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MICHAEL W. TOFFEL

KEN PUCKER

EREN KUZUCU

Allbirds: Decarbonizing Fashion

At Allbirds, we believe that climate change is the most important challenge of our time. Given that human-made greenhouse gas emissions are rapidly warming our planet, we have prioritized carbon dioxide reduction as the most important metric for our business. [1]

— Joey Zwillinger, Allbirds co-CEO and co-founder

"Allbirds pollutes the planet. And we put that dirty little secret on a label for all to see." Tim Brown, Allbirds co-CEO and co-founder, re-read these lines in the open letter his company had published as a full-page ad in the *New York Times* on Earth Day, April 22, 2021. The letter was addressed to 16 fashion companies, encouraging each to label their products' carbon footprint, and offering them the free use of Allbirds' carbon measurement tool. The stunt sought to challenge the industry and raise environmental consciousness among consumers. (**Exhibit 1** provides the full letter.) Brown and fellow co-CEO Joey Zwillinger were deeply concerned about environmental degradation and climate change, and they created Allbirds to design shoes, sell them direct-to-consumer (DTC), and produce them in a way that would create net zero greenhouse gas emissions (carbon neutral). Brown and Zwillinger thought Earth Day, an annual occasion to raise awareness about environmental issues, was the perfect day to share their message with the world.

Allbirds' product development and go-to-market strategy differed sharply from the footwear industry's norms. The company focused its innovation efforts on natural materials and launched only a few new styles per year, each intended to have a multi-year lifespan. This contrasted with most competitors who instead designed, developed, and sold many short-lived styles, often produced with synthetic materials. Allbirds launched the world's first wool-based shoe and several other innovative styles, attracting considerable media buzz and a loyal and growing customer base. Notwithstanding its promising start, Allbirds remained a small player in the global footwear market. As such, Brown and Zwillinger knew that to make a consequential difference, they would have to convince their competitors to reduce the environmental impacts of their footwear. They tried several approaches to do so, including freely sharing Allbirds' carbon measurement tool and inviting competitors to leverage Allbirds' knowhow and supply base that had developed less-carbon-intensive bio-based materials. The brand continued to grow quickly and in mid-2021 was reportedly considering preparing for an initial public offering (IPO).

HBS Professor Michael W. Toffel, Senior Lecturer Ken Pucker (Tufts University), and Case Researcher Eren Kuzucu (Case Research & Writing Group) prepared this case. Pucker worked at Timberland from 1992 to 2007, and served as Chief Operating Officer from 2000 to 2007. The case was reviewed and approved before publication by a company designate. Funding for the development of this case was provided by Harvard Business School and not by the company. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

The Footwear Industry

The global footwear industry generated $350 billion in revenues in 2019, selling 24.3 billion pairs of shoes, and was projected to reach $530 billion by 2027 for a compound annual growth rate of 5.5%.[2,3] The U.S. market of $58.8 billion was typically divided on gender lines, with women's footwear constituting 47.9% of the market, men's 39.6%, and children's 12.5%.[4] The market could also be segmented by end use. Brands typically competed in either the "brown" shoe market (e.g., casual and dress), the "outdoor" shoe market, or the "white" shoe market (e.g., sneakers and athletic shoes including sport-specific sneakers such as those designed for basketball, running, or tennis). Brown shoes were primarily sold though department stores, independent stores, and footwear chains. Outdoor shoes were sold in outdoor chains and stores, and white shoes were typically sold though national athletic chains and independent running stores. All shoe categories were increasingly being sold online. White shoes and outdoor shoes tended to be constructed of an *outsole* that touched the ground, a *midsole* that cushioned the foot, an *insole* that sat directly beneath the foot inside the shoe, and an *upper* that surrounded the foot and was often made of leather, canvas, or synthetic material. (See **Exhibit 2** for a diagram of major shoe components.)

Production and Distribution

Footwear production typically consisted of *cutting* the materials that would be used for the upper, *closing* by sewing the upper material into a closed form, *lasting* by stretching the upper onto a foot-form called a last, *adhering* the upper to the midsole and the midsole to the outsole, and *finishing* by removing stray materials and stitching and affixing any additional elements. Prior to the 1980s, white or athletic shoes represented a small segment of the footwear market. Consumers typically had one pair of "tennis shoes" made from a vulcanized construction, in which rubber was wrapped around the upper, and the shoe was then heated in an oven to attach the rubber. Examples of shoes constructed this way included Converse Chuck Taylor canvas shoes and Vans skate shoes. In the 1980s, athletic shoes began using ethylene-vinyl acetate (EVA), a synthetic compound, to create a cushioned midsole to enhance comfort and performance. This midsole was typically bonded to a rubber outsole.

During this period, Nike partnered with the Foot Locker retail chain to develop, market, and merchandise different types of sneakers for particular end uses (e.g., high top sneakers with leather uppers and ankle reinforcement for basketball, light weight synthetic uppers and cushioned midsoles for running). Coated leather or fabric were the principal materials used for uppers for these sneakers. This evolution spurred the white shoe industry to grow rapidly as consumers purchased different sneakers for different activities. Closets grew as consumers shifted from buying one pair of "tennis shoes" to owning multiple pairs of end-use specific sneakers. At the same time, white shoe brands signed endorsement deals with athletes that accelerated the boom and created a fashion and collectible mindset that continued to grow over time.

As footwear development became more complex and technically sophisticated, labor costs increased. In response, brands sought manufacturing partners that could reduce labor costs, improve efficiency, and provide technical know-how. This accelerated the migration of tanneries, component suppliers, and footwear production from the U.S. and Europe to Asia.

While this transition delivered lower labor and overhead costs, the long distances from production sources to Western markets increased lead times. This proved challenging for footwear companies to manage, especially as product deliveries increased in frequency, and product lifespans compressed. While the footwear industry did not have a fast fashion segment like apparel did with Zara, H&M and Schein, footwear retailers increasingly demanded new and exclusive product models and styles. At the

same time, longer lead times made demand forecasting more challenging and stock outs and markdowns more common.

While the white shoe market was growing quickly, the brown shoe segment was more stagnant. Causal and dress shoes were typically less technical, brands were not as powerful, and there were more private label offerings. As a result, the brown shoe business was far more fragmented than the white shoe business. Whereas Nike owned more than 50% market share in the U.S. for white shoes, the largest "brand" in the brown shoe segment was "private label" at just over 12% share.[5] Most brown shoe brands transitioned their production volumes to locales first established by white shoe brands. As such, production capacity for brown shoes also migrated to Asia. While a few brands such as Ecco, Timberland, and Merrell adopted a speedier and more innovation–centric new product introduction rhythm, thus supplanting some legacy brands, growth in the casual shoe space was slow.

By contrast, the white shoe (sneaker) market continued to surge in popularity. Shifting workplace norms favoring more casual clothing and the rise of athleisure led to more occasions to wear sneakers. In search of comfort, consumers continued to seek out more cushioned white shoes. This trend contributed to white shoes moving from "niche to become coveted fashion objects"[6] with footwear becoming the biggest selling category in the online luxury market.[7]

Fashion, Footwear and the Environment

Fashion, including footwear, has long served as a means of expression and an important component and reflection of culture. The sector also has engendered a growing social and environmental impact, employing over 300 million people[8] across its value chain and emitting somewhere between 4% and 10% of global carbon emissions.[9] In addition, the fashion industry is responsible for close to a quarter of all microplastics found in the ocean and over 350 million tons of clothing sent to landfills, annually.[10] In the years between 2000 and 2015, fashion sales grew faster than GDP[11] due to price deflation, shortening product lifecycles and a growing global middle class. Projections call for the volume of footwear and apparel produced to increase by 81% between 2020 and 2030.[12] leading to carbon emissions 50% above the target required to hit the goal of 1.5 degrees Celsius of global warming.[13]

While most of the pressure for sustainability in fashion focused on apparel, the environmental impact of footwear was garnering increasing attention. As the consequences of climate change became more evident and the average number of shoes purchased per person continued to grow, the environmental impact of footwear was becoming more salient.

Several aspects of the footwear industry caused substantial environmental impacts, including raw material extraction, component and shoe production, and end-of-life product disposition (worn shoes were typically landfilled). For example, for many shoes, the preferred upper material was leather, and leather tanning required vast amounts of water and chemicals including toxics such as the heavy metal chromium. In many countries, inadequately treated tannery effluent runoff impaired human health and ecosystems. While some tanneries produced chromium-free leather and recycled their wastewater, that was not always the case in less-regulated countries.

Footwear uppers were constructed using synthetics and natural materials. Synthetic uppers were increasingly popular as innovations enabled new fiber combinations that produced novel aesthetics and lighter footwear. Nike's Flyknit construction represented a potent embodiment of this trend. Synthetic materials were typically derived from fossil fuels, as were the plastics used to adorn uppers. Footwear midsoles that provided the necessary cushioning properties were typically produced from EVA and other materials derived from fossil fuels. Outsoles were either the same material as the midsole or were comprised of a different compound such as rubber.

Greenhouse gasses were emitted throughout the value chain, including raw material extraction, production, and transport to the production process, component and shoe production, and distribution to retailers and customers (see **Exhibit 3** for the value chain contributions of the clothing and footwear industry's carbon footprint). Studies estimate that producing a pair of shoes resulted in emissions ranging from 10 kg to 40 kg of carbon dioxide equivalent[a] (CO2e), depending on the materials, transportation modes, and energy sources used.[14] When shoes were discarded and ultimately landfilled, decomposing materials tended to release methane (a potent greenhouse gas), while other materials such as polyvinyl chloride (PVC) and other plastics did not decompose for hundreds for years.

Getting Started

Allbirds co-founder Brown grew up in New Zealand and moved to the U.S. for college. After graduating, he played professional soccer for a decade, during which time he was selected to play on New Zealand's World Cup team.[15,16] After he retired from professional sports, Brown enrolled in a master's program at the London School of Economics (LSE). He recalled that his athletic footwear seemed unnecessarily complex and presented his idea for a running shoe with simpler, natural wool uppers in an entrepreneurship class. Brown recalled that his instructor, the former CEO of Walmart.com, told him, "I don't think this is a good idea…. But for whatever reason, of everyone in this class you seem most committed to try and make this work."[17]

After graduating from LSE, Brown worked to develop a prototype of a wool running shoe. He received a research grant from the New Zealand government that he hoped to use for his prototype. Wool was not considered a suitable material for footwear uppers because existing woolen fabrics were not strong enough to hold a shoes' shape. As he progressed, Brown uncovered an opportunity to use superfine 17.5-micron merino wool, and hoped that these fibers could be knit together and bonded to produce a luxurious feeling fabric that was suitable for uppers.[18]

After developing the wool fabric, Brown arranged for the wool to be processed in Italy by Successori Reda, one of the world's oldest wool mills that supplied output to global brands including Gucci, Tom Ford, and Hugo Boss.[19] Brown used the processed wool to develop the first woolen shoe, designed to be worn without socks. In January 2014, Brown promoted his prototype on Kickstarter with a goal to raise $30,000 in a month. After his campaign reached its maximum of nearly $120,000 in just five days he closed the campaign, seeking to avoid committing to volumes he might not be able to supply.[20] He contracted with a manufacturer in Portugal to produce the shoes, and throughout 2014 delivered nearly 1000 pairs to his Kickstarter funders and a few others.[21]

Founding Allbirds

In April 2015, after fulfilling the Kickstarter campaign, Brown connected with Zwillinger, a Wharton MBA who was working at Solazyme, a biotech company that used a proprietary technology to transform low cost, plant-based crops into high value oils. Zwillinger had previously worked in advisory and investment roles at Industry Ventures, Deloitte, and Goldman Sachs.[22] They saw an opportunity to link their skills—Brown's intuition around consumer behavior and Zwillinger's

[a] Carbon dioxide equivalent (CO_2e) is a common unit to describe emissions of various greenhouse gases in terms of their global warming impact. For example, the "global warming potential" over 100 years of one kilogram (kg) of methane is equivalent to 25 kg of carbon dioxide. Thus, a production process that emitted 1 kg of methane released 25 kg CO_2e. "Overview of Greenhouse Gases," Environmental Protection Agency website, https://www.epa.gov/ghgemissions/overview-greenhouse-gases, accessed May 2021.

understanding of bio based materials—to create a business that would embed sustainability into a new natural footwear brand, leveraging the growing environmental consciousness of footwear consumers.

In May 2015, Brown and Zwillinger co-founded Allbirds and became co-CEOs. Brown focused on product design and brand, and Zwillinger managed operations, technology, and finance. (See **Exhibit 4** for organization charts.) To name the company, Brown recalled that when settlers arrived in New Zealand, they could not find any mammals and came to believe the islands were a land of "all birds."[23] In August 2015, they raised $2.25 million in seed round funding from investors including Lerer Hippeau, Brand Foundry Ventures, Great Oaks Venture Capital, Western Technology Investment, and Slow Ventures. Brown then moved to San Francisco, California to join Zwillinger to grow the business.

Launching Wool Runners

Brown and Zwillinger understood that most apparel and footwear companies competed by trying to predict consumer trends and react quickly to design, produce, and sell their products. Zwillinger noted, "Brands take the cheapest materials and fastest supply chain model and make design tweaks based on the trends." In contrast, Brown and Zwillinger decided to differentiate Allbirds based on three pillars: simple design, comfort, and sustainable natural materials. Their strategy was to develop just a select few models that they would sell for several years. This contrasted sharply from their competitors' typical approach of launching many short-lived styles each season. The founders recognized that their decision would slow their company's initial growth. Zwillinger observed, "We could grow fast if we go fast, including wholesale distribution, but we turned down that growth to make sure that we could achieve a profitable model in the long run, a model that could allow us to maintain a slower pace of innovation while still capturing the 'newness' and keeping people interested."

In March 2016, Brown and Zwillinger launched their first model, the Wool Runner, in the U.S. and New Zealand. It had a clean design, very few cut parts, muted colors, no visible logo, and was built primarily from natural materials including the New Zealand merino wool that Brown had developed for his prototype. The insoles were made with oil from castor bean plants sourced from small family farms in India. The Wool Runner had the comfort of a sneaker with the aesthetic of a causal shoe. It was produced by a contract manufacturer in South Korea. (See **Exhibit 5** for a view of the Wool Runner.)

In contrast to the fossil-fuel based synthetic alternatives of many athletic shoes, Allbirds' wool upper was a natural, renewable material. At the same time, Allbirds understood that *how* the wool was sourced also affected its ultimate sustainability. As a result, for the launch of the offering, Allbirds purchased New Zealand merino wool that was independently certified to meet the ZQ standard, which specified practices for land management, animal welfare, and traceability.

Allbirds joined Smartwool and Icebreaker as the first brands to adopt an even more environmentally stringent ZQRX standard that launched in 2020. ZQRX required sheep farmers to engage in regenerative agricultural practices to sequester carbon to mitigate climate change. According to Hana Kajimura, Associate Director - Sustainability (Sustainability Lead) at Allbirds, "wool products that come from regenerative sources could act as carbon sinks if the land the sheep graze on has been optimised to sequester carbon. If adopted widely, it has the potential to drastically reduce the carbon footprint at the raw material stage and allow the fashion industry to play its part in a decarbonised future."[24] Allbirds committed to source all of its wool from regenerative sources by 2025.

Using wool was just one of several design innovations Allbirds implemented. As former Chief Marketing Officer (CMO) Julie Channing noted:

> The wool is temperature regulating and ultimately creates a better comfort experience. We could have just stopped there with the shoes and that would have been a huge improvement in the industry that we're playing in because currently, it's so synthetic. But instead, we actually look at all aspects of our business where there's an opportunity to have a positive impact. Our packaging is a great example of where we created a solution that is both a shoe box and a shipper. It was important to us to try and find a way to be less wasteful in that process and avoiding shipping a box in another box. The outcome of that was not only a shipping package, one that uses forty percent less material in the cardboard, but also a really delightful brand moment as well. People love it because it's an incredibly unexpected experience and we see people posting photos about it and unboxing videos on YouTube about it.[25]

Brown and Zwillinger chose to distribute Wool Runners exclusively via the Allbirds online store. This direct-to-consumer (DTC) approach allowed Allbirds to control its brand presentation and storytelling. It also allowed the brand to avoid the competition for shelf space and consumer attention with brands that "differentiated themselves with flashy colors or splashy logos, which were not in the interest of customers but designed in the interest of conversion," according to Zwillinger. In addition, Kajimura noted that this distribution approach enabled Allbirds "to invest in more premium materials because we're direct to consumer and so it's important there's not four middle men taking a cut in margins."[26] Relying on partners for distribution also reduced brands' control over pricing, including markdowns (discounts) to clear unsold inventory at the end of each season. Zwillinger added, "When you start discounting your core product, no one will buy your stuff at full price anymore. They know that they could get it on discount at Nordstrom Rack, for example."

From the outset, the Wool Runner generated tremendous consumer and media interest. Time magazine called it the most comfortable shoe in the world[27] and a New York Times article highlighted Allbirds' cultural diffusion with its headline, "To fit into Silicon Valley, wear these wool shoes."[28] Instead of turning immediately to develop new shoe models, the co-founders focused next on introducing new colors and improving the comfort and fit of Wool Runner. Celebrities and influencers such as President Barack Obama, Larry Page, Matthew McConaughey, and Oprah Winfrey were photographed wearing Allbirds.[29]

The Wool Runner's success attracted the attention of competitors, and within a year, many knockoff products appeared on the market. After seeing that Amazon began selling knockoffs of Wool Runners, Zwillinger published an open letter on Medium to Amazon CEO Jeff Bezos, asking him to "Please steal our approach to sustainability." (See **Exhibit 6** for Zwillinger's letter to Jeff Bezos.) Zwillinger recalled, "I had never been in fashion or retail before, so I had no idea how fast the knockoffs would come, although the quality difference between our products and knockoffs was pretty perceptible once you had the product in hand. We continued to innovate, and our customers knew that we were the real deal."

Product Development Strategy

In mid-2016, Allbirds created a scout team that was responsible for seeking out and identifying natural materials to drive innovation and lower the company's carbon footprint. (See **Exhibit 7** for the organization chart of Allbird's Innovation and Sustainability team.) "The big brands usually would not care about small but passionate suppliers. Whereas we started thinking about working with them in earlier stages, which would make us a great anchor customer for successful and emerging companies

that could fit our values, mission, and vision. We created this virtuous ecosystem that allowed people to reach out to us and share their ideas," Zwillinger explained.

Despite the popularity of its first product, Allbirds remained committed to its strategy of pursuing innovative "slow fashion" shoes and took two years before introducing their second model, the Tree Runner. This was the first model in the Tree collection. Each of the styles in the Tree collection featured uppers made of eucalyptus pulp harvested from plantations in South Africa that were certified as meeting the Forest Stewardship Council (FSC) standard that protected ecosystem health.[30] (See **Exhibit 8** for a view of all Allbirds' certifications). The Tree collection used Tencel Lyocell's eucalyptus-based fibers that, compared to cotton, used 95% less water, caused 92% less fertilizer runoff, and emitted half the greenhouse gas emissions.[31] (See **Exhibit 9** for a timeline of Allbirds' new product introductions). Like the Wool Runner, the Tree Runner was another innovative product made primarily from natural materials. According to Brown, "the goal is not to make a sustainable product, but to make a great product because it is sustainable…without ever trading off on the consumer experience."

Each of Allbirds' products was designed to minimize its carbon footprint. As the business evolved, Jad Finck, Allbirds' VP of Innovation and Sustainability and a former colleague of Zwillinger at Solayzme, recognized the importance of providing the design team with detailed information about the carbon implications of their material choices. To that end, the company developed a life cycle assessment (LCA) tool to measure the greenhouse gas footprint of each pair of its shoes. This tool highlighted the importance that materials choices had on the carbon footprint of each product. For example, for the Wool Runner, materials represented 80% of the footprint of the shoe. (See **Exhibit 10** for a breakdown of the carbon footprint of the Wool Runner.) This understanding validated Allbirds' focus on natural materials. It also convinced the company to share the tool with competitors.

A Carbon Negative Midsole: Green EVA

The Allbirds team was not happy with the use of EVA as a midsole and outsole material in their initial product offerings. According to Finck, "when we launched, we didn't have a great option for our midsole. We had a great story for the merino wool upper and another good story for the vegetable oil insole, so we had two out of three. The bottom unit was traditional EVA because we couldn't find something at launch that was bio based."[32] EVA, a synthetic, non-biodegradable fossil-fuel derivative, was commonly used in athletic shoe midsoles because it was inexpensive, lightweight, easy to mold, soft, could be dyed any color, and exhibited shock-absorption properties.

When Zwillinger and Finck worked for Solazyme, they learned about the transformation of sugarcane into ethanol and thought that bio-based materials had the potential to replace EVA with a more environmentally friendly compound. "Brazilian sugarcane is a feedstock used for fermentation that has one of the lowest carbon intensities in the world. Sugarcane's fast rate of converting CO_2 to sugar contributed to the fact that Brazil transforms 50% of the world's sugarcane into sugar. Brazilians have done a fantastic job of creating an entire ethanol industry and using low-carbon ethanol made from sugarcane," Zwillinger said.

The Allbirds co-founders sought out a partner to undertake the research and development and to invest the capital required to commercialize a natural midsole compound and reached out to Braskem. Based in Brazil, Braskem was the largest petrochemical producer in Latin America[33] and, according to Zwillinger, "the only player we knew that had the experience and capacity to bring this idea to life." In their effort to convince Braskem, Finck wrote a *Wall Street Journal* article that Allbirds imagined might run once Braskem succeeded (see **Exhibit 11**). He delivered the article, printed on proper newsprint paper, to executives from Braskem on a flight to visit a Braskem facility in Southern Brazil. The "article" lauded Braskem's commitment to innovation, noted that all of Allbirds' shoes produced

using Braskem's solution saved the equivalent of 3 million barrels of crude oil a year, and highlighted that the renewable Green EVA product was an $10 billion annual market opportunity that started in footwear prior to spreading to thin films, solar panels, and adhesives.

Finck knew that the market opportunity for Green EVA had to go well beyond just Allbirds in order to be attractive to Braskem. "Just with the Allbirds volume alone, the capital investment required from Braskem would not make any sense. So, we thought we should bring in other customers that would use this material," Finck explained. Allbirds negotiated with Braskem to get a limited exclusivity window and in turn Allbirds agreed to help the company bring the new material to market.

Allbirds and Braskem successfully co-developed a "Green EVA," producing it by dehydrating ethanol from sugarcane (thereby transforming it into a green ethylene), and then combining this with vinyl acetate monomer (VAM) in polymerization plants. (See **Exhibit 12** for the process flow.)

Allbirds and Braskem calculated the carbon footprint of Green EVA and determined that it was "carbon negative," which meant that producing Green EVA resulted in a net *reduction* of atmospheric greenhouse gases. The results showed that producing one kilogram of Green EVA sequestered 1.2 kilograms of CO2e from the atmosphere, whereas producing one kilogram of traditional EVA emitted 1.8 kilograms of CO2e.[34] According to Finck, the Green EVA is derived from sugarcane that "essentially breathes in carbon dioxide and converts it to chemical energy in the form of sugar, and then we convert it to foam. So, while other soles are adding to the carbon footprint, this one is actually carbon negative." Green EVA had the same flexibility, light weight, and cushioning characteristics as EVA.

The deal with Braskem allowed Allbirds to exclusively use the brand name SweetFoam when referring to Green EVA. To highlight this important natural material innovation, Allbirds launched its first summer collection featuring flip-flop sandals made entirely of Green EVA. According to Kajimura, the Sugar Zeffer flip-flops "were the perfect vehicle to introduce Sweetfoam to the market."

The buzz and power of the innovation attracted interest from Allbirds' competitors. True to their commitment, the Allbirds team fielded more than one hundred inquiries from companies interested in Green EVA and introduced many of them to Braskem. By mid-2021, at least a dozen footwear brands had begun using Green EVA, including Timberland (which launched the compound under the brand name GreenStride), Puma (which created a collection with what they called BetterFoam), and TOMS (which referred to the compound simply as Green EVA).[35]

A Natural, Low Carbon Upper: Plant Leather

Allbirds' innovation scouting team learned that Natural Fiber Welding (NFW), an Illinois-based materials science and technology company, had developed a technology to process and transform renewable and natural plant matter into a product that mimicked leather. NFW branded the product Mirum. It was, by all accounts, the first composite faux leather made without any polyurethane or PVC. Allbirds believed that this material would deliver a bio-based upper material that complemented their wool and eucalyptus offerings.

NFW's technology created a plant-based, leather-like waterproof material that could be produced at low cost, at scale with a very small carbon footprint. The end product could be "tuned" (e.g., textured, colored), was plastic-free, and did not involve animals. "Based on what we saw at NFW, we immediately realized that it would be possible to produce a 'plant leather' shoe with 98% less carbon intensity compared to bovine leather," Zwillinger commented. The carbon footprint of plant leather was 40 times lower than that of animal leather (which ranged from 2 to 12 kilograms per upper,

depending on where animals were raised and how tanning was done) and 17 times lower than petroleum-based synthetic leather (estimated at 5 kilograms per upper).[36]

In early 2021, NFW announced that it had raised nearly $25 million from investors including Ralph Lauren, Central Illinois Angels, Prairie Crest Capital, and Capital V, and $2 million from Allbirds.[37] According to Zwillinger, "the intellectual property of plant leather was locked up with NFW. We wanted to have a perpetual access to plant leather and didn't want to get blocked by a big guy in the future." NFW granted Allbirds a limited first-to-market right to utilize Mirum (plant leather) in its footwear production, which Allbirds planned to roll out in 2022.

Collaborating with Adidas

In May 2020, Allbirds announced that it was expanding its running shoe collection beyond the Tree Dasher by collaborating with Adidas to produce a co-branded running shoe. The goal was to produce a performance running shoe with the lowest carbon footprint of any running shoe on the market. This partnership emanated from a chance introduction of Brown to a fellow New Zealander who was leading the North America Adidas business that subsequently led Brown to meet Erik Liedke, who was then Adidas' Executive Board Member for Global Brand.

According to Brown, "In the footwear space, you typically do not work with competitors. It is very secretive. You tend to keep innovations and materials private. We had obviously broken that once with Green EVA and got a lot of credit for it. Why not take that a step further and collaborate on a shoe?" At the same time, Brown was inspired by Nike's push to enable marathon runners to finish in under two hours, but he thought that they were "running the wrong race." He decided to pick up the phone and ask Liedeke to collaborate to rapidly develop a shoe with a carbon footprint as close to zero as possible. (See **Exhibit 13** for the email that Brown sent to Liedeke framing the opportunity.)

This partnership was unprecedented. According to Florence Rohart, Adidas Senior Footwear Designer, "we never considered, until now, how to build a shoe with the carbon footprint in mind."[38] The joint team aimed for a shoe with a carbon footprint of 2 kg CO_2e, substantially lower than the typical shoe's average of 12.5 kg CO_2e that was "the rough equivalent of five miles driven in the average car or charging your cell phone 255 times."[39] As Adidas VP of Brand Strategy James Carnes explained the partnership, "Allbirds' goal is redesigning the sneaker from the ground up…. Adidas's goal is to sustainably manufacture at scale."[40] Brown noted, "When thinking about innovating or making a product you typically think of three things: what it does, what it looks like and what it costs. The idea of carbon is a fourth pillar of product creation." He continued, "chapter one of sustainability was about all the things you can't do. Chapter 2 is about innovation, problem solving and creativity."

Sixteen months after launching the collaboration, the co-branded Adidas X Allbirds shoe launched in May 2021 (see **Exhibit 14**) with a carbon footprint of 2.94 kg CO_2e per pair, nearly a quarter of Adidas's comparable ultralight running shoe.[41] The shoe's carbon footprint was handwritten on the midsole, and thus visible only to the wearer. Early in the partnership, Allbirds sent Kajimura to Adidas to use the Allbirds life cycle tool (the same one that it was offering to give away in the *New York Times* Earth Day ad) to determine the carbon footprint of the running shoe. It measured 2.94 kg of CO2, according to Brown, "less than a Big Mac." Kajimura noted, "It felt like I was breaking the rules. I had to check myself and ask who made these rules? This is exactly the way it should be."[42]

Go-to Market Strategy

Allbirds' initial go-to-market strategy, a direct-to-consumer approach that relied only on sales via Allbirds.com, was as unconventional as its product development strategy. For most nascent footwear brands, distributing through retailers such as athletic footwear chains and department stores offered compelling scale via a national network of stores. Moreover, online retailers such as Zappos, Amazon, and Zalando also provided the opportunity to tap their large and growing consumer bases. However, as Brown noted, "Joey and I had the good fortune of never before working in the footwear industry. This allowed us to look at things with fresh eyes."

Brown and Zwillinger declined to pursue typical wholesale channels in part, according to Zwillinger, because footwear brands that sell through retailers "end up manufacturing a vast array of SKUs,[b] and they prefer going with the cheapest material and the fastest supply chain to meet the demand." Such style proliferation sometimes seeks to create a distinct set of product offerings (assortment) for each retail partner.

Developing innovative natural materials also constrained Allbirds' ability to meet retailer's demands. "It was a difficult challenge as we had to disrupt a supply chain that was deeply embedded with synthetic materials," Zwillinger said. "Everything in the footwear supply chain over the last 50 years has been built to go super-fast by using synthetic materials and manufacturers in Asia. All the manufacturing equipment in this industry was tailored for synthetic materials, ranging from required heat settings to sewing and finishing, and introducing natural ones with totally different properties required us to be much more methodical and careful about product development," he continued. "At the same time, companies like Amazon put pressure on retailers, and retailers would channel this pressure to the brands, further accelerating the product cycles."

Another advantage of selling online is that it enabled Allbirds to have direct relationships with consumers, and to collect data on their browsing and purchasing behaviors, reviews, and returns. Channing pointed out that such consumer data "gives you the opportunity to be really thoughtful about how you meet and exceed expectations based on what you know consumers want."[43] "We listen to what consumers like and regularly receive pieces of feedback," she added, noting that such information has led to many product improvements.[44]

To complement its online store, Allbirds opened several Allbirds physical stores in San Francisco, New York City, and London in 2018. By August 2021, Allbirds had opened 29 stores across 8 countries—17 in the United States, and others in Asia (China, Japan, South Korea), Europe (Germany, the Netherlands, United Kingdom) and in New Zealand. (See **Exhibit 15** for all Allbirds store openings.). These stores enabled consumers to directly engage with the brand and product, while simultaneously increasing brand awareness and growing revenue. Stores also accepted returns of products bought online. Allbirds did not mark down products sold in its online or physical stores.

In November 2018, Allbirds veered somewhat from its initial approach of relying exclusively on its own site and stores by launching a small, exclusive collection of its products to be sold in Nordstrom under a temporary agreement between two companies. "Our goal was to achieve awareness within a population that we hadn't met yet," Zwillinger commented.

For the shoes co-developed with Adidas, a very limited number would initially be exclusively distributed via Adidas FutureCraft, and then a small number would be distributed via Allbirds' online

[b] SKUs referred to stock-keeping units, which are equivalent to product models in this context.

and retail stores. After that, a larger but still limited number would be distributed through these two Allbirds channels.

Marketing Strategy

According to Channing, "Our marketing approach at launch was simply to make sure we were capturing the first-hand encounters of people who were discovering the brand, loving the product and wanting to tell other people about how insanely comfortable Allbirds are. We then sought to find marketing channels that would allow us to continue to fuel that word-of-mouth. We focused on a lot of social media and PR in the early months of the business."[45]

Allbirds' distinctive approaches to product development and management—including imposition of an internal carbon tax and a compensation system that measured and rewarded getting to a net zero carbon footprint—were designed to deliver on its mission. (See **Exhibit 16** for a view of Allbirds' high level Carbon Neutral plan). However, communicating to consumers the benefits and differentiation of Allbirds products and brand was challenging given the proliferation of greenwashing[c], the gravity of the climate challenge, the company's decision to insist on aesthetics and comfort and use natural materials whenever possible, and Allbirds' desire to influence the industry.

From the start, the company's messaging was consciously lighthearted. The tone was an outgrowth of Brown's New Zealand heritage. He noted, "how do you go after a very serious topic like sustainability, but never take yourself too seriously? The foreboding nature of the problem was almost prohibiting people from engaging with it. Somewhere along the way we realized that our job was to translate the science. And what this conversation needed was not another climate documentary, not another *Inconvenient Truth*, but more a *Tiger King*. Chapter two of sustainability was about cultural connection. The fashion industry, and by association, the artists, the creatives, the storytellers, the writers, the poets have often brought about societal change by taking complex problems and making them digestible and simple. We saw that as part of our role as a brand."

Allbirds chose to highlight its natural materials as the key vehicle for communication. "When we make shoes out of wool, tree and sugar, it gives people something to talk about, and so we've benefited a lot from word of mouth," Channing noted. "So, when introducing ourselves to new markets, we focus our efforts on marketing that will spark conversation."[46] Allbirds also embraced a witty tone. Sheep, trees, and stalks of sugarcane were humanized to be storytellers for the product. According to Brown, the sequencing of communication to consumers was important: "First, consumers see a product and coveting that is fundamental. Next, they feel the comfort, which is a personal experience. And then post purchase, they understand the purpose and the science and the sustainability." Allbirds' boxes, for example, let consumers know that the brand was carbon neutral. In addition, though it was not messaged overtly to consumers, Allbirds was a certified B Corporation (which were "legally required to consider the impact of their decisions on their workers, customers, suppliers, community, and the environment"[47]). and a Benefit Corporation (legally obliged to create public benefit alongside profits, and consider and publicly report efforts to reduce its environmental and societal impacts[48]).

As Allbirds progressed toward net zero, its messaging started to shift. This change coincided with consumers' increasing focus on climate change. Allbirds started to label each pair of its shoes (under the insole) with its specific carbon footprint. It also labeled one collection (resulting from collaboration with designer Jeff Staple) with the carbon footprint on the upper of the shoe, which meant others could

[c] Greenwashing referred to issuing misleading claims that sought to exaggerate a product's environmental attributes.

see this environmental statement while the customers were wearing them. According to Brown, "I see the carbon number less as a piece of science and more as an extension of our brand and more a recognition that you are on the side of getting this. This conversation has accelerated a lot over time."

This level of transparency was a first for the footwear industry. Years prior, Timberland had affixed an eco-label to its boxes using a 1–10-point rating scale for their materials' social and environmental impacts, and millions of pairs of Timberland shoes and boots carried this "ingredient label" until 2014 (see **Exhibit 17**). In 2010, Timberland gifted its Green Index methodology to the Outdoor Industry Association, which worked with the Sustainable Apparel Coalition (SAC) to develop an industry-wide solution that later evolved into the Higg Index.

Zwillinger thought that the time was right to be even more transparent with consumers. He noted, "If you talk to ten people on the street, everyone will have a different definition of sustainability. We wanted to synthesize a singular, digestible metric that could deliver a message to consumers." In a nod to their New Zealand heritage, Allbirds worked with Bret McKenzie from musical comedy duo Flight of the Conchords to create a video that explained carbon footprint to consumers. The video began by McKenzie asking, "You know how many calories are in that donut you are eating. Shouldn't you also know how many kilograms of carbon dioxide equivalent emissions are in that pair of shoes you are wearing?"

Future Opportunities and Challenges

Allbirds continued to grow rapidly. Reports noted that Allbirds' shoe sales doubled from more than 1 million pairs in 2017 to more than 2 million pairs in 2018. In September 2020, Allbirds raised an additional $100 million in Series E funding at a valuation to $1.7 billion. This brought total funds raised to $202.6 million. (See **Exhibit 18** for funding rounds and investors.) In July 2021, Allbirds was reportedly in the planning stages of an IPO.

While Allbirds had made a good deal of progress toward becoming a sustainable company, management remained unsatisfied. Allbirds had become carbon neutral in 2019, which meant it offset the greenhouse gas emissions that remained after its reduction efforts. To do so, it invested in projects that reduced or sequestered emissions around the world that equalled the amount of carbon released by Allbirds. But Finck noted that being carbon neutral was not their desired end point: "We don't think just offsetting our emissions and calling it a day should earn us a gold star. It should be the admissions fee—chapter one in our mission to ultimately emit zero emissions." Kajimura added, "On our path towards zero emissions, we should be purchasing offsets to net out our existing footprint - they are a means to an end but not the ultimate destination."

In July 2021, Allbirds announced its sustainability "Flight Plan." The plan introduced ten quantitative goals focused in three areas: regenerative agriculture, renewable materials and responsible energy (see **Exhibit 19**). These committed the company to reducing its greenhouse gas emissions per product by 50% by 2025 and to less than 1 kg CO_2e by 2030, goals that included emissions from onsite operations, purchased electricity, materials, production, shipping, customer use, and product disposal (encompassing Allbirds' scopes 1, 2, and 3 emissions).[d] The Flight Plan also called for developing products that would last twice as long as their current offerings.

[d] Scope 1 referred to greenhouse gas (GHG) emissions from sources a company owns and controls, such as combusting natural gas onsite to generate heating and cooling. Scope 2 referred to GHG emissions created offsite to generate purchased electricity

Some worried that Allbirds' sharing its carbon reduction roadmap and hard-earned sustainability innovations with competitors risked eroding the company's ability to differentiate on sustainability. Allbirds shared its carbon footprinting tool, invited other companies to use Green EVA, and shared its innovative natural materials with Adidas. Moreover, as companies grew sales, they tended to attract skepticism about whether they could maintain their sustainability credentials. For example, the *Financial Times* reflected on Allbirds' growth plans by noting, "The Catch-22 of any sustainable brand is that the more it produces, the less sustainable it becomes."[49]

In mid-2021, Brown and Zwillinger were pursuing growth in some new areas, including the debut of an apparel offering that included t-shirts, sweaters, jackets, underwear, and socks. The apparel line was designed in keeping with the brands' sustainability focus, using wool, eucalyptus fiber, and recycled materials. For example, some of its t-shirts were produced using its proprietary material blend of eucalyptus tree fibers, ZQ Merino wool, and discarded snow crab shells in order to stay soft and reduce odor. In addition, the company used other natural materials to enable consumers to wash the garments less often, thereby reducing the carbon footprint products over the products' lifespan.

and steam consumed by the company. Scope 3 referred to all other GHG emissions in a company's value chain, such as in the creation and shipping of raw materials and components, and shipping products to customers.

Exhibit 1 Allbirds Open Letter to Other Fashion Brands

To: Adidas × Burberry × Gucci × H&M × Hermes × Levi's ×
Louis Vuitton × Lululemon × Moncler × New Balance × Nike ×
Prada × Ralph Lauren × The North Face × Uniqlo × Zara × ...

Subject:
Our Earth Day gift to you

Dear friends,

Allbirds pollutes the planet. And we put that dirty little secret on a label for all to see.

We call it our Carbon Footprint, which is the rather precise measurement of the emissions of every product we make. It's basically a nutrition label for your closet. (See attached for reference)

That label is what we believe the public needs most: A simple, standardized way to understand that everything with a price tag comes with a cost to the planet.

So this Earth Day, we're giving our Carbon Footprint away to the entire fashion industry. The spreadsheets we use to calculate emissions. A guide to help you get started. Even the label designs. It's all yours for the taking at FreeTheFootprint.com

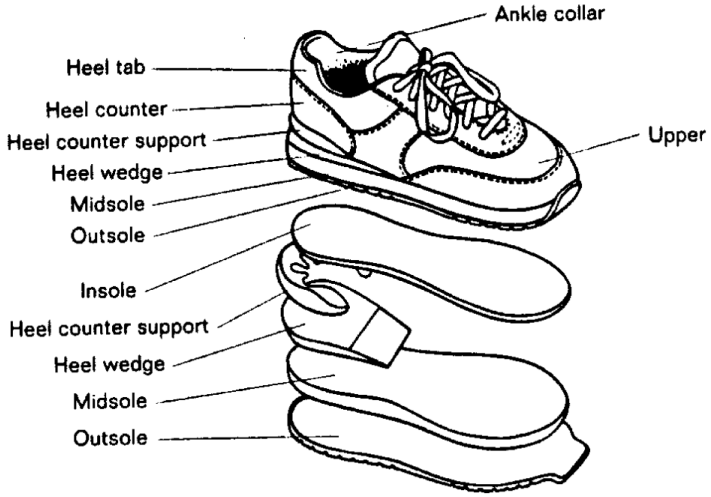
We know sharing proprietary information might not make the most business sense. But the global climate crisis is bigger than business. And if competition got us into this mess, perhaps collaboration can get us out.

So please, take our Carbon Footprint and make it yours. If we can change the way the world shops for shoes and clothes, we can change the world. Sounds ridiculous, but it's true. And if anyone can make people care about a new label, it's the fashion industry.

Chat soon,
Allbirds

Source: Full page ad in the New York Times, April 19, 2021, reproduced on Instagram. https://www.instagram.com/p/CN2rMkIgvAJ/, accessed April 30, 2021.

Exhibit 2 Diagram of Shoe Components

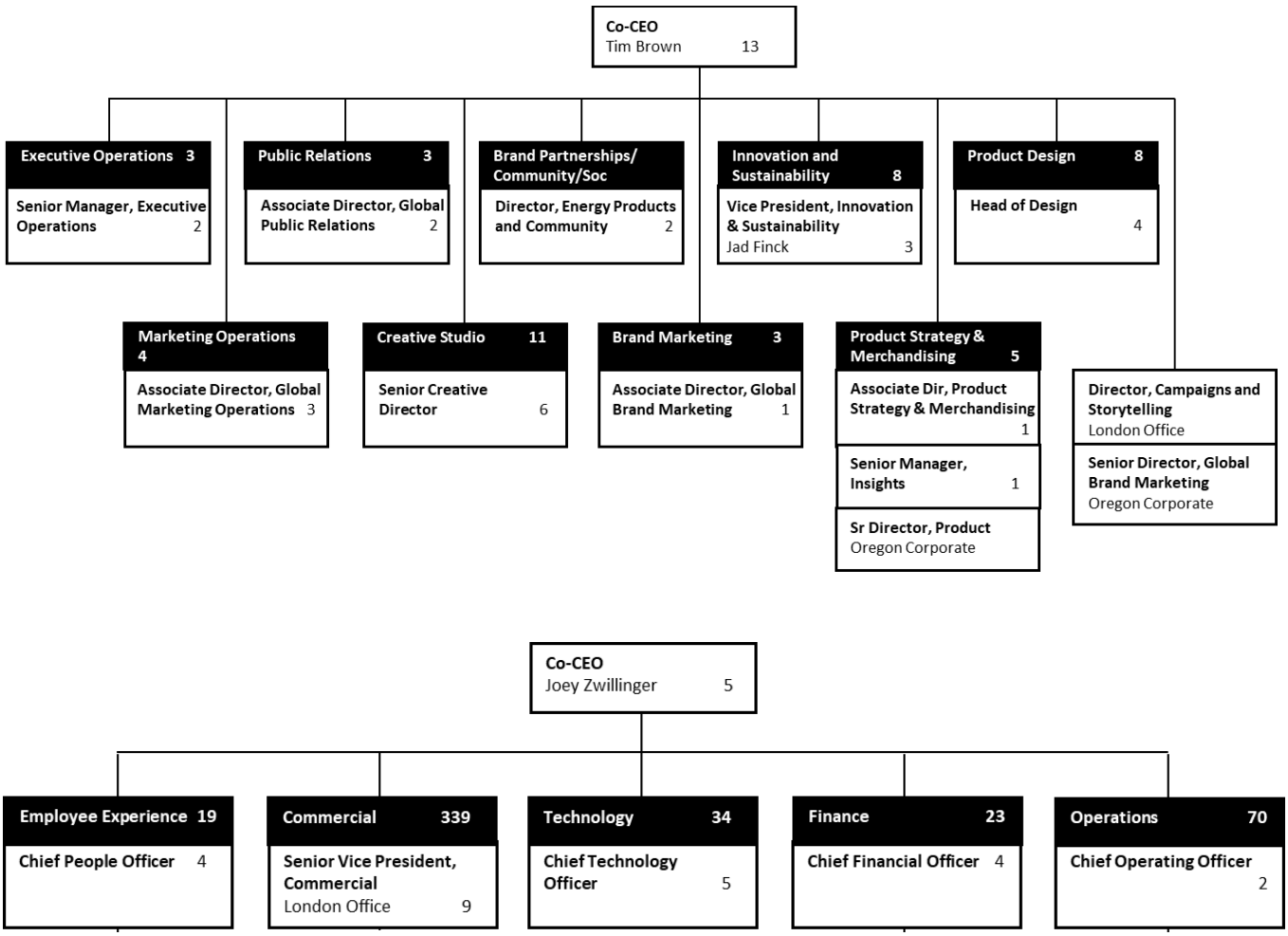


Source: Adapted by casewriters from Butler, Frank, John Hughes, Joseph Moore, Brad Bennett, Lisa Thorson, Patricia Deuster, Anita Singh, Kevin Walters, Steve Giebner, and Denise Becker, "The Navy SEAL Physical Fitness Guide," Department of Military and Emergency Medicine, Uniformed Services University of the Health Sciences, F. Edward Hebert School of Medicine, August 1, 1997, accessed May 2021.

Exhibit 3 Value Chain Contributions of the Clothing and Footwear Industry's Carbon Footprint

Source: Lauren Indvik. "Sustainable Fashion? There's No Such Thing." Financial Times Online, November 13, 2020. https://www.ft.com/content/d174e7d7-97c4-43fc-8765-95075e5fcce7, accessed July 2021.

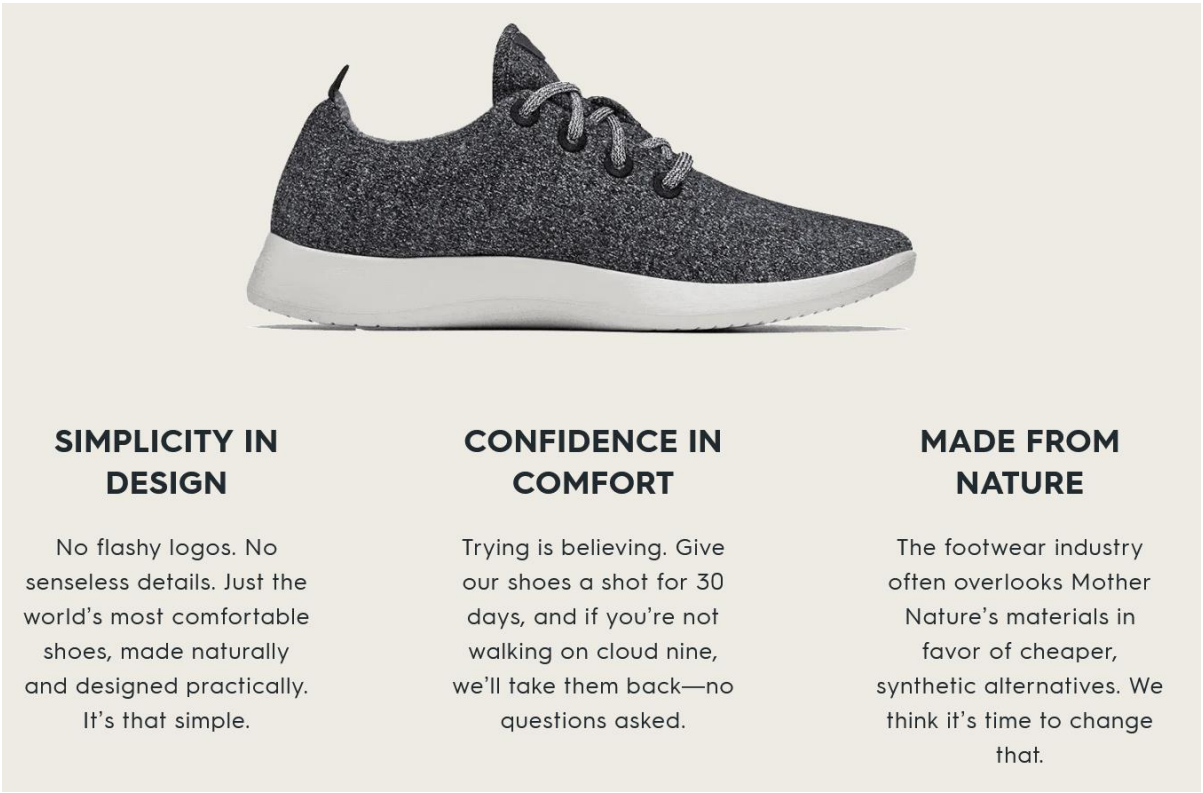
Exhibit 4 Allbirds Organization Chart



Source: Company documents.

Note: White numbers refer to headcount in that function. Black numbers are that individual's direct reports.

Exhibit 5 The Wool Runner



Source: Adapted by casewriters from company documents.

Exhibit 6 Joey Zwillinger's Letter to Jeff Bezos on Medium

Dear Mr. Bezos,

We recently saw a product Amazon makes and sells that is strikingly similar to our Wool Runner. Last week, we were asked by Christiane Amanpour about this, and whether we had been in touch to make sure that you are aware of our open-sourced, sustainable technologies and their applicability to your product. The prompt felt fair, and we hope this reaches you.

We are flattered at the similarities that your private label shoe shares with ours but hoped the commonalities would include these environmentally friendly materials as well. Alas, we are here to help. As we have done with over 100 other brands who were interested in implementing our renewable materials into their products, including direct competitors, we want to give you the components that would make this shoe not just look like ours, but also match our approach to sustainability.

In partnership with Braskem, we successfully created the world's first green EVA — a sustainable version of the foam used on the bottoms of sneakers (including yours), and one of the industry's most ubiquitous materials. By using a sugarcane waste stream, not only were we able to create a natural version of what has historically been petroleum- derived, but we are also removing carbon from the atmosphere and locking it away with one of the most photosynthetically efficient crops, fighting climate change in the process.

After all this work, we decided to give it away.

You can use it. We want you to use it. If you replaced the oil-based products in your supply chain with this natural substitute (not just for one product, but all of them), we could jointly make a major dent in the fight against climate change. With the help of your immense scale, the cost of this material will come down for all users of this material, allowing for even broader adoption.

We are happy to send samples of our SweetFoam™ or put you in touch with our partner to learn more.

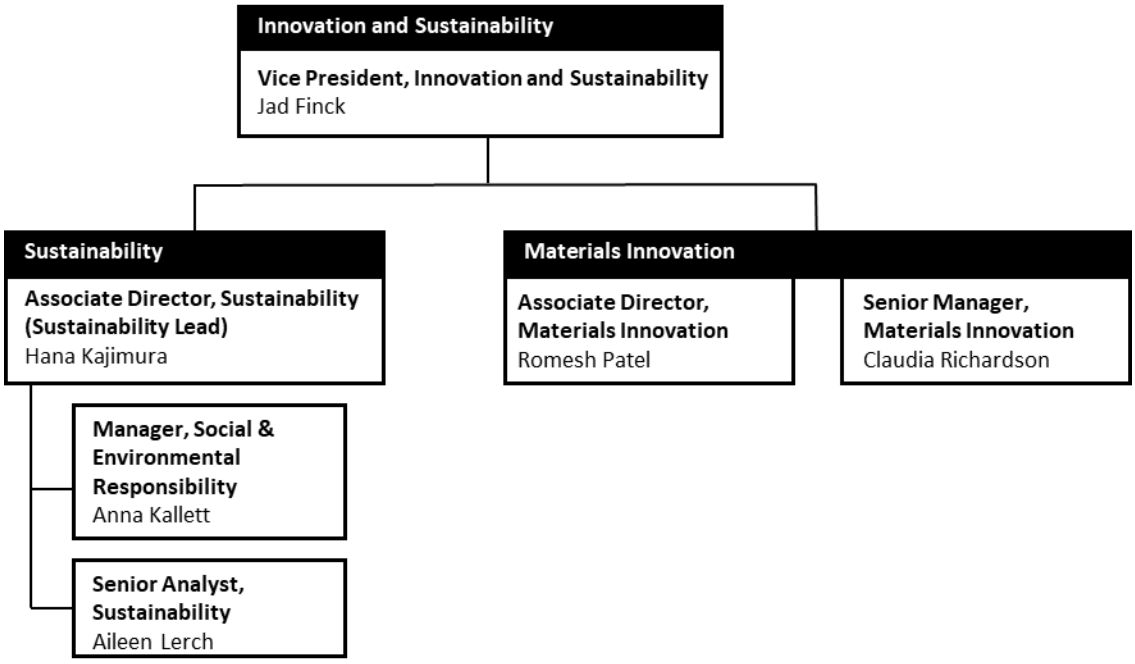
Customers value companies that are mindful of the planet and profits, and we believe the most powerful businesses in the world, such as Amazon, should lead on these issues, and will be rewarded for doing so.

Please steal our approach to sustainability.

Sincerely, Joey and Tim

Source: Joey Zwillinger, "Dear Mr. Bezos," Medium, November 25, 2019, https://joeyzwillinger.medium.com/dear-mr-bezos-e691f6d6d705, accessed March 2021.

Exhibit 7 Allbirds Organization Chart: Innovation and Sustainability



Source: Company documents.

Exhibit 8 Allbirds Product Certifications/Policies and Carbon Footprint Methodology

Subject	Policy/Certification
Materials	ZQ for wool through NZ Merino Forest Stewardship Council (FSC) for tree
Packaging	FSC Recycled Certified, 100% recycled packaging
Carbon Footprint	100% carbon neutral company, measurement of the emissions of every product Offset carbon footprint with certified carbon credits Climate Neutral-certified company
End of Life	When a customer returns a pair of lightly worn Allbirds that are unable to be sold, it is donated to Allbirds' partner organization Soles4Soul, which distributed to those in need.

Allbirds Product Carbon Footprint Methodology: The Allbirds LCA tool calculates the kilograms of carbon dioxide equivalent (CO2e) emitted to make an Allbirds product. That means in addition to calculating carbon dioxide emissions, other greenhouse gases, like methane, are accounted for and converted to CO2, assuming the global warming potential values provided by the Intergovernmental Panel on Climate Change (IPCC).

The cradle-to-grave product carbon footprint includes all emissions associated with materials (raw material production/extraction as well as materials processing), manufacturing, transportation, product use, and end of life, including fossil emissions, biogenic emissions/removals and direct land use change, as suggested by ISO 14067:2018.

Excluded Scope:

- Emissions associated with brick-and-mortar retail are not currently included in the product carbon footprint. Allbirds began as an online retailer and ecommerce continues to be the predominant sales channel. As the number of brick-and-mortar retail stores increases, Allbirds will reevaluate methodology.
- Emissions associated with Allbirds headquarters operations (corporate offices, business travel, employee commuting, etc.) are not included in the product carbon footprint, but are accounted for at the company-level.
- Emissions associated with the electricity use of personal computers and the online shopping platform are not currently included in the product carbon footprint.

Allbirds Average Product Carbon Footprint: The Allbirds average footwear carbon footprint is 10.0 kg CO2e and is calculated by weighting the carbon footprint for each product by units produced in 2020. Footwear and apparel are calculated separately due to dramatic differences in product weights and manufacturing processes.

Literature Review of Footwear LCAs: Limited research exists on the environmental impact of footwear production - there are few LCAs to begin with and even fewer are transparent about detailed methodology and assumptions. Footwear comes in a variety of styles for different functions, so it is difficult to arrive at the carbon footprint of a "standard sneaker". We compiled a range of carbon footprints from approximately 5 kg CO_2e/pair to 30+ kg CO_2e/pair within the footwear industry.

As we calculate our product carbon footprints, we think it is helpful to have a reference point. When making comparisons, it is important to ensure consistent methodology and assumptions (i.e., same

boundaries, functional unit), so we developed a set of assumptions for a "standard sneaker," based on an MIT study, to run through our own LCA tool. The resulting carbon footprint is 14.1 kg CO_2e/pair, with the following assumptions:

Life Cycle Stage	Standard Sneaker Assumptions
Functional Unit	• Men's 9 shoe: weighs 674 grams.
Materials	• 100% virgin synthetics: 32% polyurethane (PU), 29% polyester, 11% polypropylene (PP), 10% ethylene-vinyl acetate (EVA) foam, 10% rubber, 4% nylon, 4% thermoplastic polyurethane (TPU). • Assumes similar rates of material waste to our production. • Shoebox weighs 178g and is 100% virgin cardboard.
Manufacturing	• 6.39 kWh of electricity consumption - on-site coal combustion reported in the MIT LCA is excluded from Allbirds standard sneaker analysis. • Made in China.
Transportation	• Ocean versus air transportation split of 83/17, per 'Fashion on Climate' report released by the Global Fashion Agenda. • Same product global distribution as Allbirds.
Use	• None.
End of Life	• Fate of average US municipal waste (80% landfill, 20% incineration).

Source: Adapted by casewriters from company documents.

Notes: ISO 14067:2018 refers to an international standard, *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification*, that "specifies principles, requirements and guidelines for the quantification and reporting of the carbon footprint of a product (CFP), in a manner consistent with International Standards on life cycle assessment (LCA) (ISO 14040 and ISO 14044)." https://www.iso.org/standard/71206.html, accessed August 2021.

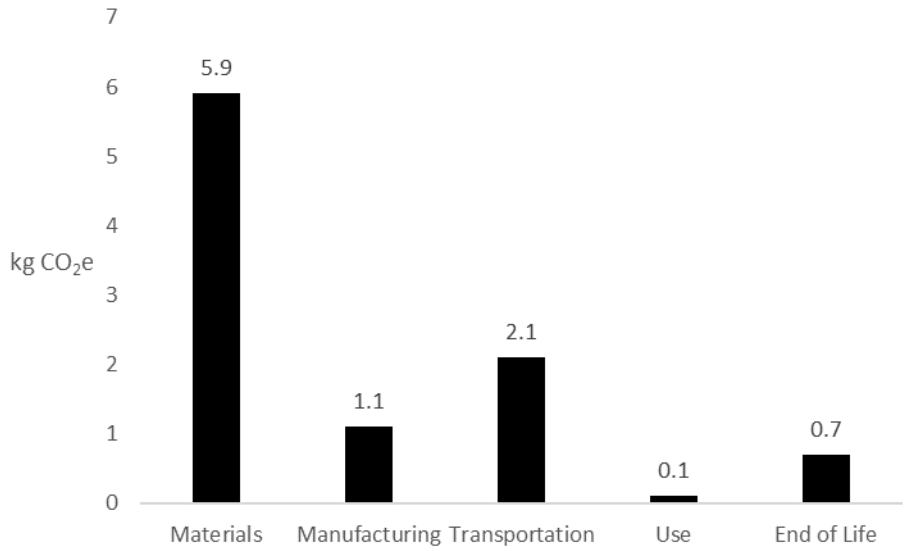
The MIT study referenced above is Lynette Cheah, Natalia Duque Ciceri, Elsa Olivetti, Seiko Matsumura, Dai Forterre, Richard Roth, and Randolph Kirchain. "Manufacturing-Focused Emissions Reductions in Footwear Production." *Journal of Cleaner Production* vol. 44 (April 2013): 18–29, https://dspace.mit.edu/handle/1721.1/102070, accessed August 2021.

Exhibit 9 Allbirds Footwear Product Range

Source: Compiled by casewriters from company documents.

Note: Figures include transportation, and are as of August 2021. All products are unisex except Tree Breezers, which is woman only.

Exhibit 10 Elements of Wool Runner's 9.9 kg CO_2e Carbon Footprint



Source: Casewriters, based on company documents.

Note: kg CO_2e refers to kilograms of carbon dioxide equivalent.

Exhibit 11 Mock *Wall Street Journal* Article on Allbirds and SweetFoam (excerpts)

From Sugarcane to Shoes—Upstart California brand and Brazilian chemical giant shake up footwear industry with novel, sustainable sneaker sole, *Wall Street Journal*, 2/1/2018 by Oliver Zev.

SÃO PAULO, BRAZIL. …Making sugar from sugarcane has been a tradition in Brazil going back hundreds of years, with ethanol becoming common in the 1970s as a response to global oil shocks. Now there is a new outlet for this sweet crop, and it involves even older transportation traditions: walking and running. Earlier this month, San Francisco-based shoe brand Allbirds started selling the world's first shoes with soles made from Brazilian sugarcane, using technology provided by Latin America's largest petrochemical company, Braskem.

The story of how the world's first sugarcane-based sneakers came to be starts [when]… Tim [Brown] linked up with Joseph Zwillinger, an industrial engineer and biotech executive, to form the company, Allbirds, Inc. — a nod to New Zealand's early mammal-less history — in 2016 and released their first shoe product, the Wool Runner, later that year. The shoe clearly struck a chord with customers–the Wool Runner went on to become the fastest selling shoe footwear history.

With their first big success under their belt, the sustainable shoe start-up company was not content to just focus on wool and they soon looked ahead to what they considered the 'holy grail' of footwear: a renewable sole. Mr. Zwillinger knew there was one company that had a strategic advantage in the green material space. In 2010 Braskem had leveraged one of Brazil's national jewels — its highly productive and rain-fed sugarcane industry — and developed a first-of-a-kind production facility that converted the sugar into a plastic that can be used in a variety of applications such as packaging and films. This so-called "green plastic" (branded "It's Green") replaced products that were typically produced with petroleum and saw a significant market uptake in areas where consumers valued the renewable aspect of the product and were willing to pay a premium for it. Mr. Zwillinger knew that this process could be modified to produce not just plastic, but the cushiony sneaker sole foam that much of the world walks on every day. "When we first spoke to Braskem about the idea in early 2016, we hadn't even sold a single pair of shoes yet. They let us know that while technically possible, without a market demand, they had no justification to modify their plant," Zwillinger said. He put the project aside. Allbirds went on to sell that first pair of Wool Runner shoes, and the sales kept coming. "Our first week of launch TIME magazine called us 'The World's Most Comfortable Shoe', and we've basically been trying to catch up to that demand ever since," said Zwillinger.

But Zwillinger and Brown never let go of their 'green sole' dream.…Typically, sneaker soles are made from a petroleum-derived foam called ethylene vinyl acetate, commonly referred to as EVA. Braskem's technology allowed for this EVA to now be made from naturally grown sugarcane, replacing up to 80% of the petroleum in the sole. "We had a lot of exciting ideas we were chasing, but it was clear that the 'Green EVA' project meant the most for Allbirds and for moving the footwear industry into a cleaner direction," said [Jad Finck, Allbirds' VP of Innovation and Sustainability]. He reached out to Braskem, and this time was able to pitch the project on the heels of a huge first year of sales and widespread adoption by top tier press. "Allbirds was no longer just an aspiration, they were now a company being celebrated across the US and even featured in major magazines as one of the best products of the year," said Mauro Oviedo, head of EVA Innovation at Braskem, "we realized very quickly they could be the perfect partner to take our sugarcane technology to market." "With their popular new brand, and focus on sustainability, we thought that they could be the 'cowbell' that made a big noise in the industry and brought all the other major players to the table," added Karen Pallone, head of the EVA business for Braskem.

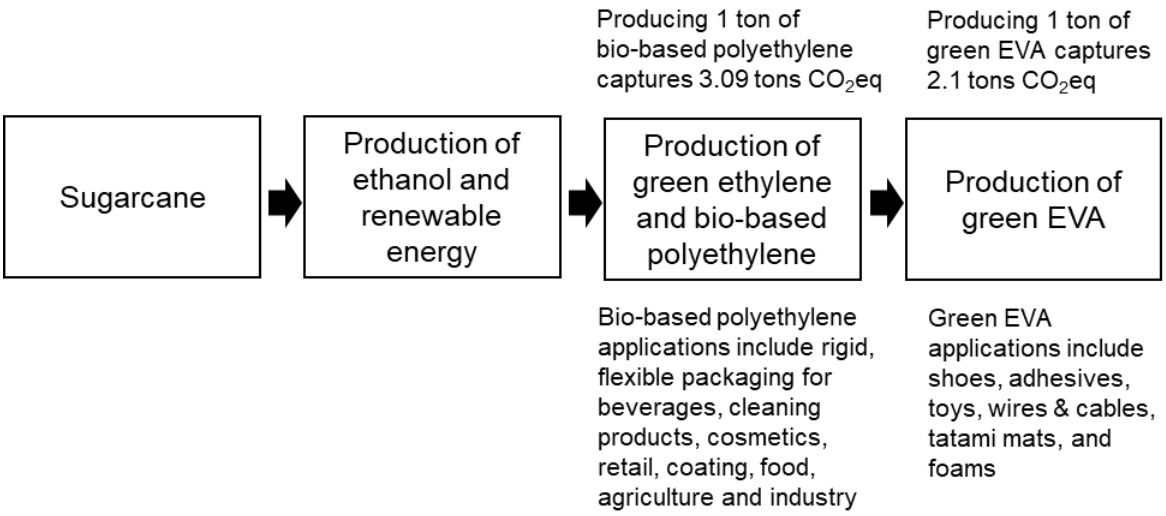
After a year of working sessions, design reviews and dozens of prototypes later, the joint Braskem-Allbirds team had a shoe that was ready for market: a light and stylish flip-flop with a sole made from Brazilian sugarcane, now dubbed GVA (short for Green EVA). The flip-flop was launched earlier this month with a huge press campaign featuring US and Brazilian celebrities and the product was an immediate hit. "After the first few weeks of looking at the numbers, we went back and increased the production order by 10 times," said Brown. "We knew we had a true blockbuster on our hands. Again."

…"We are seeing unprecedented demand for our new renewable GVA product. It started with footwear, and is now spreading into other applications like thin films, solar panels and adhesives. The market is $10 billion per year and growing. We see this as an early chapter in a long green story and we're proud that Braskem and Brazil are at the forefront of it," said Ms. Pallone.

When asked if Allbirds was concerned about other copycats in the footwear space, Joey Zwillinger said "We welcome it. We never wanted to be the only ones doing this. In fact, if we do not have other companies copy us, then our whole effort will not have the impact we are shooting for. We are running a business first and foremost, but our mission from the beginning has always been to use our business to move the industry to do things in a better way." Following on the heels of the flip-flop, the Allbirds team quickly rolled out the new green foam into all their shoe lines. "All of our shoe soles are now made entirely with the Braskem sugarcane-based foam. If the shoe industry followed suit, it would be the equivalent of saving over 3 million barrels of crude oil a year. And that is just in footwear. We are already working on what is next. This is just the beginning of a movement in sustainable manufacturing. Watch this space," said Finck smiling….

Source: Company documents.

Exhibit 12 Green EVA Process Flow



Source: Adapted by casewriters from "Sustainable Solution For a Circular Economy," Braskem, https://www.braskem.com.br/portal/imgreen/arquivos/catalogos/Catalogo_Im_green_ING_AF_BX-.pdf, accessed March 2021.

Note: Carbon dioxide equivalent figures reflect greenhouse emissions from cradle to the Braskem gate.

Exhibit 13 Initial email Tim Brown sent to Eric Liedtke, Adidas' Former Head of Product & Brand, September 2019

Dear Eric –

It was a real pleasure to meet up a few weeks ago. Our conversation was hugely inspiring in terms of just how closely aligned we are on the urgency of a sustainability revolution and it prompted a bunch of thoughts. As we discussed, I said that when one of those bubbled up to the surface in terms of something we could do together that I'd share it with you. One has and here it is (in bullet form for ease of digestion)....

1. *All the things we agree on....*
2. The environmental crisis is the problem of our generation;
3. (I suspect) History will judge us all quite harshly in how we act in this moment;
4. People buy GREAT products not Sustainable ones – this isn't about people changing their behaviors as much as it is business and government changing the rules of the game;
5. The businesses that are tackling this challenge head on now are doing the right thing for the environment sure, but, they will also be the ones that win in the long run;
6. Carbon Neutrality isn't the whole conversation (worker's rights, micro plastics, water usage et al) but we believe it to be the single most important unifying strategy and we all need to be thinking in terms of it;
7. The fashion industry is a huge contributor of carbon emissions (~10% globally = to Europe);
8. Footwear is a big part of that (~25 billion pairs produced annually) and has largely played lip service to the idea of sustainability;
9. Sustainability is a complicated emotional topic but, we think, is best tackled as a rational, economic one;
10. Our philosophy (not just ours but best practice in our deeply researched opinion):
    1. Measure your carbon impact – all your business not just part of it = A number;
    2. Innovate to reduce that number managing the cost like you would any other line item in your financials;
    3. Use offsets as a short term measure to effectively tax anything greater than zero = In our case less than >10kg per pair of shoes we make on average with a plan to drive and innovate that number down each year.
11. *And, so, bear with me....*
12. In short, every pair of shoes we make has a number = the amount of kg's of carbon omitted in its production;
13. In reality every pair of shoes in existence also does;
14. But no one has ever really publicly talked about it or disclosed it;
15. *What if we worked together to create a world first....*
16. Other companies in this space have the "mythical sub 2 hour" as their ambition, what if we worked together on a "sub 2 kg/carbon" shoe. While we might not get there on this first try – we think it would be like running a 2 minute mile – we think the act of trying might be as important as the result itself;
17. We released a carbon negative Green EVA material last year – see diagram below – called SweetFoam so we are making truly solid progress with parts of this journey;
18. Undoubtedly together we could vastly accelerate that;
19. Which could be a shared statement of *quantified* intent around a new moment in how we consider the ways we make things;
20. Recognizing that, as you so clearly do from our conversation, that the moment for talking about sustainability and having interest in it is quite quickly turning into one about action, activism, and, quite possibly, revolution.

Completely respectfully, we're going to do this anyway but we're really intrigued by the idea of how you could help both get us there better and faster. Let me know if you'd be up for chatting about it more. Completely understand if not.

Cheers,

Tim Brown
Co-Founder & Co-CEO
allbirds.com

Source: Company documents.

Exhibit 14 Futurecraft, Designed by Adidas and Allbirds Collaboration

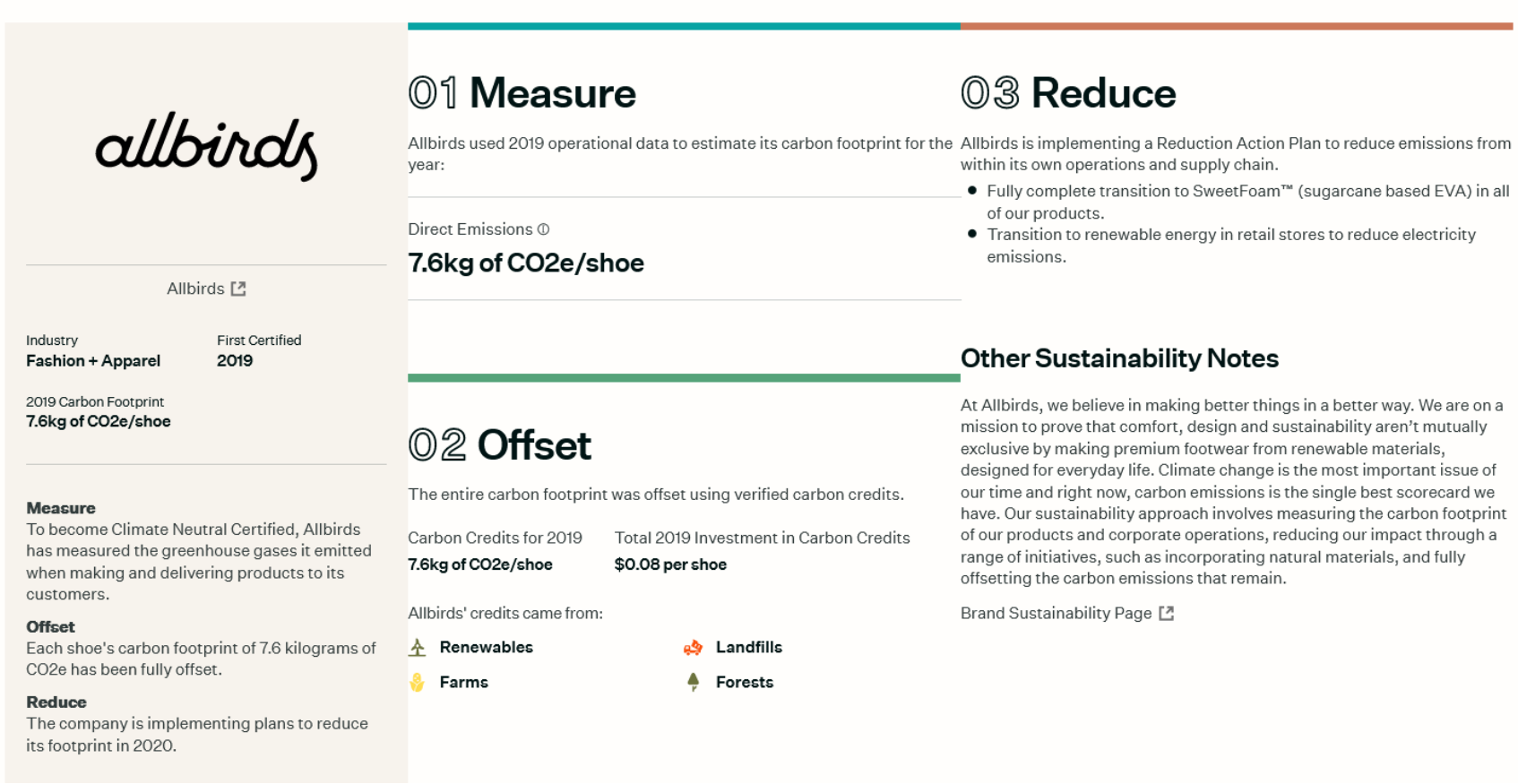
Source: Company documents.

Exhibit 15 Allbirds Stores

Opening Year	United States	Europe	Asia	Australasia
2018	New York City, NY San Francisco, CA	London, UK		
2019	Boston, MA Chicago, IL San Francisco, CA Seattle, WA Venice, CA	Berlin, Germany	Shanghai, China Beijing, China Guangzhou, China Chengdu, China	Auckland, New Zealand
2020	Austin, TX Livermore, CA Philadelphia, PA San Diego, CA Washington, DC	London, UK Amsterdam, The Netherlands	Tokyo, Japan	
2021	Boulder, CO Minneapolis, MN New York City, NY Palo Alto, CA Pasadena, CA		Seoul, South Korea Tokyo, Japan	

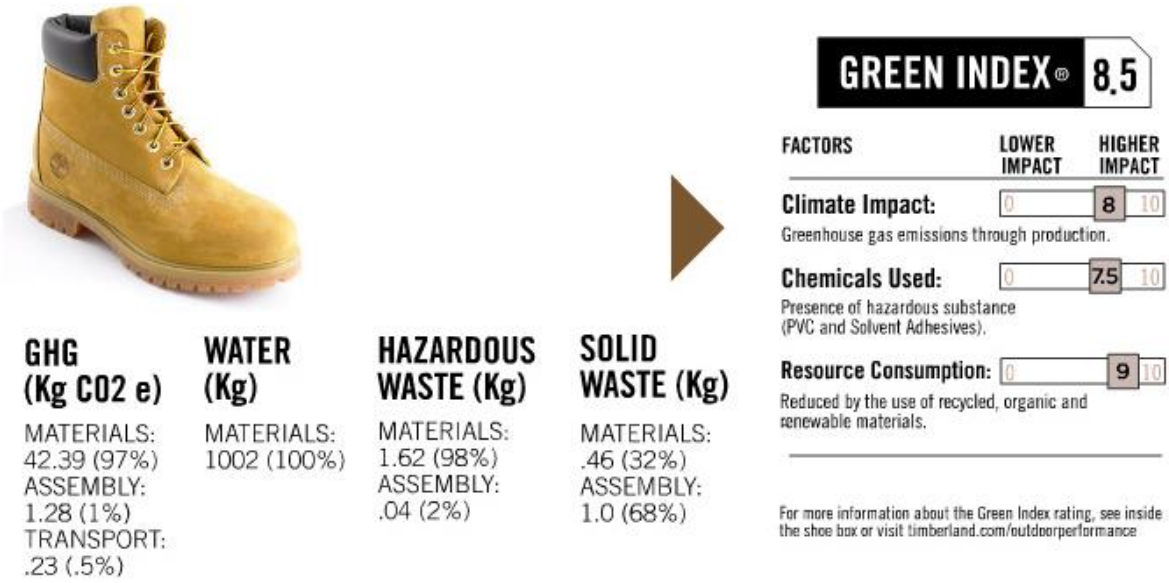
Source: Adapted by casewriters from company documents.

Exhibit 16 Allbirds Climate Neutral Plan



Source: "Allbirds | A Climate Neutral Certified Brand," Climate Neutral, https://www.climateneutral.org/custom-brands/allbirds, accessed March 2021.

Exhibit 17 Timberland Green Index



Source: Reprinted by permission of Timberland / VF.

Exhibit 18 Allbirds Fundraising Rounds

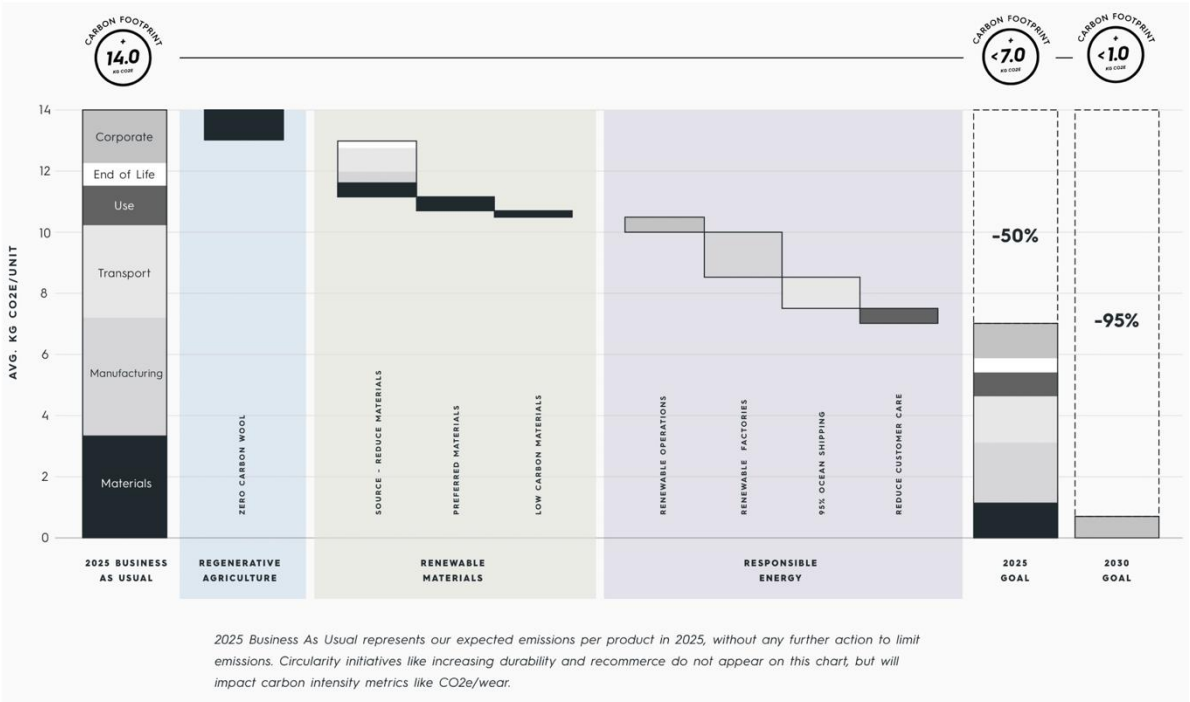
Date	Deal Type	Amount (million US$)	Raised to Date (million US$)	Pre-Val (million US$)	Post-Val (million US$)	Investors	Stage
Feb 2014	Product Crowdfunding	0.1	N/A	N/A	N/A	N/A	Generating Revenue
Mar. 2016	Seed Round	2.7	2.7	5	7	Great Oaks Venture Capital, Brand Foundry Ventures, Lerer Hippeau, Western Technology Investment	Generating Revenue
Sept. 2016	Series A	7.3	10.0	25	32	Andre Iguodala, Andrew McPhee, David Gilboa, Expansion Venture Capital, Maveron, Peterson Partners, Red Sea Ventures, Rosecliff Venture Partners, Scooter Braun, V1.vc, Lerer Hippeau, Great Oaks Venture Capital	Profitable
Sept. 2017	Series B	17.5	27.5	350	368	Elephant Partners, Lerer Hippeau, Maveron, Otter Rock Capital, Tiger Global Management	Profitable
Oct. 2018	Series C	50.0	77.5	1,350	1,400	Fidelity, Leonardo DiCaprio, Tiger Global Management, T. Rowe Price	Profitable
Jan. 2020	Series D	25.1	102.6	1,700	1,730	Baillie Gifford, Fidelity, Fifth Wall, IPD Capital	Profitable
Sept. 2020	Series E	100.0	202.6	1,600	1,700[e]	Baillie Gifford, Franklin Templeton, Rockefeller Cap. Management, TDM Grow Partners, T. Rowe Price	Profitable

Source: Adapted by casewriters from "Allbirds, Private Company Profile," PitchBook, January 12, 2021, accessed January 2021.

Note: e indicates estimated figures. This table excludes the private, secondary transaction of Slow Ventures' exit from Allbirds.

Exhibit 19 Allbirds Flight Plan

Regenerative Agriculture Shift farming practices to draw down carbon	**Renewable Materials** Replace petroleum-based materials with natural ones	**Responsible Energy** Use less and cleaner fuel and electricity
100% of wool from regenerative sources.	75% sustainably sourced natural or recycled materials.	**"Owned & operated"** – 100% renewable energy for "owned & operated" facilities
Reduce or sequester 100% of annual CO_2e emissions from wool.	Reduce carbon footprint of key raw materials by 25%.	**Manufacturing** – 100% renewable energy for T1*.
	Reduce raw materials use by 25% across footwear & apparel products.	**Transportation** – achieve steady state of >95% ocean shipping.
	Double the lifetime of footwear & apparel products.	**Customer use** – 100% of customers machine wash on cold and 50% of customers hang-dry Allbirds apparel.



Source: Company documents

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