



CANOPY GREEN PAPER

RENEWCELL: A SPRINGBOARD NOT A HURDLE

LESSONS LEARNED AND
ACTIONS MOVING FORWARD



AS THE FIRST OF ITS KIND COMMERCIAL TEXTILE- TO-TEXTILE RECYCLING FACILITY, ALL EYES WERE ON RENEWCELL — AND THEY STILL ARE.



First-to-market technologies always navigate bumpy terrain. It's par for the course for any innovator spearheading the transition to a new supply chain. But when Renewcell filed for bankruptcy at the end of February 2024, the news sent shockwaves across the industry. *What went wrong? What lies ahead? Is this the end of circular fashion?*

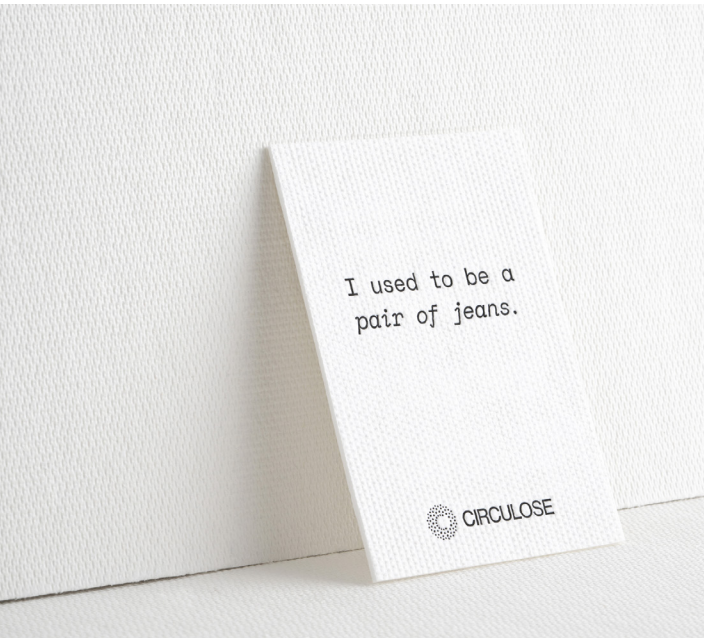
Canopy has been along for every step of the journey with Renewcell, including deep work with the management team, brands, and supply chain partners. From this privileged vantage point, we've gleaned significant insights. These are already informing our work with partners and stakeholders across the MMCF value chain as we look to "fail forward" and have the Next Gen sector emerge stronger.

The following reflections — both Key Insights and Applied Learnings Moving Forward — are offered in the spirit of collectively doing better next time. This is by no means an exhaustive inquiry. It does however capture many of the bumps in the road that Renewcell encountered.

We invite you to use them as collective lessons, regardless of your role within the value chain, as we forge ahead towards a circular and lower-carbon fashion sector. As is often the case when changing complex systems, there are a lot of intersections and entangled problems. We have endeavoured to explore these problems to provide a simplified view of what happened.

We owe a debt of gratitude to Renewcell for their trailblazing efforts in the Next Gen textile sector, which has benefitted subsequent innovators entering the market with a smoother pathway to success. At the time of writing this piece, the Renewcell business is in the final stages of being sold in a bankruptcy proceeding. Since February, Canopy and many others have worked diligently to enable the Next Gen phoenix to rise from the ashes. We look forward to that being so!

Thank-you to everyone in the value chain who is stepping forward — for your commitment and leadership in building a truly sustainable industry for the benefit of our planet and all who call it home.



HIGHLIGHTS

Status quo production will not change with only one part of the system changing and everything else remaining static. Although there may be some “drop in elements” each partner in the value chain must be prepared to step outside of the norm, if only in the early stages, to work with others along the chain. Paradoxically a pre-competitive mindset may be necessary to set up opportunities for a competitive advantage at a later phase.

Governments are nearly invisible in this space at the commercialization phase — and supportive tax policies and financial incentives focused on commercial-scale production could play a breakthrough role in making circular manufacturing innovations mainstream.

Next Gen Solutions are the next frontier for impact motivated investors or infrastructure inclined capital. Renewcell had four months at scale and prime specification before it started having significant cash pressures. A broader pool of committed investors — including equity and debt — is needed to unlock these game-changing solutions with capital depth and long game patience for successful scale-up.

For early-to-market innovators, it will be key for brands, spinners, and fibre producers to coalesce around a simplified supply chain in the initial stages. A single blend percentage, a focused group of suppliers, and fewer sets of textiles will help all actors along the manufacturing chain to achieve optimized production. Larger volume runs will provide the opportunity to produce consistent product at more competitive price points.

Next Gen mills do not operate in isolation; they function in an industrial ecosystem. The feedstock component of this ecosystem requires appropriate frameworks and support to guarantee both accessibility and transparency. Municipalities and governments in particular stand to benefit from scaling textile diversion away from landfill and should be participating in aggregation and sorting programs. This will reduce the raw material costs for a circular manufacturing sector, which is competing against wood fibre that is highly subsidized and has been off-loading the costs onto the environment for

KEY INSIGHTS FROM RENEWCELL'S JOURNEY



INSIGHT 1

COMMISSIONING A MILL AND VALUE CHAIN TAKES TIME!

BUILDING VS. COMMISSIONING

Renewcell moved on an ambitious timeline. They built a commercial mill in 15 months during a global pandemic — a remarkable feat. However, commissioning a new commercial mill is a whole other endeavour! Getting all the industrial systems and machinery working at scale and to product specifications is a massive enterprise and the pilot-to-main-line transition took more resources and time than anticipated. This resulted in batch processing, which had knock-on effects down the supply chain, causing variations in technical performance. Consequently, other supply chain tiers had to adjust their own processes and machinery multiple times to accommodate changing material inputs. This added to the clock and to the costs.

EVERYONE IN THE CHAIN NEEDS TIME TO ADAPT AND ADOPT

Integrating a new input into an optimized value chain needs to be built into brands' design cycles and annual budgets. Renewcell entered the market mid-year, which led to a misalignment between their financial ramp-up and the internal and supply timelines of brands. This timing issue affected the brands' ability to place new orders and bring products to the market in significant volumes. The runway was too short, especially given Renewcell's initial focus on a subset of global brands.

INSIGHT 2

GETTING THE COST RIGHT

EARLY-TO-MARKET PREMIUMS

There is a narrow tolerance for green premiums within the current system, especially over the medium to long term. Yes — some of the larger global brands or luxury houses can absorb the margin or cover start-up premiums through innovation budgets, but to reach critical mass of production smaller companies, that collectively purchase the majority of MMCF, must also be purchasing these materials. Topline costs need to be reduced through brand and producer incentives (i.e. rebates, tax breaks) and/or with production subsidies. That said there are limits to premiums in the long run and this reality has to be factored into innovators' business projections. In this first phase of commercialization, it will take a combination of creative public and private funding to make Next Gen work. Brand innovation budgets need to be dedicated to kick-starting circular manufacturing as/until government funding gets dedicated. Brand budgets should be linked to their Next Gen targets, related climate and sustainability KPIs, and with a carbon accounting lens to strengthen the internal business case.

DIFFUSE PRODUCTION INTENSIFIES COSTS

Each brand was testing Renewcell fibre in isolation within their established supply chains with different blends, specification requirements, and desired fabrics. This created a snowballing of costs through the value chain, as no single spinner or fibre producer was able to achieve optimized production. This led to the finished garment price being significantly higher than conventional MMCF and even Renewcell's premium — and out of reach for some.



INSIGHT 3

MILLS ARE PART OF A BROADER INDUSTRIAL ECOSYSTEM

SCALED CONVENTIONAL INPUTS VS. FEEDSTOCK SYSTEMS

No region currently has a robust strategy to support early-to-market circular textile manufacturing access to the required volumes of feedstock and sorting capacity. The Renewcell team did remarkable work for the entire sector in starting to map and build the back-end feedstock systems to feed circular fashion, all without sectoral support. Their pace of scaling outstripped the feedstock, making inputs prone to pricing volatility, especially in comparison to wood at extraordinarily low prices. Municipalities and regional governments should be supporting early market players to divert textiles from landfills.

RELIANCE ON "PURE" COTTON INPUTS IN UNDERDEVELOPED TEXTILE RECYCLING ECONOMY

Renewcell's technology requires 95%+ cotton content as a feedstock. Until Europe's textile recovery systems are established in response to the upcoming bans on landfilling Renewcell's reliance on "100%" cotton inputs narrowed its sourcing options to a higher-priced feedstock. Innovators whose technologies process poly blended textiles will be able to avoid this reliance on "higher end" feedstocks. Eventually textile recovery systems should bring the price of post consumer separated fibres down.



INSIGHT 4

GOVERNMENT PROGRAMS NEED TO KEEP PACE WITH A SCALING SECTOR

IT’S TIME FOR “YES, AND...”

R&D support continues to be important, and governments need to expedite a parallel stream of instruments that enable commercialization of Next Gen production. Brands, producers, and innovators need a suite of market subsidies, feed-in tariff equivalents, tax incentives, rebates, and commercialization grants to help the venture scale as quickly as possible and the market to absorb early market premiums. These government programs will enable Next Gen to enter the system at a more competitive price. Alternatively, they will allow the market to absorb a premium until economies of scale and feedstock supply systems are mature enough for businesses to reduce prices on their own. This has been done for renewable energy and EVs.

EXISTING REGULATIONS ARE PATCHY

Other jurisdictions need to emulate the EU and develop robust regulatory frameworks that shift their markets away from “take, make, waste” production and enable a global supply of recycled textile feedstock. There is a rich body of regulations in the EU, some US States, and China to build from. But even in leading jurisdictions like the EU, there are gaps between a raft of forward-looking policies including waste export limitations, take back and eco-design requirements, and on the ground capacity that will enable the transition to circular manufacturing. Policy initiatives that support scaled textile sorting and recycling centres in multiple centralized markets and that offset high regional transportation costs for low carbon circular materials need to be added to the mix.



INSIGHT 5

GETTING THE RIGHT FINANCE PARTNERS AND MODELS

OVERSHARING

IPO’ing was a bold move for a first-to-market pioneer. However, being a publicly traded company exposed Renewcell’s reporting to a world of investors without patience or insight. When they needed to issue an adjustment message, those investors left the company, resulting in a precipitous fall in share price. This scared off investors at a time when foundational funding was essential. The reporting requirements would have been challenging even for a well-established entity introducing a revolutionary new technology into its repertoire. Ultimately, it was an Achilles’ heel for the feisty start-up.

ENSURING THE INVESTMENT RAMP
MATCHES THE TIMELINE OF CHANGE

Renewcell’s investment runway did not match the timeline the new-to-market commercial-scale venture needed to fully commission its facility and the transition timeline its value chain required to adjust their own production processes for the new product. Expectations were too ambitious for the reality of the time it took for the mill and its value chain partners to develop production comfort and consistency. That comfort and consistency was coming to fruition right before the bankruptcy. Investment and internal mechanics were out of sync.



INSIGHT 6

DON'T PUT ALL YOUR EGGS IN ONE BASKET

VARIED MARKETS BUILD RESILIENCE

Renewcell launched with viscose-grade dissolving pulp to better capture the largest segment of the MMCF fibre basket, but they only focused on the ready-to-wear apparel segment. Expanding the market for their optimized product to include other textile categories such as home and workwear would have diversified their offering and cushioned the slow initial uptake from apparel. That would have allowed for the fashion industry to align and address some of the complexity in that supply chain.

YOU ONLY GET ONE CHANCE TO MAKE FIRST IMPRESSION — MAKE IT A GOOD ONE

The revenue model of profitability at launch forced Renewcell into selling a sub-prime product that couldn't hit performance specifications during the mill commissioning phase. This gave the wrong impression through the value chain. Rather than relying on the fashion sector to absorb that sub-optimal product, other commodities that have different technical requirements, such as paper and packaging, would have been good alternative markets for Renewcell as they scaled and hit specification, in concert with a different revenue expectation and runway from investors.

INSIGHT 7

MAKING IT SAFE FOR EVERYONE TO JUMP

ORDERS VS. OFFTAKES

Letters of Interest with explicit volumes are great tools at key junctures as they build investor confidence in the level of market support for a technology. However, non-binding Letters of Interest ultimately need to be converted into purchase orders. Renewcell's initial offtake agreements were promising, but they didn't translate to follow-through orders at a rate that Renewcell needed. Fibre producers were cautious and did not want to buy volumes of CIRCULOSE® pulp unless they had a guarantee of brand demand. The first fibre products that contained Renewcell's pulp didn't move as quickly as expected, partly due to price. Producers were then reluctant to buy larger volumes without a security net from brands. It underscored the need for everyone to step in and assume some of the risk together.

BRINGING ALL OF THE VALUE CHAIN ALONG

MMCF is a supply chain that's been optimizing efficiencies for 100+ years. Patience, consistent education, and active support to troubleshoot the transition are needed across the value-chain. When it came to integration or implementation of Renewcell's new fibres, working with all key players in the supply chain in new ways was all fresh learning. Innovators need the technical knowledge expertise in house to help with implementation. And on the brand side, that requires dedicated brand champions to help their value chain partners navigate, problem-solve, and effectively pull through. Brands with clear Next Gen targets had an easier internal sell.

INSIGHT 8

CHANGING CONVENTIONAL SUPPLY CHAINS

SUPPORT THOSE THAT LEAD

Chinese viscose producers, Yibin Grace and Tangshan Sanyou, were the first to adapt their machinery and process to produce MMCF fibres at specification with CIRCULOSE®. Aditya Birla followed soon after. Some brands were waiting on other suppliers before jumping in rather than supporting those who took the risks of being first to market.

THE DOMINO EFFECT

The textile supply chain is long and complex. What was not adequately factored into Renewcell's projections was the time that each actor in the chain would ultimately require to refine and adjust their processes — and that they wouldn't be able to do so until the supplier in the chain directly before them had hit specification. This added months into the product pull-through in spite of many trying to pull it through on fast timelines and creative measures being introduced. Renewcell launched the CIRCULOSE® Supplier Network (CSN) in July. This was designed to activate the market by showcasing the Tier 1 and 2 suppliers that were ready to pull CIRCULOSE® through into yarns and fabrics. But the CSN was launched when Renewcell's financial woes were already showing. Renewcell had four months to get orders up and flowing compared to 12–18 months.



APPLIED LEARNINGS MOVING FORWARD

In spite of the challenges it has encountered, Renewcell is a strong technology that produces a good product. The MMCF fibre made from Renewcell's pulp has been described by one of the world's largest MMCF producers as "excellent quality" — and we've heard the same from brands. Their bankruptcy was not a fundamental flaw with the team or the technology. Below are some of the lessons that Canopy is integrating into its work with supply chain and movement partners.



LEARNING 1

THE FUTURE REQUIRES
A DIFFERENT WAY OF
WORKING

Transforming fashion’s impacts requires a fundamental shift in business-as-usual and existing status quo production. To meet the moment, we must be creative in how we think of ourselves, our companies, and organizations within the system and be prepared to step outside of the “normal” confines of our roles. We need to be willing to surrender some of the autonomy we would normally have in business-as-usual, recognizing that none of us can transform carbon-intensive supply chains by ourselves or by tinkering around the edges. It takes a fashion village.

LEARNING 2

GOVERNMENT
TRANSITION
SUPPORT FOR
COMMERCIALIZATION

Ventures are at their most vulnerable when commercializing. There is a good reason this stage is called the “valley of death”. That risk can be mitigated. Just as conventional producers receive significant support via subsidies, tax incentives, grant programs, etc., governments need to accelerate the introduction of transition support for Next Gen innovators that are commercializing (or conventional producers retrofitting to Next Gen) so there is minimal/no premium at the pulp stage and/or institute rebates and tax incentives for brands who are buying Next Gen. We’ve seen how powerful a boost this can be with renewables and other sectors.

LEARNING 3

WE CAN’T WAIT FOR
SUBSIDIES

Government programs can take time to establish. In the interim, the development of a corporate “transition fund” can enable all brands to access Next Gen fibres, recognizing that greater market pull-through enables economy-of-scale production and ultimately better pricing for all. Corporate-funded transition vehicles can be launched on shorter timelines than government programs and have been important in other commodities, like cotton.

LEARNING 4

SIMPLIFIED SUPPLY
CHAIN, OPTIMIZED
PRODUCTION

Galvanizing around a single blend, like 30% Next Gen fibre to start, a simplified supply chain with just a few supply chain partners initially, and a prioritized textile application in the early stages will enable larger runs and better pricing through the value chain for first-to-market products. Aligning brands on a 30% blend saves MMCF producers R&D and resources. Concentrating on common yarns and limiting the mix of yarns and textiles available with channeled brand orders via a subset of producers creates micro-economies of scale, which will help alleviate the early price pinch. Additionally, next-in-line innovators should have plans in place for pre-optimized pulp and an extended runway until revenue to allow for production finessing.

LEARNING 5

CREATIVE BUDGETING
IS PART OF BUSINESS

Accommodating commodity pricing and production cost fluctuations is part of business. Brands need to creatively accommodate short to mid-term premiums that are associated with early-to-market Next Gen production. Establishing internal “green premium” budgets or redirecting “innovation” and marketing budgets has been successfully deployed by fashion brands as well as in other sectors as innovation ramped up to economy of scale. Likewise, when pitching the integration of Next Gen, brand champions can align the new materials with core business goals such as Scope 3 or SBTi targets and with strong consumer validation.



LEARNING 6

TECH ENABLEMENT

Platforms that enable supply chain transparency, data sharing, and aggregate collective purchasing power have an important role to play in creating efficiencies along the supply chain and streamlining pull-through. Many smaller brands do not meet minimal order quotas but collectively bring significant volume to market pull through.



LEARNING 7

MORE FINANCING IS NEEDED

Renewcell’s financing runway fell short. There needs to be more equity and debt investment in the space, and investment runway needs to allow for refinement and product optimization in the first 12–18 months of production and to effectively integrate into market cycles. Planning ahead for what happens to the pre-optimized product is also required.

LEARNING 8

KNOW AND DIVERSIFY CUSTOMER BASE

Innovators need to take heed of what their customers are telling them about price and quality expectations. It is to be expected that there will be significant volume of product that does not meet technical and performance specifications as a new mill commissions. This is normal. What isn’t normal is to expect to sell sub-par product into the market — and at a premium. Innovators need to identify other markets for that initial product or have a business model that does not require profitable sale of the first batches of product. Likewise, innovators need to provide customers with some clarity on what the price can be hit, even if that is at mill two, three, or even five years. The sector needs to have a view on their future plans to effectively budget.

LEARNING 9

REWARD EARLY VALUE CHAIN LEADERS

Brands need to support and reward leadership by conventional producers in pulling Next Gen to market. Prioritizing MMCF fibre from producers who did buy Renewcell’s pulp — Yibin Grace, Tanghan Sanyou, Birla, and Jilin Chemical Fiber — will not only incentivize those producers to lean in further and order more, but it will also spur slower-to-move producers to prioritize the file. Likewise, brands should be acknowledged and supported with communications and marketing support from NGOs. It goes without saying that consumers need to step in to pull Next Gen through to market.



LEARNING 10

REV UP FEEDSTOCK SYSTEMS

Regardless of whether an innovator will require a blended textile stream or primarily cellulosic fabric inputs, functional, scaled, and cost-effective textile aggregation and recycling systems need to be invested in and developed in a timely manner.



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