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TM



ANCE & SPORTS MATERIALS



## Carbon: a new chapter

Smarter thermal insulation

Pressure mounts on PFAS

Regenerated fibres in big demand

THE INTERNATIONAL MAGAZINE FOR PERFORMANCE & SPORTS MATERIALS

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**Front cover:** Canadian activewear brand Lululemon will be introducing apparel made from recycled pollution thanks to LanzaTech's Carbon Smart technology and a partnership with Far Eastern New Century (FENC).  
IMAGE: LULULEMON

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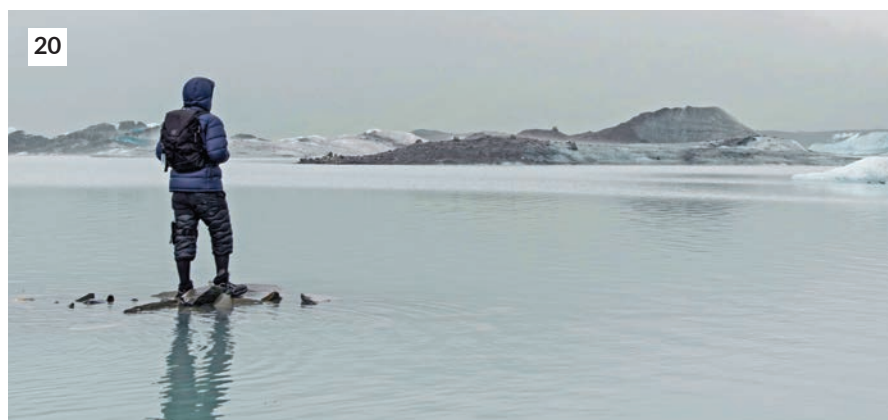
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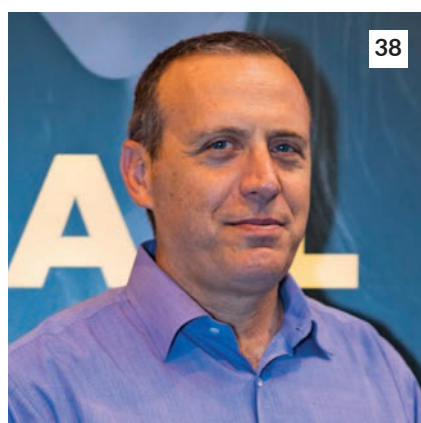
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# Global news

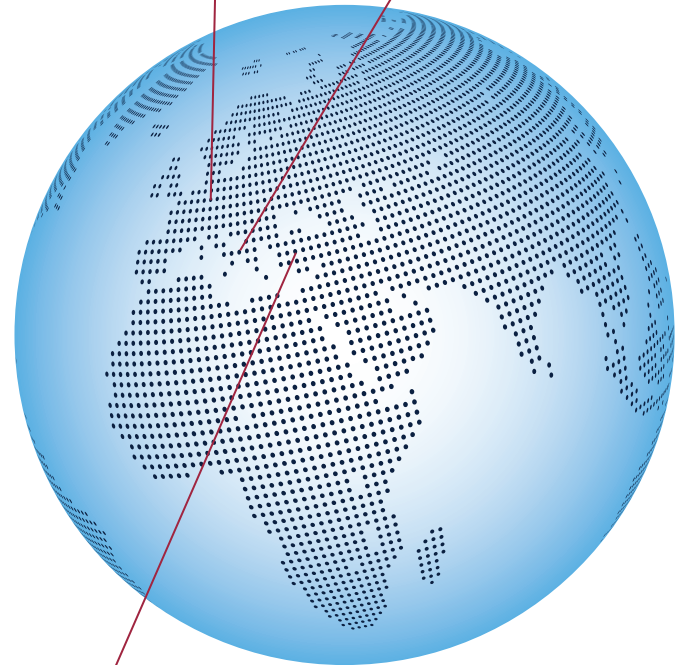
**Sweden** Tent brand Hilleberg is celebrating its half-century this year. Co-founder Bo Hilleberg has said the company's exclusive focus on tents has contributed to its success and longevity. Today, its products are in use on every continent, in all types of weather and terrain and have earned a reputation for strength, reliability and ease-of-use. "Even when many outdoor companies began diversifying their product lines, we felt that specialising in one product category, and really doing that to the best of our abilities, was the best way for us," Mr Hilleberg has said.

**Canada** Toronto-based outerwear brand Canada Goose recently released its first-quarter results for fiscal 2022. Revenues for the quarter were around \$45 million, just over double compared to the same period last year. At a global level, e-commerce revenue increased by 80%, whereas direct-to-consumer revenue in mainland China, the brand's best performer, surged by more than 180%. Canada Goose said that revenues increased significantly in all geographic locations.

**Switzerland** Short-staple fibre spinning machinery specialist Rieter is to acquire three businesses from machinery manufacturing group Saurer, expecting to complete the deal before the end of August. The three companies are automatic winder developer Schalfhorst, elastomer components provider Accotex and bearing solutions provider Temco. Rieter will pay a total of €300 million for all three.

**Germany** Producer of worsted yarns for weaving, circular and flat knitting in pure wool and wool blends, Südrolle Group, has released details of the yarn collection it proposes for the autumn-winter 2022-23 fashion season. It said the yarns in the collection support a desire to return to active life. Südrolle said. "Some people will rediscover the pleasure of meeting friends; others will share new experiences and adventures." It pointed out that, in all these situations, it will be important to choose the appropriate clothing, not only during movement but also for moments of quiet relaxation.

**Italy** Italian footwear and sportswear manufacturing company Lotto Sports has announced a new partnership with New York-based brand acquisition and management firm WHP. Under the new agreement, WHP has acquired the global intellectual property rights for the Lotto brand, providing new financial investment in Lotto Sports. The current Lotto Sports team, under chief executive Andrea Tomat, will continue to operate the Lotto brand in Italy and the rest of Europe, as well as in the Middle East and Africa.



**Spain** Fashion group Inditex has brought forward its plan to use only more sustainable cotton in its clothing. The parent company of Zara, Pull&Bear, Massimo Dutti and other fashion brands had set itself the target of using 100% more sustainable cotton by 2025, but it has now said it will achieve this target by 2023. Inditex's use of 'more sustainable cotton' reached 91% of its total consumption of the fibre in 2020.

**Brazil** Advanced materials and performance chemicals group Solvay is launching a new polyamide 5.6 yarn called Bio Amni. As the name suggests, the yarn, which is being produced entirely at the group's textile unit in Brazil, is partially bio-based. Solvay said it had been two years in development. The polyamide is 47% derived from sugar cane, an abundant renewable resource in Brazil.

**Turkey** Fabric manufacturer ISKO has finalised a licensing agreement with the Hong Kong Research Institute of Textile and Apparel (HKRITA) to use its Green Machine garment-to-garment recycling technology. The technology uses a hydrothermal process to separate cotton and polyester in clothing, turning the polyester into new fibres and the cotton into a cellulose powder. The process is gentle, which allows the fibres to retain their properties. HKRITA has been running one of the machines itself in Hong Kong for several years and a second opened in an H&M store in Stockholm in the autumn of 2020.

**Antarctica** South Korean sportswear brand Kolon Sport recently signed a memorandum of understanding with the Korea Polar Research Institute (KPRI). Kolon will now develop kit for KPRI's K-route expedition, which is currently exploring inland Antarctica. KPRI intends to complete a 1,700-kilometre route through the territory to help South Korean scientists achieve better research results. Emphasis is on producing climate-appropriate apparel, to ensure the research team can complete the mission safely.

**China** China-based viscose producer Sateri has installed a \$780,000 solar photovoltaic system on the roof of one of its mills, the start of a focus on renewable energy to reduce its carbon footprint. Allen Zhang, president of Sateri, said: "This pilot solar project is a small step towards realising decarbonisation goals. We are encouraged by the success of this first experience with solar energy and plan to invest in more renewable energy use across our mill operations."

**Japan** Japanese research firms Mitsubishi UFJ and Macromill have put a value of \$14.5 billion on the sports market in the Asian country in 2020, down by 30% from the previous year. Clothing, shoes and equipment for individual activity such as working out or running have continued to sell well, but researchers said a downturn in playing team sports, caused by the pandemic, had led to the decline in overall market value.

**US** Sports group adidas has announced its decision to sell the Reebok brand to New York City-headquartered Authentic Brands Group (ABG) for up to €2.1 billion (or just under \$2.5 billion). ABG owns a range of brands including Juicy Couture, Forever 21 and Hervé Leger, plus the Sports Illustrated publication and the likeness rights to well-known personalities such as Muhammad Ali, Shaquille O'Neal, Marilyn Monroe and Elvis Presley. Adidas first revealed formal plans to divest itself of Reebok back in February. Although still subject to final approval, the deal is expected to close during the first quarter of 2022.



**Taiwan** Taiwanese performance materials specialist Far Eastern New Century (FENC) has published its 2020 Sustainability Report. It said it had made progress on chemical recycling of polyester. FENC also continued its collaboration with adidas and Parley for the Oceans. In 2020, the scope of the project was expanded, capturing over 6,000 tonnes of ocean plastic, which were converted into new products.

**Thailand** Swiss textiles technology company HeiQ has bought a bio-based antimicrobial specialist to "diversify and innovate its product range and capabilities". Life Materials, which has operations in Thailand and North Carolina, has developed a portfolio of smart ingredients and formulations and uses inorganic, organic and bio-based botanical active substances. As part of the acquisition, HeiQ will have access to hygiene technologies, such as odour absorbent additives, that complement its core antimicrobial technology. It will also have additional offices and laboratories in Thailand and Brazil.



**South Korea** Spandex producer Hyosung has completed a Life Cycle Assessment (LCA) exercise to compare the environmental performance of its 100% recycled creora regen spandex to that of virgin creora spandex. Third-party certifier, Networks Y carried out the LCA, assessing both fibres from pre-manufacturing to the manufacturing stage. The study concluded that creora regen spandex has a carbon footprint that is approximately 67% lower.

**New Zealand** Outdoor and performance brand Icebreaker has released its fourth annual transparency report, revealing that 91% of its total fibre composition is now plant- or merino wool-based. Compared to 2020, 65% more styles were made with 100% plant- or merino-based fibres in 2021. Icebreaker is forecasted to sell more than 1.3 million units of 100% plant- or merino-based apparel in 2021 alone. In 2019, the wool specialist committed to going plastic-free by 2023. That is, Icebreaker aims to make its clothing exclusively from plant- or merino-based fibres by the end of that year.

**Australia** In its most recent review of the global cotton market, information resource Cotlook said there is strong optimism regarding the 2021-2022 crop in Australia and it has increased its projection for the volume of cotton farmers will produce there. "Owing to very good rainfall, which has replenished reservoirs and will allow farmers to plant cotton on a greater scale than in recent years, our figure has been increased to one million tonnes," it said, adding that this would be Australia's largest cotton crop since the 2017-2018 season. Its revised global number for 2021-2022 is now slightly over 25.8 million tonnes, representing an increase of 7% from its estimate for the recently concluded 2020-2021 season.

# People



## Leroy Sané supports Nike campaign

Bayern Munich and German national team attacker **Leroy Sané** is the front man for Nike's autumn 2021 underwear campaign.

Products in the collection are made using its Dri-Fit material for comfort and its ReLuxe proprietary material, which contains 75% recycled fibres. Nike has said this is part of a wider initiative, Move To Zero, through which it is aiming to establish zero carbon and zero waste in its supply chain.

Nike has said Move To Zero will "help protect the future of sport" 🌐

## Alternative move

**Patrick Thomas**, former CEO of luxury brand Hermès, has joined the board of MycoWorks. MycoWorks owns Fine Mycelium, the biotechnology company that harnesses mycelium (the vegetative part of a fungus, found in mushroom roots) to grow a "made-to-order natural material".

Mr Thomas said: "The fashion and footwear industries' desire to add quality alternatives to their design process is decades old and the demand from consumers is ever-growing." 🌐

## Hefty fine for covid claims

Australia's federal court has issued yoga and activewear brand Lorna Jane with a fine of A\$5 million (\$3.6 million) "for making false and misleading representations to consumers in connection with the promotion and supply of its LJ Shield Activewear".

In 2020, the Australian Competition & Consumer Commission (ACCC) expressed concern about the brand's promotion of its LJ Shield Activewear. The brand presented the products as having the capability to stop the spread of covid-19 thanks to what it called "ground-breaking technology" that would "eliminate the virus on contact with the fabric".

After the federal court imposed the fine in July, ACCC chair, **Rod Sims**, said: "Lorna Jane falsely promoted its LJ Shield Activewear as eliminating or providing protection from covid amidst growing numbers of cases in Australia. The whole marketing campaign was based upon consumers' desire for greater protection against the global pandemic."

The brand's founder, **Lorna Jane Clarkson**, said: "The company was let down by its supplier and I feel that I was let down personally by people I trusted. I have spent 35 years building a business that supports and empowers women; I would never intentionally put that at risk." 🌐

## Salomon selects CEO

Outdoor group Amer Sports Corporation has appointed **Franco Fogliato** as CEO of footwear and winter sports-focused Salomon. Mr Fogliato has previously worked for VF, The North Face, the Billabong group and Columbia and has been based in Europe and North America. Most recently, he served as executive vice-president for omni-channel at Columbia.

## From Alpiq to Archroma

Textile chemicals group Archroma has announced that **Thomas Bucher** will become its new chief finance officer on October 1. Mr Bucher will replace **Roland Waibel**, who is retiring. Thomas Bucher joins from Alpiq Holding AG, where he has been group CFO since 2015. Prior to Alpiq, he worked at Gategroup for six years having previously held a series of senior finance roles at Ciba. 🌐

## Change at GTT

Water-repellent textile finishing developer Green Theme Technologies (GTT) has appointed **David Andreas** as its new chief executive. Mr Andreas had been GTT's company president and chief operating officer since 2019; he took over from **Dr Gary Selwyn** as chief executive on August 11. He said on taking up his new role that the change had come at "a fantastic time" for GTT and its PFC-free technology platform, Empel. 🌐

## Brooke Farris on board

Australian boardsports apparel brand Rip Curl has appointed **Brooke Farris** as its new chief executive. She took up the role on August 16 in place of **Michael Daly**, who recently moved to become group chief executive and managing director of parent group, Kathmandu. Mrs Farris has worked for the brand since 2010 in roles ranging from event management to executing marketing strategy. At the time of the announcement, she said it would be "an absolute privilege" to lead the company. 🌐

## UKFT board appointment adds technical know-how

Trade association UK Fashion and Textiles (UKFT) has appointed **Professor Parik Goswami**, director of

Technical Textiles Research Centre and the head of the department of fashion and textiles at the University of Huddersfield, to the board to help the association increase its focus on innovation, R&D and sustainability. Professor Goswami's areas of research are product development using flexible materials and application of chemistry for functionalising textiles. He manages a large portfolio of research concerned with fibre and polymer science, nonwovens, medical textiles, sustainable materials, nano and submicron fibres, and plasma treatments for functionalising textiles.

Prior to joining the University of Huddersfield, Professor Goswami was the director of research and innovation at the school of design at the University of Leeds, where he led the Fibre and Fabric Functionalisation Research Group.

### European move

Sports brand Puma has named **Richard Teyssier** as its new general manager for Europe, taking up the role on September 1. He succeeds **Arne Freundt**, who became Puma's chief commercial officer in June. Mr Teyssier had been Puma's general manager for France since 2010. **Christophe Cance** will succeed him in that role.

### Interesting thread

Textile thread dyeing specialist Coloreel has appointed **Torbjörn Bäck** as its new chief executive. He succeeds **Mattias Nordin**, who has moved to the role of senior vice-president for business development. Mr Bäck was previously president for the northern European market of manufacturing group Camfil, which specialises in air filters. Coloreel said it was confident the new chief executive would be able to generate growth for its patented technology for on-demand digital dyeing of textile thread.

### ICAC makes innovation hire

The International Cotton Advisory Board has chosen **Kanwar Usman** as its first head of textiles and innovation. Mr Usman was formerly the director general of the textile division in Pakistan's ministry of commerce. ICAC executive director, **Kai Hughes**, said: "As the only intergovernmental commodity body recognised by the United Nations that covers cotton, it's crucial that we are able to support the needs of the full supply chain, from the field all the way to retail."

## Change of CEO at Sanitized

**Urs Stalder** has stepped down as chief executive of Swiss antimicrobial textile technology provider Sanitized. **Michael Lüthi**, a member of the family that owns Sanitized, assumed the role of chief executive at the start of August.

After almost three decades working for the company, leading it for the last nine years, Mr Stalder said the appointment of his successor indicated that the company was "cultivating its roots and values", but also looking to the future and positioning itself for upcoming challenges.

Michael Lüthi, an economist by training, joined Sanitized in 2018 and has worked, until now, as the head of its polymer additives business unit. Mr Stalder will remain as a member of the company's executive board.

## Change at the top for Schoeller

The CEO of Swiss textile and technology company Schoeller is retiring after 10 years and is being replaced by chief operating officer **Joachim Kath**.

**Siegfried Winkelbeiner**, who steered the group into previously untapped sectors, said he had wished to create an environment in which staff could thrive.

Mr Kath, who has a background in the chemicals industry, has been preparing to take over for 18 months.

## Mask move rewarded

A decision last year at Toray Advanced Materials in South Korea to switch production of nonwoven materials from personal hygiene products to masks has earned company vice-president **Park Seo-jin** an honour from the government in Seoul.

Mr Park took the decision to convert Toray's production facilities for spunbond nonwoven fabric into a centre for the production of filters for masks at a time in early 2020 when South Korea was experiencing a shortage in supply. Toray's contribution allowed the South Korean government to put in place its widely praised plan of measures to counter covid-19.

As a result, the Toray vice-president was one of a number of people to receive a special award for promoting public health at a special ceremony earlier this year.

## Return of the founder

Founder of fitness apparel brand Gymshark, **Ben Francis**, resumed the position of chief executive in August. Current chief executive, **Steve Hewitt**, will remain with the company, acting as its executive president.

Mr Francis was 19 when he founded Gymshark, specialising at first in nutritional supplements before moving into gymwear. He appointed Steve Hewitt as chief executive four years ago. He said his aim in making the change now was to drive growth in the US and Asia. In August 2020, Gymshark was valued at £1 billion. Ben Francis still owns 70% of the Birmingham-based company.

## New CEO to take over at Wolverine at year end

Outdoor footwear group Wolverine World Wide has announced that **Brendan Hoffman**, whom it appointed as company president in September, will take over as chief executive at the end of 2021.

Wolverine said on appointing him as president last year that he would initially work with current chief executive and company president, **Blake Krueger**, and "transition over a period of time" into the chief executive role. That period of time will last until the end of this year.

The group paid tribute to Mr Krueger, who has worked at the company for the last 28 years. It said that in his time as chief executive, a post he took up in 2007, he had transformed Wolverine "from a traditional footwear wholesaler into a consumer-obsessed, digital-focused growth company with one of the world's largest portfolios of footwear and lifestyle brands".

He will continue to be involved. After the handover he will become executive chairman, will continue to lead the board of directors and will work with Mr Hoffman on "key international and strategic initiatives".

# Industry & Innovation

## Seed stage

Australian product authentication and track and trace solutions provider Security Matters has collaborated with the Israel Cotton Board (ICB) and the country's organic cotton growers to mark cotton plants at the seed stage using Security Matters' technology. An offshoot project of a wider cotton verification partnership between the company and ICB, the cotton seeds in question have reportedly now grown into healthy, flowering plants. 🌱

## Trail shoe first

A newcomer to the trail running shoe market, Norda, has launched its brand with the first seamless trail running shoe made with bio-based Dyneema fibre. Flagship product, Norda001, uses bio-based Dyneema fibre in a seamless upper. The fibre is engineered at the molecular level to provide high strength and low weight, as well as waterproof and breathable properties. In addition, Royal DSM, the producer of Dyneema, has said that the fibres help provide increased foot stability and wearer comfort. This version of the fibre is sourced from renewable, bio-based feedstock. 🌱

## Anta's high-end aims

Chinese sportswear brand Anta is to invest £450 million in research and development over the next five years. It said it wanted to increase the volume of "high-end" products it brings out. Specifically, it said that by 2025, it plans to increase its annual sales volume of running shoes from 20 million pairs to 40 million pairs and basketball shoes from 6 million to 12 million pairs.

## Blockchain tracing

Sustainability hub Fashion for Good has completed a viscose traceability pilot with Bestseller and Kering to trace viscose in garments using TextileGenesis' blockchain tracing solution. Bestseller and Kering each contributed four garment styles, totalling around 23,000 products that were catalogued and tracked on the TextileGenesis platform.

The garments were made with varying compositions; from 100% sustainable viscose, produced by Lenzing, ENKA and Tangshan Sanyou, to blends with other fibres. They were traced through 25 suppliers from Austria, Germany, Italy, Turkey, India, Bangladesh and China. 🌱



## Exclusive jacket

Outdoor brand Jack Wolfskin is to include the first fully recycled, three-layer Polartec Windbloc fabric in a new version of its men's Blizzard jacket in the coming autumn-winter season. The two companies, long-term partners, have worked on the project together and describe themselves as co-developers of the jacket.

The three-layer recycled Windbloc fabric will feature exclusively in the new Blizzard jacket. The outer and inner layers are 100% recycled Polartec fabric and the filling in the sandwich is Jack Wolfskin's Texapore Ecosphere membrane, which is also made entirely from recycled content. Wearers will have high levels of wind protection, warmth, water repellency and breathability, the companies have stated. 🌱

## Lululemon invests in Genomatica

Yogawear brand Lululemon Athletica has signed a multi-year deal with materials company Genomatica to bring renewably-sourced, bio-based materials into products. This is the Canadian company's first equity investment in a sustainable materials company and Genomatica's largest partnership within the retail industry.

The two companies will aim to create a lower impact, plant-based nylon to replace conventional nylon, which is the largest volume of synthetic material currently used to make Lululemon products. Genomatica uses biotechnology and fermentation to convert plant-based ingredients into chemical building blocks. These are converted to pellets and yarns, and the companies will be working with Lululemon's fabric supply chain to incorporate this material into products. 🌱

## Hohenstein offers organic cotton assurances

Textile research and testing organisation Hohenstein has developed a new assessment method for organic cotton. There has been a sharp rise in demand for organic cotton products, Hohenstein said, but in contrast to conventionally grown cotton, organic cotton must be grown without genetically modified seeds, chemical pesticides or fertilisers.

"Nevertheless," it continued, "genetic modifications are repeatedly found in textiles that are falsely labelled organic. Often, available certification systems are not backed up by lab testing. At best, they only take random seed samples." Its new test involves a DNA analysis method, which Hohenstein has said will make it possible "to ascertain the amount of genetically modified cotton contained in products". 🌱

## Asics invests in insole start-up

Sports footwear brand Asics has announced that its Ventures Corporation subsidiary has acquired a share of Japan HealthCare.

Tokyo-based Japan HealthCare was founded in 2017 by Dr Daichi Okabe, one of only a small number of podiatrists working in Japan. It develops custom-made insoles with a view to using them to help prevent musculoskeletal disorders such as knee and lower-back pain.

The system Dr Okabe has developed is based on photos of the feet that people can take on their phones. It uses details in the photos to build personalised insoles for its customers. The start-up says the insoles support wearers by stabilising the body. It won the grand prize in the most recent Asics Accelerator Programme, which concluded in February. 

## Chemical combo

Germany-based Pulcra Chemicals has bought Belgian counterpart Devan for an undisclosed sum. Devan is known for its antimicrobial range BI-OME and bio-based textile finishes. Ümit Yaldiz, CEO of Pulcra Chemicals Group, said: "With our combined platform, Pulcra will become a stronger partner for our customers." Devan has offices in the UK, Portugal, the US and a team in Shanghai. Its CEO, Sven Ghyselinck, said: "This new home will allow Devan finishes to find a faster way into the global textile market and will help the textile industry to benefit from more sustainable products". 

## Bio-based addition

Italian textile technology firm Altexa and its North American partner GHS Holdings launched a bio-based waterproof laminate, an addition to the HDry range, at the Outdoor Retailer show in Denver in mid-August. The new product, HDry b5, has 53% bio-based content and uses no perfluorinated compounds. A non-edible, bio-based corn derivative provides the bio-based material. It works using Altexa's direct 3D lamination method. 

## Marker system patent

Fibretrace, a traceability technology solution, has been awarded a European patent for Photon Marker System in Fibre Material. The Australian company describes it as "another step towards a transparent era of sustainable textiles, combining physical and digital traceability with the power of authentication". Fibretrace works by embedding a scannable luminescent pigment into any natural, man-made or synthetic fibre. 

## Bottle boost

Seoul-based outdoor brand BlackYak recently signed an agreement with fibre producer TK Chemical and drinks company Sansu Beverage, designed to broaden its recycled polyethylene terephthalate (rPET) feeder base for its domestically produced K-rPET fibre, also marketed as Ecolon. BlackYak and TK Chemical have previously worked with Korean mineral water company Sparkle on a similar initiative. 

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# Backtrack

**24.08.2021**

ShanghaiTex 2021 switches to hybrid model

**23.08.2021**

Adidas launches 'no-dye' golf shoes

Hyosung weighs anchor on 'Mipan regen ocean'

Innovation for famous Puma football boot

Strong first-half growth for Foot Locker

**20.08.2021**

Allbirds lands on activewear

US brand chooses biopolymer from Italian supplier

**19.08.2021**

Adidas updates Barricade for 'modern tennis'

**18.08.2021**

UK outdoor 'in a great place as an industry', says JD Sports

Teijin to review its targets for CO<sub>2</sub> reduction

Vietnam seeks ways to remedy covid-related production shortfalls

**17.08.2021**

New version of Predict shoe from Salomon

First-half growth for Asics

Snowsports industry pleads for joint climate action

Micro-factory trend creates opportunities along supply chain

**16.08.2021**

Yue Yuen reports 'decent recovery'

**13.08.2021**

Applied DNA's fibre focus eclipsed by covid testing opportunities

**12.08.2021**

Inov-8 celebrates Mont Blanc with special edition

**11.08.2021**

Bestseller and National Geographic home in on China

US brand uses tree planting scheme to reach 'carbon neutrality'

Covid closes clothing factories in Vietnam

Origin Materials earns US bio-based certification

Limitations on space make it impossible for us to run more than a carefully selected sample of industry news in WSA. However, we publish hundreds more stories on [www.sportstextiles.com](http://www.sportstextiles.com), one of the most comprehensive archives of news anywhere on the web for textiles, apparel, footwear and equipment for sports and outdoor. Below are just some of the headlines that have appeared on the site in recent weeks.

**10.08.2021**

Scandinavian partnership for HD Wool

Kraig Labs seeks new spider silk patents

Outdoor Retailer opens in Denver

**09.08.2021**

Adidas reports China decline

Growth for Mizuno

Santini has special jerseys ready for the 2021 Vuelta

Unifi's net revenues up 114% in Q4

**06.08.2021**

Reebok revisits airbag material for footwear collaboration

Levi Strauss & Co makes first activewear acquisition

**05.08.2021**

Cotton season ends on a high note

Tonello's 'radical paradigm shift'

OIA praises outdoor-conscious legislation

**04.08.2021**

Low liquor ratio equals salt-free cellulosic dyeing

'Excellent' demand for Lenzing's specialty fibres

US-Austrian partnership to propel blended textiles separation

**03.08.2021**

Surprise acquisition will help Wolverine "build beyond footwear"

Record first half for Columbia Sportswear

Reebok's 'Cordura pack' Beatnik set for rerelease

European outdoor sector shows resilience despite 10% fall

**02.08.2021**

Foot Locker announces two acquisitions

Chinese wool conference held

Gildan Activewear joins US Cotton Trust Protocol

**30.07.2021**

Major names become Ellen MacArthur Foundation partners

Econyl steps out of comfort zone with consumer-facing platform

Extra padding for Moncler

**29.07.2021**

Two brands make Wolverine optimistic about 2021

BlackYak has helped recycle 17 million PET bottles this year

Footwear propels Puma to strong second quarter

**28.07.2021**

Nepa launches new hiking boots via crowdfunding

Ortholite makes strides towards zero waste

Deadly explosion at German chemicals site

**27.07.2021**

China is the first focus for Mizuno-Polygiene partnership

Textiles circularity pilot asks for brands to 'walk the talk'

Skechers benefits from post-covid desire for comfort

**26.07.2021**

Wastewater treatment project to go ahead at Lenzing's Grimsby plant

Korean golfwear blends merino wool with rPET

Fulgar yarn used for biodegradable cycling shorts

**23.07.2021**

Quechua wants to help consumers rediscover the joys of hiking

Anta Group donates \$7.7 million to flood-hit Henan

Swimwear brand among British Fashion Council's changemakers.

# take ADVANTAGE



Carbon dioxide is a leading contributor to global warming, and central to emissions reduction targets, which are set more often than met. It is also, potentially, a feedstock for chemicals and materials.

# From carbon neutral to carbon negative

Each report by the Intergovernmental Panel on Climate Change (IPCC) spells out more clearly the impact of carbon dioxide and other greenhouse gases (GHG) on global warming. Companies in all sectors, from banking to manufacturing, have pledged to reduce their emissions, both direct and indirect, with a view to becoming carbon neutral at some point in the future. This process usually involves a switch from fossil-based to renewable energy sources. Investing in new, more efficient machinery to optimise processes is another option that delivers results relatively easily. But there is only so much that can be done. In manufacturing, especially, there will remain GHG emissions that cannot be eliminated, and few believe that offsetting them is a viable long-term solution.

Despite the many pledges from industry to become carbon neutral, the reality, as stated in the sixth IPCC assessment report, published in August, is that carbon dioxide (CO<sub>2</sub>) emissions have continued to grow. "We saw brands vowing, in 2005, to reduce their GHG emissions by 20% by 2020. Since then, they have in fact increased by 33%," said Austin Whitman, CEO and founder of Climate Neutral, speaking at a Net Zero Now webinar organised by Outdoor Retailer. The San Francisco based non-profit has, in its two years of existence, attracted close to 300 companies seeking "climate neutral" certification.

There is much 'greenwashing' in the claims brands make, as the New Standard Institute (NSI) consistently finds in its research. "We examined the CSR reports of leading fashion industry companies and found that no real progress was being made," NSI founder Maxine Bedat tells WSA. The data presented is, she says, often weak, full of omissions and inaccuracies that lead to creative carbon accounting. The New York-based think-tank is pushing for stricter rules on GHG emissions in the apparel industry and is working with New York state legislators on this topic.

Kurt Kipka, vice-president of the Apparel Impact Institute (Aii), is a bit more optimistic; he says the advent of science-based targets has helped improve reporting methods and progress is being made in identifying and reducing GHG emissions. The San Francisco-based organisation

is home to several initiatives, including Clean by Design, originally launched by Dr Linda Greer within the Natural Resources Defence Council (NRDC), and the Carbon Leadership Project. The goal of this programme, created with Reset Carbon, is to develop and implement standardised tools that will enable brands and companies to share resources and align their efforts on science-based targets.

"The carbon reduction project applies the same template that was used for Clean by Design, that is, we identify the key areas that could lead to a meaningful quantitative reduction of negative impacts," says Mr Kipka. "Wet processing is a small subset of the supply chain, but it makes up a large portion of a company's carbon emissions," he adds, especially if a textile processing mill is powered by coal. A switch to cleaner, renewable fuels or to waterless processes will reduce emissions, but even improving efficiency can be useful. "It is a low-hanging fruit that could reduce the apparel industry's CO<sub>2</sub> emissions by at least 15%, and in some cases by up to 50% on a site by site basis, without even shifting to renewable energy sources," he says. "Often, it pays for itself."

## Improving efficiency

Fibre producers and textile mills that own and operate their facilities are investing in energy-saving and emissions-reducing measures. In early 2020, Israel-based polyamide producer Nilit replaced fuel oil with natural gas, a move that it says cut its CO<sub>2</sub> emissions by 40% and brought sulfur dioxide emissions down to zero.

Italian mill Eurojersey installed a new central heating plant in 2019 cutting its methane gas emissions by 217,000 cubic-metres. "That is the equivalent of 434 tonnes of CO<sub>2</sub>," says Eurojersey managing director, Andrea Crespi. "Investments to improve the efficiency of the washing process for printed Sensitive Fabrics has led to an 8% reduction in water consumption between 2017 and 2019. This percentage corresponds to a savings of 40 million litres of water." The Carvico group has also installed a new series of solar panels which produce some 70,000 kWh and cover the energy requirements of its shipping warehouse.





Solar panels also cover the rooftops of Schoeller's headquarters in Sevelen, Switzerland. The textile manufacturer installed 2,838 photovoltaic modules in 2019, a CHF 700,000 (€649,000) investment. In 2020, these generated more energy than expected by around 10%, says Rolf Landolt, head of engineering at Schoeller, providing 950,000 kWh instead of the anticipated average annual output of 865,000kWh. This exceeds the plant's needs, allowing the company to feed 15% back into the electricity grid and generate revenues of CHF 85,000. It believes the panels will have paid for themselves within seven or eight years.

Lenzing, a producer of manmade cellulose fibres, plans to invest €100 million to optimise processes and achieve its goal of becoming

carbon neutral by 2050. Of this total, €40 million has been spent already on a new air purification and sulfur recovery plant at the company's main facility in Austria. It is expected to reduce the company's CO<sub>2</sub> emissions by 15,000 tonnes. These measures, paired with offsetting programmes, have enabled Lenzing to market carbon neutral-certified Tencel-branded lyocell and modal fibres. "We, as a company and brand, have taken steps to reduce our footprint, but not all emissions are avoidable," says Florian Heubrandner, head of Lenzing's textiles business. Until carbon emissions levels can be completely eradicated, the company says it will offset emissions by supporting verified carbon reduction projects in areas that are linked to the textile industry.

*Canadian activewear brand Lululemon will be introducing apparel made from recycled pollution using LanzaTech's Carbon Smart technology and Far Eastern New Century (FENC).*

CREDIT: LULULEMON

## CO<sub>2</sub> as a renewable resource

As Mr Heubrandner points out that not all carbon emissions can be eliminated, and that carbon dioxide is not all bad. It is, for one thing, essential to photosynthesis, and for another, not only drawn from fossil resources. There are renewable sources of carbon, and carbon dioxide, which should be promoted. This is the mission that the nova Institute, a German research lab, has taken on. In September 2020, it launched the Renewable Carbon Initiative (RCI) with a number of European chemicals and materials suppliers, including Lenzing and LanzaTech, to encourage a transition to renewable sources of the basic chemical element. "The carbon clock says we have less than seven years left if we want to keep global warming below 1.5°C," said Michael Carus, founder and managing director of the nova Institute speaking at a Renewable Carbon Initiative webinar. The organisation estimates that 84% of current carbon usage is drawn from fossil resources, with 10% coming from biomass, 5% from recycling and only 0.5% from atmospheric or industrial CO<sub>2</sub> fumes. It envisions a future in which carbon would be recycled (for 55% of its usage), biobased (20%) and derived from CO<sub>2</sub> (25%).

While carbon dioxide emissions in the air are a source of pollution, the gas can also be a feedstock for the manufacturing of chemicals and materials. It can be collected in air, in a process known as Direct Air Capture, or siphoned off from smokestacks. Scrubbing factories clean of their carbon emissions could therefore turn a liability into an asset, and create a new revenue stream.

LanzaTech, a Chicago-based biotech company, has developed a process that turns carbon monoxide into ethanol through a process Freya Burton, chief sustainability officer, says is similar to traditional fermentation: "Instead of yeast fermenting sugar to make alcohol, our naturally occurring bacteria ferment CO and CO<sub>2</sub> into ethanol." A different type of bacteria will produce isopropyl alcohol (IPA), she says. Carbon monoxide



can be captured and transformed directly on site, at a steel mill (in China and Europe), municipal waste treatment facility (Japan) or from agricultural residue (India). The technology can pay for itself in four to six years, she says, depending on location and the incentives made available to companies. "It makes sense from both an environmental and an economical point of view," she says.

Through a technology platform it calls Carbon Smart, LanzaTech has partnered with Taiwan-based Far Eastern New Century (FENC) to develop polyester yarns and textiles, which Canadian activewear brand Lululemon will be using to make sports apparel. The company does not intend to stop at fibres and has plans to use its carbon recycling technology to manufacture other chemicals for the textile industry.

A black ink made from GHG emissions has been developed by Graviky Labs, a company based in Cambridge, Massachusetts and New Delhi, India. Like LanzaTech, its retrofit tool captures

*Investment in new equipment has enabled Eurojersey to reduce the carbon footprint of its patented Sensitive warp-knitted fabric by 5% for a dyed fabric (2.8 kg to 2.6 kg CO<sub>2</sub>e) and by 24% for a printed fabric (6.4 to 4.0 kg CO<sub>2</sub>e), based on a functional unit of 1 sq m of fabric.*

CREDIT: EUROJERSEY



*(Left:) Biocosmo is the name textile mill Schoeller has given to its most sustainable and responsible fabrics made in its solar-powered plant in Sevelen, Switzerland.*

CREDIT: SCHOELLER TEXTILAG

*(Right:) LanzaTech has partnered with Lululemon, India Glycols Limited (IGL) and Far Eastern New Century (FENC) to bring to market the first polyester yarns made from recycled carbon.*

CREDIT: LANZATECH

pollution at source and uses it to make different grades of inks and coatings. From 30-40% of total content is “recycled pollution” and the remaining 60-70% traditional binders, said co-founder Nikhil Kaushik at a Fashion For Good webinar last July. The company ultimately seeks to derive 100% of its ink components from recycled carbon dioxide. Eco-minded lifestyle brand Pangaia has printed its packaging with Graviky Labs’ pollution-based Air Ink.

Fairbrics, a winner of the H&M Foundation’s Global Change Award innovation challenge, plans to make polyester from CO<sub>2</sub> emissions. The French start-up intends to buy carbon dioxide from companies that remove it at source or from air, as does Swiss company Climeworks. It expects to have a commercially available product within five years, cofounder Tawfiq Nasr Allah told WSA.

### Carbon-negative materials

Because these materials remove CO<sub>2</sub> from the air, they can be ‘carbon negative’ as well, on condition they do not burn an equivalent amount of fossil-based carbon in the process of their manufacturing. This would require an analysis of inputs and outputs, at scale, which many of these companies have yet to reach.

Origin Materials promotes its technology as a carbon negative solution. In the past decade, the Sacramento-based company has been working on a process that converts wood industry residue into building blocks for plastics and textiles. Its platform is said to be able to produce furfural (CMF) or hydrothermal carbon (HTC), which can be used to make polyester fibres. It has formed a strategic alliance with PrimaLoft to develop these in the next three or four years. Origin says it will be a carbon-negative material, when produced at commercial scale, based on a lifecycle assessment conducted by Deloitte.

Living Ink also takes a waste biomass product, from the algae industry, to make what it says are carbon-negative inks and pigments. “Algae absorb atmospheric carbon dioxide to grow and we lock that carbon in our biobased inks and pigments for years,” says Living Ink co-founder and CEO, Scott Fulbright, adding that the company uses “a waste material that would normally be landfilled and would therefore emit methane”. The Denver-based start-up is busy scaling up and delivering its first product, a black ink and pigment, to sports apparel brands. Patagonia will be printing its hangtags with Living Ink, Pangaia its packaging, and Vollebak has made T-shirts dyed with the innovative pigment.

As brands seek to reduce their CO<sub>2</sub> emissions, it seems that any and all solutions are being investigated, down to switching to a ‘carbon-negative’ ink. “Awareness was low when we first started,” says Mr Fulbright. “Now brands are looking at every single material they use, and they are very much focused on reaching their carbon-neutral goals. There are not that many carbon-negative materials available.” Ink is as good as any place to start.



*The Post Carbon Lab designed a futuristic garment concept for Pakistani denim brand Azgar9. The hood of the CO<sub>2</sub>AT poncho is dyed with a “living” photosynthetic coating embedded with microorganisms that convert carbon dioxide exhaled by the wearer into pure oxygen, as plants do.*

CREDIT: FEDERICO MARTINS

How many carbon credits a company can claim when using these materials remains to be seen. A polyester fibre made from LanzaTech’s Smart Carbon platform will have a reduced carbon footprint for only 30% of its total content, as its technology converts CO into ethanol that is used to produce monoethylene glycol (MEG). MEG makes up only 30% of a polyester fibre, the remainder being purified terephthalic acid (PTA).

These technologies can ultimately extract pollution from the air and lock it into textiles and packaging, says Freya Barton. The calculations will need to be done on how much carbon dioxide is captured and stored, and how much is released into the air or in waste during the manufacturing process. It is ultimately a new chapter in the carbon cycle that has yet to be written. 🌐



*Vollebak has created the first T-shirts using a carbon negative black pigment made from an algae-industry by-product by biomaterials company Living Ink.*

CREDIT: VOLLEBAK/SUN LEE

Both the European Union and the United States plan to institute stricter legislation, which may include outright bans, for PFAS. Whether these cover the entire class of chemicals has yet to be seen, but pressure is mounting and there is now strong momentum behind calls to phase these chemicals out for good.

# PFAS on borrowed time

**F**luorocarbon-based durable water repellent (DWR) finishes used in textile processing are admittedly a minute part of a major issue, the impact of which extends far beyond performance sportswear. Per- and polyfluoroalkyl substances (known as PFAS) number in the thousands and their unique properties have found uses in countless industries. But a well-documented body of science has found these highly persistent and mobile chemicals to accumulate in the environment and in living organisms. They are, beyond doubt, a source of global contamination.

Their continued use may now be on the cusp of change. In July this year, the state of Maine passed a law prohibiting the entire PFAS class, making it the first government body to enact a broad ban. It calls for a total phase-out by 2030, except in instances deemed “currently unavoidable”. This is a fitting, and possibly unfortunate, indication of the state of the discussions under way at agencies in charge of chemicals, the US Environmental Protection Agency (EPA) and the European Chemicals Agency (ECHA).

PFAS compounds have up till now been regulated on a substance-by-substance basis. The EU banned PFOS ten years ago and PFOA in July 2020, as part of the Persistent Organic Pollutants (POP) framework. This led manufacturers to develop alternative compounds, introducing Gen-X as a replacement for PFOA. “PFAS are very prone to regrettable substitution. It is easy for the industry to make a minor change and produce a chemical that is not yet regulated,” says Jonatan Kleimark, head of the ‘No to PFAS Movement’ at the International Chemical Secretariat (ChemSec). The Swedish non-profit, which advocates for the substitution of toxic chemicals with safer alternatives, is pushing for the entire class to be regulated as a group. It is not alone. Last year, five European states (Germany, the Netherlands, Norway, Sweden, and Denmark) collectively called for a broad restriction of PFAS within REACH, which oversees the safe use of chemicals in the EU.

Some scientists favour a blanket ban on the entire family. One group of academics specifically argues that “thousands of PFAS have already been documented across multiple industries and business sectors. Managing PFAS one by one is neither feasible



*The waterproof and breathable shell fabric of the One Parka by Swedish brand Houdini is made from recycled polyester and is fully recyclable. Both the membrane and water-repellent finish are PFC-free.*

CREDIT: HOUDINI SPORTSWEAR

nor cost-efficient. More comprehensive solutions are needed, given that traditional approaches have failed to control widespread exposures to PFAS and resulted in inadequate public health protection.” Their position is reflected in the title of the paper, ‘Scientific Basis for Managing PFAS as a Chemical Class’ (Environmental Letters, June 2020).

The EU could set restrictions or prohibit the use of PFAS from 2024 or 2025, says Dr Kleimark. “PFAS could be phased out for all uses except essential ones. The issue now hinges on where you draw the line between essential and non-essential,” he adds. The military have benefited from exemptions deemed “essential” for apparel applications. This may not last. “It is generally accepted that within five or ten years, there will be a global ban on all these chemicals,” Sarah Berhanu, materials expert at the French Defence Procurement Agency, said at a webinar organised by textile innovation cluster Euramaterials in March.

The definition of future essential uses for PFAS will no doubt be a topic of intense discussion. It is hard, however, to consider durable water repellent (DWR) finishes in sportswear as essential. Even more so now that there are alternatives. “It is not such a big deal to phase out PFCs,” says Dr Kleimark. “But it will require companies to take bold measures, bolder than what we have seen up till now.”

### The issue of PTFE

A blanket ban on all PFAS chemicals, if enacted, raises the question of whether polytetrafluorethylene (PTFE) would be included. “PTFE is a polymer and therefore not covered by REACH today. But it is made up of smaller PFAS structures and as such is a part of the PFAS family,” argues Dr Kleimark. It is a position shared by Matteo Morlacchi, co-founder of Altexa (with his brother Luca). “A ban on PFAS chemistry means a ban on PTFE as there will be no way to produce the material. A key motivation for developing our first-generation product in 2005 was to offer a PTFE-free alternative,” he says, in reference to Outdry, a lamination technology the brothers sold to Columbia Sportswear in 2010.

Following the same line of thinking, Sympatex says alternatives exist for PFC-based water-repellent finishes and PTFE-based waterproof-breathable films. This is what the Unterföhring, a Germany-based maker of a polyester-based membrane, sought to bring to the attention of policy-makers and the industry in an April 2021 position paper calling for a ban on PTFE in clothing and footwear. The paper details the adverse effects of PTFE manufacturing on health and the environment.

It is impossible to speculate on the decisions policy and law-makers will ultimately take with regard to PTFE. As a major user of this material, it is an issue WL Gore keeps an eye on. “Since these restrictions are in the early stages of definition, it is not yet clear how our products may be impacted. We will continue to follow their development while seeking opportunities to

**“PFAS are prone to regrettable substitution. It is easy for the industry to make a minor change and produce a chemical that is not yet regulated.”**

JONATAN KLEIMARK, CHEMSEC



US brand Black Diamond uses GTT's Empel technology for items that require water resistance, such as the Element Hoody shown here.

CREDIT: BLACK DIAMOND

explain the value of fluoropolymers and to demonstrate how these materials can be managed responsibly throughout their entire lifecycle,” the company said in response to a request for comment. With regards to PFC-based finishes, it says it will, as announced in 2017, eliminate PFCs of environmental concern from its products. It added: “We remain focused on achieving these ambitious goals and will continue to monitor the evolving regulatory landscape over the next several years to determine what, if any, changes are appropriate.”

### Innovation in processing

For brands looking for alternatives, new options are becoming available. Altexa says its new machines, which laminate a membrane directly to a manufactured shoe upper, glove or backpack, are more efficient and simpler to use. Green Theme Technologies (GTT) has recently raised \$3.5 million in a Series B fundraising round to scale up its Empel technology, which applies water repellents (and dyes) in a dry or waterless process. Its PFC-free DWR is bonded to a textile substrate using heat, and can be applied on a wide array of synthetic fabrics. “Empel is fundamentally different from other CO (C-zero) technologies

because it uses polymer chemistry to encapsulate the fibres,” says Martin Flora, vice-president of business development. The term C0 has come to be used to designate PFC-free DWRs. It evolved from the switch from C8 to C6 and thus to C0, but does not mean the finish has no carbon in it, and can be misleading.

GTT’s technology will match the water-repellency of PFC-based finishes, but not their ability to repel oily substances. “Empel greatly improves soil release in regular wash-cycles,” he says, adding that an “extended soil release study” by GTT gave “very positive” results.

Altapel M 325-SC1 is a new DWR that Bolger & O’Hearn will be introducing at IFAI in November. The Massachusetts-based specialty chemicals company says the fluorocarbon-free aqueous finish is made from a “hydrophobic-reactive polymer” that delivers high water-repellency and wash-durability. “It can be applied across a broad range of fibres and blends, and specifically addresses some of the issues related to fabrics containing Spandex,” Shawn Honeycutt, business development manager, tells WSA. “Our products are very good at water-based stain-resistance, and we test all fabrics using a Bundesmann to provide real world results.”

Burlington, part of Elevate Textiles, recently launched PF Zero, a non-PFAS water-repellent finish, which it says, “remains unchanged” after 50 launderings. “Sustainability is at the forefront of all Burlington developments, with a commitment to responsible chemistries, recycled content and manufacturing processes that minimise environmental impact,” Nelson Bebo, vice-president for performance fabrics for the Greensboro-based company, declared at launch.

Rudolf Group has been offering non-PFC based DWRs since 2003. The company based in Geretsried, Germany, recently presented a DWR made from a by-product of cereal grain that would otherwise be disposed of and another one made from a mixture of plant extracts. While the greater part of the first of these two new products is made



*A pioneer in PFC-free water repellent finishes, Rudolf is introducing two new bio-based references, made from cereal grain waste or a mix of plant extracts, to its Ruco-Dry range.*

CREDIT: RUDOLF GROUP

from recycled biomass, “it meets the performance and durability of conventional water-repellent textile finishes,” said Dr Dirk Sielemann, head R&D for Rudolf Group.

A research project led by Sofileta, a textile manufacturer based in Bourgoin-Jallieu, France, is looking into developing DWRs using non-chemical means. It is experimenting with lasers to modify a textile’s surface and thus improve its ability to repel water and oil. “We can create a lotus-leaf texture that, combined with wax-coated crystals, provides a hydrophobic surface and a self-cleaning mechanism,” said Jordan Inard, in charge of the project (known as Deperflex at Sofileta), during a webinar organised by French textile innovation cluster Techtera. The consortium is testing different geometries and coatings to obtain a hydro- and oleophobic surface on textiles.

Chemours, the maker of Teflon, historically made from PFC and now available as a biobased PFC-free DWR, did not wish to respond to a request for comment. The company does, however, expect to face litigation dating from



*Polartec, now owned by Milliken, has announced a total phase-out of PFC-based DWRs in its product range.*

CREDIT: POLARTEC



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before 2015, the year it was spun off from DuPont. An agreement was reached with the companies formerly involved in the making of PFAS chemicals, namely DuPont and Corteva, the new name for what was previously the agricultural division of DowDuPont. The three companies will jointly cover expenses of up to \$4 billion related to future legal PFAS liabilities.

### Changing of the guard

The trend is clearly to move away from using chemicals that remain forever. Polartec recently announced the full phasing out of all PFC-based finishes in its ranges. A process the Massachusetts-based company began in 2017. "It took four years, roughly, to offer a durable fit-for-use product to apply to our outer layers," says Polartec global product director, Michael Cattanaach. "It is a substantial part of our business, as we have become much more than a fleece manufacturer." The company has developed different solutions for different substrates, from polyester fleece to nylon NeoShell fabrics.

"We are in the midst of a generational change in the industry," says David Karstad, Polartec's creative director. He points out that "many products were massively over-specified for their intended use", while brands are now "much more focused on sustainability". Once dominated by what Mr Cattanaach describes as a hang-tag arms race, he believes it is time for the industry to refocus on technologies that deliver the required functions. Polartec has introduced its non-PFC finishes in various ranges over the past three years without receiving any complaints. "No one even noticed," he says, comparing it to a "surreptitious, real-life field-test."

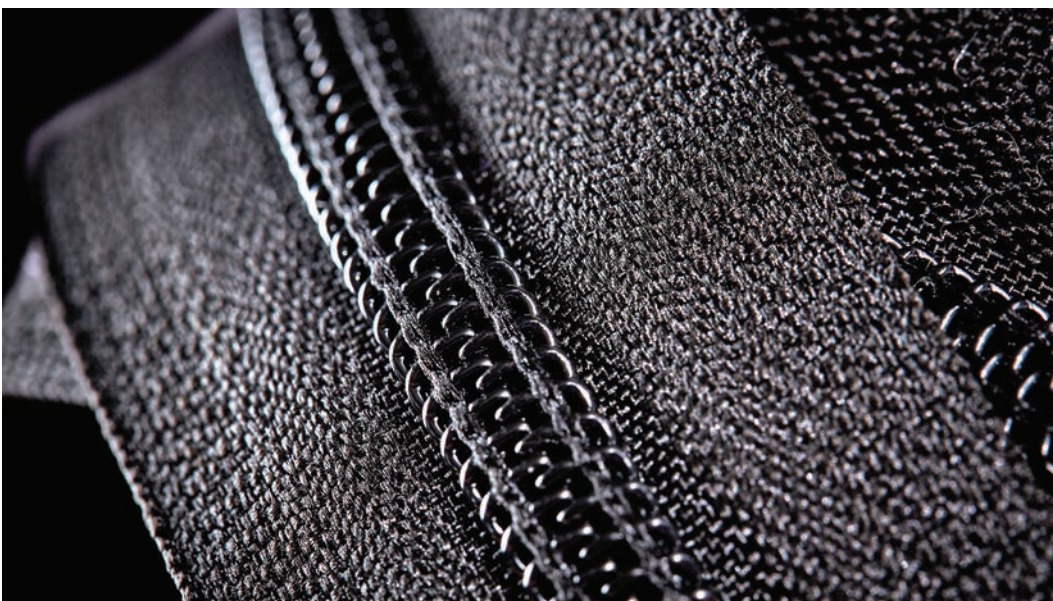
While the list of brands and suppliers having pledged to phase out PFAS from their ranges grows longer, regulatory or legislative action will take time before coming into effect. Policy makers will need to decide whether to regulate this class of chemicals as a group or not, including polymers or not, and what uses will remain essential.



Swedish brand Håglöfs is introducing a new high-tech range built for Nordic environments known as L.I.M. ZT, (Less Is More Zenith). It chose a Gore-Tex Pro Shell which it says offers the best protection.

CREDIT: HAGLÖFS

"If we had applied the precautionary principle, we would never have used this chemistry in clothing in the first place," Eva Karlsson, CEO of Houdini Sportswear tells WSA. Polartec believes that innovation, rather than legislation, will ultimately drive out PFAS chemistry for good. Others, including Shawn Honeycut, at Bolger & O'Hearn, assume that PFCs will eventually be banned, but litigation or fear of litigation, could make the process go much faster. 



GTT's PFC-free Empel platform is now used by zipper manufacturer YKK as part of its plan to reduce water and chemical usage through innovative technologies.

CREDIT: YKK

The addition of gold, graphene and aerogels is boosting the performance properties of synthetic fillers and natural down. New circular solutions are also being introduced as demand for recycled down drives research into automating the extraction of the precious clusters from used clothes.

# Smarter thermal insulation

**B**e it in natural down or in synthetic fillers, a striking array of novel ingredients is being put to new uses to enhance the insulating properties of cold-weather clothing. Graphene, despite being a conductive material, is fast becoming a new standard in high performance gear, in combination with down or polyester padding. At the other end of the spectrum, Pangaia, an eco-minded lifestyle brand has chosen a kapok and down blend developed by Minardi Piume that it creatively markets as FlowerDown. The new developments often pair increased thermal efficiency with a reduced environmental footprint to respond to the double demand for performance and sustainability. Molina has chosen a biobased graphene material and Allied Feather and Down infuses its quick drying down with gold particles that are recycled from used electronics. Imbotex has found that its camel hair padding made from fabric offcuts offers a higher level of thermal protection than an equivalent made from virgin fibres. These are just a few of the many new features and functions driving innovation in insulation.

Down remains the holy grail, for its packability and unrivalled warmth-to-weight, and the model for many of the new developments in this field. It has inspired a new generation of synthetic blowable loose fillers that mimic down for brands seeking non animal-based solutions. This is the format that Thermore, headquartered in Milan, Italy, has chosen for its new Ecodown Fibers Genius, which it says bridges the gap between loose fill and padding. It is designed to be blown into the baffles of a garment, but once laundered, the intertwined fibres form a padding-like structure, which Thermore says improves its stability, reduces clumping and minimises cold spots. It further claims that Ecodown Fibers Genius “ages like a fine wine” and is up to 10% warmer after two home washing cycles.

PrimaLoft’s own loose filler, ThermoPlume, is said to have been adopted by more than 70 brands for their A/W 21-22 collections. The down alternative developed by the Latham, New York-based company is now available in 100% post-consumer recycled PET. “Many brands, especially in the fashion business, but also in



outdoor and sports, are looking for animal-free, sustainably sourced solutions that provide a similar aesthetic and performance to down,” Vanessa Mason, senior vice-president for engineering, tells WSA. She also points out that “the down market can be highly volatile and is currently seeing higher price points. The stable pricing of synthetic products makes planning easier for our customers.”

In a bold and long-term move to switch away from fossil fuel-based synthetics, PrimaLoft has entered into a partnership with Original Materials, a company based in Sacramento, that has developed a process to extract materials and chemicals from wood residue. The goal of this new research programme launched in April this year is “to develop carbon-negative, insulating, high-performance fibres for an array of textile applications,” says Ms Mason. She says that Origin PET is chemically identical to fossil-based PET and is compatible with existing manufacturing processes, but functionalising the material for textile applications can have its own special requirements. The company expects to have a “first commercial product available within the next three to four years,” she adds. The process in development is said to be carbon negative, that is it captures more carbon than it emits.

Progress in manufacturing is making space-age technologies, such as aerogels, more accessible, easier to apply and less fragile. These developments inspired 3M, based in Saint Paul, Minnesota, to produce its own version with its new Thinsulate Xerogel insulation. The highly porous material, which is 99% air, is an excellent insulator, but was up till now difficult to work with in mills owing to issues of dusting and breakage, says Mike Mandanas, laboratory manager for 3M.

“Many brands are looking for animal-free, sustainably sourced solutions that provide a similar aesthetic and performance to down.”

VANESSA MASON, PRIMALOFT

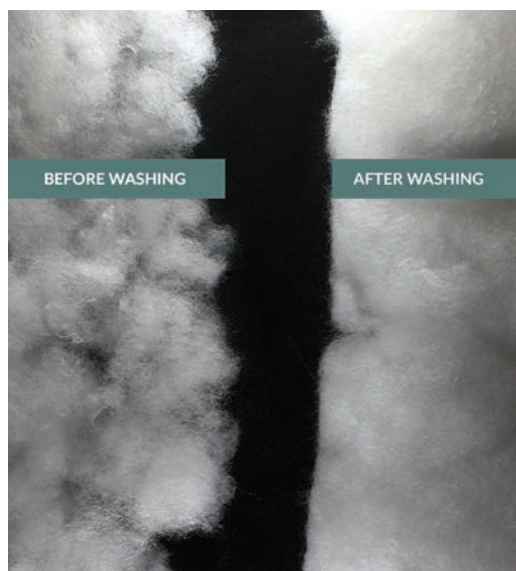
This new reference from 3M can also respond to brands’ quest for more sustainable materials as it includes 60% post-consumer recycled polyester. The ultra-thin 120g insulator will first target footwear and glove applications where it will deliver high thermal protection and water resistance even when compressed, according to Tony Valtos, from Clove Hitch Marketing. 3M has found that 3M Xerogel insulation has more than twice the thermal efficiency when used in areas under compression compared to 3M’s Type B insulation and that breathability is 15 times higher at the same weights.

### Improving on down

With its new Expedry down, laced with recycled gold nanoparticles, Allied Feather & Down seeks to address an area in which the natural material faces competition from synthetic insulators: namely water. The Los Angeles-based company undertook a re-evaluation of DWR treatments applied to down and determined that it is not water directly, but rather the build-up of moisture in extremely humid conditions that reduces the natural material’s loft. Once down is saturated with humidity, it says hydrophobic finishes have no ability to accelerate drying. The gold-based finish developed by Fuze Biotech was

*The gold-infused ExpeDRY down from Allied Feather & Down is said to dry 25% faster in consumer washing and 40-50% faster in production compared to an untreated down fill, reducing energy use and the product’s carbon footprint by close to 30%.*

CREDIT: ALLIED FEATHER & DOWN



found to boost water evaporation, without the need for heat, and speed up drying times by 40% to 60% compared to untreated down. Allied sees this as a possible game-changer for its ability to perform “in real world situations”. The quick drying feature, both during production and consumer use, will help products last longer and contribute to a reduced carbon footprint.

Graphene has also been harnessed to improve on down’s natural properties, as seen at Molina, based in Cairate, in the north of Italy. “It is a thermo-conductive material and is theoretically not wanted in an insulating product, but graphene removes hot and cold spots and dissipates excess heat,” says Andrea Molina, fifth-generation member of the family-owned company founded in 1890. He says this new product, which combines down with graphene-enhanced recycled polyester, is best suited to active uses. Molina has chosen a biobased graphene made from carbonised corn waste.

### Upcycled insulation

With demand for recycled materials going up, suppliers are stepping up their capacities and integrating new resources, including post-industrial fabric waste into their processes. Molina has recently set up a new production line to make padding from offcuts collected at its customers’ sewing facilities. This long-term project is currently in the R&D stage. “We are just beginning to build a circular system with our brand partners,” says Mr Molina. Its partners include Italian ready-to-wear brands that collect their fabric offcuts, made in camel hair, among other premium fibres, and send



(Left) Thermore’s new Ecodown Fibers Genius is delivered as a blowable filler and forms a padding-like structure after laundering. Suited to both slim and puffy styles, it can be blown into baffles measuring 5 to 15 cm in width.

CREDIT: THERMORE

(Right) 3M has developed an aerogel-based insulation, Thinsulate Xerogel, which addresses some of the issues related with the space-age material, making it easier to manipulate in mills. It is said to deliver superior thermal insulation, even when compressed.

CREDIT: 3M

them to either Molina, which recycles them into loose fill, or Imbotex, which uses them in its rolled padding. “It is a high-quality waste material; it would be a pity to waste it,” he says.

Recycling, or rather upcycling, its preferred term, is a core competency of Imbotex, a maker of high-end insulation based in Cittadella, in the north-east of Italy. In 2019, the women-owned-and -operated company created a new division, Imbotex Lab, dedicated to its upcycled products. Its patented and fully mechanical process turns high-end textile waste into padding for apparel, bedding and furniture. Camel hair and cashmere fabric scraps along with silk yarn spinning waste and cone ends are turned back into fibre and mixed in with recycled polyester or PLA, a low-melt fibre that serves to stabilise the padding, Imbotex sales manager, Francesca Fincati, states.

The newest product, Nouvelle, turns silk fabric offcuts into thermal insulation. The fabric scraps are sorted by dark and light shades, and are offered in two options, says Ms Fincati: “The fibres can be decolourised, using GOTS-certified oxygenated water, or overdyed in black.” The resulting paddings contain 60% recycled silk and 40% PLA.

New projects under way at Imbotex include natural fibre paddings made from blends of organic cotton and linen or hemp and nettle. The company has recently collaborated with D-Air Lab, an innovation lab founded by Lino Dainese, to make the thermal insulation of a suit designed for arctic expeditions. The Antarctica Suit, currently on show at the Venice Biennale, is made with three layers of insulation, one made from



Imbotex has developed a patented recycling system to convert cashmere and camel hair fabric offcuts and spinning waste from silk yarn into high-end padding. Cameluxe and Luxepad won an ISPO Textrends award this year.

CREDIT: IMBOTEX

Cameluxe, one made from graphene and one from Nativia silk padding. "It is designed to protect from the extreme conditions of Antarctica where temperatures can dip to -89°C and the winds are strong," says Ms Fincati.

A novel natural down padding sold in rolls, Thindown is produced by Natural Insulation Products Inc. (NIPI), based in Chieti Scalo, Italy, using a patented process initially developed by Canadian down specialist and NIPI shareholder Ron Reuben. His latest creation blends 50% Responsible Down Standard (RDS) certified down with 35% Sorona, a biobased stretch polyester fibre from DuPont Biomaterials, and 15% polyester. This gives the padding added stretch recovery along with the warmth, lightness and breathability of natural down. The company has also developed a recycled down version of its padding. "Down is a totally sustainable raw material that has a longer lifecycle than a single manufactured end product," says Stefania Lapponi, Thindown marketing manager.

### New sources for down

As demand for recycled down continues to grow, suppliers say sourcing this secondary raw material is not yet a problem, but the most forward-looking are thinking ahead. The primary source of feathers for recycling currently comes from used bedding. In the future, it would be good to be able to extract down from clothing. "Demand for virgin down increases by 5% to 10% every year, and this is tomorrow's Re:Down," says Eric Firmann, CEO and cofounder of Re:Down. The company is working with Iteratif, a circular economy consultancy based in Chamonix, France, to develop a machine that automates the extraction of down from apparel. The system involves cutting open the outer fabric of a puffer jacket and hoovering up the down, which can then be processed in the company's facility in Hungary. "Iteratif has studied each step of the process and is seeking a recycling solution for each element. A partnership has already been set up with Toray to recycle the textiles," he says. "There is a lot of down out there to recycle. The problem is collecting it and scaling up the process at a reasonable cost." Setting up the necessary logistics will be complex, but he says this system could provide brands with a solution for their unsold or unsellable goods. It could also enable brands that do business in France to comply with a new law that bans the incineration of non-food waste and excess stock by retailers, starting in January 2022.

Downlite, based in Mason, Ohio, is working on a similar project with Vancouver-based deBrand, a reverse logistics company that manages obsolete, damaged or unsaleable goods for brands. We "turn liabilities into assets" said co-founder Wes Baker during a webinar in the run-up to Outdoor Retailer in this July. "Down is an ideal candidate for circularity," he says. "It starts as a by-product, it is the best insulator, has high recovery value, and a longer life span than polyester fillers. Moreover, most of the infrastructure is already in place, the



recycled down can be washed and processed in existing facilities."

deBrand has been working on the project, known as CircleDown, for the past 18 months, developing a shredding machine that cuts open each item and liberates the down using a mixture of air pressure and automated separation techniques. The company pairs these operations with a software program that analyses data on goods equipped with RFID tags, which can contain information such as size, composition and weight, to direct them to the best second-life solution. Tracking technologies could help brands better manage overstock, says Mr Baker, adding that deBrand is part of the Accelerating Circularity Project (ACP).

Down's exceptional longevity makes it a prime contender for multiple lifecycles. As seen at Imbotex and Molina, waste fabrics can also be recycled into thermal insulation and thus contribute to reducing waste and unused stocks. Turning old textiles into nonwovens is admittedly an age-old practice, but these new initiatives give a second life to a precious resource. They are thus building up one of the few truly closed-loop textile-to-textile recycling value chains. 

*New references in Thindown, a down padding made by NIPI, include a blend with Sorona, a biobased polyester fibre from DuPont Biomaterials, and a recycled down range.*

CREDIT: THINDOWN

### RATING THE SUSTAINABILITY OF DOWN vs POLYESTER

To provide solid data on the impacts of natural down compared to polyester insulation, the International Down and Feather Bureau (IDFB) commissioned a comparative Life Cycle Assessment (LCA) conducted by Long Trail Sustainability, a sustainability consultancy, and published in 2019. The cradle-to-gate study covers raw materials and manufacturing steps but not impacts during use or end of life. The functional unit chosen was a fill material with a CLO value of 4.06, corresponding to 108 gsm of 700 Fill Power down and 230gsm of polyester, over a lifetime of five years. The findings indicated that down's environmental impact is between 85% and 97% lower in five categories (human health, ecosystems, resources, cumulative energy demand, climate change). The report's authors note that participating IDFB members provided primary data on energy, water and material inputs and waste outputs for down, but secondary data was used for the polyester fill. It would arguably have been more relevant to compare the natural material with recycled polyester, as it has come to be the dominant fibre in many products.

*Lenzing's collaboration with Orange Fiber offers a new twist on fibre innovation.*

ALL CREDITS: LUCA DISTEFANO,  
ORANGE FIBER



# Fruit and fibre

**J**uly's announcement that Lenzing had joined forces with Orange Fiber to make limited-edition Tencel lyocell-blended fibres from a combination of orange and wood pulp was several years in the making. That's how long the Austrian fibre producer and the start-up whose manufacturing of citrus waste-derived cellulose pulp takes place at its facilities in Sicily have been in dialogue about this.

The two companies first crossed paths a few years ago and they discovered that they were united in a common mission: to develop a new fibre type from pulp generated from waste products. Co-founder and chief executive, Enrica Arena, tells WSA that Orange Fiber had developed an interest in creating a new fibre with characteristics that differed from those of its first product, a continuous filament of cellulose acetate that it launched in 2012, attracting the interest of companies including Italian luxury house Ferragamo. Partnering with Lenzing, a specialist in manmade, primarily wood-based, cellulosic fibres, proved to be a perfect fit. "We are extremely happy with the result," she says.



## RISE TO THE CHALLENGE

In this article, Enrica Arena, co-founder and chief executive of Orange Fiber (which has patented a method for making textile fibre from the pulp of citrus fruit) and Gert Kroner, vice president of global research and development at cellulose fibre group Lenzing, peel back the layers to give us the squeeze on a recently unveiled partnership.

### A dose of sweetness

With the Orange Fiber team currently in the process of spinning the new fibres in Italy, ready to be woven into fabric in the same country before a projected launch by the end of October, the final product's performance qualities are not yet fully known. Nevertheless, Lenzing is quick to underscore the inherently circular properties of

the new product, describing it as “fully biodegradable” because the raw materials are 80% wood and 20% citrus pulp. In addition, Gert Kroner, Lenzing’s vice-president for global research and development, underlines the importance the Austrian company places on “closing the loop” and on reducing its consumption of energy and chemicals. It directly dissolves its cellulose in an organic solvent to ensure no complex chemicals are used, for example.

By applying Lenzing’s production processes to the new fibre, Mr Kroner explains that there can be an assurance of biodegradability in this case too. Beyond this, the Tencel-branded, orange and wood pulp-derived lyocell fibre resulting from the partnership will share the same technical features as standard Tencel lyocell, he explains. Its origin is botanical and the finished product will be soft to the touch, with good tensile strength and moisture absorption. “Together, we have successfully incorporated an unconventional waste material with Lenzing’s sustainably sourced wood to produce a new fibre, without compromising on quality or technical properties,” he emphasises. The orange component is an unconventional ingredient because, according to Orange Fiber’s research, the orange pulp that constitutes material left over from the making of orange juice is a by-product that does not have an established secondary market.

### Ripe for innovation

The Austrian company believes that its fibre innovation alongside Orange Fiber will pave the way for more circularity-minded disruption across the textile industry, particularly in the realm of upcycling agricultural waste material. Mr Kroner describes the collaboration as one of mutual support. Lenzing was able to support its Italian partner in developing the pulp quality most suited to its closed-loop production processes, while Orange Fiber is overseeing the sale and communication of the final product, including the transformation of the fibre into fabrics that will appeal to different brands and retailers.

In turn, Ms Arena praises Lenzing’s “very high standard of effectiveness and sustainability”. On the sales side, Orange Fiber has already been

**“We have successfully incorporated an unconventional waste material with Lenzing’s sustainably sourced wood to produce a new fibre.”**

GERT KRONER, LENZING

overwhelmed by requests from designers, buyers, retailers and manufacturers, Ms Arena enthuses, thanks in part to Lenzing’s vast network. Currently in the works are “a number of collaborations”, she tells WSA, as buyers seem “super enthusiastic to start creating with this new product”. Mr Kroner also acknowledges that the response has been positive, attributing this, at least in part, to what he perceives to be a growing interest in pushing the boundaries of wood-based cellulosic fibres. Experimenting and combining them with an unorthodox raw material such as orange pulp seems to have caught the imagination of many. Thus far, four tonnes of the fibre have been produced and both organisations view the collaboration as an ongoing effort.

As well as increasing production of the new fibre, shared goals include increasing the citrus pulp ratio in future versions of the raw material mix. The partners say they are conscious of a growing appetite in the market for similarly innovative fibres. For the Italian company, next steps towards helping to fulfil that demand include raising new funding to scale up production capacity, securing multi-year agreements with brands and establishing new production facilities. Lenzing stresses its desire to partner with companies of all sizes under its Tencel Limited Edition umbrella (of which the new, as-yet-unnamed fibre, is a part), taking a more macrocosmic view of the need to “give waste a new life” through the co-creation of special-edition fibres.

An encouragingly sweet note of optimism is tangible in both companies’ collaborative vision to continue to upcycle existing, underutilised organic resources, so as to better serve the textile market as a whole. 



*The project's next phase involves increasing the concentration of orange pulp in the fibre cocktail.*

# Born again fibres

In recent weeks, outdoor brand Patagonia has signed a multiyear agreement with Finnish textile technology group Infinited Fiber, a company that specialises in making a regenerated fibre out of textile waste. Supply of the regenerated fibre that the company calls Infinna is limited, but this new agreement makes Patagonia one of a number of brands with guaranteed access to a share of it. In parallel, the Finnish company will benefit because the deal secures sales of Infinna in the years ahead as it increases production.

Around the same time, the fibre producer announced that it had secured investments totalling €30 million in its latest financing round, with new backers including sportswear company adidas, the investment arm of apparel group Bestseller and investment company Security Trading Oy. They join previous investors H&M Group, investment company Nidoco, and China-based viscose producer Sateri.

It describes Infinna as being of “virgin quality, with the soft and natural look and feel of cotton”. It produces the regenerated fibre from what it refers to as “cotton-rich textile waste” and has explained that, because its fibres derive from cellulose, a building block of all plants, Infinna is biodegradable and contains “no microplastics to clog our seas”. Clothes made from it can be recycled again in the same process, together with other textile waste.



## NEWCOMERS

**Demand for regenerated fibres is so strong that the contracts Finnish group Infinited Fiber signs this year will tie up all of the production capacity of its new, flagship factory for years to come. It is already working on other ways of “radically improving” the availability of the material.**

### A true alternative

Chief executive and co-founder, Petri Alava, explains that the technology Infinited Fiber has developed breaks down the feedstock at molecular level and creates new fibres from the molecules. “In that process, the fibres forget their physical history and, partially, their chemical history,” Mr Alava says. “We talk about the fibres being reborn. It’s not cotton fibre, but it’s very close to it. Cotton is 99% cellulose and cellulose is a sugar; we use the sugar in our process. Our material is a true alternative to cotton and can be used in exactly the same applications as cotton: hoodies, pants or whatever.”

He believes this can be a key to circularity in the textiles mainstream. Consumers do not want

*Patagonia, adidas, H&M and Bestseller are all investing in Infinna. The regenerated fibre is close enough to cotton to work well in garments such as hoodies and jogging pants.*

ALL CREDITS: INFINITED FIBER



to have to compromise on design or quality or on how the material feels against the skin, he explains, and what consumers want, or do not, is what drives brands.

### Circular marathon

At the time of the Patagonia announcement, the brand's lead material developer, Ciara Cates, said consumers would never guess, on picking up a garment made from Infinna, that the source was old garments. And on the subject of making the textile industry more circular, she said it was a marathon rather than a sprint and that she was confident the brand's partnership with Infinited Fiber would help it complete the course. "It not only recycles the products of the past," she said of the tie-up between the two companies, "it also builds a circularity plan for the products of the future."

Perhaps some consumers would like it to be obvious they have chosen garments made from recycling old stock. Recycled fibres are popular. Petri Alava thinks this is fine but warns of the need to keep quality high. He explains: "If you use mechanically recycled cotton, after a relatively short period of usage you get pilling on the fabrics because you are cutting the cotton fibres shorter by about 10% each time."

He repeats that for circularity to become the norm, it is essential to make the circular choices easy ones for consumers to make. Yes, clothing and fashion are about self-expression, he says, and many people want what they wear to help them convey some of the values they hold dear, but in the Infinited Fiber chief executive's book, this comes after looking good and feeling comfortable.

By 2025, adidas is aiming to be able to say that 90% of the articles it brings to market are sustainable and, with a view to meeting that target, it is increasing its use of sustainable materials in all areas of its product range. It has devised a three-loop system for this. It has a recycled loop (in which products are made from recycled materials), a circular loop (in which products are "made to be remade"), and a regenerative loop (in which products are made with nature in mind). It views its work with

Infinited Fiber as part of its regenerative loop efforts; "it will enable us to source cellulose-based materials made from recycled cotton-rich textile waste" adidas says.

### No end of blends

Fibre blends are a big part of the apparel market, of course, and Mr Alava accepts that this will continue. He says Infinited Fiber is able to work at the moment with garments that are 80% cotton and 20% polyester (or a combination of polyester, nylon and, in small quantities, elastane, with polyester usually the main synthetic component), but that it is close to pushing this to 60-40. Its system includes a pre-treatment process, during which non-cellulose-based materials are removed. Dyes and surface-treatment chemicals are also removed at this stage.

At the moment, these materials form a waste-stream, but the Finnish company is able to use that waste to generate energy for the rest of its processes. It is looking into technology and partnership possibilities that could mean giving new life to some of the components of the polyester, too, if not to the fibre itself. "This looks possible," he says, "but it's not ready today. In the pre-treatment, what we do is depolymerise the polyester so it's no longer polyester fibre. Instead, the direction we are looking at going in would involve finding a use for a couple of the chemical components that make up the polyester."

### Tie up supply

In April, the company announced plans to build a new factory in Finland to meet growing demand for Infinna from clothing brands. It is currently supplying customers from two pilot facilities it runs in its home country, in the towns of Espoo and Valkeakoski. The new factory will have an annual production capacity of 30,000 tonnes, enough to produce around 100 million T-shirts without adding any other fibre. However, the company expects the sales deals it agrees in the course of 2021 to tie up supply of the new factory's entire output for the next several years.

Mr Alava explains that there will also be ongoing

*Left to right, the different stages of Infinited Fiber's process for turning textile waste into a liquid form of cellulose and then Infinna regenerated textile fibre.*



investment in the two pilot facilities between 2022 and 2024 and that this will help deliver higher quantities of Infinna to the brands that desire it. "Brands will be able to bring some collections to the market," he says, "and at the same time they will spread the message within their organisations. Then, there will be interest in using Infinna in more and more categories." The new factory will be the flagship, though. The chief executive describes this as the company taking its destiny into its own hands and creating enough capacity to make commercial volumes of Infinna, "radically improving" the availability of the material.

"We are just technology geeks," he continues. "We want industrial manufacturers, either fibre manufacturers, including viscose producers and polyester producers, or other industrial companies that are active in the textile value chain to work with us. Our primary focus will be on the technology and on assisting manufacturers. The need is massive and it would take far too long for us to build global capacity." It will not quite be a question of licensing the technology so that industrial-scale textile manufacturers around the world can use it on a plug-and-play basis to produce Infinna, but it won't be too far away from that either, Mr Alava says, adding: "Discussions are already taking place about licensing. We are pursuing this agenda as we speak and we won't need to wait until the flagship factory is up and running. Retro-fitting an existing viscose plant is not that difficult, and the capital expenditure would be radically lower than for our flagship factory."

While all these ideas are taking shape, Infinited Fiber has been able to guarantee a certain volume of Infinna to the brands that have already decided to plan it into their future collections. Its pilot factories and, soon, its flagship factory will be able to meet this demand. Mr Alava also says that sourcing enough textile waste to create the regenerated fibres will not be difficult. "The industry creates 92 million tonnes of textile waste annually," he points out, "and from that we need our qualified partners to give us 30,000 tonnes. Also, many of the brands that want to work with us have in place already, or are looking at, their own take-back systems." He says brands that want to close their own loops as tightly as possible could make sure their own used products are the source of the Infinna that goes into their own new collections if they want to insist on that.

### Financial support

He is encouraged by some of the components of the Green Deal strategy that the European Commission launched at the end of 2019 and of the Circular Economy Action Plan that followed in early 2020, with a new, comprehensive European Union strategy for textiles to come soon. Ideas at the core of this include a detailed focus on textile reuse and on new "ecodesign measures" that will ensure textile products are "fit for circularity". More than that, the Commission has said it will provide incentives and support to companies that generate circular materials through circular



*Wet spinning at one of Infinited Fiber's pilot plants.*

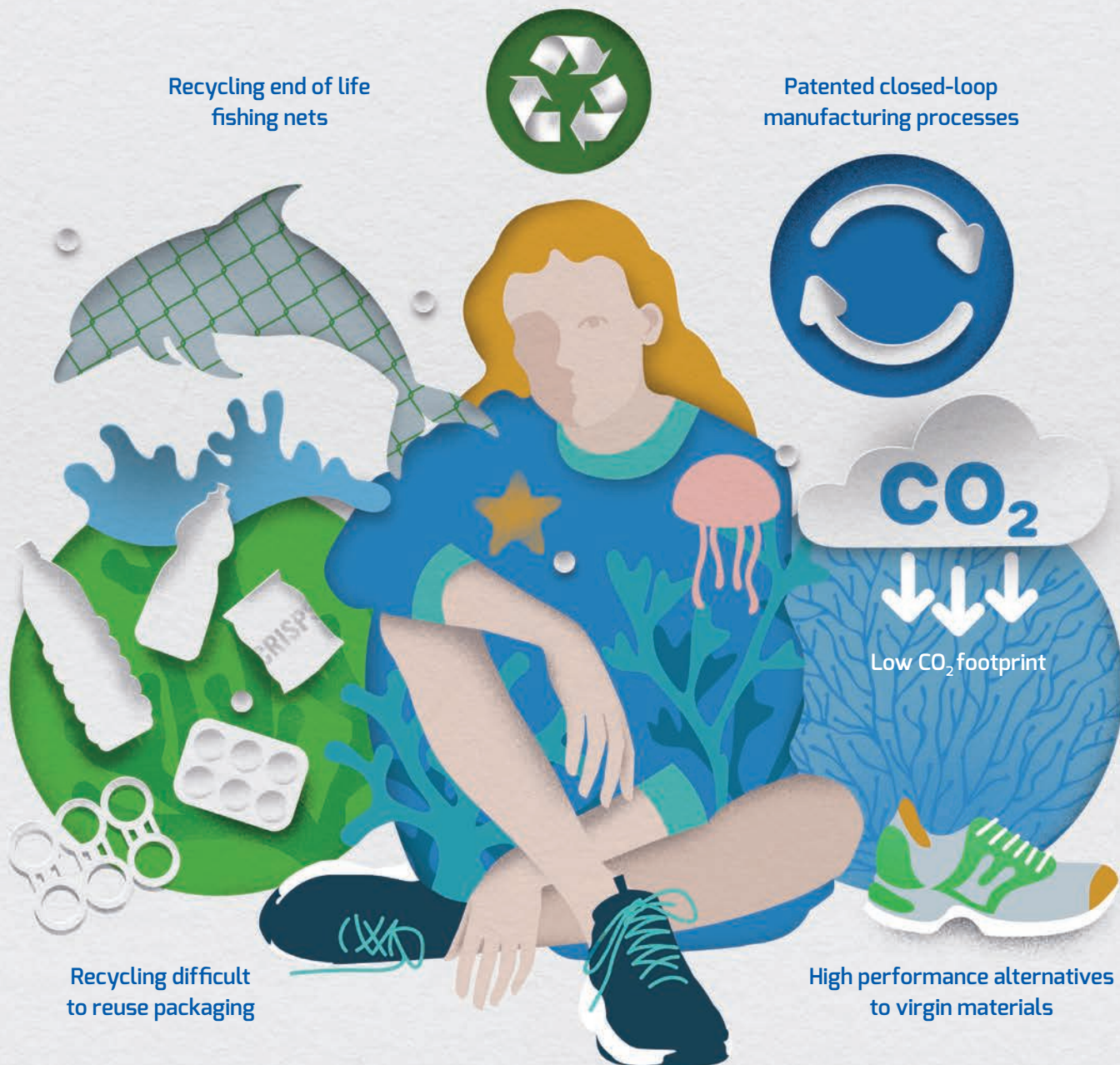
production processes. Petri Alava is encouraged by this, as he is of a commitment that is already in place to make sure the 27 member states collect textile waste separately from other waste streams by 2025.

The talk of incentives and support, including financial support, is also encouraging, and even though it takes time and effort to secure a share of European Commission funding, Infinited Fiber already has some experience of this. In late 2020, it was announced as a lead partner in a consortium of 12 that had bid successfully for €6.75 million in funding for an initiative called The New Cotton Project. It will turn textile waste into regenerated fibres. Yarn producers and fabric mills are part of the project, as are academic institutions and non-profit groups that will help design the business model. H&M and adidas have already committed to designing, manufacturing and selling apparel made from the new fabrics.

"Our experience of working with the European Commission is positive," Mr Alava says. "I can't say that it's easy to get the money, but it's worthwhile pushing for it. And what is good is that you can apply once and if you don't get a grant you get useful feedback about what was good and what was bad, and then you just apply again." 🌱

*Co-founder and chief executive, Petri Alava, wearing a shirt that is a 50-50 blend of Infinna and organic cotton.*





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# A century of tradition

**S**ome of the machines that join Hanwag soles to uppers in its headquarters in Vierkirchen are so old that not only are they no longer manufactured, but there is no maintenance service, so the German bootmaker's staff have to carefully tend to the machines themselves. For 100 years, the company has made rugged outdoor boots and shoes using traditional double stitching and cementing methods, eschewing some of the more modern techniques, believing the construction not only reflects the past but also creates the highest-quality shoes. "We know how mountaineering boots were made 100 years ago," says marketing director Christian Wittig. "That's an advantage; it means we can be progressive without losing sight of our heritage."

Established in 1921 by Hans Wagner, a third-generation shoemaker, the company grew slowly, first from Mr Wagner's own house, later taking on more apprentices and expanding into a workshop. The small town, near Munich, remains the company's headquarters to this day.

Mr Wagner's nephew Sepp joined in 1936, eager to learn the trade and to help grow the business. The factory was plundered at the end of



## FOOTWEAR TECHNOLOGY

**German outdoor brand Hanwag credits faithfulness to original manufacturing techniques for its longevity. It takes the best of old and new to create ranges made for mountain and road.**

the Second World War, but as the economy started to recover, so did the demand for ski and mountain boots. Sepp took over the management in the 1960s, and began to expand internationally, securing partnerships in the US and being well placed for the climbing and hiking boom that took off in Germany in the 1980s.

### Timeless methods

A central tenet of the business is the construction technique, as Hanwag claims it is one of the few remaining shoemakers in its category to employ such time-consuming and costly processes. In the cemented construction, the upper is moulded and stretched over the last and lasted to the insole to form a unit. The upper and insole are

“We know how mountaineering boots were made 100 years ago. That’s an advantage; it means we can be progressive without losing sight of our heritage.”

CHRISTIAN WITTIG, HANWAG

*New ranges are designed for hiking and mountain climbing, as well as everyday activities.*

ALL CREDITS: HANWAG

then cemented with adhesive under high pressure and the midsole and outsole are added. In the double stitching method, the insole is punched and tacked to the last, and then the leather upper and the lining are stitched to the insole rib. Excess material is trimmed and the leather upper is secured again with a second row of stitching.

“Nowadays, to make double stitched footwear, not only do you need experience of the method, you also need to have a feel for the machines,” says production manager Harmut Trabert. “We keep them running ourselves, as there is no longer any maintenance and repair service. Hanwag is a traditional shoemaking company and it’s a matter of prestige to continue this traditional construction method.”

While the company prides itself on traditional values, it was modern-minded when it chose the construction techniques so they would enable easy resoling. Extending the useful life of shoes is something we are hearing more about, as companies look to reduce waste and tap into ‘circular thinking’. Resoling is a popular service at its headquarters in Vierkirchen. “These boots are perfectly worn in; people don’t want to replace them. In fact, they’re often long-standing

companions and the source of many happy memories,” says Mr Trabert. “We often receive boots to be resoled that have seen years and years of use. It’s something that makes us proud of our work.”



*One of the early ski boot designs, which became popular in the US.*

A big factor in longevity is also down to the materials. Hanwag sources most of its leather from German tannery Heinen, a partnership it is particularly proud of. Heinen uses only German hides and has a close relationship with its hide merchants, tracking which slaughterhouses and farms the animals come from. These animals spend a lot of time outside in a range of weather conditions and have time to grow thick and firm hides.

For mountain boots, Hanwag uses Heinen's branded leather Terracare, which it says is defined by the production standards: environmentally friendly, resource efficient and socially compatible. It has also produced ranges made from yak leather. "Yak leather is also excellent, only there are not that many yaks. We're just not able to produce enough of our yak models – we could sell far more than we do," the company states.

### European footprint

As the company has grown, so has production, with manufacturing now taking place at facilities in Hungary and Croatia, as well as Germany. This enables shorter transport routes and reduces corresponding CO<sub>2</sub> emissions, compared with outsourcing to Asia, as many companies do. "We deliberately make in Europe, not just because of shorter distances or highly skilled employees, but to uphold traditional construction techniques." It claims the proximity also proved an advantage in 2020 when the pandemic hit, in terms of flexible production.

A finished Hanwag mountain boot consists of, on average, 180 separate parts and around 120 processes – meaning employees are highly skilled and many remain with the company throughout their working lives. It cites some of the 'Hanwag stories' on its website: Franz Kreutner joined as a refugee shortly after the Second World War and stayed for 47 years, while head of research Adam Weger, who worked for Hanwag from 1968 to 2015, tested every shoe in the mountains. The website has been updated this year with 'inspirational content' and expertise, as a way of connecting to its consumers.

After the early death of his daughter, who was previously managing director of the company, Sepp Wagner sold the family-owned business to Swedish group Fenix Outdoor in 2004. The company diversified to make more styles and tap new markets, but stayed faithful to its manufacturing techniques. Its winter 21/22 collection includes The Banks Snow GTX, a winter hiking boot that is snowshoe compatible and has a built-in mini snow gaiter. It features a warm, waterproof Gore-Tex Partelana lining and slip-resistant Vibram Endurance Ice outsoles. In its hiking category, it has launched the Torsby GTX, a mid-cut, lightweight shoe made with a suede and nubuck upper and an outsole which includes recycled rubber.

### Pared-down celebrations

During the 100th anniversary year, the company plans to make 400,000 pairs of boots and shoes and capitalise on the expected increase in walking



and hiking as people make the most of nature following pandemic lockdowns and restrictions. The pandemic has brought new customers to the outdoors and introduced a more balanced gender mix, according to UK brand manager Christopher King. "Our business model means we are able to offer trade customers a more interesting colour palette, as well as a better fit offering thanks to our wide range of lasts," he tells WSA.

The company had originally hoped to celebrate the centenary with a big global event but, due to the pandemic, any events are now taking place on a local basis. In the UK, it will have a large presence at the Keswick Mountain Festival, which takes place in September. "We are celebrating on a global scale too," says Mr King. "We're proud to have launched a new Hans Wagner Heritage Collection, which includes ultra-premium and heritage-inspired handcrafted models that celebrate our history and honour our founder."

Hanwag is confident cementing old practices and modern materials will help it through the next 100 years. "Our approach is based on employing the best craftsman, the highest quality standards and selecting the best raw materials. As to whether it's worth the additional cost? That's simple: it's the only way to make such high-quality boots."🌐

*Launched for the anniversary, the Hans Wagner Heritage Collection includes premium and heritage-inspired handcrafted models.*

*Hanwag is proud of its roots, maintaining similar processes that were prevalent when the company started in 1921.*



# RUN ON WASTE

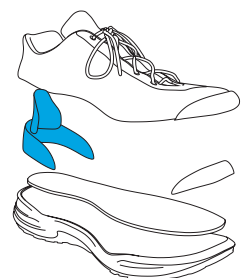
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## SUSTAINABILITY

A project to grow flax, spin and weave linen and produce clothing has sprung to life in Blackburn, Lancashire. Organisers harbour hope that it could spark a wider revival of textiles and garment manufacturing there.

# No place like home

**C**lothing entrepreneur, designer and television personality Patrick Grant is backing a community textile project in Blackburn that aims to prove that locally made apparel from locally grown textiles and natural dyestuff is still possible in the UK in 2021. Homegrown Homespun is a regenerative fashion project that has grown out of a wider arts programme in this part of northern England called Super Slow Way. In spring 2021, with the support of Patrick Grant, volunteers cleared an area of land in Blackburn and began growing flax on it, leaving space for woad and other plants that can provide natural dyes.

Hardy volunteers have gone every Friday since then, in sunshine and in rain, to look after the plot, which was donated to the project by the local council. The land, situated close to a wooded area near the Leeds-Liverpool canal, was disused and overgrown, but the Homegrown Homespun team cleared it, fenced it off neatly (with the help of students from Blackburn College), tilled, drilled, seeded and weeded it until, in the middle of August, the flax was ready for pulling, retting, spinning and weaving. Volunteers have included people of all ages from all parts of the region and the project, from the outset, has been open to everyone. It is close to Blackburn railway station and one of the Super Slow Way directors, Jenny Rutter, says there are plans to cut walkways between the flax field and the Leeds-Liverpool canal, which would allow local runners, walkers and cyclists to make a very quick detour from the towpath to see the site.

## Northern stories

Super Slow Way takes its name from the canal; Yorkshire poet Ian McMillan gave it this title in a short poem from 2016, which he wrote to commemorate the 200th anniversary of the canal's completion. He talks about the waterway as a conduit for "our tales, our Northern stories". The programme focuses on the communities that grew up beside the canal, or at least the stretch of it that spans the 25 kilometres or so between

*Cut and dried. The project's aim goes beyond one crop of flax and one pair of linen jeans to a revival of locally produced fibre, fabric and clothing in Lancashire.*

CREDIT: JUSTINE ALDERSLEY-WILLIAMS



Pendle and Blackburn. Jenny Rutter immediately loved the idea of featuring textiles and clothing produced by local communities. “There used to be 100,000 looms in Burnley [one of the towns in her area] alone,” she explains. “Manchester was the showcase for clothes and fabrics, but all the spinning and weaving happened here. The climate is suited to it because it’s damp here, making fires in the mills less likely. That’s also why people wore wooden clogs in the mills; boots with hobnails could spark and cause fires. All of these things, the mills, the cloth and the clogs, are part of our local heritage.”

Super Slow Way’s aim is to use arts and culture projects to help people stay connected to the whole of that heritage, including textiles. “The textile industry is here because the canal is here and our communities are as diverse as they are thanks to the textile industry,” Ms Rutter says.

### Local sourcing

No irrigation was required to produce Homegrown Homespun’s special crop in this rainy part of the world and the team used no fertiliser either. North West England Fibreshed, another of the driving forces behind the project, would have wanted the field to fill with flax in no other way. A community of textile producers and educators who champion regeneratively grown materials, Fibreshed is a non-profit organisation that launched in California in 2010. Founder, Rebecca Burgess, set out to develop, for her own use, a wardrobe of garments whose fibres, dyes and labour were sourced entirely from her home region. She explained that she wanted to reduce her ecological footprint, so she teamed up with farmers and artisans who were no more than 250 kilometres from her home in Fairfax, to the north of San Francisco, to source clothing in a super slow way.

### First project

Her idea has spread and there are now Fibreshed communities across the US and Canada, as well as in Denmark, Finland, Germany and India. There are four in the United Kingdom, including the North West England Fibreshed, set up by Wirral-based textile dyeing specialist Justine Aldersey-Williams in 2020. Homegrown Homespun is this Fibreshed community’s first project, with Ms Aldersey-Williams organising workshops from the outset to help local people increase their knowledge of fibres, spinning, weaving and dyeing. At the time of a WSA visit, one wet summer Friday, this included an impromptu demonstration of the effects of woad on a small, white, silk handkerchief. There is a dye garden just in front of the flax field with, in addition to woad, marigolds for yellow dye, hollyhocks for purple, madder and lady’s bedstraw for red.

For the purposes of the demonstration, she picked woad leaves from the plot and placed them in a metal salad bowl. She then worked the leaves with her hand for a time, almost as though she were kneading dough for bread, before adding the handkerchief to the mix. It quickly turned green,

“We want to turn the clock back to a system that existed a few hundred years ago when everything was produced locally and people in the community got involved.”

PATRICK GRANT



but the colour would soon change to blue, with exposure to oxygen.

Justine Aldersey Williams and Patrick Grant came up with this initiative together. She knew him to be as passionate about locally sourced and produced clothes as she is and, because he is a judge on a television programme that showcases and celebrates the sewing skills of members of the public, his involvement has helped attract wide interest.

### Community concerns

Mr Grant’s own business interests include high-end, London-based tailoring and menswear brands Norton & Sons and E. Tautz & Sons. In recent years, he has also taken over the Cookson & Clegg Clothing Company, which makes jeans at a factory in Blackburn, and set up a social enterprise called Community Clothing, which is also based in the Lancashire city. It aims to produce UK-made clothing and to connect with communities in which clothing and textiles play, or have played, a significant role. With Community Clothing, Mr Grant, who lives near Blackburn, aims to design and make “simple ranges of clothing for men and women” using the fruits of these communities’ labour.

Another motivation for Community Clothing is to highlight the state of play that has emerged on UK high streets (and elsewhere). “The market price for clothing has fallen dramatically in the last two decades,” Mr Grant said on setting Community Clothing up, “as a result of retailers moving their manufacturing offshore.” But he said the same

*Clothing entrepreneur and television personality Patrick Grant at the Homegrown Homespun field in the early days of the project in spring 2021. He wants consumers to be able to choose climate-positive materials for their clothes.*

CREDIT: BEA DAVIDSON

retailers, driven by shareholders' desire for profit, continue to demand high margins, and the prices they charge consumers reflect this. Garments from UK-based manufacturers would command even higher prices, but not high enough to make most of these businesses viable owing to the small volumes retailers want to stock. All that is left to these local manufacturers, according to Mr Grant, is "smaller-volume, seasonal production for the higher-end fashion industry". In most cases, this is work for specific times of the year only, leading to a lot of what he calls "seasonal hiring and firing" of garment workers. In some cases, people are even being paid "wages below the legal minimum", he claims. His idea is to have skilled workers make Community Clothing's collections during otherwise "quiet production periods"; Mr Grant's community interest company will sell these clothes directly to the public. "We can keep prices affordable and sell large volumes," he says.

### Turn the clock back

Speaking on the same theme on BBC Radio in June, Patrick Grant said: "The textile system we have now, as lots of us know, is pretty damaging to the environment. We want to turn the clock back to a system that existed a few hundred years ago when everything was produced locally and people in the community got involved."

All of this helps explain his involvement in Homegrown Homespun. He describes flax as "an amazing plant that just springs to life" (in the right geographies). His specific aim is to use the locally grown linen fibres from the project to make, through Community Clothing, some jeans. What he makes will then go on show at an exhibition called the British Textile Biennial in the autumn. "We want to prove the concept," Mr Grant says, "and if the concept works we'll roll it out in a bigger way. We want to regenerate sustainable clothing and to create jobs. We want to encourage people to move away from having bad materials in their clothes to using good, climate-positive materials instead."

This chimes completely with the views of Justine Aldersey-Williams. "It's simple," she says. "We have to choose between clothing from above the ground and clothing from below the ground." This same thought is part of her manifesto for North West England Fibreshed, in which she calls for a transition from extractive textile manufacturing processes to more regenerative systems. Anything that moves us away from fossil fuels is positive in her book, even if it's only in a (super) slow way. She's not aiming to end greenwashing in the global fashion industry, saying with a shrug: "I don't think greenwashing will ever stop. People who tell lies will keep telling lies. Nothing will change them. For some of us, though, there is a better way. We can live with less and make things that last longer."

### Start small

Homegrown Homespun's initial ambitions are deliberately conservative and the team will be happy even with just one pair of Patrick Grant



jeans from this inaugural crop. "We calculated conservatively because we wondered about crop failure and other factors," Ms Aldersey-Williams says, "but we will have more than enough. The flax you can grow in 15 square-metres of land will give enough linen to make one pair of jeans. We have 300 or 400 square-metres here." The whole point is to make a start and show that the Homegrown Homespun idea can bear fruit. "Starting with a single pair of jeans, she explains, "we will build a whole network of people who will grow flax in their gardens, their allotments or fields like this one. We will have people who can process the fibres, make spun yarn and weave fabric. These crafts have not been valued or taken seriously because they were women's work. That needs to change. These are activities that connect us to the earth."

If the project team is able to expand Homegrown Homespun, what it envisages is something that emulates the way Harris Tweed works in Scotland. Harris Tweed is woven from 100% pure new wool yarn that must, by law, have been dyed and spun in the Outer Hebrides, the most remote of the inhabited isles off the west coast of Scotland. The yarn must be woven by hand in the homes of islanders. At the moment, there are 220 weavers throughout the islands collectively producing between 1 million and 1.5 million metres of Harris Tweed fabric per year. These people often have other jobs, too, such as looking after land and livestock, but weaving a fabric that is in great demand the world over provides an important supplementary income throughout the year.

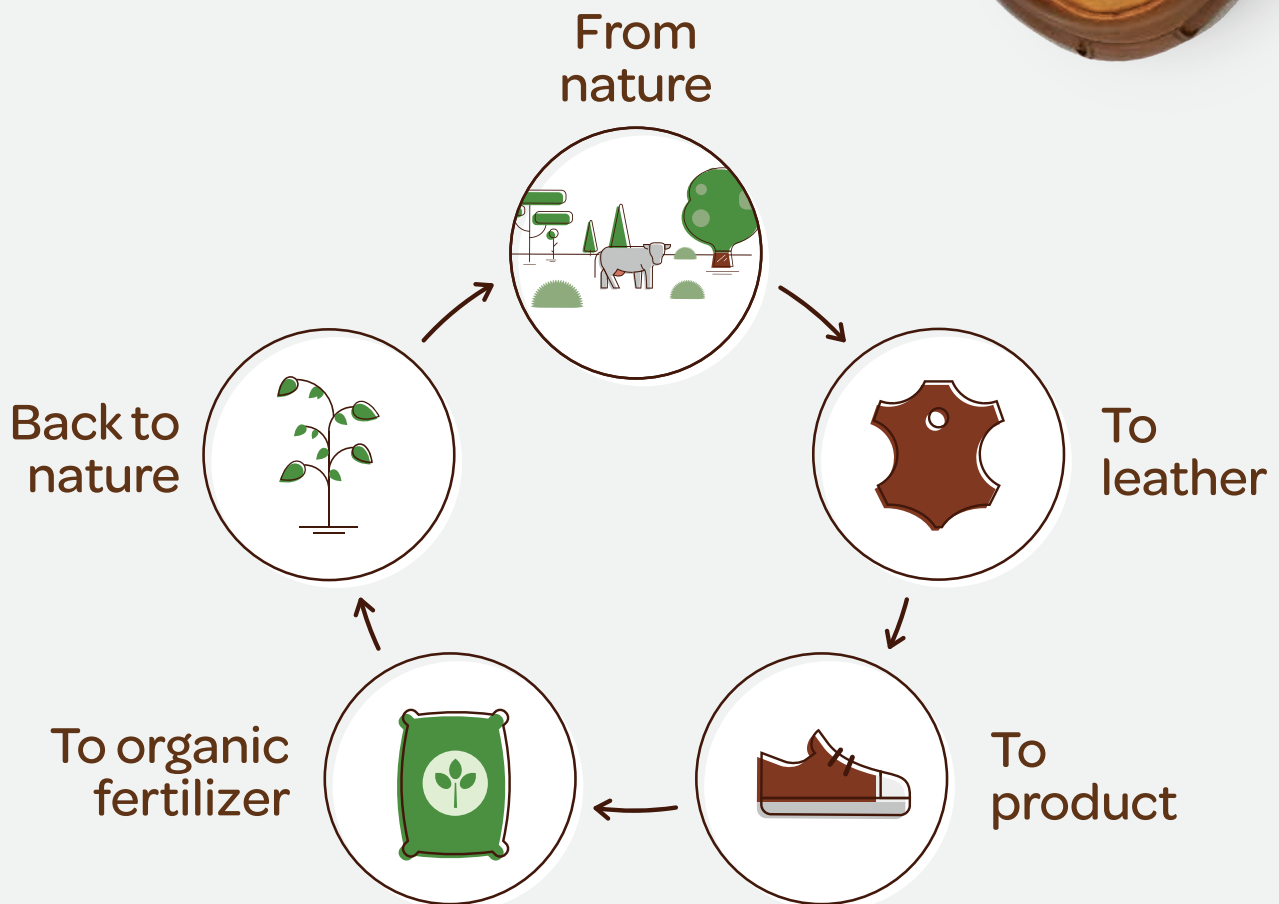
Justine Aldersey-Williams, Jenny Rutter and Patrick Grant believe that something similar could flourish in Lancashire as a result of Homegrown Homespun, with a real flax, linen and clothing cottage-industry building up there. It won't challenge fast fashion, but it will show that a slower, alternative way is possible. 🌱

*Justine Aldersey-Williams demonstrates hand-dyeing with woad to volunteers at the Homegrown Homespun project in Blackburn.*

CREDIT: WTP



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# Nylon 6.6 and the end of greenwashing

**H**ead of global marketing at Nilit, the world's biggest producer of nylon 6.6 yarns, Sagee Aran, is convinced his company has a contribution to make in helping the textile and garment industry lower its impact on the environment.

**You have said Nilit's nylon products have been constructed to address "the particular environmental challenges" that the textile and apparel industry faces. What are those challenges?**

When we come to market with new technology, we have four pillars in mind and any new product we bring out will have to check at least one of these boxes. The first one asks if the product will contribute to waste reduction. The second relates to water preservation, by which we mean drinking water for communities. The third is wellbeing, by which we want to know if people will feel good if they wear a garment made from our yarns. For example, we have a product, Sensil Breeze, that has a cooling effect built into the core of the polymer, so it's permanent. If 100 lawyers



## DIALOGUE

**Sagee Aran, head of global marketing, Nilit.**

in a big office all wore a baselayer garment with this technology, the company could reduce its use of air conditioning because the effect would be that people would feel one degree cooler thanks to the baselayer. One degree may not sound like much, but if you multiply that by lots of buildings for ten hours a day, you save a lot of energy. This is an example of the ways in which textiles can make a contribution to helping the environment. The fourth pillar is that garments made using our products should be long-lasting. This helps address environmental challenges, of course, because if you can keep the same garment for a few years, it means you don't have to buy another one. But if the consumer is going to keep a garment and keep wearing it, it has to keep looking good. The nylon that we and our competitors produce is a good fibre for that.

*Nilit is in no doubt that nylon 6.6 has a role to play in helping the textile and garment industry lower its impact on the environment.*

CREDIT: NILIT

***You list water conservation as one of Nilit's priorities. The United Nations World Water Development Report for 2021 predicts that water scarcity in Asia, where so much textile production takes place, is likely to worsen owing to climate change. What do you think the textile and apparel sector can do to stop the situation from becoming worse?***

Dyeing has a big impact. Many dyehouses are in places where government control of waste management could certainly be stronger. Dope-dyeing or yarn-dyeing can help and brands can choose this. It would mean they'd have a smaller collection of colours but they can tell their customers that they want to do things in a more responsible way and they can even reflect that in their prices to encourage people to buy clothes in the colours we can offer with dope-dyeing. They can just say to consumers: 'Look, we are not going to be able to supply you with light green, bold green, olive green, matt green and fluorescent green. There will only be one green'.

***What about the water consumption of the textile industry in general?***

The biggest issue in textiles with regard to water is that we praise cotton as a sustainable fibre, and this is completely untrue, for two reasons. There is a lack of available water in the world and there is also a lack of land for growing food crops. Cotton consumes large volumes of water and large areas of land. We could use the water and the land to grow food, but instead we use it to grow fibre to make apparel. Come on. It's a political issue because cotton is the main driver of the economy in some countries and there is a big lobbying effort in favour of cotton, so change is not going to happen quickly.

***What volume of nylon 6.6 is Nilit producing each year at the moment?***

The volume is around 45,000 tonnes of yarn per year. We have four facilities. The biggest one is in Israel. We have another in Suzhou, near Shanghai, one in Martinsville, Virginia, in the US, and the Americana plant in Brazil. Altogether, we have between 900 and 1,000 employees.

***How much of this output is recycled?***

Today, we are able to dispatch something like 2,000 tonnes per year. I've talked to our own employees about this and they have said that 2,000 out of 45,000 is not that big a number. I've said that, yes, they are correct, but there is more to it than this. Recycled yarn means you are recycling waste. What we want in the end is apparel that will sell. It must have the look, the feel and the performance. If you are unable to get this from a post-industrial recycled polymer, it will not sell, and if it will not sell, you cannot do anything. So, when we go to market with responsible offerings, with sustainability, we must be sure they will sell. For them to sell, they must have the characteristics of virgin polymers, with the abrasion resistance, the dye uniformity, the touch, everything.

***“I think big brands are very careful about protecting their reputations. Why would they claim anything that they cannot substantiate? And why would I if I am supplying them?”***

SAGEE ARAN, NILIT



CREDIT: NILIT

***What are the main sources of the fibres Nilit uses to make recycled Sensil EcoCare and Sensil EcoCare Breeze yarns? Are these products recyclable as well as having recycled content?***

We can't make everything recycled, it will not work, but EcoCare is technology that we have built during the last ten years. The recycled content is from our own production waste. We are trying to bring in raw material from third parties, too, especially traceable ocean plastics (fishing nets for example), to make yarn out of it. But, technology-wise, it's not that simple because the material is so unclear. If it's difficult to get polymers with the same characteristics and we can't do big volumes, we can, at least, do small capsules and show that it's possible. And the last element we have been able to do so far is biodegradable, with Sensil BioCare. With biodegradability there is a lot of controversy but for most apparel there is no technology at the moment to recycle it and, at end of life, it goes to landfill and it can stay there for hundreds of years. You can put it into landfill without worrying how long it will be there or you can make it biodegradable. The controversy is that, if it's biodegradable it becomes gas, CO<sub>2</sub> and methane, and you're increasing carbon emissions. It's all checks and balances and it depends what you want to achieve.

***Is helping to “lessen the persistence of textile waste in seawater and landfills” enough?***

Of course it's not enough. We've been tackling the issue of microplastics in the oceans because this is something that we can help control. Of all the plastic in the oceans, 80% or 90% is not from apparel or fabric, it's from other plastics, but there is a lot of shedding. We launched Sensil BioCare only after we were able to show certified laboratory results that demonstrate that 40% of it had biodegraded after about 500 days. It costs a little bit more, and if it costs more people need to think about it before they buy it, but it shows that we have something in response to the microplastics. Other examples of products that we have launched as part of our responsible offering are Sensil WaterCare, which has to do with water preservation, and another, which we're about to launch, has non-fossil feedstock. This portfolio means we are doing something, and we will still be able to bring the same quality of product to the market.

***What has been the reaction to these developments among your customers?***

In the past, we asked the market what it needed. Today, we are going to the brands and telling them: this is what we have, this is the story, and asking them how we can convey the message together. If a company wants to become a really responsible supplier, it needs to show it, and not only with hang-tags. We carry out internal audits every year and we have a zero-waste management methodology. Cardboard, wood, oil, plastic: nothing is thrown away. Either we use these materials to create something, or we have a partner, someone we can audit, that knows how to do that instead of us. We are very vocal and everything is backed by scientific data, by an external lab or by certification that we can show. Apart from that, we've completely changed the way we are sourcing energy for our industrial operations. Just for the spinning operations, the energy saving is 40%, so this is something else we can talk to customers about.

***A new report into synthetic materials from London-based consultancy Changing Markets Foundation claims, after analysing information from 48 major fashion brands, that “greenwashing is clearly this season's hottest trend”. What will bring about the end of greenwashing?***

I think big brands are very careful about protecting their reputations. Why would they claim anything that they cannot substantiate? And why would I if I am supplying them? Among our customers are big names, such as Lululemon, adidas, Inditex, Odlo and others. The claims we make about our fibres are not a matter we can play around with. When I go to them, I have to be able to put all the information on the table and face their questions and offer them the verification and audit information they

**“The biggest issue in textiles with regard to water is that we praise cotton as a sustainable fibre, and this is completely untrue.”**

need. They want to make sure that, when they do go to market with a new product, there is nothing that is going to come back and hit them like a boomerang.

***How will consumers know that marketing professionals have stopped greenwashing?***

What's still missing is regulation. The organisations responsible for regulating this need to be much stronger. They have the ability to influence what happens in the market, particularly with hang-tags. You can go into a mall and see a garment with a ticket that says it's made from recycled fibres. But who knows what it's really made from? There's nothing to make it clear. Ours have a QR code that goes straight to our website. That lets people know where to come to if they have a question. They know there is some reliability behind the hang-tag. It will require local regulations, but companies will not be able to have misleading marketing. You cannot play around with this; you have to be 100% transparent and when you showcase your technology you have to show the scientific basis for the claims you make about it. That's how to get away from greenwashing.

*Nilit's Sensil nylon in action in Ironman triathlon kit from long-term partner, Germany-based brand Thoni Mara.*

CREDIT: THONI MARA



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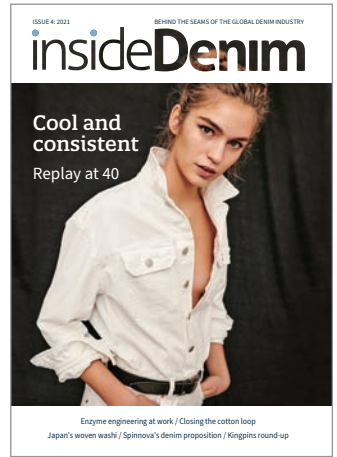
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