BIOSWITCH

ENVIRONMENTALLY-FRIENDLY CLOTHING BASED ON BIO-BASED AND OTHER RENEWABLE MATERIALS

THE GOOD PRACTICE CASE STUDY VAUDE SPORT GMBH & CO. KG

Author: John Vos, BTG Biomass Technology Group BV
Contributor: René Bethmann, VAUDE Sport GmbH & Co. KG

Abstract

This case study describes the transition journey and experience of German outdoor outfitter VAUDE, and the role renewable raw materials, including bio-based materials, play in its consumer product innovations. Sustainability is a core value of the company that has the ambition to become the greenest outdoor outfitter in Europe. This ambition is reflected in the launch of its trend-setting Green Shape Core Collection in 2018: a collection of clothes, shoes and backpacks made from innovative materials that are functional and environmentally friendly. Throughout the product development phase, nature served as model, taskmaster, and as an inexhaustible source of inspiration. About 90 % of the diverse textile materials used in the production processes are bio-based, recycled or purely natural materials. For VAUDE, using innovative bio-based materials helps to reduce its collective impact while also improving technical attributes to drive very high performing materials. The VAUDE experience can serve as a showcase and, considering the strong involvement of the outdoor sports industry in sustainability, offers a chance to create a ripple effect throughout other industries.

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Company background

VAUDE is a German sports equipment brand making functional and innovative clothing and other articles like bags, rucksack, tents, etc. to enjoy the outdoors. The family-owned company, founded in 1974, employs about 500 people at its company headquarters near the southern German town of Tettnang. VAUDE operates internationally and generates annual sales of around €100 million.

VAUDE stands for environmentally-friendly products made from fair manufacturing. It has a willingness to invest time in innovation and has a clear ambition to remain a sustainability pioneer. Antje von Dewitz, who followed up her father as CEO in 2009, wants to make VAUDE the greenest outdoor outfitter in Europe

A pioneer and industry leader on sustainability

When it comes to ecological product development "Practice what you preach" applies to VAUDE for decades. In 1994 it introduced Ecolog, a recycling system for polyester clothing, in 2001 it was the first outdoor company to be awarded the Bluesign ecolabel and since 2012 the head office has been fully CO_2 neutral.[1]

VAUDE participates in a number of sustainability initiatives in the clothing sector: Fair Wear Foundation, Greenpeace Detox and Bündnis für nachhaltige Textilien. It has received a number of awards and accolades for its products and role with regard to sustainability.

EFFECTIVE project interviewer: VAUDE is a true pioneer for sustainability in the outdoor clothing and sports industry. Why is this part of your DNA?

René Bethmann (Innovation Manager Materials and Manufacturing): "As an Outdoor Outfitter which supports users to enjoy nature, our aim is to make our impact on nature and the environment as small as possible. We take responsibility in everything we do for our employees, our partners, the environment which is surrounding us and our products. We design with a focus on minimal material consumption, we try to avoid waste and design products that are timeless, durable and repairable. Thus, as a company that acts sustainably, we align ourselves with long-term, future oriented, ecological, social and economic goals. We use or develop the most sustainable materials available to us, optimizing processing even in the most inconspicuous places to make products we can be proud of. Products that convey our enthusiasm and guarantee our end customers the perfect experience."[2]

[1]Outdoormerk Vaude, koploper in duurzaamheid, 5 April 2018, https://farout.be/2018/04/05/outdoor-merk-vaude-duurzaamheid/

[2]H2020 project EFFECTIVE, spring 2020 newsletter, https://www.effective-project.eu/f/docs/DOWNLOAD/EFFECTIVE---Spring-Newsletter---A-biobased-economy-for-the-post-virus-world.pdf

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It has been innovative in terms of creating a circular approach for its prominent **Green Shape** product line where emphasis is laid on quality materials, design and reparability to ensure longlife[3].

What sustainability means in VAUDE products: the Green Shape label

In 2009 VAUDE began to steadily steer product development toward sustainability and the next year it introduced the Green Shape label. Green Shape identifies environmentally friendly products made from sustainable yet functional materials. They are manufactured under fair working conditions along the entire supply chain. Green Shape has become very well established in the outdoor market.

Green Shape has gone through several stages of development. Initially, the Green Shape criteria included only the materials used. Nowadays the Green Shape criteria apply to the entire product lifecycle, from design, through all the materials used, production sites, use and care of the product, to possible recycling and/or environmentally friendly disposal.

Each year more Green Shape items are added to the VAUDE product range. In the apparel collection the company has been increasingly successful in finding environmentally friendly materials from responsible suppliers. Over 95% of VAUDE's apparel is Green Shape. For other products -especially with tents, backpacks and footwear- great challenges are faced. Materials such as hard plastics, metals, foams for shoe soles etc. are a fairly hard nut to crack from an ecological point of view[4].

Figure 1: Green Shape infographic[5]

[3]Alexis FIGEAC, Centre for Sustainable Consumption and Production (CSCP). VAUDE: A Circular Business Model Innovation Journey. R2piproject Deliverable 5.2, www.r2piproject.eu/wp-content/uploads/2017/12/D5.2-Vaude-Case-Report.pdf

[4]https://csr-report.vaude.com/gri-en/product/greenshape-concept.php

[5]https://csr-report.vaude.com/gri-en/product/greenshape-concept.php

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Green Shape Core Collection

With the Green Shape Core Collection, launched in 2018, VAUDE offers a thoroughly sustainable set of outdoor apparel and gear. VAUDE developed innovative materials for the collection that are functional and environmentally friendly and also offer solutions to global problems such as those caused by microplastics. The collection includes 19 products: apparel, shoes and backpacks. Throughout the product development phase, nature served as model, taskmaster, and as an inexhaustible source of inspiration. About 90 % of the diverse textile materials used in the production processes are bio-based, recycled or purely natural materials. The Green Shape Core Collection is a clear testimony of what motivates VAUDE as a brand and an unwavering expression of what the company imagines the future of sustainable outdoor gear to be[7][8][9].

> The development of the trend-setting Green Shape Core Collection focused on various aspects of sustainability. Mario Schlegel (Head of Design) describes the special design approach:
> "The Green Shape Core Collection breaks with convention in terms of concept and organisation. Instead of aiming for weight optimisation, higher waterproof values, and other high performance parameters, the collection has opted out of the race for higher, faster, farther. We have not only optimised the product design and fit of the individual items to ensure a sense of well-being and comfort for a diversity of activities, we have also focused on making the collection combinable. How can they be intelligently layered for even more flexibility? Colours and materials play a smaller role so that a very limited outdoor collection can be truly versatile and used for any activity."[6]

Clear ambition to increase the share of renewable raw materials

VAUDE uses petroleum-based synthetic materials such as polyester, polyamide or polyurethane for many of its products. To use less fossil resources and to avoid adding more plastic to the planet it has set itself the goal of increasing the share of renewable raw materials used in its products, including bio-based polymers and materials, responsible natural fibers and a variety of recycled materials. Renewable resources can be natural plant fibers such as organic cotton, hemp or kapok. Animal-based raw materials such as down, merino wool or leather can also be an alternative to synthetic materials. Fibers from cellulose are also suitable, such as fibers from wood[10].

The company has set concrete objectives for its ambition that "by 2024, at least 90 % of all VAUDE products will have a renewable (bio-based) or recycled material content of greater than 50 %." [11]

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[6] http://www.mountainblog.eu/vaude-green-shape-core-collection-receives-if-design-award-in-gold-sustainable-design-award-winning

[7] https://www.vaude.com/media/pdf/53/1c/78/2018_05_VAUDE-wins-the-GreenTec-Award-2018_en.pdf

[8] https://www.vaude.com/en-GB/Green-Shape-Core-Collection

[9] https://www.effective-project.eu/Partners/VAUDE_1/

[10] VAUDE 2019 CSR report (Aug 2020), https://csr-report.vaude.com/gri-en/product/bioplastics.php

[11] H2020 project EFFECTIVE, https://www.effective-project.eu/f/docs/DOWNLOAD/EFFECTIVE---Spring-Newsletter---A-biobased-economy-for-the-post-virus-world.pdf

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Figure 2: Green Shape Core Collection[12]

EFFECTIVE Interviewer: Where do you see the potential of bio-based materials for your products?
René Bethmann (Innovation Manager Materials and Manufacturing): "Up to now, most functional fabrics are based on fossil fuels. But, fossil resources are finite. Therefore, synthetic materials made from renewable raw materials must become a part of the solution. We have set ourselves the goal of increasing the amount of renewable raw materials we use. In this way, we can use less fossil resources and diminish our carbon footprint. Bio-based materials are a way for us to reduce our collective impact while also improving technical attributes to drive very high performing materials. Traditional thinking that a sustainable product delivers lower performance might become obsolete. Recycling is just the end perspective of a product or material. We need to start at the beginning of material´s life to close the loop entirely and finally lower our dependency on fossil resources, which not only create environmental sustainability, bio-based materials are also a chance to create a ripple effect throughout other industries, the aim being that virgin fossil-based products should eventually be withdrawn from any raw material portfolio. [13]

[12] http://www.mountainblog.eu/wp-content/uploads/2018/03/GreenShapeCoreCollection_W1819_Produktuebersicht.jpg

[13] H2020 project EFFECTIVE, spring 2020 newsletter, https://csr-report.vaude.com/gri-en/product/bioplastics.php

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Examples of switching from fossil to innovative bio-based materials

Working in close collaboration with partners in the value chain, in particular suppliers from the chemical industry, VAUDE has introduced innovative bio-based materials including biopolymers and biocomposites in its Green Shape products. Here are a few examples[14] [15]:

• VAUDE uses polymer materials derived from the oil of castor beans to produce trims (such as zippers, buckles and hooks) and high-performance fibers (for clothing). Castor oil is a unique natural material that is obtained from the Ricinus Communis plant, which grows in tropical regions. It is grown in relatively poor soil conditions, and its production does not compete with the food-chain. For developing the buckles of its new bag and backpack collection, VAUDE uses bio-polyamides supplied by Evonik[16]

• In VAUDE's Ceplex Green membrane, used for waterproofing, up to 25% of conventional polyurethane (PU) is replaced by s.Café®. The bio-PU is obtained from recycled coffee grounds which are converted into a polyol. Bio-PU is a drop-in chemical offering the same performance as its conventional fossil counterpart.

• Bio-based thermoplastic polyurethane (TPU) is used in the heel counter and toe cap to waterproof one of VAUDE trekking boot models. The bio-TPU is made using two building block biochemicals: succinic acid and 1,3-propanediol. The bio-TPU, a joint development of Covestro and Reverdia, has a bio-based content of about 64%.

• Another innovation highlight is the newly developed fleece material in which TENCEL® is used on the inner surface. The TENCEL® fibre is made from 100% wood cellulose, a renewable raw material that has excellent functional properties. And the best thing about it: microparticles that enter the global water cycle during the washing process can biodegrade completely in seawater.

Challenges shifting to bio-based

As mentioned above, VAUDE has the ambition that by 2024, at least 90 % of all VAUDE products will have a renewable (bio-based) or recycled material content of greater than 50%. The company is spending a lot of time and resources on realising these targets. But achieving them is no panacea. What are the main challenges for the company to realise its ambition? The BIOSWITCH project interviewed VAUDE's innovation manager René Bethmann on this topic[17].

"To increase the renewable or recycled content whilst remaining price competitive is a major challenge", he mentions. "In terms of sales price we have little room to manoeuvre. As a brand you are stuck in a specific price range. VAUDE operates at the mid-price level, and there is a natural maximum to the sales

[14] https://www.vaude.com/en-NL/Equipment/Eco-Fair/Sustainable-Materials/Biobased-plastic

[15] René Bethmann (2019), VAUDE, presented at: Bioplastics and Biocomposites Innovative Building Blocks of the Emerging Bioeconomy, 14 February 2019, Rotorua, New Zealand, https://www.scionresearch.com/__data/assets/pdf_file/0008/65816/Bio2AN-Vaude.pdf

[16] https://corporate.evonik.com/en/evonik-showcases-sustainable-material-solutions-for-the-sports-industry-117644.html

[17] Telephone interview with VAUDE Innovation Manager René Bethmann, 13 October 2020

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price that our consumers consider acceptable. A jacket selling at 250 euro will stay unsold if it is priced 15% higher. In real life we do not experience much of a GreenPremium effect[18] .

Our production costs are rising, for various reasons and in many ways. It is not just the higher prices of renewable/recycled feedstock or less harmful chemical components compared to virgin fossil feedstock. It also concerns costs linked to the certification process. The costs of labour in production countries are increasing too.

We work with several large chemical industries but compared to some of the other outfitters in the outdoor sports industry are a relatively small player. Our power to convince our suppliers to adjust their chemical product portfolio is limited. Our modest scale limits the accessibility and availability of new biomaterials such as bioplastics and biocomposites to us and drives up their costs.

Currently there are few economic incentives supporting a (further) switch to bio-based. We hope that fiscal measures that are to be implemented under the European Green Deal, like the carbon tax on fossil resources, will lead to a monetary award for our sustainable practices.

Only few people question the (un-)sustainability of using fossil-based materials. And since the onset of the Covid-19 pandemic prices for fossil oil dropped dramatically. Making it difficult for us making large progress towards achieving our 2024 ambition right now."

Lessons learned and take-home messages

VAUDE is a fully family-owned company that has sustainability as part of its DNA and long-term, future-oriented ecological, social and economic goals.

Have set themselves an explicit goal of increasing the share of renewable raw materials used.

Its collection of 19 core products, for the development of which nature served as model, taskmaster, and source of inspiration, ensures a sense of well-being and comfort for a diversity of outdoor activities.

Already succeeded using bio-based, recycled or purely natural materials for about 90% of the diverse textile materials used in the collection of 19 core products, with the ambition to achieve a renewable (bio-based) or recycled material content of >50% for almost all (at least 90%) VAUDE products in 2024.

[18]The term GreenPremium prices is defined by nova-Institute as: "The additional price a market actor is willing to pay for the additional emotional performance and/or the strategic performance of the intermediate or end product the buyer expects to get when choosing the bio-based alternative compared to the price of the conventional counterpart with the same technical performance." See e.g. See Carus, M., Eder, A., Beckmann, J. 2014a: nova paper #3: "GreenPremium prices along the value chain of bio- based products". Hurth 2014. http://bio-based.eu/nova-papers/#GreenPremium

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Bio-based materials are a way to reduce the company's collective impact while also improving technical attributes to drive very high performing materials.

Bio-based materials are also a chance to create a ripple effect throughout other industries.

Increasing cost prices, modest company size, lack of monetary reward for sustainable performance and lack of incentives are important barriers to keep up momentum in the ongoing transition from fossil to bio-based.

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