



canopy green paper



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LAY OF THE LAND FOR NEXT GENERATION SOLUTIONS

Latest Developments and Trends in MMCF Textiles

Diversifying the Man Made Cellulosic Fibre (MMCF) basket to include Next Generation Solutions that are more circular economy in nature helps address viscose's primary environmental impact areas. New technologies and manufacturing processes are already bringing viscose to market that is made with cellulose derived from feedstocks such as used cotton clothing. Trials using microbial cellulose and agricultural residues are advancing as innovators and conventional producers strive to scale Next Generation Solutions to keep pace with market expectations, and to deliver solutions proportional to the ecological challenges of our times.

This Green Paper enables brands to discover the fast moving "lay of the land" of Next Generation Solutions in the MMCF supply chain. It is the first in a series of Next-Gen focused Green Papers that Canopy will publish in the coming 24 months.

WHICH FABRICS (MMCF) QUALIFY AS NEXT-GEN?

At Canopy, Next Generation (Next-Gen) Solutions are the innovative designs, systems and technologies that enable us to achieve protection, including restoration, of 30% of the world's high carbon and bio-diverse forests by 2030 and 50% by 2050. These solutions enable:

- Radical reduction in the use of forest fibre and other raw resources;
- Optimally efficient use of materials;
- Product reuse; and
- Shifts from conventional high carbon feedstocks to alternative, less damaging or regenerative raw materials.

THE RACE TO NEXT-GEN

Six years after the public launch of CanopyStyle, and thanks to the consistent engagement of CanopyStyle brand partners, viscose producers are in a race to bring Next-Gen viscose fabrics to market! Here's an overview of some of these exciting developments with both mainstream viscose producers and disruptive technology ventures.

VISCOSE PRODUCERS TO MARKET WITH NEXT-GEN PRODUCTS: STATUS

Producer	Next Gen Feedstock	2017	2018	2019	2020 ¹ (Projected)
Aditya Birla	Recycled textile			20%	50%+
Lenzing	Recycled textile	20%	20%	30%	Refer to footnote 2
Tangshan Sanyou	Recycled textile			50% trial	50% for Sanyou projects 2020 ¹

CONVENTIONAL VISCOSE PRODUCERS VIE FOR MARKET DIFFERENTIATION ON NEXT-GEN

Over recent months there has been a stream of commercial viscose products and trials – with more anticipated by year-end. Some of these integrate the technologies of Next-Gen innovators and some of which are based on internally developed technologies.

Other producers are actively testing Next-Gen options, building partnerships with innovators and brands, as well as investing significant resources to develop alternative fabrics. With the exception of Aditya Birla, Lenzing, Sanyou and the Royal Golden Eagle Group's USD 60 million R&D investment in Next-Gen textile fibre in October 2019, other producers' efforts and results are not yet public. Canopy will continue to provide brands with regular updates and analysis on advancements.

"STATE OF THE NATION" OF DISRUPTIVE TECHNOLOGIES

An increasing number of innovators are developing new disruptive technologies that create pulp using agricultural residues, textile waste and microbial technologies with closed loop processes. Canopy is currently working with a number of innovators that have developed processes for making dissolving pulp and/or staple fibre MMCF for viscose textiles or an MMCF for a cottonized fabric. Though there are many more innovators out there, the table below includes the companies that currently support the CanopyStyle commitments.

If your company has an innovative technology and wants to partner with Canopy on solutions at scale, contact us at canopystyle@canopyplanet.org.

A NET INCREASE IN NEXT-GEN OPTIONS IN 2019

The principal idea of the circular economy is that there is materials flow. In a circular economy the concept of 'waste' doesn't exist. One company's by-product of manufacturing is another's feedstock. The mindset of modern product, process and system designers is to ensure the best use of resources and to plan for re-use and/or recycling of the materials and by-products. The tide is turning, but we are not there yet. Every year some 100 million tons of textiles are landfilled around the world and massive volumes of agricultural residue are burnt after the food grain harvests. To stabilize our climate, wildlife populations and natural systems, we need to shift to this new mindset and diversify our fibre basket to these new raw materials.

When CanopyStyle was launched in 2013, leading viscose producers told Canopy that turning recycled clothing into viscose at commercial scale wasn't possible, but 2019 has shown us otherwise! Since last June, two additional viscose producers have launched commercial Next Generation products and trials, both containing recycled textiles. As shown in the table above Aditya Birla has launched a viscose containing 20% pre-consumer recycled fabric, Tangshan Sanyou launched a successful trial, followed by a low volume commercial line of viscose made with 50% post-consumer recycled textile, and Lenzing has increased the recycled content in its Refibra fabric to 30%, with 10% post-consumer. Aditya Birla also announced that it is on track to launch a commercial grade viscose with 50% recycled textile in 2020 whilst Lenzing has announced a vision to make textile recycling common place and have a line composed of up to 50% post consumer textile waste on market by 2025.

NEXT-GEN TECHNOLOGY INNOVATORS: STAGE OF COMMERCIALIZATION

Innovator Stage of Commercialization	Technology Development	Investment	Pilot Scale	Commercial Scale	Scale Up Model ³
Circular Systems – Agraloop		X (seeking investment for pilot and commercial scale)	X		1 & 4
EVRNU			X		1 & 3
Infinited Fibre			X		1
Nanollose					2
Renewcell ³		X (seeking investment for commercial scale capacity expansion)		X (Current capacity: 7000 t/yr & seeking to build larger mill)	4
Tyton	X	X (seeking investment for pilot mill)	X		1



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CAN NEXT-GEN FIBRE REPLACE TREE FIBRE?

It takes 2.5-4.5 tons⁵ of trees to produce one ton of dissolving pulp for viscose. Disruptive technology innovators have improved efficiencies and can now convert one ton of used cotton garments into one ton of viscose. Other innovators have developed processes for growing microbial cellulose on industrial food waste as the feedstock for viscose textiles. These alternatives are much more material, energy and water efficient than traditional methods of using wood to make viscose fabrics.⁶ As noted above, some of the world's largest viscose producers have already begun integrating used cotton into their viscose manufacturing process. The continued refinement of these technologies and

wide adoption of these processes will be key in reducing pressure on carbon and species-rich ecosystems.

There is so much cotton and rayon waste generated every year that, were it all collected, it could be converted into three times the current production of MMCF fabrics.

Canopy will be releasing a complete Next Generation Solutions report in early 2020, recommending the necessary next steps to materialize this vision. As momentum builds we will soon see the end to the use of Ancient and Endangered Forests and instead of using virgin inputs, viscose will become a model for circularity within the textile world.



Forest Ecosystems already supply more than 150 million trees for viscose each year, and that number is still growing. Viscose production is slated to double within the next eight years, which is why it is imperative to ensure this new production capacity is focused on Next Generation Solutions.

photo: © Paul Hilton



Ancient and Endangered Forest fibre cannot continue to be a source of fibre for viscose and rayon fabrics.

Footnotes

1. Publicly stated 2020 Next-Gen fibre target
2. Lenzing has committed to produce commercial s lines with up to 50% recycled textile by 2025.
3. Scale up model entails: 1. Licence the technology; 2. Partner with viscose producers; 3. Sell the technology; or 4. Build "bricks and mortar"
4. Renewcell product : circulose
5. Depends on the efficiency of the dissolving pulp mill
6. Stella Life Cycle Assessment: <https://www.stellamccartney.com/cloud/smcwp/uploads/2017/09/Stella-McCartney-EPL-Report-2016-FINAL.pdf>

BRAND ACTIONS TO PULL NEXT-GEN SOLUTIONS TO MARKET AT SCALE:

- Trial Next-Gen fabrics that utilize disruptive new technologies such as microbial cellulosic processing as well as Next Gen fabrics with the highest available recycled textile or agricultural residue content.
- Aggressively adopt Next-Gen fabrics into their clothing design.
- Develop off-take/early adopter agreements to help draw innovation to commercial market scale,
- Promote the environmental qualities of Next-Gen fabrics to their customer base.
- Ask large viscose producers for Next-Gen fabrics, with the highest possible post-consumer recycled or agricultural residue content, up to 100%.
- Financially support innovators when possible.

STAY TUNED ... We anticipate other substantive Next Generation innovation commitments and product launches between now and the end of 2020 as producers diversify their fibre baskets to be in sync with brands and retailers

