials used in high volume across all members. We are conducting further due diligence to optimize these materials to ensure they qualify as circular materials and in accordance with the C2C Certified Standard at the Gold or Platinum level.

Part of our approach, and part of the C2C Certified Standard, is to assess the material and the location where the material is manufactured. Our process for traditional materials (viscose) identifies large suppliers used by many of our members so that we can ensure a more significant environmental impact and a sharing of time and effort. For viscose, we partnered with Canopy who ensured that our suggested suppliers meet the requirements of their strategies around supply chain transparency and to minimize deforestation.

We consider chemically recycled cellulosics from post-consumer waste a new innovative material. Our goals are to 1) cut down on the use of virgin materials, 2) divert waste from landfill and 3) use safer chemistry. Chemical recycling of cellulosic apparel that can then generate new virgin quality viscose fiber meets our requirements.

Q: Who will be awarded the innovator’s grant?

Through our due diligence process, that includes thorough research and partnering with Fashion for Good and Canopy as advisors, we narrowed down a pool of potential technologies to two finalists. This year’s winners, Tyton BioSciences and Ambercycle, were determined through votes cast by our members, will be awarded a grant to help them assess and verify their material and technology to ensure it meets our definition of a circular material.
Preferred MMCs

Supporting the transition

There are a number of initiatives working towards preferred MMCs. Collaboration and information are key for a successful uptake of preferred MMCs.

Textile Exchange Manmade Cellulosics Global Round Table is an international meeting during the Textile Exchange Conference in Milan facilitating exchange on MMCs.

Textile Exchange MMC Working Group to support the development of a preferred MMC market is currently under development.

Textile Exchange MMC E-Learning Series was a 4-part series for its members offering the opportunity to learn more about MMCs, their future role and more responsible approaches run between April and September 2018.

Canopy works with over 160 of the forest industry’s biggest customers and their suppliers to develop business solutions that address deforestation and protect forests. In 2017, Canopy published the updated Hot Button Issue report, which was first launched in 2016 and supports brands and retailers in their selection of manmade cellulosic fiber suppliers. Since 2017, CanopyStyle Audits were conducted by the Rainforest Alliance for Lenzing, Birla Cellulose, Sateri, Sanyou, Fulida and ENKA have been released. Some producers have a low risk of sourcing from ancient and endangered forests, while others have high risk confirmed. These audits are available to the public and a 2018 ‘Hot Button’ coming this fall will provide detailed updates.

Changing Markets in collaboration with The Forest Trust Roadmap launched a Roadmap towards responsible viscose and modal fiber manufacturing in February 2018.

Collaboration for Sustainable Development of Viscose (CV) in China has released a new joint 3-year roadmap for the sustainable development of the viscose manufacturing industry in China.

Control Union launched CONNECTED, a supply chain traceability platform. The tool was developed in collaboration with H&M and its viscose suppliers and is now ready for other brands to use.

Fashion Positive leverages Cradle to Cradle Certified™ Product Standards to transform the way fashion products and materials are made. Lyocell, cupro and viscose were selected for the Call to Innovation because of their potential for circular economy.


ZDHC expands its Roadmap to Zero Program to Manmade Cellulosic Fiber Production.

Given its ecological footprint, today’s fashion is an environmental emergency: We need to move from a fashions sector with a high impact on the planet to one that is inspired and uses natural resources sustainably. Forests can help this transition.

Paola Deda, Chief, UNECE/FAO Forestry and Timber Section
Preferred MMCs

“Recycled” MMCs

Manmade cellulosics represents a particularly vibrant innovation landscape with regard to recycling and using by-products of non-textile industries. These “Recycled” MMCs are actually not the result of recycling of manmade cellulosics such as viscose or lyocell but made from reclaimed materials such as cotton byproducts and leftovers.

MMCs made from reclaimed cellulosics

Commercially available on the market:

Lenzing’s Refibra™ is the first lyocell fiber made with reclaimed materials offered on a commercial scale. Refibra™ was launched in spring 2017 and is currently made from 20 percent pre-consumer cotton residues.

Asahi Kasei’s Bemberg is a cupro fiber made in Japan from 100 percent cotton linter, a pre-consumer residue of the cotton processing. The annual production capacity is 17,000 mt.

In Development:

Re:newcell transforms high cellulosic waste such as cotton and manmade cellulosics into dissolving pulp reusing the process chemicals. The Kristinehamn demo plant in Sweden produces 7,000 mt of re:newcell pulp per year.

Evrnu is a US-Based startup working on the development of chemical process turning cellulosic textile residues into new MMC fibers. See Textile Exchange’s Insider Series for more.

Infinited Fiber is a Finnish startup that has developed a technology that can return the cotton, viscose and other cellulose based residues back to new MMC fibers. The technology can be applied in any existing dissolving pulp and vMMC fiber plant.

Ioncell is a technology that turns used textiles, pulp or even old newspapers into new textile fibers using a novel solvent called ionic liquid. The commercial production start is planned for 2025.

MMCs made from non-textile residues

Orange Fiber is an Italian startup which has developed a process to extract cellulose from the by-products of the citrus industry to produce fabrics. The latest collection was produced in an acetate process. See Textile Exchange’s Insider Series for more.

Inspidere’s Mestic® is a method to retrieve and convert cellulose from dairy cow manure into regenerated cellulose fibers. The startup is based in the Netherlands.

Circular Systems’ Agraloop Bio-refinery is currently developing BioFibre™, fibers made entirely from food crop residues. According to Circular Systems it is not a manmade cellulosic but a fiber made using a regenerative closed-loop biochemical process. Agraloop plans to have commercial prototype fiber/yarn/fabrics available in early 2019.

MMCs from recycled feedstock from polyester-cotton blends

Pioneers include Worn Again, HKRITA, Tyton Biosciences and Blend Re:Wind (see the chapter on “Fiber Blend Recycling” for details).
Preferred MMCs

Commitments

The number of brands and retailers committed to eliminate endangered forests from their fabrics increased from zero in fall 2013 to 60 in fall 2015 and 160 in fall 2018(1).

Among the committed brands are Levi Strauss & Co., Marks & Spencer, EILEEN FISHER, Stella McCartney and H&M.

Seven major brands and retailers have publicly committed to the Changing Markets Roadmap. These seven companies are Inditex, ASOS, H&M, Tesco, M&S, Esprit and C&A (as of July 2018).

The brands and retailers committed to use their leverage with manufacturers to reduce carbon emissions, improve health and safety of workers and local communities and drive the transition to closed-loop chemical processes.

"After many years of ignoring the environmental impacts of viscose manufacturing, leading clothing brands and retailers are sending a clear message to viscose manufacturers that they expect the industry to move to more responsible viscose production. It is time for the rest of the industry to step up and start taking a holistic approach to cleaning up their viscose supply chain."

Urska Trunk, Campaign Adviser, Changing Markets Foundation

(1) CanopyStyle Infographic 2018 received by email (2) Information received from Changing Market by email.
Synthetic Fibers
Polyester
Recycled Polyester

Polyester is the most widely used fiber. With an annual production of around 53 million mt polyester had a share of more than 50 percent of the global fiber production in 2017.

Recycled polyester is mainly made from PET plastic bottles. Recycled polyester can also be made from other post-consumer plastic such as ocean waste or discarded polyester shirts or from pre-consumer processing residues such as fabric scraps.

The market share of recycled polyester increased from around eight percent of the world PET fiber production in 2007 to around 14 percent in 2017. The rPET share of polyester filament was around four percent, while the rPET share of polyester staple fiber was as high as around 36 percent in 2017.

Due to the ban on importing different types of solid waste including plastic bottles and polyester textile waste to China, recycled polyester production is expected to decrease in 2018. The prices for recycled polyester have already been increasing as a reaction to the ban.

This regulation [the waste import ban in China] will send shockwaves around the world, and force many countries to tackle the ‘out of sight, out of mind’ attitude we’ve developed towards waste.

Liu Hua
Greenpeace East Asia plastics campaigner

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(1) Based on CRFS data received by mail and Textile Exchange compilation of global fiber market (see chapter on Global Market)
(2) Shen et al. (2010): Open-loop recycling: A LCA case study of PET bottle-to-fibre recycling
Recycled Polyester

Directory: Key suppliers and innovators

This map locates key suppliers and innovators of recycled polyester based on their headquarter.

**CANADA**
- Loop Industries / Indorama joint venture (CE)

**ITALY**
- Radici Group - r-RADYARN® + r-Starlight® (M)
- Sinterama - Newlife™ (M)

**KENYA**
- T3. Trash. Thread. Textile (MF)

**SPAIN**
- Seaqual (MO)

**NETHERLANDS**
- Ioniqa (CE)

**GERMANY**
- Advansa - Suprelle® (M)
- Trevira - SINFINECO® (M)

**NETHERLANDS**
- Ioniqa (CE)

**FRANCE**
- CARBIOS (CE)

**SWITZERLAND**
- Gr3n (CE)

**CHINA**
- Haiyan Haili Green Fiber (M)
- Nan Ya Plastics - ECOGREEN®-plus (C)

**JAPAN**
- Jeplan (CE)
- Teijin - ECOPET™ (M) + Eco Circle™ (C)
- Toray - ECOUSE™ (M)

**KOREA**
- Hyosung - Regen™ (M)

**TAIWAN**
- Far Eastern - TOPGREEN® (M+C)
- Libolon - RePET™ (M)

**THAILAND**
- Indorama - Ecorama (M)

**SRI LANKA**
- Eco Spindles (M)

**USA**
- Ambercycle (CE)
- BIONIC® (MO)
- Circular Systems - Texloop rPET-1 (MF)
- Invista - LYCRA® T400® (C) + COOLMAX® and THERMOLITE® EcoMade (M)
- Poole Company - EcoSure® (M)
- Premiere
- Thread - Ground to Good™
- Unifi - REPREVE® (M)

**INDIA**
- Ganesha Ecosphere - Rivivere (M)
- Polygenta - perPETual (C)
- Reliance - Recron® Green
- Sutle Textiles - in development (M)
- Sybil Industries - SyGreen (M)

**GMO**
- Mechanical recycling of ocean plastic

**MF**
- Mechanical recycling and fairness

**C**
- Chemical recycling

**CE**
- Chemical recycling emerging

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Recycled polyester

Supplier updates

Eco Spindles opened a new PET recycling facility in Sri Lanka in 2018.

Far Eastern (FENC) was again a primary supplier of World Cup uniforms for the football tournament in Russia in 2018.

FENC issued its first green bonds. The proceeds will be used for different sustainability initiatives, including PET recycling.

Ganesha Ecosphere Limited (GEL), leading rPET supplier in India, continued to expand its rPET production capacities and set up a new production facility in Temra, India in 2017.

Hyosung focused on sustainability at the ISPO Munich in 2018 and presented a new recycled product, Regen™ cotna combined with creora elastane.

Indorama expands PET recycling capabilities with acquisition of Sorepla in France.

Indorama and Loop Industries announced a joint venture to manufacture and commercialize sustainable polyester resin. Indorama again hosted again RECO, the largest annual upcycling design competition in Thailand which aims to raise awareness on using PET and polyester waste.

Polygenta perPETual was among the finalists of The Circulars 2018 Award. See Textile Exchange’s Insider Series for more.

Sinterama launched 100 per cent recycled fiber ‘Newlife’ FR, a flame retardant yarn, in 2017 and won the “Technology and Innovation Award” at the Green Carpet fashion Awards event held in Milan in 2017.

Sutlej Textiles, an Indian company, announced that it will start a PET staple fiber production facility in Jammu & Kashmir in India which will recycle PET bottles.

Sybil Industries Ltd., an Indian company, started manufacturing its SyGreen rPET yarn. The company collaborates with the Delhi-based waste management company Gem Enviro Management.

Teijin Polyester (Thailand) Limited (TPL) and Assumption College Primary Section (ACP) announced their collaboration in a recycling project of used PET bottles from April 1, 2017. Two reverse vending machines, which accept used PET bottles and pay the user a fee, have been installed at the ACP campus.

Trevira, a German company owned by Thai Indorama Group launched a new brand called SINFINECO® in 2017 which may be used for all its sustainable products including its rPET fiber and filaments certified to GRS and RCS made from plastic bottles but also pre-consumer residues.

Unifi expanded its REPREVE® production to Vietnam. Unifi announced in November 2017 that it has recycled more than 10 billion plastic bottles so far and is targeting 20 billion bottles to be recycled by 2020 and 30 billion by 2022.

Indorama Ventures plays a key role in promoting the circular economy and environmental sustainability globally. We believe that the recycling of PET packaging is one of the most responsible solutions for the preservation of resources and the reduction of PET containers in landfills. Indorama Ventures is playing its part and investing in recycling solutions globally.

Mr. Aloke Lohia, Group CEO of Indorama Ventures

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Recycled polyester

Innovation

Mechanical Recycling with a Special Mission

Commercially available:

BIONIC® materials (resins, fiber, yarns and fabrics) are made with plastic recovered from marine and coastal environments. BIONIC® has joined forces with Waterkeeper Alliance, a global network of grassroots leaders protecting everyone’s right to clean water, on an initiative designed to protect the world’s coastal and marine environments from plastic pollution. This network of coastal cleanup efforts is called STRONGER THREAD®.

Thread Ground to Good™ begins as raw material – the plastic bottles collected by people earning their way out of poverty. The raw materials are sourced from Haiti and Honduras. The fabric sold in their shop and the yarn sold to brands is manufactured by strategic mill partners in the Eastern and Western hemispheres. See Textile Exchange’s Insider Series for more.

In development:

Circular Systems has developed Texloop Recycling, a platform which focuses on the mechanical processing of post-industrial cutting-waste. Texloop rPET-1 is a range of filament yarns and woven materials made in this process. It is currently in the commercialization phase.

T3. Trash. Thread. Textile. is a new project in development in Kenya. T3 is currently constructing a mechanical PET bottle recycling plant in Kenya with an initial capacity of 25 mt per day. The core focus of the project is to directly collaborate with the first collectors (scavengers) and uplift them from severe poverty.

Seaqual is a startup using ocean waste to produce recycled polyester yarns.

Chemical Recycling

Commercially available on the market:

FENC’s TOPGREEN®, Polygenta’s perPETual and Teijin’s Eco Circle™ commercially offer chemically recycled PET.

In 2018 INVISTA launched LYCRA® T400® EcoMade fiber. More than 65 percent of the overall fiber content comes from a combination of recycled plastics (PET bottles) and renewable plant-based resources (corn). The LYCRA® T400® Ecomade recycled content is chemically recycled.

In development:

Ambercycle is a startup developing an enzymatic process for polyester recycling.

CARBIOS developed an enzymatic process to depolymerize PET into its monomers.

Gr3n invented a new chemical process using microwave radiation to accelerate the depolymerization of PET into monomers. See Textile Exchange’s Insider Series for more.

Ioniqa has developed a chemical recycling process for rPET. In 2017 they started to develop the first production plant of 10 kilotons in the Netherlands. See Textile Exchange’s Insider Series for more.

Jeplan’s new Kitakyushu Hibokinada Plant for chemical recycling of polyester in Japan has started test production in December 2017.

Loop Industries / Indorama joint venture has developed a patented chemical recycling process to depolymerize all kinds of polyesters with zero energy use. The chemical recycling produces recycled polyester DMT and MEG. The partnership plans to begin production in 2020.
Q: What is your new project in Kenya all about?

We are setting up a textile fibers manufacturing plant where we will be recycling 100 percent post-consumer PET waste into textile fibers while preserving the environment, supporting the local community and empowering Kenyans. The name of our company is T3 which stands for Trash. Thread. Textile. We are located in Athi River, Kenya about 35 minutes from Nairobi. The initial capacity of the plant will be 25 mt a day and we will be using the mechanical process to recycle.

The core values of T3 are fair trade and being environmental friendly with a mechanical manufacturing process. Our key focus is having a zero waste manufacturing process, using green energy and bio fuels throughout the plant and recycling all the water we use as well as having a transparent supply chain.

The three main problems Kenya is facing today are - poverty, unemployment, and plastic waste. Plastic has become one of the most manufactured materials in Kenya and life today is unthinkable without it. The benefits of plastic - its durability, weight and cost of production, also make it problematic when it comes to its end of life phase due to its non-biodegradable nature. It is unfortunate that reusable, valuable resources sit alongside the garbage in a landfill, the burn pit, or are clogging drainages causing flooding, environmental degradation, and health impacts. Kenya has a very big informal waste picker collection sector. Our core focus is to uplift the first collectors (scavengers) and bypass the broker. With this business model in place, we will empower Kenyans living in the poorest areas of the county and uplift them from severe poverty.

Kenya is known for its wildlife and beautiful beaches. Today, unfortunately, our national parks and beaches are no exception to plastic pollution. In order to beat plastic pollution, we are incorporating national parks, conservancies, beaches, lakes, rivers and other water bodies into our collection strategy. We have developed a number of partnerships with various stakeholders over the past year. We are now at a place where we are going to start the actual collection from these areas next month.

Our plant will not only manufacture regenerated textile fibers but this will mean we mop up all the PET from these regions & areas that are heavily polluted and are in dire need of cleaning up and recycle it.

By offering a solution to manufacture eco friendly textile fibers from the same bottles we can definitely change the perception of PET. In addition, the focus for the main manufacturing process will be on empowering women, youth, persons affected by disabilities and HIV affected individuals.

Q: What is the status of your project?

The status of the project right now is: we have started the construction of our facility on a 2.3 acre plot. We expect to have the facility ready by the end of the year and the machinery to arrive by March next year. Currently, we are stock piling PET to have adequate supply and stock and mitigate any risks.

In our first year, we wish to recycle 6,000,000 kilograms of PET. We will create direct employment for 200 people in the first six months and indirect employment for 650 people. The company will be vertically integrated, and use almost all of its material in yarn and textile manufacturing.

Our product will primarily be sold to fashion designers internationally and global fashion houses so they can now source recycled, socially responsible, eco friendly textile fibers made in Kenya with a transparent supply chain having an impact on the local minorities and communities.
The Textile Exchange rPET Working Group is a global multi-stakeholder network aiming to increase the update of recycled polyester.

A part of the rPET Working Group is the Recycled Polyester Call. The rPET Call is a tool to stimulate commitments to increase the use of rPET by at least 25 percent by 2020 (see next page).

Fashion Positive PLUS members have identified chemical recycling as a necessary innovation for circular growth of polyester in apparel.

Plastics for Change has adopted strategies from fair trade agricultural practices and applied them to the informal recycling economy in developing countries. See Textile Exchange’s Insider Series for more.

The rPET WG has been very busy this year. A particular highlight was the debut of the supplier chart. Many in the group helped collect information from a variety of suppliers. Thanks to Nike, our chart is now in Tableau reader. A wonderful tool which allows you to slice and dice the information in a variety of ways depending on company needs. There’s more work to do in collecting suppliers and maintaining the chart but was a big step in the right direction. On to bigger and better things in 2019.

Karla Magruder, rPET Working Group Chair and Founder of Fabrikology
To scale the recycled polyester market, Textile Exchange has initiated the Recycled Polyester Call. Participating brands and retailers publicly commit to increase their use of rPET by at least 25 percent by 2020. Suppliers and industry organizations can also show their support to the rPET commitments made by brands and retailers.

Brands and retailers that signed the rPET commitment

The number of brands and retailers that publicly committed to increase their use of rPET by at least 25 percent by 2020 grew from 29 in October 2017 to 38 in October 2018.


Suppliers that signed the rPET commitment

Among the suppliers that have expressed their support for the brands and retailers participating in the rPET challenge are Geetanjali Woolens, Haiyan Hail Green Fiber, Nan Ya Plastics Corporation, Applied DNA Sciences, gr3n, Hallotex S.L., Hussain Mills Limited, Orimpex Tekstil Ltd.Sti, Pettenati Centro America, Polygenta/Perpetual, Pratibha Syntex Pvt. Ltd., PSP India, Unifi, Inc., Recyctex Co., Ltd., rePATRN and Worn Again.

Industry organizations that signed the rPET commitment

Industry organizations that expressed their support are Chetana Society, Circle Economy, GreenBlue, Japan Organic Cotton Association/JOCA, Plastics For Change, Pre Organic Cotton Program (ITOCHU/KURKKU), Sustainable Furnishings Council and Thread International.

If your company is interested to join, please download the commitment letter at https://textileexchange.org/recycled-polyester-commitment/

We’re excited to increase not only the amount of recycled polyester we source, but also the depth of our engagement within the rPET supply chain. We believe rPET can go beyond environmental impact to have social benefits for vulnerable populations. We’re especially excited to scale the effort through our partnership with Thread, a B Corporation that transforms trash from the developing world into recycled polyester, strategically creating transparent and dignified supply chains in Haiti, Honduras and Taiwan.

Zachary Angelini, Timberland’s Environmental Stewardship Manager
Biobased polyester

Facts and figures

The market share of biobased polyester is estimated at less than one percent of the total polyester production\(^1\).

Biobased polyesters include biobased PET but also other polyesters such as PLA or biobased PTT. Further examples are shown in the Innovation section.

Sustainability advantages and challenges

Biobased polyester is an alternative to oil-based polyester, particularly as the future availability and stability of oil becomes a higher risk. It can also play an important role in combating climate change. Biobased polyester is not, purely by definition, sustainable. Agriculture and forestry are already drivers of biodiversity degradation.

Key to the successful and sustainable development and deployment of a biobased economy will be innovation in feedstocks that do not compete with food production or that are not dependent on high inputs of water, agrichemicals, etc. in agriculture, governance of land, and the management of natural resources\(^2\).

Supporting the transition

Textile Exchange Biosynthetics Working Group is a multi-stakeholder initiative with the objective to support the knowledge, understanding and development of biosynthetics for the textile industry. One of the first tasks will be to develop a definition of "preferred biosynthetics".

Textile Exchange has launched the new website aboutbiosynthetics.org which focuses on textiles made from sugars, biomass and plant oils and a Quick Guide to Biosynthetics in the beginning of 2018.

FIBFAB is a EU Horizon 2020 project that aims to industrialize the production of biodegradable and sustainable polylactic acid (PLA) based fabrics (wool/PLA and cotton/PLA) and to overcome the current limitations of PLA fibers.

Plant and animal-based renewable raw materials offer a multitude of benefits within the outdoor industry, including use in base textiles, polymer feedstocks, trims, footwear & equipment components, packaging, machinery lubricants and derivatives for performance chemistry. However, depending on how these renewable materials are grown, harvested, and sourced, they can raise a range of potential issues including impacts related to land use, biodiversity, climate, crop substitutions, and more. The Outdoor Industry Association Sustainability Working Group is working to identify and address its greatest impact areas in this arena, utilizing existing best practice efforts wherever possible to guide the sourcing of renewable materials where traceability and/or sustainability standards do not yet exist. OIA’s ongoing partnership with Textile Exchange on this work and ensuring connectivity with Textile Exchange’s efforts on biosynthetics will be critical to ensure industry efficiency and effectiveness in making broad-scale change across shared global supply chains.

Beth Jensen
Senior Director of Sustainable Business Innovation,
Outdoor Industry Association

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(1): Textile Exchange estimate based on European Bioplastics (20017) - Bioplastics Market Data 2017 and IVC data from their website
Biobased polyester

Supplier innovation landscape

Fibers and yarns

Far Eastern’s TopGreen® are bPET chips to garments made in Taiwan and China. Far Eastern also offers biobased PTT and biobased PLA made with NatureWorks Ingeo™ which is made from corn.

In 2018 INVISTA launched LYCRA® T400® EcoMade fiber. More than 65 percent of the overall fiber content comes from a combination of chemically recycled plastics (PET bottles) and renewable plant-based resources (corn).

Palmetto offers biobased PLA staple fiber made with NatureWorks Ingeo® which is derived from corn.

Mango Materials is developing a process to produce PHA biopolymers from waste biogas (methane) via a microbial process.

Radici’s CornLeaf is a filament yarn based on Ingeo™ PLA biopolymer which is made from corn.

Teijin has developed ECO CIRCLE™ Plantfiber, a 30 percent biobased PET resin derived from sugarcane.

Toray’s Ecodear® PET is a 30 percent plant-based polyester fiber derived from sugarcane. Toray also offers a 30 percent plant-based Ecodear® PTT and a 100 percent biobased PLA filament.

Trevira, an Indorama Ventures company, offers biobased PLA fibers and filaments made with Nature Works LLC Ingeo™ which is made from grain (corn).

Chemicals

Avantium started the construction of bio-MEG demonstration plant in the Netherlands.

Anellotech is a USA based company producing biobased paraxylene.

Braskem and Haldor Topsoe announced a partnership in 2017 to validate the MOSAiK™ sugar-to-biochemicals solution for production of bio-MEG in a demonstration plant.

DuPont Sorona® is a partially biobased PTT polyester polymer with 37 percent renewably sourced, plant-based content by weight made from corn sugar.

Gevo has developed fully renewable carbon-based para-xyylene, a key ingredient to convert petro-based polyester for fibers and bottles to 100 percent renewable content.

Indorama offers a Bio-PET resin made with 30 percent plant-based bio-MEG.

Natureworks manufactures its Ingeo™ branded polylactic acid (PLA) to manufacture plastics and fibers. Ingeo™ is currently derived from corn, cassava, sugar cane or beets. The Natureworks R&D team is working on a new technology to skip plants entirely.

Virent offers its BioFormPX® paraxylene made from sugars. Virent completed a year long run of a demonstration plant in 2017-18 which demonstrates the technology to convert plant sugars to bio-paraxylene, a key raw material for bio-polyester fiber. See Textile Exchange’s Insider Series for more.
Nylon
Recycled Nylon

Production facts and figures

With around 5.7 million mt, nylon has a market share of around 5.4 percent of the global fiber production market\(^1\).

Global nylon production increased from 3.74 million mt in 1990 to 5.73 million mt in 2017\(^1\).

The market share of recycled nylon is difficult to estimate. Reliable numbers on the global recycled nylon production volume are currently not available.

Recycled nylon can be produced from pre- or post-consumer waste. Pre-consumer waste may be processing scraps. Post-consumer nylon materials are for example discarded fishing nets. The recycling process can be mechanical or chemical.

Main standards used for recycled nylon include the GRS, RCS and SCS RC.

The recycling of nylon helps to decrease dependency on fossil based raw materials and to reduce the waste material. Aquafil estimates that 70,000 barrels of oil are saved per 10,000 mt of regenerated caprolactam\(^2\).

\(^1\): Based on IVC data from their website \(^2\): Aquafil website: http://www.econyl.com/de/the-process/

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GLOBAL MARKET SHARE OF NYLON IN 2017

GLOBAL NYLON PRODUCTION (MILLION MT)
Recycled Nylon

Directory: Key suppliers and innovators

This map locates key suppliers and innovators producing recycled nylon.

**USA**
- Premiere - EcoInnovationFiber™
- Unifi - REPREVE® (P, C)

**SPAIN**
- Nurel - Reco (P)

**ITALY**
- Aquafil - ECONYL® (P, PO; C)
- Fulgar - Q-NOVA® (P, M)

**SOUTH KOREA**
- Hyosung - Regen™ (PO, M+C)

**JAPAN**
- Toray - CYCLEAD™ (P+PO)

**TAIWAN**
- Chain Yarn - Chainlon Greenlon® Re (P, PO; M)
- Far Eastern - FEFC® eco (P)
- Formosa - Sunylon (P)

**ISRAEL**
- Nilit - Ecocare (P, M)

Mapping of key suppliers by headquarter

- **M** Mechanical recycling
- **C** Chemical recycling
- **P** Pre-consumer
- **PO** Post-consumer waste
The global production capacity for biobased polyamide is around 0.24 million mt\(^1\). We estimate the share of biobased nylon fibers is less than 1 percent of the nylon fiber market\(^2\).

Biobased nylon is at least partially made from renewable resources, helping to reduce dependency on oil. It is not, purely by definition, sustainable. Further impact areas such as competition with food, the use of agrochemicals, the governance of land etc. have to be taken into account.

### Fibers and yarns

**Cathay’s TERRYL®** is a biobased polyamide line offering PA56, PA510, PA512, PA514 and co-polymers chips and filament with 31-100 percent renewable shares.

**Fulgar’s EVO®** is a 100 percent biobased nylon yarn made from castor oil.

**RadiciGroup’s Biofeel®** is a 100 percent biobased polyamide yarn derived from renewable, non-food plant sources.

**RadiciGroup’s dorix® 6.10** is 64 percent biobased polyamide staple fiber.

**RadiciGroup’s Radilon® 6.10** is a 64 percent biobased polyamide yarn for apparel (ready to wear, technical wear, sportswear, intimatewear), and for home interiors.

**Toray’s ECODEAR® PA 6.10** is a biobased polyamide filament derived from castor bean.

### Chemicals and resins

**Arkema’s Rilsan®** is a polyamide 11 resin produced from 100 percent castor oil.

**DSM’s EcoPaXX®** is a 70 percent biobased polyamide (PA410) resin derived from castor bean plant.

**Evonik and BioAmber** have a long term agreement for the development and manufacturing of catalysts for making BDO (1,4- butanediol), THF (tetrahydrofurane) and GBL (gamma – butyrolactone) from biobased succinic acid.

**Aquafil and Genomatica** have announced a multi-year agreement to create sustainable caprolactam, a key ingredient to producing 100 percent sustainable nylon - Project EFFECTIVE.

**Virent’s BioFormBZ®Benzene** can be used for the production of nylon.

**How Textile Exchange supports you**

Textile Exchange Biosynthetics Working Group is a multi-stakeholder initiative with the objective to support the knowledge, understanding and development of biosynthetics for the textile industry. One of the first tasks will be to develop a definition of “preferred biosynthetics”.

Textile Exchange has launched a new website aboutbiosynthetics.org, which focuses on textiles made from sugars, biomass and plant oils and a Quick Guide to Biosynthetics in the beginning of 2018.

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\(^1\): European Bioplastics (2017) - Bioplastics Market Data 2017, \(^2\): Compared to the global fiber production volume compiled by Textile Exchange based on various sources (see chapter on Global Fiber Production).

"We started our commitment to sustainability several years ago. Now, we are really proud for our products to have become a reference point for the textile industry. Supporting and being a member of Textile Exchange’s Biosynthetics Working Group and Round Table is a great opportunity to reconfirm our involvement in green issues, and to support brands committed to textile sustainability."

Alan Garosi, Marketing Manager at Fulgar
Q&A with Federica Zanetti

Federica Zanetti
Federica Zanetti, Assistant Professor, Department of Agricultural and Food Sciences (DISTAL), University of Bologna

What attracted you to become an expert on castor beans?

I’m an agronomist and my expertise is mainly in non-food oilseed crops. Castor is a unique oilseed crop presenting several perfect traits for the biobased industry: i) it’s a non-food crop, without any possibility to compete with food/feed; ii) its seeds are very rich in oil (>60 percent); iii) its oil has a peculiar fatty acid composition (>90 percent of ricinoleic acid, which is used to produce biopolymers); iv) it’s a spontaneous crop of the Mediterranean basin.

Give us the fast facts on where and how its grown?

More than 85 percent of world castor production is from India, where the crop is grown under tropical climate and as a perennial crop. There castor is mainly managed by hand with a very labor intensive activity. Traditionally castor was grown also in the Mediterranean basin, here the crop has a summer annual cycle. Recently new hybrids were made available on the market by different breeding companies from Israel, those genotypes (semi-dwarf) are really suitable for a full mechanization of the production system from sowing to harvest.

In terms of sustainability .... what are pros and cons?

Castor has been identified as a low input crop, it is a very resilient species, naturally resistant to many pests and diseases and suitable to be grown under marginal soil. Interestingly the newly available castor hybrids are also characterized by lower water requirement, being able to grow under rainfed condition or with very limited irrigation need. Castor is a “natural enemy” of different soil-borne diseases and its inclusion into typical rotation will improve the overall sustainability of the farming system.

Castor is characterized by several noxious compounds: ricin (in the seeds), ricinine (in all the vegetative tissues), allergens (mainly in the pollen). The most dangerous compound is ricin but it could be easily detoxified by heating the seeds. Please do not ingest castor seeds, they are quite dangerous.
Other Manmade Fibers
Other manmade fibers

Examples of other recycled and biobased manmade fibers

There are a variety of further preferred biobased or recycled manmade fibers in development or already available.

Recycled elastane

Asahi Kasei’s Roica™ launched its first GRS certified recycled elastane, polyurethane filament, in 2016.

Sheico Group’s Sheiflex® is a recycled spandex which received its GRS certification in 2017.

Biobased elastane

In 2014 INVISTA introduced T162R LYCRA® fiber, a 70 percent biobased elastane derived from corn. INVISTA is currently exploring whether the market for this product has changed since then and whether there is growing demand.

In development

Spidersilk - biobased manmade protein material

Bolt Threads’ Microsilk is a biobased manmade spidersilk primarily made of sugar, water, salts and yeast. See Textile Exchange’s Insider Series for more.

Spiber is a protein based material made through fermentation.

AMSilk Biosteel® is a biobased spider silk produced in a continuous spinning process.

Kraig Biokraft is a spider silk fiber made by genetically engineered silkworms and composed entirely of protein produced naturally by the silkworm.

Biopolymer made from algae

Algiknit is a biobased material made from the seaweed kelp.
Many textiles produced today are fiber blends. Fiber blends recycling is particularly challenging due to the mix of materials, such as cotton and polyester. Thanks to a few innovative startups, there is the prospect that high value fiber blend recycling will be possible soon.

**Chemical recycling**

The Hong Kong Research Institute of Textiles and Apparel (HKRITA) - in collaboration with the H&M Foundation - has developed a hydrothermal method using heat, water and green chemicals for recycling cotton and polyester blends. A new pre-industrial size facility scaling this technology was opened in September 2018.

Mistra Future Fashion’s Blend Re:Wind is a Swedish process for the recycling of poly-cotton blended textiles. Cotton is turned into new high quality viscose filaments and polyester into two pure new monomers.

Tyton Biosciences can recycle polyester or poly-cotton blends into the building blocks of virgin-grade polyester. The chemical process reduces polyester to its monomers (terephthalic acid and ethylene glycol).

Worn Again Technologies’ patented process can separate, decontaminate and extract polyester polymers and cellulose (from cotton) from non-reusable textiles, as well as plastic bottles and packaging, to go back into new products as part of a repeatable process.

**Mechanical recycling**

Novetex opened its Novetex Upcycling Factory in Hong Kong in September 2018 for mechanical fiber-to-fiber recycling. The technology was developed in collaboration with HKRITA and H&M Foundation and can recycle post-consumer fiber blends.

There are enough textiles and plastic bottles ‘above ground’ and in circulation today to meet our annual demand for raw materials to make new clothing and textiles.

Cyndi Rhoades, CEO of Worn Again Technologies
Textile Exchange reports through its benchmark that a considerable proportion of its membership is now engaged with the Sustainable Development Goals (SDGs), a set of 17 global goals which apply to all countries. Increasingly the SDGs are also finding prominence in sustainability disclosures and corporate sustainability commitments. SDG Target 12.6 specifically encourages companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle. An SDG Target 12.6 Live Tracker has been developed by the Global Reporting Initiative in collaboration with Tata Consultancy Services, to monitor sustainability reporting globally. In 2018, sustainability reports by Textile Exchange members that incorporated SDG disclosure included C&A, Fast Retailing, H&M, Inditex, Lenzing, PVH, and Target.

Certain barriers to engagement with the SDGs, however, persist. Companies continue to be concerned about adding another framework to their existing sustainability platforms and commitments. To help companies engage with the SDGs, Textile Exchange has developed a curated set of resources for the industry, including commissioning a report with KPMG: Threading the Needle: Weaving the Sustainable Development Goals into the textile, apparel and retail industry.

Available for download on textilesforsdg.org
Five things to know about the SDGs and how they impact the textile value chain:

1. **Sourcing Countries**
   Sourcing countries are increasingly developing policy to achieve the SDG targets which, in turn, directly impacts the local regulatory environment. The predecessors to the SDGs helped fuel many of China’s economic and social achievements and the SDGs continue to drive China’s 15 year economic plan and its new development agenda, environmental regulation and infrastructure investments. China’s success has now encouraged many other sourcing countries to embed the SDGs into their own development agendas.

2. **Risk Management**
   The SDGs mirror leading global risks and can act as an important tool for risk management as well as innovation. The alternative of not addressing the issues underlying the SDGs raises the risk profile of a business and its brand value and may soon impact its financial valuation as investors incorporate the SDGs into their ESG assessments.

3. **A Global Language for Sustainability**
   Implementing a common language and set of targets for all global actors – governments, business and civil society – enables a more efficient use and protection of global resources and serves as a framework for cross-sector and place and context-based partnerships.

4. **A New Corporate Code of Ethics**
   The SDGs represent the modern day code of ethics for business and government alike. Furthermore, the discipline of evaluating environmental, social and economic issues through the lens of 17 topics supports better decision making and outcomes. Even sophisticated sustainability programs have something to learn in understanding the synergies and tradeoffs of certain investments. For example, applying a gender lens or investing in sustainable agriculture can have positive aspects on a number of the SDG targets.

5. **Global Targets Magnify Effort and Impacts**
   Sustainable development applies to both developing and developed countries. The SDGs offer unprecedented opportunities for addressing unsustainable consumption patterns and resource management as well as fostering innovation.

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**Resources**

To learn more, here are Textile Exchange resources:

- Threading the Needle report, including an engagement model, case studies and a country SDG Readiness Index.
- TextilesForSDGs.org, which includes curated resources by SDG, country and supply chain. It also includes a Mapping of Lead Fibers to the SDGs.
- SDG Insights from Textile Exchange’s SDG Benchmark.
Q&A with WRI

Cynthia Cummis
Director Of Private Sector Climate Mitigation, World Resources Institute

Michael Sadowski
Research Consultant, World Resources Institute

Nate Aden
Senior Fellow, World Resources Institute

What actions they intend to take under the Paris Agreement. For example, the government of Japan has highlighted the need for companies to set ambitious carbon reduction goals consistent with the Paris Agreement, and linked such efforts with the country’s NDC.

What’s the biggest barrier for textile companies to set targets for carbon?

Until the Science Based Targets initiative (SBTi) was launched in 2015, very few companies were setting Scope 3 reduction targets and tracking progress. Since this practice is new to companies, Scope 3 target setting is one of the biggest challenges. Significant portion of brands’ and retailers’ emissions come from their supply chain: in the production of raw materials such as leather, polyester and cotton, as well as in certain processes such as dyeing and finishing. Many companies’ supply chains are complex and global, so it can be difficult for them to have influence on the ground and to get access to supplier-specific emissions data. Since brands often share suppliers, collective action from across the industry is needed. Led by WRI, the SBTi is developing guidance for companies across the apparel and footwear value chain to set carbon reduction targets that are aligned with the temperature goals agreed to in the Paris Agreement and that meet the SBTi target validation criteria. The guidance will also include recommendations on how companies can achieve reductions from emissions hotspots, such as purchased goods and services.

Tell us more about Scope 3 emissions - are we getting clearer on how to measure?

The GHG Protocol Scope 3 Standard provides an approach that companies can use to measure their entire value chain emissions inventory and identify where to focus reduction activities. It is accompanied by a suite of user-friendly guidance and tools developed by GHG Protocol to make Scope 3 accounting easier and more accessible, including the Scope 3 Calculation Guidance, which describes the methods companies may use to calculate emissions from all Scope 3 categories. Companies just getting started in calculating Scope 3 emissions can use the free Scope 3 Evaluator Tool, which provides a Scope 3 inventory that can be used as an initial basis for identifying emissions hotspots, reduction opportunities and informing future efforts to improve inventory data quality. Based on the initial screening from the tool, companies should continue to collect primary data for Scope 3 categories with significant emissions.

Managing Scope 3 emissions is indeed an enormous task. However, several large companies have set targets to drive ambitious reductions in their value chain. For instance, Levi Strauss & Co. has committed to reduce absolute Scope 3 emissions from purchased goods and services 40 percent by 2025 from a 2016 base-year. To achieve this, Levi’s is working with Partnership for Cleaner Textile (PaCT) at IFC to help its suppliers reduce GHG emissions. In one year, participating suppliers reduced their GHG emissions by an average of nearly 20 percent. In addition to reducing their carbon footprint, these initiatives helped participating suppliers save more than $1 million in operating costs. Given these promising results, Levi’s is working with the IFC to scale PaCT globally to include more suppliers.

We are all interested in the link between the SDGs and the SBTs, can you explain this for us in simple terms?

Science-based targets can be used by countries as a metric to track progress against SDG #13, which calls for urgent action to combat climate change and minimize its disruptions. Uptake of science-based targets in the private sector can also be used to help countries meet their National Determined Contributions (NDCs), which outline
Q&A with Julie Brown

What’s the latest on the Higg Materials Sustainability Index?

Periodically the Higg MSI gets updated with new and improved data enhancements. This means that Higg MSI (and Higg DDM) may change and that new materials will be available to analyze and use in designs and decision-making. On September 3, 2018 SAC conducted the most recent update. You can always learn about the most recent updates in the Learn More section of the tool. One of the big updates was the implementation of a ‘Materials Sharing’ functionality. Thanks to this technology enhancement, users can now share materials with clients and other stakeholders. Previously, brands had to contact supply chain partners to request the “recipe” of a unique material. This required a lot of back and forth communication and could take quite a bit of time. Now, manufacturers can send final materials to a customer’s Higg MSI account with the confidence that each material is correctly represented in the tool. This has helped expand upstream communication within the value chain, another key aspect to improving our industry’s transparency efforts. As of August 27th, 1,194 users were registered with 557 companies / organization accounts.

What do your members like most about the tool?

The members like the clear scoring for products, analytics and benchmarking, that it is easy to use and intuitive, that it fosters collaboration, the midpoints for material impacts and that it is a harmonized industry standard.

What are the biggest challenges?

LCA is a useful tool, but extreme caution needs to be taken when making direct comparisons between material choices, technologies, and processes. There are many different data sources with different assumptions – most of which are defensible. The Higg MSI uses a variety of data sources and assumptions that reflect the best available knowledge of the state of the apparel/footwear industry. However, there is inherent uncertainty in the results. As such, it is critical that users of the Higg MSI understand that there are limitations to the conclusions that can be drawn. We encourage users to understand the data source and data quality associated with each process. This information can be found when you click on a specific process under the “Data Quality” section. Additionally, in the “Meta information” section for each specific process, we describe information relevant to the underlying data including the source, age of data, and geographical representativeness. We also encourage users to send us additional data sources and comments about existing data! We aim to keep updating the MSI to ensure that it represents the latest and greatest knowledge about materials, processes, and technologies in the industry.

Given nothing’s perfect, what are you doing to see the MSI keeps getting better?

We are working with some of the best minds in the industry to make sure that the Higg MSI remains credible and continues to improve. One main way of doing this is through improving data. We ask the industry to submit data for raw materials and material production processes at msicontributor.higg.org. Once data is submitted, it is reviewed, scored, and entered into the tool where it is available to the industry. We are also staying up to date on improvements in assessment methodologies to make sure we are using the best available methodologies in this tool.
Circular Economy

Who is doing what

It is estimated that less than one percent of all clothing is recycled back into clothing\(^1\).

The amount of global textile production and consumption is increasing. Around 48 million mt of clothes are disposed annually, with around 75 percent of them landfilled or incinerated\(^1\).

The Circular Fashion System Commitment

The 2020 Circular Fashion System Commitment, a call by the Global Fashion Agenda, had been signed by 94 companies, representing 12.5 percent of the global fashion market by June 2018. The companies have committed to take action on one or more of four immediate action points - one being to increase the use of post-consumer recycled fibers\(^2\).

Initiatives supporting the transition

Textile Exchange offers a variety of services to support the industry’s move towards circular economy. Textile Exchange Membership offers access to a network of suppliers and brands working towards circularity. The Global Recycled Standard (GRS) and The Recycled Claim Standard (RCS) are leading standards used for recycled materials. The Preferred Fiber and Materials Market Report highlights projects fostering circularity in fiber and material streams. The Preferred Fiber and Materials Benchmarking Program already includes circularity and Textile Exchange aims to further integrate circularity in its benchmarking program. The rPET Working Group informs and encourages the industry to scale their use of recycled polyester. Events such as The Second Life of Cotton Round Table at the Textile Exchange Conference in Milan discussed opportunities and challenges with regard to mechanical and chemical cotton recycling.

Circle Economy’s Circle Textile Program develops the systems innovations necessary for the transition towards a circular textile industry. One of the flagship initiatives is Fibersort, a technology able to automatically sort large volumes of mixed post-consumer textiles based on fiber composition. The first Fibersort production started in February 2018. See Textile Exchange’s Insider Series for more.

Fashion Positive Plus is a group of apparel brands committed to the development and adoption of materials designed to provide the foundation of a circular economy for fashion (see Q&A in the chapter Manmade Cellulosics).

The Cradle to Cradle Products Innovation Institute, a non-profit organization, administers the Cradle to Cradle Certified™ Product Standard, which was gifted to the institute by its founders, William McDonough and Dr. Michael Braungart, in 2010.


The European Clothing Action Plan (ECAP) is a €3.6 million EU LIFE funded project which aims to reduce clothing waste across Europe and embed a circular economy approach. The project runs for three and a half years, ending in March 2019.

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\(^1\)Ellen MacArthur Foundation (2017) - A New Textiles Economy
\(^2\)http://www.globalfashionagenda.com/commitment/#
Circular Economy

Service providers

It is estimated that around 75 percent of disposed clothes are landfilled or incinerated, and only 25 percent collected for reuse or recycling (1). A few innovative service providers support brands and retailers to maximize the reutilization of their unsold or used textiles and reappraise them as valuable secondary raw material.

I:CO, short for I:Collect, is a global solutions provider for collection, reuse and recycling of used clothing and shoes. I:CO’s take-back system and logistics network collects clothing and shoes through in-store boxes in more than 60 countries, sorts the items and either reuses or recycles them ensuring maximum reutilization of these valuable materials.

TEXAID offers with its in-shop collection system at selected clothes stores the possibility of handing in used clothes where they are sold – in shops. TEXAID collects, sorts and recycles left-over stock, remnants and other textile waste in order to obtain raw materials for new uses. TEXAID can utilize high-quality goods all over the world, which means that there is no additional competition for retailers and manufacturers on their own market (IP Protection Solution).

Bank & Vogue is a wholesale supplier & buyer of used goods & store returns across North America, with international shipping. Bank & Vogue started with the desire to provide a service to the Salvation Amy and has since grown into something much larger. They operate their own chain of stores, Beyond Retro, that sells vintage and upcycled clothing. Credential clothing (bags of unsorted clothes from donations & unsold inventory from stores) is sent to places where they can find a second life.

The Renewal Workshop takes discarded apparel and textiles and turns them into Renewed Apparel, upcycled materials or recycling feedstock. Data is collected on everything that flows through the system and is given back to the brand partners to help them improve the production and design of future products. See Textile Exchange’s Insider Series for more.

Yerdle supports brands to buy back and resell used items by providing technology and logistics to develop white-label resale programs.

The reGAIN app supports users to pack unwanted clothes into a box or bag, then, with the help of the app, find the nearest drop off point and print a shipping label. After dropping the package off, the app unlocks discount coupons which give the user a discount at reGAIN’s partners.

(1) Ellen MacArthur Foundation (2017) - A New Textiles Economy
Q&A with Katrin Ley

Katrin Ley
Managing Director of Fashion for Good

Q What is Fashion for Good?
Fashion for Good is the global initiative that is here to make all fashion good. We are a global platform for innovation, made possible through collaboration and community. The organization was launched in 2017 with C&A Foundation as a founding partner. Its programs are supported by corporate partners adidas, C&A, Galeries Lafayette Group, Kering, PVH, Target, Zalando.

Q How does Fashion for Good support the transition towards a circular textile economy?
At the core of Fashion for Good is an Innovation Platform, which includes:

- **Fashion for Good-Plug and Play Accelerator**: Fashion for Good works with Plug and Play, a leading Silicon Valley accelerator, to give promising start-up innovators the expertise and funding they need in order to grow.
- **Scaling Program**: Fashion for Good supports innovations that have passed the proof-of-concept phase. A dedicated team helps them scale by offering bespoke support and access to expertise, customers and capital.
- **Good Fashion Fund**: This fund will catalyse access to finance where this is required to shift at scale to more sustainable production methods.

Fashion for Good is founded on the principle of collaboration and aims to create tools that are open-source, such as its Good Fashion Guide, which provides practical tips for brands wishing to embrace circular apparel principles. It operates from its first hub in Amsterdam, which also houses a Circular Apparel Community co-working space and a visitor-facing Experience.

Q Where are you one year after the launch?
The international organization in the first year alone, now has eight corporate partners, organized over 360 one-on-one introductory sessions between innovators and corporate brands, unlocked significant investments for start-ups, and has seen multiple production pilots come to life. The Fashion for Good programs have supported more than 40 start-ups to date.

Q What’s the Fashion for Good Experience?
The Fashion for Good Experience is the world’s first interactive tech museum dedicated to sustainable fashion innovation. The museum aims to change the hearts and minds of visitors by helping them discover the stories behind their clothes, learn how they can take action and explore how they can have a positive impact. Through a digital and personalized journey, visitors can learn about the history of good fashion, discover more sustainable products and explore future fashion innovations. The Experience was opened to the public on the first week of October in Amsterdam, and can be visited seven days a week.
Q&A with Francois Souchet

Francois Souchet
Lead, Make Fashion Circular, Ellen MacArthur Foundation

Tell us about the Make Fashion Circular program and any exciting updates you have for us!

It’s been an incredibly busy time for the Make Fashion Circular team. Since Ellen announced the launch at Copenhagen Fashion Summit in May, we have been working hard with our participants to drive understanding of the actions needed to make a circular economy for fashion a reality.

We’re getting ready for our second workshop with participants in November. The first was held in London in June and it was a great opportunity to bring everyone together and agree on the priorities. This time we will be New York and we want to talk about how we can work together as a group to develop solutions to some of the challenges we’ve been talking about.

Looking further ahead we are due to launch an exciting project in Spring 2019, which will show the elements of the circular economy in action.

What motivated the EMF to take on textiles and fashion?

Fashion is something we all have a connection with. Clothes are part of our everyday lives, from the uniforms we wear for work, to the outfits that express our personal identity. But beyond that, fashion is a huge part of our economy. It’s a $3 trillion a year (USD) industry and employs millions of people around the world - and that means it has serious consequences for society, business and the environment.

The more we looked at it, the clearer it became that the fashion industry today works in an entirely linear way. We take resources and materials, turn them into clothes and increasingly those clothes are used less and less before they are usually landfilled or burned. It’s not a system that can work in the long term.

By applying circular economy principles we could see how this hugely wasteful industry could actually become one that starts to have a far more positive impact, and thrives in the future.

It’s an enormous task - this idea of transiting from linear to circular - especially for fashion, any good news stories for us or indicators of progress?

It’s been fantastic to see people’s understanding of the issues surrounding fashion grow and grow. We have spoken at events around the world, had conversations with players operating at every stage in the system and seen customers become more engaged in the call for a redesign for fashion. This raised awareness is crucial to achieving our Make Fashion Circular ambitions.

The exciting thing about our work with the fashion industry has been to see how much creativity and innovation there is out there. Companies like Orange Fibre and Bolt Threads are using their skills to tackle the issue of safe and renewable materials, Y Closet and Rent the Runway are showing the huge potential for new business models that ensure clothing is used more, and brands like Eileen Fisher, with its Tiny Factory project, are taking important steps to ensure clothing is made to be made again.
Q&A with Sarah Grey

Sarah Grey
Research Analyst, WRAP

Q
SCAP has worked with companies to set targets for Water, Energy and Waste - How do you calculate textile waste?

The waste footprint of clothing is calculated for the whole lifespan of garments. This means we include waste from production, processing, the use phase, and when the garment gets discarded. The waste footprint definition used for SCAP is quite broad, we include any discarded textile. We do not include co-products and by-products and we do not include auxiliary materials such as packaging.

Q
Waste has risen to the forefront of many sustainability agenda’s, how is SCAP working with apparel and textile retailers in the UK [and consumers] to work more strategically on waste?

We have a particular interest in reducing supply chain waste, since this is the focus for our SCAP retailers and brands, we are working with them to identify where there is waste and what they can do about it. We are looking in particular at processes from spinning through to CMT to identify waste (if there is any) and make recommendations.

SCAP has many recycling and reuse signatories in the UK involved in collection, sorting, and resale of used clothing. We support retailers to join up with recycling and reuse organizations so that garments can be collected, cleaned and repaired if necessary, and sold on. While the majority of clothing collected by recycling and reuse organizations signed to SCAP is post-consumer waste, the organizations handle both post and pre-consumer garments.

We also developed messages and guidance for our Love Your Clothes consumer campaign which is all available on our website. This material aims to encourage householders to keep their clothes out of the bin by caring for them better, and perhaps giving them another life if they no longer want them by repairing or donating them, for example.

Q
Any inspiring stories you can share?

There are some great case studies and stories to share. I’m excited about the Market Makers project which we’re working on with WRI, funded by the C&A Foundation, to trial new business models for retailers and brands in the UK, USA and India, to make the fashion system more circular by encouraging rental services, for example. I’m also pretty excited right now by the ECAP / LWARB campaign, Love Not Landfill which is persuading young people in London to look for ways to recycle and upcycle garments.

Q
2020 is fast approaching - where to next for SCAP and your members?

Wouldn’t that be giving the game away? Post-2020 looks really exciting and we’ve got some important work to do, but I can’t say more than that at the moment, except look out for more from WRAP and the work we are doing on clothing in the rest of 2018 and in early 2019. There is research to publish that will shape our work to come. And the results of an enquiry by the British Parliament into clothing waste will put a further spotlight on the issues we’re talking about and the importance of initiatives like SCAP to tackle this global problem.
Bio Economy

Supporting the transition to a Bio Economy

It is estimated that around 48 million mt of oil feedstock are used for the global synthetic fiber production per year\(^1\). Another seven million mt of oil feedstock are used for the production of synthetic fertilizers and 200,000 mt for the production of synthetic pesticides\(^1\). A sustainable bioeconomy together with a move to a circular economy can support the transition towards a fossil-free future and play an important role in addressing climate change.

**Textile Exchange’s Biosynthetics Working Group** kicked off in 2016. The first task of the Biosynthetics Working Group has been to research and create the microsite aboutbiosynthetics.org. It has involved the gathering and synthesis of available information and resources on biosynthetics, with the goal of enabling this relatively new material to become a larger part of a company’s PFM portfolio. biov8tion has been leading this project and Virent has been a key provider of input and support. An important next step will be the definition of “preferred” biosynthetics.

If you are interested to join the Biosynthetic Working Group, please contact materials@textileexchange.org.

**A Textile Exchange Biosynthetics Survey** conducted in 2018 with 138 participants revealed a growing interest in biosynthetics. Brands and suppliers are exploring biobased materials as interesting alternative to fossil-based synthetics. The results of the survey will be launched at the Textile Exchange Conference 2018 in Milan.

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\(^1\)Ellen MacArthur Foundation (2017) - A New Textiles Economy
Microfibers

Spotlights

Microplastics continue to be a hot spot issue. It is estimated that another 22 million mt of microfibers will be added to the ocean between 2015 and 2050\(^1\). The annual amount of primary microplastics released from textiles is estimated at 190,000 mt per annum\(^2\).

Proposals for textile labeling regulation

In the two USA states California and Connecticut, proposals were made suggesting additional labeling of synthetic textiles to alert consumers about the microfiber issue.

Reports and studies

SIFO published a report “Microplastic pollution from textiles: A literature review” in early 2018.

Greenpeace published a report called “Microplastics and persistent fluorinated chemicals in the Antarctic” in June 2018.

The European Outdoor Group has initiated a new project to compare the impacts of recycled and virgin polyester and nylon on synthetic textile microfiber pollution. Another project aims to understand how textile coloration could affect textile microfiber release.

SINTEF and the research institutes NTNU and Sichuan University together with Norwegian brands, textile manufacturers and NGOs initiated a project on microfibers, evaluating the fate, effects and mitigation measures for microplastic fiber pollution in aquatic environments.

Campaigns

The Women’s Insititute (WI), a UK based organization, launched the End Plastic Soup campaign in 2017 to protect the ocean from contaminating micro plastic fibers.

Innovative solutions:

Guppyfriend washing bag is a patented solution that filters out microfibers released from textiles during washing. The fabric bag is made of a specially designed microfilter material allowing users to collect and dispose the fibers after laundry.

Xeros introduced a filtration innovation called XFiltra™ which is compatible with any home washing machine to protect the environment from microfibers created from home laundry.

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of primary microplastics

from textiles per year \(^2\)

An additional

22 million mt

between 2015 to 2050

if no action \(^1\)

\(^1\) Ellen MacArthur Foundation (2017) - A New Textiles Economy
\(^2\) Eunomia (2016) - Plastics in the Marine Environment
Q&A with Beth Jensen

Beth Jensen
Senior Director of Sustainable Business Innovation, Outdoor Industry Association

Everyone’s talking about plastic waste, what’s your take on the situation for the textile industry?

While the broader plastic waste issue is concerning overall, the textile industry’s primary leverage point is around microfibers – tiny fiber particles less than five millimeters in size, which shed from carpets, home textiles, apparel, and other textile-based products. The Outdoor Industry Association (OIA) and the European Outdoor Group (EOG), collectively representing over 1,500 companies, recognize the outdoor industry’s potential contribution to microfiber pollution. We believe it is our responsibility to support and facilitate a unified effort among our member companies as well as among other key industries to drive the collection of data that is necessary to better understand the sources and causes of microfiber release, and to implement appropriate solutions that are based on sound science. Microfiber shedding is a much more complex challenge than microbeads in personal care products, as microbeads are/were an added feature and could therefore be fairly easily removed from the product formulation while preserving the efficacy of the product. Microfiber shedding is simply a characteristic of all textiles and as such, the solution is not as easy as a simple “ban.”

What are we most worried about and how is the industry responding?

Many types of products are shedding microfibers from fashion apparel to home textiles, towels to tires. Shedding occurs in the manufacturing process of products as well as in the consumer use, care, and disposal phases. Several of the main sources of microfiber shedding include transport via the water during washing, transport via the air for example during the cutting of fabric in the manufacturing and shedding from textiles as they break down in landfills after consumer disposal. It is important to note that ALL fabrics and fibers shed, whether natural or synthetic. In addition to the fiber itself, fabrics of any type, natural or synthetic, often include chemical coatings and finishes, which are then transported with the microfibers when they shed.

How has the OIA and others responded to the problem?

The global outdoor industry has collaboratively created a shared cross-industry “Microfiber Action Roadmap” to coordinate its actions on the microfiber shedding challenge, including its work with research and academic partners to gather the data needed to make more informed decisions about the fabrics and fibers being used to make products. Connected to this, the Outdoor Industry Association Microfibers Task Force – a subset of the OIA Sustainability Working Group – is currently focused on collaborating to drive four key workstreams around the topic of microfiber shedding: research, test method development, policy engagement (primarily at state level) and communications.

Why does the industry continue to use fabrics that are thought to shed microplastic fibers and what does the microfiber issue mean for companies who are diligently transitioning to recycled or biosynthetic replacements to petroleum based?

All textile materials shed over time, whether natural or synthetic. The industry is currently researching the shedding rates of various textile types via various projects; however, at this point, it is unclear which fibers have the highest release rate or overall impact. Every fabric in the marketplace today has benefits and disadvantages, in terms of performance as well as impacts. The outdoor industry will continue to utilize a range of both natural and synthetic fabrics for a wide variety of applications. Synthetic fabrics can provide unparalleled performance in specific applications. Generally speaking, recycled materials are a less impactful choice than virgin materials. So recycled polyester or nylon are certainly superior options to virgin polyester.
The above chapters in this report provide an overview of the most important fiber specific standards such as cotton, wool or down standards.

Beyond the fiber specific standards, there are a variety of standards which can be used for various fiber types.

Examples are the traceability standard Content Claim Standard (CCS), standards for organic materials such as Organic Content Standard (OCS) and the Global Organic Textile Standard (GOTS) and standards for recycled materials such as the Recycled Claim Standard (RCS), the Global Recycled Standard (GRS) or the SCS Recycled Content (RC) Standard.

**Uptake:**

The number of CCS certified facilities increased from six in 2014 to 45 in 2017. The number of OCS certified facilities increased from 3,174 in 2014 to 3,643 in 2017. The number of GOTS certified facilities increased from 3,663 in 2014 to 5,024 in 2017. The number of RCS certified facilities increased from 78 in 2014 to 505 in 2017. The number of GRS certified facilities increased from 649 in 2014 to 1,376 in 2017.

**Key standard news:**

**GRS/RCS Update:**

In 2017, the revised versions of our recycled standards were released: Recycled Claim Standard 2.0 and Global Recycled Standard 4.0. Included in the revisions of the standards are improved guidance for the definitions of recycled material, pre-consumer material, and post-consumer material. There are also clearer guidelines for confirming the source of reclaimed material suppliers. The GRS has adopted ZDHC’s Manufacturer's Restricted Substance List. You can read more on our website under “Global Recycled Standard”: http://textileexchange.org/integrity/.

**OCS:**

The Organic Content Standard 2.0 was released January 1, 2016 after a multi-stakeholder review. Certification Bodies and Certified Organizations have to comply with the new requirements since January 2017.
Methodology & Disclaimer

Challenges

The compilation of global market data is challenging. The collection of primary data from the suppliers is beyond what is possible within the scope of this report, so we rely on secondary data from industry associations, international organizations, governmental organizations, standard setters or research institutes. We are trying our best to provide an accurate and reliable picture of the market but data gaps and inconsistencies are very common for global market data. In general all global market data are rounded estimates.

For a detailed description of the methodology behind the organic cotton production volumes, please have a look at our Organic Cotton Market Report.

Data quality checks and triangulation

Textile Exchange tried to identify the most reliable sources for each fiber category and conducted triangulations with at least 2-3 sources wherever possible.

Production volume scope

The production data in this report cover the total amount of fibers produced. The report does not differentiate between different usages and is thus not specific to the clothing industry. The fibers may be used for clothing, home textiles, technical textiles or any other application.

Definition of fiber

Fiber includes staple fiber and filament. All numbers reported on manmade cellulosics and synthetics include staple fiber and filament production volumes.

Reporting period

All data presented in this report cover the calendar year 2017. As the cotton production volumes are collected in ICAC harvest years starting from 1 August and ending on 31 July, the cotton production volumes can be allocated to the calendar years in different ways. Most reports allocate the ICAC year which starts in a calendar year to the respective calendar year (e.g. 2017/18 cotton production volumes to the 2017 calendar year). Textile Exchange has decided to follow this approach for the global production volume trend figures. When it comes to the breakdown of preferred cotton options however, the report covers the 2016/17 figures as these are the latest available data.

Methodological changes and comparison to previous years

Textile Exchange continuously improves its data collection methodology. Some data reported in previous years have been revised or updated since the actual data have become available for initial estimates or the methodology has been improved. A simple comparison between previously reported numbers and data reported in this year does not show the actual change over time but is caused by one of the reasons mentioned above.

News

The news presented in the report are either based on information directly received from the companies and organizations, their press releases or websites.
Methodology & Disclaimer

Definitions

Preferred Fiber and Material (PFM) is ecologically and/or socially progressive and has been selected because it has more sustainable properties in comparison to conventional options. Ways to recognize or achieve a preferred status include: (1) The fiber or material has a recognized industry standard in place that confirms its status as preferred. (2) The fiber or material has sustainability criteria developed through a formalized multi-stakeholder process. (3) The fiber or material has been objectively tested or verified as having sustainability attributes, such as through a peer reviewed Life Cycle Assessment (LCA). A PFM strategy should be based on the principles of continuous improvement and result in impact improvements.

Preferred Synthetics are synthetic fibers that are ecologically and/or socially progressive because they have more sustainable properties in comparison to other conventional options. Synthetics currently defined by Textile Exchange as preferred includes: recycled polyester, recycled nylon, and potentially biosynthetics.

Preferred Man Made Cellulosics (pMMCs) are sourced from non-endangered certified sustainably managed forests and are manufactured more sustainably. This means chemicals, water and energy are properly managed to avoid pollution and human exposure. pMMCs include: Lyocell, Preferred Modal and Preferred Viscose. There is currently no third party industry standard to support the sustainability claims of a pMMC through the processing of pulp and fiber. Chain of Custody from certified feedstocks can be provided by the main forest standards (such as FSC or PEFC) and through Textile Exchange’s Content Claim Standard (CCS).

Preferred Cotton (pCotton) is cotton that is ecologically and/or socially progressive because it has more sustainable properties in comparison to other conventional options. Cottons currently defined by Textile Exchange as preferred include: Recycled, Organic, Fair Trade, Cotton made in Africa (CmiA) cotton, cotton grown to the standards set by the Better Cotton Initiative (BCI and its benchmarked equivalencies), CottonConnect REEL cotton and Cleaner Cotton.

Preferred Wool (pWool) includes wool that is grown with a progressive approach to land management, and animal welfare. The portfolio of options includes organic, Responsible Wool Standard (RWS) and its equivalencies, and recycled wool (e.g. certified to the Global Recycled Standard (GRS), Recycled Claim Standard (RCS), SCS certified).

Preferred Down (pDown) comes from farms certified to either the Responsible Down Standard (RDS), the Traceable Down Standard (TDS), or Downpass Standard (revised in 2017). Among other animal welfare criteria, pDown excludes feathers/down from birds that have been live plucked or force-fed. The portfolio of pDown options also includes recycled down (e.g. certified to the Global Recycled Standard (GRS), Recycled Claim Standard (RCS), SCS certified).

The definition of “preferred” fiber and materials is undergoing a review at the moment. The review is done in an open multi-stakeholder process where everybody is invited to participate. If you want to be involved, contact materials@textileexchange.org.
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Textile Exchange envisions a global textile industry that protects and restores the environment and enhances lives. www.TextileExchange.org

To learn more about preferred fibers and materials, visit Textile Exchange’s websites:
www.aboutorganiccotton.org
www.aboutbiosynthetics.org


The Preferred Fiber & Materials Benchmark Insights Report provides the latest updates on brand and retailer fiber and materials-related activities.