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2023

SUSTAINABLE FASHION FROM PORTUGAL

THE GREEN WAY

FROM PORTUGAL

ATP

SUSTAINABLE FASHION FROM PORTUGAL

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SPECIAL THANKS TO | ANA TAVARES . CENTRAL MODELS
L'AGENCE . STIVALI . FREEPIK

PUBLISHED BY
ATP - ASSOCIAÇÃO TÊXTIL E VESTUÁRIO DE PORTUGAL

PRODUCED BY
MANIFESTO MODA

WWW.ATP.PT

Printed . Multitema

PROJECT SUSTAINABLE FASHION FROM PORTUGAL

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RESPONSIBLE PROCESSES

IN TEXTILE PRODUCTION

FROM PORTUGAL

INDEX

EDITO

Capitalising on the foundations laid by The Green Book and The Green Wave, which provided an overview of the Portuguese Textile and Clothing Industry's commitment and measures toward achieving environmental sustainability, as well as the momentum driven by The Green Materials, which explored a renewed perspective on materials and their usage — a most essential approach toward the aforementioned goal —, this new magazine, The Green Way, which also emerged from ATP project "Sustainable Fashion From Portugal", highlights the processes and technologies that are being carried out today in order to achieve the goal of producing a more environmentally friendly fashion: all in the name of a better tomorrow.

"The Green Way" is an open window to the ensemble of greener recycling, dyeing, finishing and printing processes currently being implemented by Portuguese companies. Moreover, it delves into the efforts of said companies toward managing water and energy resources, toward complying with the growing relevance of traceability and digitalisation, and, lastly, toward exploring and raising awareness to the vital role of decarbonisation as a means of reversing the harm that the Textile and Clothing Industry (TCI) brought upon our Earth. Above all, this magazine aims to act as a showcase for our one and common path, a path which, albeit far from complete, is being built upon solid values of commitment, seriousness and rigour — concepts that, over tizme, have guided the performance of one of the undeniable giants of our country's economy.

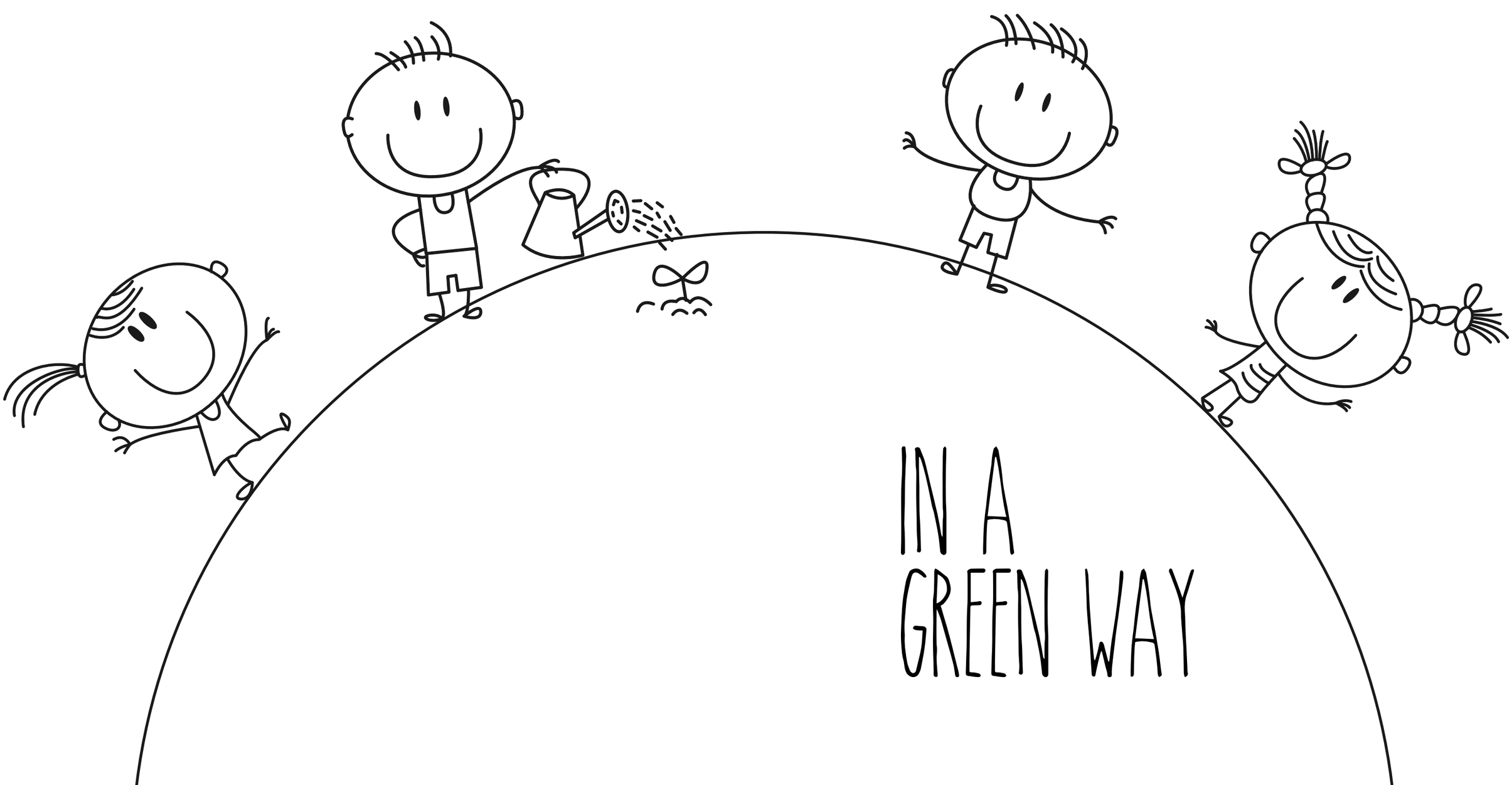
Upon following the evolution of this sector for over 30 years, I have had the pleasure of being part of a journey that has been punctuated by continuous and ongoing improvements. Faced with stern competition from countries where the production of garments entails significantly lower costs, the Portuguese Textile and Clothing Industry made itself known by excelling in product quality and development. Then, innovation and design too emerged as differentiating factors too. Nowadays, adopting a path built long before the word sustainability first established itself as a mainstay of a more global consciousness, it is the introduction of greener raw materials, the careful management of water and energy consumption, and the application of more eco-friendly textile ennobling processes that stand out. This path, trodden by textile and clothing companies alike, leads to a brighter future for all.

Sofia Botelho

"Sustainable Fashion From Portugal" – Project Director

ATP – Executive Director

HOW WE DO IT



IN A GREEN WAY

BECAUSE

WE CARE

BY ISABEL LINDIM

In our day-to-day life, textiles and clothing are something we are used to taking for granted, without often realizing that the evolution in this sector is much greater than one might think. Beyond the doors of factories, laboratories, research centers, universities, associations, creators and producers, there is a world in motion, in the sense of using technology and science in favor of a giant industry that wants to be cleaner and more eco-friendly.

In this publication, dedicated to the different processes in the textile area, we see how the word sustainability is no longer just a green flag or a business card, but a necessity for companies and a requirement for consumers. We are in a phase where the implementation of solutions are already benefiting the producing entities and the environment. Everyone wins with less water use and less energy consumption, with less harmful chemicals in dyeing and finishing, in the use of recycled fibers and in the creation of a digital map for the raw materials and value chain.

A few decades ago, when the fast fashion boom began, it would be hard to believe that one day we could look at a piece of clothing and know the entire production process with such fragmented characteristics. The idea of bioeconomy will connect all players: designer, creator, producers and consumers. The life of a piece begins with its design and ends at the time of recycling, when it will give life to another article. The more accurate this system is, the more existing fibers can be used and the less impact the industry will have on available resources, which must be preserved. Instead of extracting, we are going to imitate nature through biotechnology.

Recycling and traceability are the main catalysts for this enormous transformation that we are witnessing. They will be the true mirror of sustainability and transparency, where the different phases of the textile and clothing industry will be exposed. All processes are related and all will form part of a new circular system.

LESS WASTE WATER

The numbers may be overwhelming, but they don't lie. It takes 2,700 litres of fresh water to produce a single cotton t-shirt — a volume that corresponds to the average drinking water consumption, per person, over the span of two and a half years. According to a report devised by the Ellen MacArthur Foundation (A New Textiles Economy), the textile industry is responsible for an annual consumption of approximately 93,000 million cubic metres of water. It is worth mentioning that this report pertains to 2017, and reflects a reality where said figures are sure to multiply every year. Ultimately, the aforementioned are but a response to an overwhelming demand — a demand which shows no signs of slowing down, quite the opposite, in fact.

In terms of environmental impact, this rise in demand means that more water and more energy are being consumed, all the while generating more pollution. In this very same study conducted by the Ellen MacArthur Foundation, data also indicates that, every year, 200,000 tonnes of dyes are lost in effluent on account of inefficient dyeing and finishing processes. All over the world, the number of places where sustainable water management is simply not feasible, due to a lack of infrastructure, keeps adding up. This lack of infrastructure may be assessed by overall water consumption, water waste and water underutilisation, as well as through the pollution that has a direct effect on wastewater, releasing toxic substances that remain in the ecosystems indefinitely. According to World Bank data, nearly 20% of all industrial water pollution stems from the dyeing and textile treatment stages.

Although the scenarios of greater risk and contamination are mostly consolidated in countries of the southern hemisphere (due to some of these being key forces in both the production and the collection of industry surpluses and used clothing that end up in landfills), this problem affects the entire planet, even more so upon knowing that we are facing a sprawling level of maritime pollution.

It is estimated that the process of washing synthetic fibres is responsible for 35% of all microplastics released into the environment. "A single laundry load of polyester clothes can discharge 700,000 microplastic fibres that can end up in the food chain", states a recent report drafted by the European Parliament.

Nowadays, microplastics — tiny synthetic fibres less than 5 millimetres in length — resulting from frequent washing in clothing, are spread across different terrestrial and marine ecosystems. Their journey is almost always done via water, and there are no means of preventing these particles from reaching the oceans, seas and rivers. Thousands of tonnes of garments, in fact, end up in dumps (like the dumping ground in Dandora, the largest in Kenya) and they originate primarily from Western countries.

When compared with the different sectors of the global economy, the textile, clothing and footwear industries are among its top polluters and emitters of greenhouse gases (accounting for 10% of all greenhouse gas emissions), in both the production and waste management stages.

The Sustainable Development Goals (SDGs), outlined by the United Nations in 2015, include the sustainable management of water resources. SDG 6.3 reads "by 2030, improve water quality by reducing pollution, eliminating dumping and minimising (the) release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally".

This point is directly linked to the textile and clothing industry, both when it comes to the usage of toxic elements in the production of items, as well as in the

treatment and reuse of water and recycling solutions.
In Europe, the Zero Pollution Action Plan — one of the main strategies featured in the Green New Deal — has, as one of its targets "to improve water quality by (1) reducing waste and plastic litter at sea (by 50%) and (2) reducing microplastics released into the environment (by 30%)".
The Ecolabel is one of the main additions that rose from a context where the consumer has access to information about the ecological criteria of companies.
One of the greatest concerns of the textile sector has been to guarantee proper management of water resources, therefore, it is only natural that technological innovation heeds that very same route. Beyond the consumers' perception about the responsibility of brands and companies in the use of water resources, lies the knowledge of producers, who know or should know that water is an increasingly scarce good, mainly in southern European countries, where periods of drought are more extreme.
Water reuse, for example, is becoming less of a far fetched future, and more of a reality being employed by Portuguese companies. Investment in new machinery has been a constant during recent years, in order to implement recirculation and reuse systems that allow for the harnessing of water resources.
For this reality to become more popular, it is vital to ensure cooperation toward the attainment of field-relevant academic, technological and business advances. The Giatex project, coordinated by CITEVE, is one of the funding sources of the RRP (Recovery and Resilience Programme), and already features goals that must be achieved until 2025, when the project expires.
The University of Beira Interior, the Faculty of Engineering of Porto University and the University of Minho are some of Giatex's partners.
The solutions resulting from this joint venture will be available to all companies facing water management problems. Along the following pages, one may find some of the brands currently prioritising the reduction and reuse of this ever fundamental resource. In some cases, namely those of the textile dyeing and printing domains, technologies such as ECOdyeing, Colorifix and Nano Earth Dye allow for nearly absolute water savings.
CITEVE also joined in to support a highly relevant international initiative that aims to minimise the impact of the textile industry on the environment. The Microfibre Consortium, which includes several countries, aims to create processes that allow for a lower release of microfibres, both during the production and the life cycle of garments. In other words, it is a way of promoting developments in technology and Artificial Intelligent so as to find solutions for textile waste accumulations which end up being absorbed by ecosystems — mainly the oceans — and by all living beings, including humans. After all, it is already proven that microplastics, which are present in the synthetic fibres produced by this sector, are a reality that reaches human beings through air, water and food.

LESS WATER

A. SAMPAIO

When it comes to its sustainability, the textile industry has to redeem itself and continuously grow a greener mindset. A. Sampaio supports proper water use and treatment. The company ensures the best water management possible with strict collaborations with finishing and dyeing partners, whose processes are evolving to reduce the water needed. A. Sampaio fabric developments also look into fibres with water-saving procedures (both on the fibre production and following fabric manufacturing processes). New fibres also convey opportunities, supporting the efforts to reduce or eliminate the microplastic release of the fabrics, and protect the aquatic environments.
Yarn made from plastic retrieved from the oceans in nearby geography is another staple in A. Sampaio fabric offer.

SOMELOS

In Somelos group, ambitious goals have been established and the water consumption will be significantly reduced not only by the introduction of new dying processes and recipes, but also as a result of the investment in state of the art equipment as dyeing machines and stenter. The group captures directly from the river and has just invested in a new water treatment decanter. Its effluents are centrally treated.

ACATEL

Acatel strategy is to reduce the water consumption with a recovery and resilience programme called Intelligent Water Management in the Textile and Clothing Industry.
This initiative joins a group of textile companies, universities, associations, which will study the data of the various stakeholders, in order to be able to implement systems for cleaning and reusing water in the industry. The textile sector is a major consumer of water, which requires a water treatment plant to clean it. The objective is that after treatment, Acatel will be able to develop a technology to reintroduce it back into the dyeing and finishing processes and reach 0% water consumption.

WONDER RAW

In Wonder Raw the printing solution is free of pre--treatments, steaming and washing, enabling lessened consumption of water and waste.
Example of water savings:

- The Direct-To-Garment (DTG) digital printing solution adopted vs. screen printing of a single t-shirt: Up to 93.8% less water consumption
- The Direct-To-Fabric (DTF) digital printing solution adopted vs. rotary screen printing per sqm: Up to 95.63% less water consumption.

LESS WATER

POLOPIQUÉ

In its yarn dyeing area, has in the present year 2022, an average consumption of 60 Lt/Kg, being cotton the main raw material to be dyed. This ratio is obtained thanks to the strong investment made by Polopiqué in recent years in technologically and energetically advanced machines.

- High precision and uniformity winding, which allows us to have bobbins with a high density and good performance in terms of penetration of the baths;
- Dyeing machines that allow working with these bobbins with the sufficient certainty of obtaining good dyeing, energy and water savings, due to the low bath ratios (1/6), which we intend to lower soon to 1/4;
- Optimisation of the processes, in order to obtain preparations and soaps at lower temperatures;
- Selection of dyes and auxiliary products in order to achieve better washability and thus reduce water in the process;
- Recycling some effluents for later use. The goal is to optimise the water its (re)use. Therefore, in addition to the measures already implemented to reduce and recover this natural resource in Polopiqué production processes, the acquisition of a wastewater treatment unit is planned, in order to reuse all the water from the dyeing process.

Moving towards continuous improvement, Polopiqué seek to increase efficiency and reduce waste in all units. Therefore, in addition to the investments made in innovative dyeing equipment, the dyeing procedures have been improved.
With these new processes, in which more sustainable and efficient products are used, lower temperatures are possible, reducing the amount of energy consumed – "doing more with less". Together with the company suppliers, who are a key part of our supply chain, Polopiqué continuously seek to improve our range of chemicals in order to achieve a more sustainable production.

JF ALMEIDA

JFA recycles and reuses 30% of the water that enters its dyeing shop. At the outlet of the company dyeing machines, dirty and clean effluents are separated. Clean effluents go to the physical and chemical treatment plant, where all contaminating parts are removed.
The now clean water is fed back into the process.
The water reduction translates into more than 72 Olympic swimming pools per year (six and a half per month).
– In the last 10 years, JF Almeida have managed to reduce the specific consumption of water by 46%: from 120 L/kh to 65 L/kg, through process optimization and machinery upgrades.

RIOPELE

Riopele water management policy is based on three main pillars: an optimised water consumption management, the recovery of effluents generated by the production processes and efficient water abstraction management.
The company is continuously investing in programmes aimed at reducing the use of water resources, reusing water and recycling industrial effluents, which allows to achieve a level of excellence in water management and conservation.
The facilities are equipped with a water treatment and pre-treatment plant, ensuring that all the process water is appropriately processed and routed to a proper destination while promoting its safe return to the water cycle.
Through the commitment to reduce water consumption, Riopele has invested in state-of-the-art machines to ensure that the water we use is recycled and reused to its maximum potential.
Nowadays, the company recycled 53% of the water used. Additionally, 1% of the water consumption is made up of reclaimed rainwater.

RDD TEXTILES

RDD partnered up with Colorifix to engineer colour developing a revolutionary bio-based dyeing process that creates pigments through a fermentation process.
In this process RDD is able to produce colours in a natural way, reading the DNA sequences from a wide range of organisms present in nature and introducing this DNA information into microorganisms that can produce colours for the dyeing fabrics process.
The possible colours, including intensity, are highly variable and dependent on fabrics compositions and dyeing protocol, especially when compared cellulosic fibres with synthetics. For the first time, RDD is trying to apply this methodology in a garment dye process, increasing the range of applications of this sustainable dyeing process. A very recent Life Cycle Assessment, revealed that this highly efficient and cost-effective process saves more than 53% of energy, uses less 77% of water and less 80% of chemicals consumption, contributing less 37% for global warming when compared this dyeing approach with conventional methodology. The water produce in the fermentation process is the one used on the conventional jet dye machine, resulting in the non-harmful waste water.

RENEWABLE ENERGY

In 2022, Europe was faced with an energy crisis that left many sectors of the economy vulnerable, including the textile and clothing one. Last year's conundrum shone a light on an underlying dependence on countries governed by autocracies or even dictatorships, which were, coincidentally, major suppliers of natural gas. It was realised that the origin of fossil fuels was, ultimately, not only a problem that concerned greenhouse gas emissions, climate change impact and pollution, but also energy security.

The renewable energy issue is no longer a global goal, but an overarching emergency. Much has been written and debated on this subject in the last year, resulting in solutions that do not fully point to renewable energies — and even a Recovery and Resilience Plan that foresees a large share for decarbonisation —, but, above all, that undoubtedly brought about a new emphasis to that which is truly indispensable in this field: initiative, knowledge and financing. Beyond their geopolitical connotation, any decisions made within this sector are also business decisions.

In the Portuguese context, solar energy is at the top of the renewable energies, and many companies are already moving toward the adoption of infrastructures that allow for this renewable source of electricity to be used at a large scale (we'll talk about some of them in the next few pages). The crisis has merely accelerated what had been expected for years. The placement of photovoltaic (solar) panels — on the roof of companies or factories — is one of the most effective solutions toward reaching full autonomy and compliance with company and factory-wide decarbonisation goals.

With that said, solar energy is not the only means of providing a solution to the aforementioned matters. Many companies have begun to turn to green hydrogen, an energy source that may be obtained through renewable electricity (such as solar-powered electricity). The transition to this renewable energy comes as a decision made by many sectors, not solely the textile one, in turn, meeting the government goals toward the creation of green hydrogen production infrastructures and its export to Europe through gas pipelines. This multi-million investment is mainly intended to bolster different industrial sectors in Europe.

As for the energy efficiency of industry-related equipment, technological innovation too brings solutions aimed at saving energy. The use of biomass in heating boilers is one possible substitute for natural gas, as is the reuse of exhaust gases for heating water, and the use of heat from dirty water (water used in jets) to heat the clean water that would then be used in this very same process.

In the textile and clothing industry, water and energy are two sides of the same coin: reducing the consumption of one means reducing the consumption of the other. This new perspective unfolds in two singular aspects: the use of more sustainable sources and the application of cleaner processes, internally.

In dyeing and finishing, energy plays an essential role. The new Colorifix technology does not use chemicals in dyeing and in addition to reducing water, gas and energy expenditures, it avoids further environmental impact by circumventing the usage of microplastics that would inevitably return to nature.

Portugal aligns itself with European decisions, be those made by the European Commission or by other business initiatives. The Fashion Pact, an agreement signed at the G7 summit in Biarritz in 2019, by Emmanuel Macron's French government and 200 other international brands, outlines, as one of its priorities, to achieve 100% renewable energy in the entire textile and clothing production system by 2030. Therefore, one asks: is it possible to achieve this number? Technology states so. Although, to do that, we need to change the mindset and break barriers and dependencies that were crystallised many decades ago.

The inevitable path toward decarbonisation, which will enable businesses to become self-sustainable, includes yet another aspect: the need to decrease the production of fibres sourced from fossil fuels. Figures show that there will always be a progressive increase in fibre production, worldwide. We may even reach a total production of 250 million tonnes, in 2050 (for reference, we are currently standing at 110 million tonnes). To what extent is the industry investing in new fibres? Portugal, through its various pioneering companies, is now able to respond in full.

CLEAN ENERGY

JF ALMEIDA

Several projects are being implemented in 2022 in JF Almeida:

- Upgrade of the photovoltaic installation (from 700 kW to 5 MW) – 3.2 M€;
- Conversion of textile finishing equipment from natural gas to steam;
- Replacement of natural gas boilers with biomass equipment.

The biomass boiler will allow the reduction of carbon emissions by around 4000 tons per year. This boiler will use PKS (a by-product of the production of palm oil with a high calorific value) as fuel, as well as the cotton down that is recovered from the air suction system of the spinning and weaving plants and that which is produced in the tamblers and department of rolling. Currently, all textile waste generated in the production process is reused.

Even cotton fluff will soon begin to be used as a fuel to produce thermal energy for the finishing processes in the biomass boiler.

In 2022, extra efforts were taken to decarbonize the processes. By redefining the thermal processes and energy source – from natural gas to biomass – was able to reduce the natural gas consumption by 87%. CO_2 specific emissions have reduced by 65% since the beginning of the year.

With the implementation of these projects among others, JF Almeida is expect to reduce the carbon emissions by 7,000 tons per year by 2023. This represents a massive 50% reduction in carbon emissions compared to 2021.

Others changes:

- Cogeneration unit for the production of electrical and thermal energy
- Flash steam recovery
- Energy recovery from compressor oil
- Replacement of the fleet of combustion forklifts with electric ones
- Replacement of light bulbs with LEDs

Advantages of Biomass Energy:

- Biomass is a renewable energy and is available and within our reach in practically all places;
- It is low-polluting, emitting no carbon dioxide (according to the natural carbon neutral cycle);
- It is highly reliable and the response to variations in demand is high;
- Solid biomass is extremely cheap, and its ash is less harmful to the environment;
- Biomass is more economical compared to fossil fuels;
- There is less corrosion of the equipment (boilers, ovens, etc);
- The use of biomass allows for sustainable land cleaning, especially in rural communities.

CLEAN ENERGY

LEMAR

Lemar has established the decarbonization as a focus area and, as a result, a fundamental core part of the environmental mission statement.
The project “DECARBONIZATION +” is being developed in the digital and climate transition to reduce emissions of carbon. The implementation of these measures and decarbonization of energy consumption will have a mitigating effect on climate change and on corporate sustainability, by contributing to environmental and economic performance, in line with the United Nations 2030 agenda, the Paris Agreement, the European Green Deal and the Roadmap to Carbon Neutrality 2050. Summarily, this project matches the following types of investment:

- "Low carbon processes and technologies in industry" through a digital solution and intelligent support for measurement, monitoring, data processing for management and optimization of processes and consumption, resulting in the reduction of GHG emissions through increased efficient use.
- "Adoption of energy efficiency measures in industry" through the optimization of the current compressed air system.
- "Incorporation of energy from renewable sources and energy storage" through the installation of systems for the production of electricity from a renewable energy source for self-consumption, specifically through the installation of a photovoltaic plant.

In conclusion, this project is integrated, as it includes planned investments in the three typologies, thus, combining valences in the areas of low carbon processes and technologies, efficiency energy, as well as sustainable energy and energy storage.

WONDER RAW

Currently, the printing solution in Wonder Raw reduces energy consumption. Example of energy savings:

- The DTG digital printing solution vs. screen printing of a single t-shirt: Up to 66.57% less energy consumed.
- The DTF digital printing solution vs. rotary screen printing per sqm: Up to 94.78% less energy consumed.

RIOPELE

Riopele invest in a rational and sustainable energy model and develop actions aimed at reducing the carbon footprint.
They are now a fully operational photovoltaic power station, with an installed capacity of 1MW, consisting of 3000 solar panels, mounted on fixed structures, in an area of approx. 1,5 hectares.
The company has also made several investments to increase energy efficiency, namely through the installation of new compressor management systems, the replacement of HVAC systems with upgraded and efficient systems, the installation of electric vehicle (EV) charging stations and the gradual replacement of the fleet and other means of transportation for electric vehicles, therefore the company is achieving higher energy efficiency in our production areas and reducing the energy consumption needs.
In 2023, Riopele will have in operation a biomass central that will produce most of the steam consumed by the company and a new solar photovoltaic power plant.
By 2027, the company believes that all the electrical energy used in the production process will come from renewable sources.

CLEAN ENERGY

ACATEL

Within the scope of productive innovation and decarbonization projects, Acatel, once again, has as its initiative an investment worth €7 million over the next three years.
These investments are based on the acquisition of new machines with lower consumption of water, electricity and gas, and greater productivity, the installation of voltaic panels, biomass boiler, management system, monitoring and control of energy and water consumption, and new technologies dyeing and printing without the use of chemicals and with lower consumption.

FAMILITEX

Most of the resources used today to generate electricity are exhaustible. Solar energy is now one of the main sources of renewable energy. Familitex started the process of installing 551 Photovoltaic panels with 240KW of nominal power. The same method was used at Barceltinge Tinturaria, installation of 1258 Photovoltaic panels with 679KW of nominal power to supply the factory. The dyeing store reuses exhaust gases to heat water, uses the heat from dirty water (water used in the jets) to heat the clean water that will be used in the process.

SOMELOS

In line with its sustainability strategy and ambitious goals, the SOMELOS group has been heavily investing in becoming 60-70% independent within two years. For that, two new areas of solar panels are being installed more than tripling its actual production and a new biomass boiler is at set up stage. At the same time, the group continues its consumption reduction goals by updating equipment and increasing processes efficiency.

POLOPIQUÉ

The textile industry is one of the industries that need to reduce, significantly, the CO_2 emissions. There are several measures that have been implemented and designed at Polopiqué to reduce the ecological and carbon footprint and the emissions of greenhouse gases, as CO_2. Recently, Polopiqué acquired a boiler, in the dyeing house, to produce steam using biomass. In this sense, we can contribute to a more sustainable and profitable industry due to the savings that are produced compared to traditional fossil fuels. Concerning to the consumption of energy, Polopiqué expanded the installation of photovoltaic panels, increasing the amount of electricity generated from a renewable energy source, cleaner, and eco-friendly. Using solar energy can significantly reduce the impact on the environment.

LASA

In order to reinforce its sustainable production and reduce its dependence on energy, LASA Group will install 2.820 new solar panels. This will allow to increase its capacity to 2,2Mwp.
LASA always have been aware of the benefits acquired from renewable energy. For this reason, the company already has a good part of the energy generated by solar panels, mainly focused on the Filasa unit, that will be provided with a total of 1,62Mwp. Besides the commitment to invest even more in sustainable production, the instability in gas prices have driven further to this path.
Bearing in mind the huge increase in gas prices LASA decided to strengthen this investment for costs reduction purposes but also for environmental protection. With this project in place, LASA Group expects that 1070 tons of CO_2 per year will be prevented.
This increase of energy capacity will allow to reduce up to 15% in electricity costs, in this way increasing the energy independence of the Group.
The intention is to increase the installed capacity in 3Mwp more, in order to achieve a reduction in electricity costs up to 35%.

A. SAMPAIO

Energy is required for most industrial processes, but A. Sampaio acknowledges the importance of keeping the environment in mind along every step. Therefore, the focus is on several ongoing initiatives that help achieve the A. Sampaio green ambitions: the energy purchased from the power grid is 100% produced from renewable sources; photovoltaic solar panels generate 15% - 20% of total energy consumption, and is fulfilling an expansion project to cover 40% of our internal energy consumption; they are concluding the change of the lighting to LED in all facility areas, and use the heat generated by the air compressors to heat production areas; A. Sampaio also reinforced the commitment to the 2015 Paris Agreement through Science-Based Targets (SBTi), and rely on programs and software that allow to measure the impact of efforts to reduce CO_2 emissions by 25% until 2025 (scope 1+2), which implies a yearly 4.2% reduction of CO_2 emissions.

TRACEABILITY

A day will come when most consumers will point their mobile phone at a label to instantly uncover all the details pertaining to the production of said item. where and how it was made, how many suppliers were involved in the value chain and whether all steps followed the principles of sustainability and social ethics.

This map of origins, or digital passport, will be one of the fundamental bases of the fashion industry, a sector which is now undergoing a major transition phase. Producers will have, at their disposal, information that will enable them to make more responsible choices. Buyers, on the other hand, will be able to gain full knowledge of what they are consuming. While it seems like a difficult concept to put into practice, due to its breadth and complexity, it is in fact an increasingly close reality and, in the future, will become a new tool for all.

Along the extensive production process, there is a new added value for those presenting the final product: profiling a raw material, tracing its process down to the last moment of manufacturing. The idea of meeting the expectations of more demanding consumers and participating in economic growth, bearing a lesser impact on the environment and lesser inequality for those among the workforce, will be one of the major differences that shall distinguish the recent past from the near future, in this industry.

The greatest allies of this digital era, as applied to the sphere of textiles, are technologies that allow for a secure traceability. Nowadays, the industry is able to rely on a plethora of methods that make it possible to, through forensic analysis, obtain data on the different raw materials. If forged certificates made up a very prolific market just a few years ago, presently, it is increasingly more difficult for this type of documentation to be left unchecked. Uncovering the DNA of a given item, whether or not it is made from natural fibres, has become a rather accessible process.

Worldwide, one of the most prominent examples in promoting traceability, comes in the form of a joint venture between Google and fashion designer Stella McCartney and WWF, a Non-Governmental Organization dedicated to the conservation of wildlife and protecting the environment. The aim of this supergroup is to map the sustainability of different raw materials present in the fashion industry by means of a tool entitled "Global Fibre Impact Explorer".

Stella McCartney was the driving force behind the project, but, since its inception, several companies have joined in to provide valuable support. There is a common interest in obtaining information on the origin of raw materials and the processes by which they are obtained when they are received at the factory for the manufacturing process. Through this scrupulousness alone, may it be stated, with both full certainty and transparency, that all production complied with sustainability standards.

By using the Google Earth engine and the Google Cloud network, it is possible to assess the entire value chain of a given textile, and its environmental impact, according to five main categories: air pollution, forests, biodiversity, climate and water consumption and quality. Additionally, this data also makes it possible to assess social responsibility in the sourcing of raw materials and across the supplier network. As such, it will be possible to detect situations in which a given process entailed human exploitation and non-compliance with human rights.

In Europe, the European Commission established two systems that help increase transparency across the entire traceability process. One of such systems, LCA (Life Cycle Assessment), evaluates the environmental impact in product design decisions. It is used, for example, in the choice of materials, the selection of technologies and the criteria for subsequent recycling. It makes it possible to plan the entire life cycle of a product.

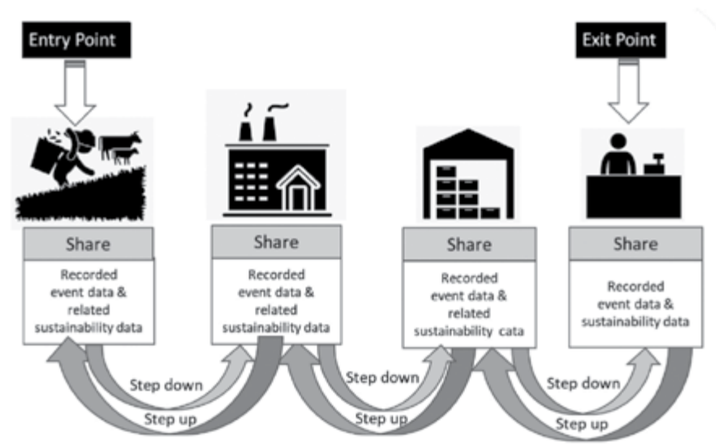
Likewise, according to the objectives outlined by the European Green Deal, regarding the textile and clothing industry, the PEF (Product Environmental Footprint) is a calculation method that evaluates the ecological footprint of materials — and the second of the abovementioned systems According to specific rules for this sector, 16 factors are taken into account, including water consumption, fossil fuel use, land occupation and pollution levels. As it may be expected, science, technology and now Artificial Intelligence are this system's greatest allies.

One of the most recent subjects addressed by and published in Première Vision's magazine was Traceability. It focuses mainly on how it may be implemented and the amount and type of tools that are available on the market today. This is a huge challenge in the face of "the legacy of a value chain that, in the past 30 years, has become fractured all over the globe", but it will be essential to identify, audit, collect information and track operations and suppliers to get a clear overview of the situation.

One of the questions raised in the aforementioned has to do with the reliability of the information obtained, which may be part of a dynamic or static network of data, such as certificates. A tool that is used here is the blockchain, which can detect false certificates, in addition to holding multiple other uses across the value chain.

A few companies in Europe are fully dedicated to traceability, companies which, subsequently, progressively boost the security of this network. Not only is it essential to collect information, but also to "uphold its integrity" by running it through different systems. In this way, one can reach conclusions like so: the amount of organic cotton that is sold surpasses the amount produced. This reality has evolved in a massive way — literally and figuratively — because fraud has become commonplace in the textile industry, bolstered by a heightened demand from consumers as well as by both a surge in labour and an increase in the availability of raw materials in third world countries. Through biochemical analyses, it is possible to profile a fibre or a raw material, while also detecting certain geographical characteristics of a product. The fingerprint of each textile may be ascribed by means of watermarks that are invisible to the eye or through synthetic DNA marks. Later on, after the garments have been made, these marks may be removed along the washing processes — it all depends on whether the manufacturer chooses to do it, or not. In principle, companies and brands will have at their disposal the provenance of components and will be able to make more conscious decisions. This reality will warrant more proximity to and more confidence across the value chain, both of which concepts are synonymous with transparency and sustainability.

TRACEABILTY



RIOPELE

Greater operational efficiency and sustainability. More flexible and highly digitised production. Management control based on optimised KPIs. This is this company new textile production standard. Riopele aims to improve the traceability process through this new digital production monitoring system.
The pioneer project in the textile sector started in the Weaving area, under the Riopele Digital program, and integrates an in-house software system, adding the analysis of big data and artificial intelligence methods in the production area.
The company is also testing automated processes using AI that will enable highly flexible and optimised operations, aiming to optimise results and streamline inspection processes.
By the end of 2022, Riopele will conclude the project to integrate digital monitoring in all its production process, which includes Spinning, Twisting, Dyeing, Weaving and Finishing, in an area of 140 thousand square meters.
With this new integrated digital monitoring system, the factors of traceability and sustainability are boosted, making Riopele's verticalised production the benchmark for digitalisation in the sector.

A. SAMPAIO

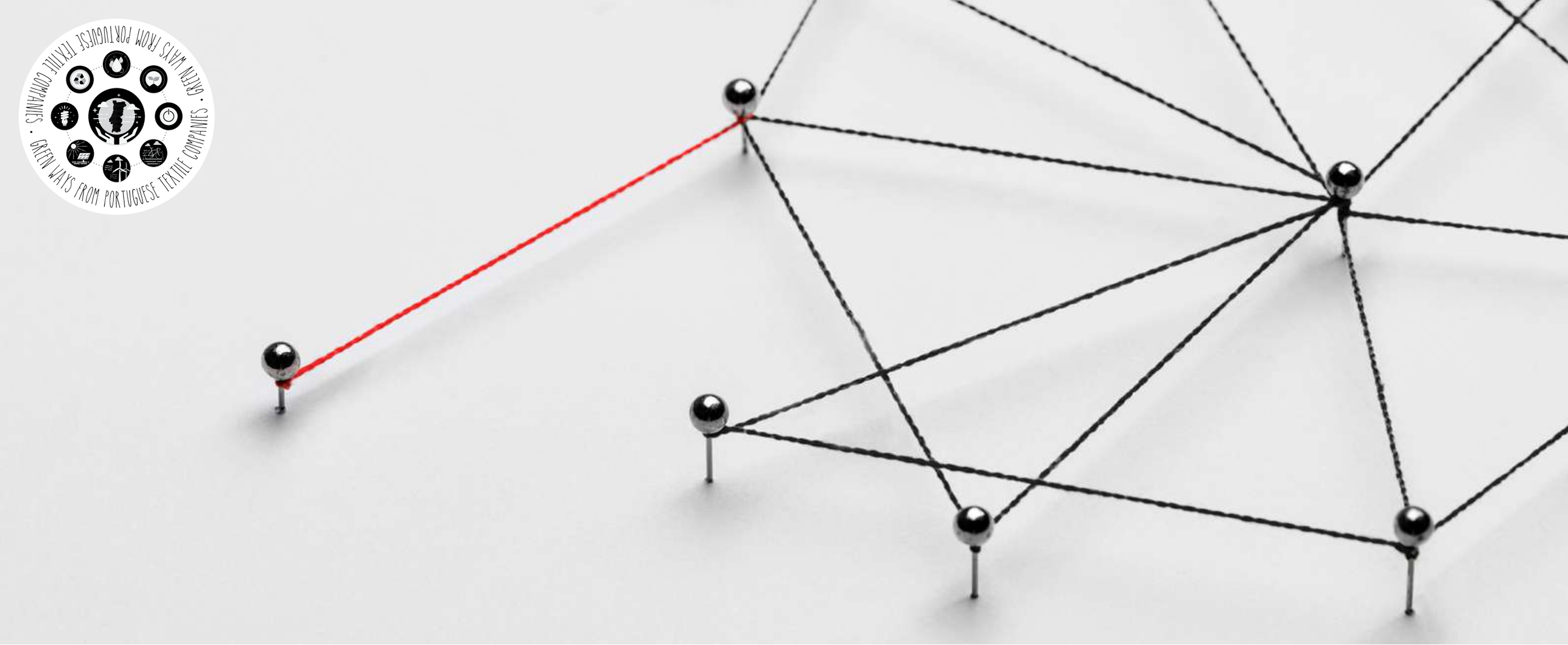
The textile industry works to become an example of sustainability. Today, A. Sampaio supply chain shares an ecological mindset to protect our planet for future generations. At A. Sampaio, every fabric is developed alongside reliable partners to ensure full supply chain traceability and allow clients and consumers to make informed decisions regarding their fabrics or garments. The ERP system is particularly customised to guarantee the most transparent traceability, from the yarn to the finished fabric. The certifications — GOTS, GRS and RWS — also contribute to the fabrics' traceability with the systems and safety they provide to the company, clients and consumers as a solid external verification. The company does not purchase materials from origins that do not comply with social and human rights. Furthermore, A. Sampaio participates in pilot projects of fibre markers in three stages, depending on the nature of the fibre: farms, yarn spinning and fibre producers. The goal is for these fibres markers to be embedded as upstream as possible.

POLOPIQUÉ

With the objective of obtaining the minimum waste and consumption of resources, continuously implements methods to identify defects in production rapidly, combining sustainability with the continuous search for new, more efficient and agile technologies, Polopiqué acquired an innovative technology from Smartex. The technology, based on a hardware-enabled and machine-vision driven software, detect textile defects in real-time in textile manufacturing, including circular knitting. The traceability and detection of these defects avoid waste of energy, material, and human costs regarding the reprocess of these defective items. Beside this project, already implemented, there are other projects in progress, also related to the traceability of supply chain.

FAMILITEX

Familitex progressively assume new approaches that minimize the harmful impact on it, namely through strict compliance with the fundamentals inherent in the numerous certifications guaranteed to Familitex, through a policy of rigorous selection of raw materials. Therefore, regulatory processes are increasingly demanding, consumers value the process of origin of materials, the ways of mapping and tracking textile supply chains are multiplying, as far as the suppliers allow.



ACATEL

One of the vectors of Acatel's strategy is transparency in its value chain, from the purchase of yarn to the delivery of its product.
Therefore, it uses a technology called Fibretrace, that guarantees this reading.
Initially, the company started by using a cotton, Good Earth Cotton, which is the first cotton with a positive carbon footprint, planted in Australia, audited by Carbon Friendly, utilizing an Australian developed but internationally accredited (ISO14064-2), best practice methodology.

FibreTrace® MAPPED is a digital transparency solution which maps the global textile supply chain from fibre to retail.

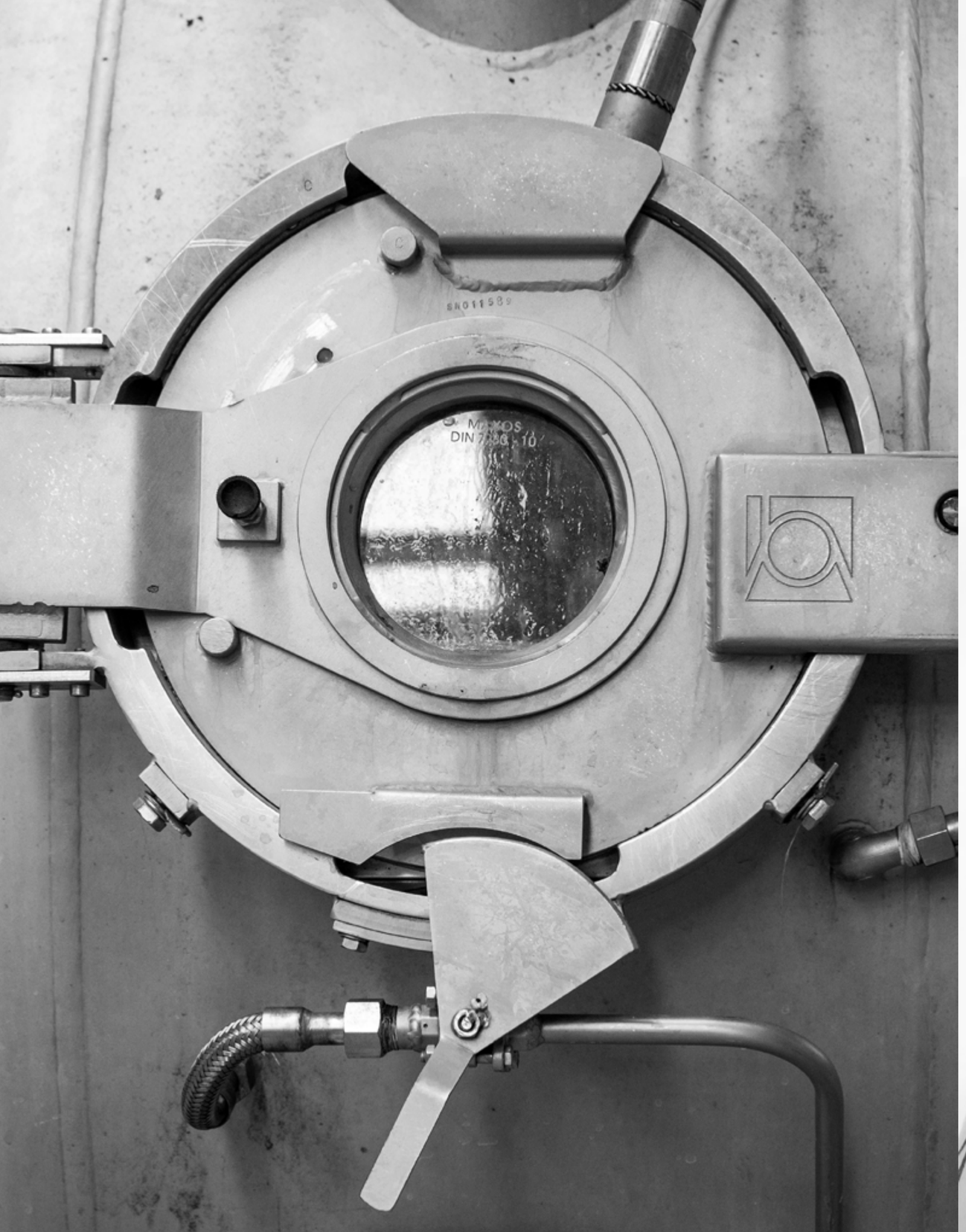
- Fibre to retail transparency in one easy to use platform
- Digital centralised chain of custody
- Visual mapping of global supply chains including supplier name, type, and location
- Access anywhere, anytime on any device
- Powered by blockchain security
- Centralised purchase and shipping documentation
- Incorporate existing environmental and social compliance credentials
- Create or upload product (SKU) information
- Duplicate supply chain entries for multiple products (SKUs)
- Share the story of every item from farm to shelf with the end consumer
- Unlimited users

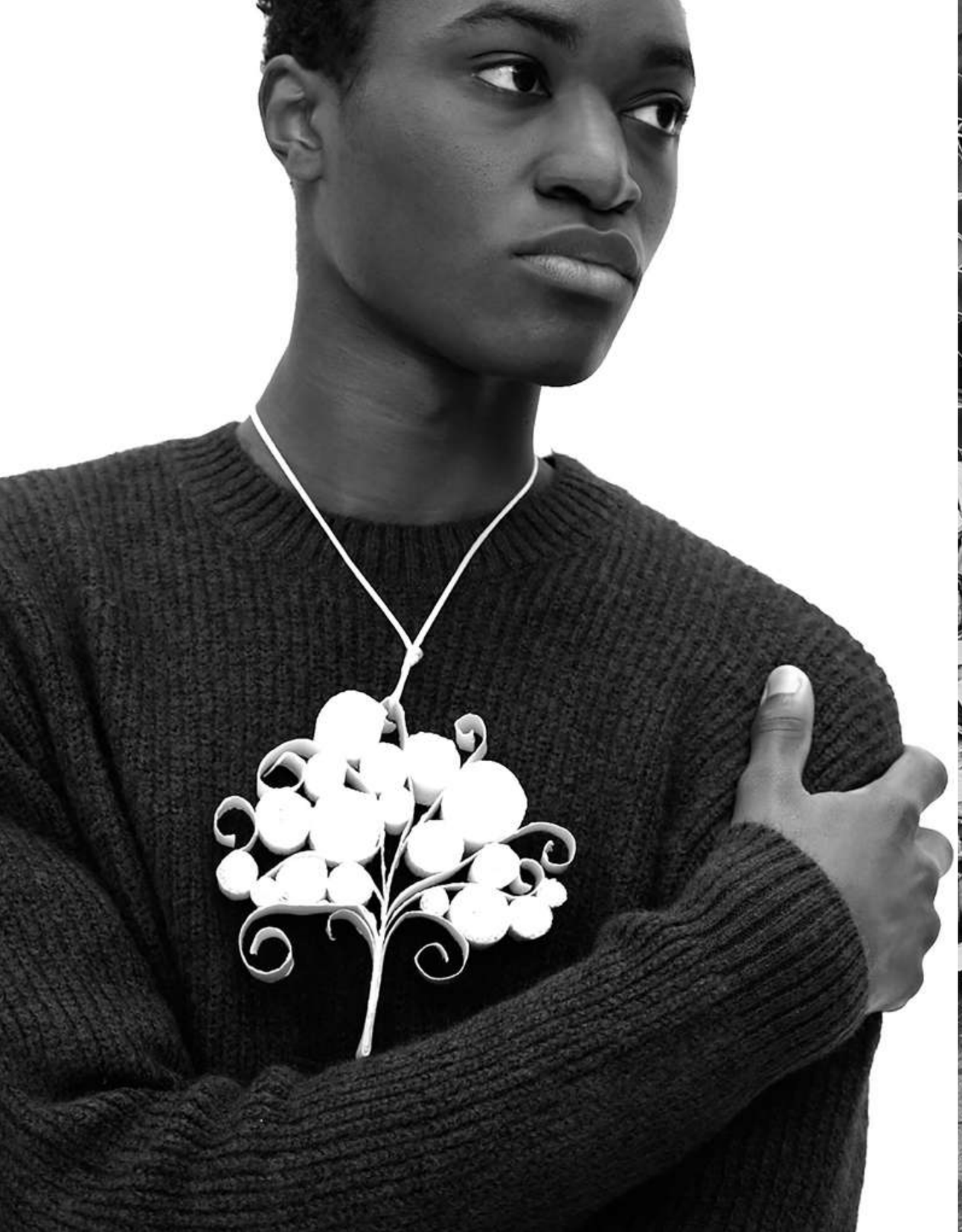
FibreTrace® VERIFIED connects digital transparency with physical technology to provide integrity and authentication.

- View in real-time your FibreTrace® VERIFIED products as they are audited for fibre type and quantification throughout the global supply chain
- Data accessible and editable by approved auditing partners
- Book training or support services
- Fibre to retail transparency in one easy to use platform
- Digital centralised chain of custody
- Visual mapping of global supply chains including supplier name, type and location
- Access anywhere, anytime on any device due to the cloud based software solution
- Centralised transaction and shipping documentation
- Incorporate existing environmental and social compliance credentials
- Create or upload product (SKU) information
- Share the story of every item from farm to shelf with the end consumer (B2C)


PENTEK


RETHINK


LOVE



DYEING

Colours are a reflection of moods, cultures, trends and eras. They are an extension of fashion and the type of society in which one lives. Dyes paint urban and rural landscapes alike, making up that which one first sees, and what one seldom forgets. Dyes signify abundance. For some, they represent attraction, for others protection. Black, for example, is a colour in which we take refuge. Every December, a Pantone Colour of the Year is dictated. In 2023, "Viva Magenta" was nominated as a means of, through its vibrancy, instilling life in oft difficult times. From the moment it is nominated, it quickly makes its way to storefronts and high streets across the world.

On the other side of the mirror, far from the consumer's first thought when buying a garment, lies the impact that the dyeing of that specific colour has on the environment, one that is barely perceptible to the naked eye. For example, the total water usage and energy expenditures linked to this item, the number of washes applied to it, the type of dyes and other chemicals that were used in its production, and, lastly, the amount of microplastics that ultimately ended up in bodies of water and within them they shall remain. Although these questions stand out as some of the imperatives of an industry that wants to be cleaner and more sustainable, they rarely arise during one's shopping experience. Dyeing is a process that is present in all manners of textiles, even the white ones. In this aspect, the incessant quest for greener dyeing processes, science and technology have established themselves as the producers' and manufacturers' biggest allies.

In the case of Portugal, long gone is the time when discharges from dyeing plants (facilities) caused a real environmental problem, as may be seen in the Vale do Ave region, where much of the textile and clothing industry is concentrated. Although these may be no more than mere first steps, development is set to be rapid as companies have lined up to provide a large, common investment. The new processes used in dyeing, whether chemical, mechanical or biological, are becoming true game changers at all levels of the textile industry (and beyond). One underlying aspect — the one that influences all others — is the usage of water. The alternative dyes that have since emerged require progressively fewer water resources. This way, energy expenditures resulting from washes and heating are subsequently reduced. This is accompanied by a lower usage of chemical products, a direct consequence of a decrease in the concentration of pigments involved. In fact, some of the recently implemented processes entail little to no water usage.

In the universe of this new green chemistry — one that is free of toxic elements — the newly formed bio-based formulas go through different versions, some of which are being put to the test in Portugal. In dyes

obtained through biological processes, conventional compounds are not used, only biological ones extracted from the DNA of different beings. The dyes are produced through bacteria, featuring information that is contained within nature, with synthesised pigments, as is the case of the Colorifix and Huue methods.

For the time being, however, their colour palette is not too comprehensive. Different colours require different types of micro-organisms, all of which are subject to genetic manipulation. To attain certain tonalities, thus extracting desired colours, a significant development needs to be made so as to successfully manipulate said organisms. As previously mentioned, science and technology have been the great allies of an industry that wants to reach cleaner and more innovative solutions, one that circumvents the need for heavy metals or salt. The investment required to accommodate these changes may be high, but it is also incredibly tempting. To Portugal, the home of the largest dyeing plant in Europe, this evolution will bring nothing but advantages.

In dyeing, one may also opt to exclusively use natural colours. As a matter of fact, for several companies, the shift toward this alternative has been their greatest of challenges. The goal here is to use the raw tones of the fibres while still providing the comfort that users have grown accustomed to. That is, to warrant the solidity of the dyes, so that resistance to the elements is still achieved. However, this strategy is still shrouded by some obstacles, in the process of attaining an excellent standard of durability, as the end product is more prone to rapid degradation or to losses of colour.

In spite of these challenges, consumers who are more concerned about sustainable production processes and their impact on the environment will naturally be more interested in items such as the aforementioned. The matter of fact is, there are several processes that can lead to the production of mono-fibre, naturally dyed, products sourced from recycled materials — the greener, eco-friendly consumer's choice.

In the future, the idea of sustainability will also entail a more eco-friendly usage of colours. The biggest trend in fashion may eventually become the preservation of raw colour, without dyes. That, or colours that mimic nature through alchemy — an idea for the future that may comprise multiple shades within one. Nonetheless, we are but at the start of this journey. We are nearing towards a reality where biotechnology far surpasses the need for conventional dyes. Soon enough, we shall, instead, adorn our bodies with “rosemary green”, “mushroom brown”, “hemp beige”, “blueberry blue”, “banana yellow” and even “coral green” — all of these dyes being chemical-free, and nullifying the need to extract resources from nature.

DYEING

QUINTA & SANTOS

Quinta & Santos seeks to be revolutionary on a daily basis, namely at the forefront of garment dyeing in finishing pieces.
After several partnerships with scientific entities, and the increase in internal specialization, it felt the need to tart working on something more innovative, on cutting-edge technology.
Sustainability and the preservation of future generations is part of the company mission. Developing natural dyes is a starting point, however, developing natural dyes combined with technology is another level.

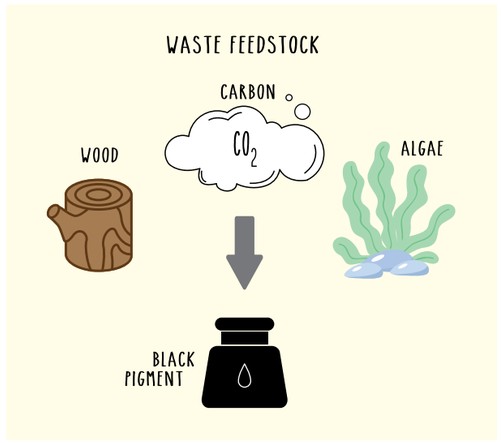
The Nano Earth Dye is the great proof that it is Possible – from natural extracts and allying with nanotechnology –, to give 100% natural dyes, making it possible to obtain more vivid, more equalized and more substantive colors.
Any Pantone color can be chosen, as when choosing a reactive dye.
Another advantage of dyeing your pieces with this natural dye is that there are no many effluents with the dye, so it is possible to reduce the ecological footprint caused by this more sustainable process by around 95%. Like that, the company saves energy and water.

JF ALMEIDA

INFUSION by JFA JF ALMEIDA creates dyeing from tea leaves certified by SGS, applicable to cotton fibers and their blends.
The infusion is based on the use of tea leaves residues.
The quality of the final product and the lowest environmental impact are the key points of the new process.
JF Almeida has a line of natural dyes for cotton fiber, the LandColors, a dyeing process that allows to save 30% of water and spend 20% less process time.
With this product the company achieve a low environmental impact energy.
JFAlmeida is also making an effort to reduce energy consumption and carbon emissions.

In 2016, the company created the Energy area, fully focused on reducing energy consumption and optimizing processes.
In the last 5 years the specific energy consumption was reduced by 18%. Carbon emissions decreased by 13% over the same period.

DYEING



RDD TEXTILES

RDD has been involved in the development of revolutionary sustainable dyestuffs. Recycrom™ is a process where recycled fabric materials and cutting waste as used as feedstock to produce innovative dyestuffs. An innovative technology was developed by Officina +39, which uses textile scraps to produce a coloured powder, 100% made from recycled textile materials. This upcycling process avoids the disposal of fabric waste to landfills, recreating a new product and saving environment from substances that can be released. The dyeing process can be done in conventional dyeing machines, and every colour can be used as input, being the intensity of colours dependent on the original of the colours. Living Ink Algae Ink™ process is one of our most recent innovations.

It's a carbon negative replacement for carbon black, having a reduction of 200% of carbon dioxide compared to traditional carbon black. Algae Black is a safe and renewable black pigment derived from waste-algae supply. This pigment has been tested and applied in a variety of products and processes for many applications, however this is the first time that was tested and used as dyestuffs for textile dyeing process. RDD was able to research and develop a dyeing protocol based on garment dye process, achieving a grey colour with good quality.

ACATEL

One of Acatel's strategic vectors is to contribute to reduce the carbon footprint. In the dyeing area, it uses a new technology called Colorifix. This technology does not use any kind of chemicals, it only dyes for 2 hours at 37º, instead of 4h/6h. It is a completely innovative process, which compared to the traditional process, allows a reduction in terms of LCA of: 77% reduction of water usage; 80% reduction in chemicals usage; 71% reduction in natural gas usage; 53% reduction in energy; 31% lower contribution to global warming; 38% lower contribution to ozone layer depletion; 61% lower contribution to abiotic depletion of elements, largely through lower usage of added salts; 37% lower contribution to eutrophication, or the environmental impact of excessive use of fertilizers and other macronutrients.

WONDER RAW

This company makes available natural dyes in the dyeing processes of the garments, which allows increased savings in water and energy and use products and dyes that are less aggressive to the environment. The natural dyeing processes use natural dyes that are extracted from minerals and plants and are applied in processes that allow increased energy savings compared to conventional dyeing processes.

PRINTING

Although the apparent end-result may be the same, the methods employed in the world of printing are changing radically. The age-old art of printing designs and patterns onto fabrics is undergoing an invisible revolution, which will very soon spread to all continents and major textile producers. These are eco-friendly methods, which blend with other phases of textile production and bring new possibilities to the table.
Alongside the various upgrades which came to redefine the actual printing stages, be they applied to equipment or techniques, the big change came in the form of a passage from a conventional, physical format, to a digital one. The first clear advantage of this evolution is the use of water, which, upon employing digital printing machines, is almost null. These new processes brought about hardware reliant printing techniques such as inkjet or laser printing, both of which do not require water resources.
The machinery changes and, with it, so do the dyes that are used. Alternatives to synthetic compounds are increasing in number and can even become a way of capturing carbon from the environment, as seen in the examples along the following pages. Just as with dyeing, in printing, the possibility of creating colours in shades of nature is already a common reality. These not only include pastel colours, which we normally associate with natural dyes, but also darker shades — for example, coal black or hemp black, which are not derived from fossil fuel sources.
The reduction of harmful chemicals for human health and ecosystems is already a major victory for printing, but the transition to the digital sphere has also opened to the door for an enormous wealth of possible outputs, all of which are unlocked by technology, robotics and Artificial Intelligence. For designers, there is no limit to the creation of new patterns. The new printing tools have brought about innovative conditions for brands, factories and producers.
Within recent results, the durability of the prints and the fact that they are less vulnerable to washing were also mentioned. In the increasingly complex value chain of the textile industry, it can be said that printing is one of the processes that has already entered cruising speed toward sustainability. From now on, the industry's true challenge is to both use and promote the use of these new alternative tools.

PRINTING

WONDER RAW

With sustainability and quality in mind, the technology and processes developed by WonderRaw are designed to help artists, designers, youtubers, influencers, brands overcome the challenge of selling made-to--order products, boosting production on demand, eliminating overproduction and implement a successful digital strategy.
Therefore, we have a streamlined single-step on-demand digital printing technology that allows a simplified on-demand sustainable production of textiles and clothing. Our DTG & DTF are both integrated inline pre-treatment processes that require no additional labour, have automatic setups with correct pre-treatment, no need to prepare in advance and with the best print quality results by using eco-friendly inks, non-toxic, free of phthalates and heavy metals, which grant not only a superb hand feel but also durable prints following wash cycles and extensive use.
The DTG & DTF digital printing machines also come with XDi technology, which eliminates all creative limitations with its unlimited innovative 3D decorations.
By making it possible to have multiple effects (e.g. embroidery, heat transfer in screen and vinyl, high density embellishments, screen printing) in just one print, it also simplifies processes and saves resources.

RDD TEXTILES

Impacting the fashion world through sustainable innovation bio blacks by RDD are made through the processing of waste into innovative high performing true black pigments. Eco black is made from wood waste with a closed-loop production, that emits zero greenhouse gases (including carbon dioxide) and are safe for human health, unlike any other petroleum black pigments. Hemp Black is made with hemp waste (the stalk) than goes through a process patent by the company. Eco6 is a lightweight, low density activated carbon with a high surface area, sequestering 6.8 kilograms of CO_2 for every kilogram used. Both pigments are suitable for a wide range of applications, with numerous dispersions, and are also compatible with nearly every printing and coating formulas, which makes them an easy substitute for harmful black pigments.

CARING

FINISHINGS

Finishing. That which grants every piece its distinctive comfort while ensuring its durability; that which is instantly perceptible to the touch. The process which may require, in itself, the most individual steps, depending on both the fibre and colour at hand. It is the production phase that entails the most prevalent of chemical interventions, the most baths, the most heating, and the most water consumption. If there is one true process where the textile and clothing industry yearns to see technology advance, it is this one.

Here, we are not only talking about the reduction of water and energy resources, but also about the time and equipment required, as well as the toxic elements involved. Contrary to what one might believe, the finishing stage may be more chemically intensive than dyeing, even. Take denim, for example. The jeanology method is underway, which aims to reduce the use of water and toxic elements throughout the entire system, although prioritising the finishing stage, the phase that grants an article — of this particular material — its final comfort, which originally presents a more rigid texture.

It is in the finishes that the stability required for the pieces to enter the market is truly achieved. Finishes are, thus, what gives a product its final qualities. The whole process may be sustainable, from obtaining the yarn to the preparation, dyeing or printing of the item, but if the latter is not comfortable and resistant, consumers will not buy it. That's why investing in these equipment, and related methods, is deemed as a process only suitable for the most careful of people. Throughout almost all processes, it is possible to pause production and revisit an earlier stage in order to correct any given mistake (e.g. during yarn production or colour dyeing), but, in finishing, it is very difficult to go back.

Also, in this aspect, science and technology go hand in hand with the industry in order to find solutions and invest toward this evolution. Nowa-

days, this field is home to a myriad of experiments, with some of the newly developed techniques already being put to use. In this final stage of production, several chemicals are used, with many of them granting some kind of functionality to the article, such as anti-mosquito or anti-bacterial materials, or sportswear with the anti-odour or water-repellency features — in these cases, heavier chemicals tend to be used here, such as PFCs, which are hardly removed from water once they have come in contact with it. This is a situation that, in the future, will certainly bear more solutions, most of which should entail the use of green chemicals and the avoidance of synthetic, fossil-based products.

One of the most successful replacements in this field is the use of oils in lieu of softeners, the latter of which are rich in silicone — an element that puts a heavy burden on the environment. Research in this field has been thorough, with most of it focusing on achieving a certain level of performance, comparable to that of chemical applications, albeit using products extracted from nature, without it representing a disturbance to ecosystems — both through the sourcing of raw materials that may be used as or turned into softeners, or through the waste that flows into the wastewaster as a result of industrial washing.

All processes in the textile and clothing industry are related and, in this case, both recycling and eco-design represent a clear added value opportunity for the preparation and finishing stages. If the fibres are separated by colour and material, or if in the first life of a garment there is only one fibre and only one colour in its production, both the dyeing and finishing phases will end up taking advantage from a reduction in total interventions and manufacturing time. Until now, colours have been generally removed during the act of recycling. If, in the future, this process becomes more optimised, this improved performance will bring, with it, a decrease in the overall consumption of water and energy.

FINISHINGS

ACATEL

Acatel develops processes designed in an eco-design logic. In other words, as Acatel is inserted in the customers' value chain, it will have to contribute to circularity.
At finishing process Acatel only use bio base softners. All the chemicals in the process are being eliminated. Acatel offers a range of bio-based products that offer comparable performance to products applied in textile industries. The new range of bio-based products have been designed to:

- Eliminates/lowers carbon emissions from the textile industry
- Eliminates toxic hazards of the chemical industry
- No dangerous levels of harmful substances are released into the air and water
- Reduces energy use due to the elimination of fossil fuels

Bio-based Products are wholly or partly derived from biological resources, such as plants or algae, excluding geological and/or fossil materials.
They must include biological ingredients, including renewable domestic agricultural materials, renewable chemicals and forestry materials, or an intermediate ingredient or feedstock.
Biobased products generally provide an alternative to conventional petrochemicals offering a green alternative.

A. SAMPAIO

Sustainable developments for a "zero-emission fashion" are the sizzling matter of the day, and the textile industry has been leading the way. A. Sampaio improves the fabric engineering while exploring new finishing processes constantly:
PFCs repellents used on the fabrics are becoming more environmentally friendly; antibacterial properties are also becoming more of natural origin; new fabric engineering allows to increase the effectiveness of fabrics finishes or to eliminate the need for specific treatments (such as those related to UV protection, for example).

FAMILITEX

In finishing area, Familitex is committed to a vision of a sustainable future, based on experience in innovation, knowledge and the search for more efficient and environmentally responsible work methods. The company has fabric finishes with natural dyes and materials with short bath durations, natural chemicals, or ZDHC LEVEL 3.

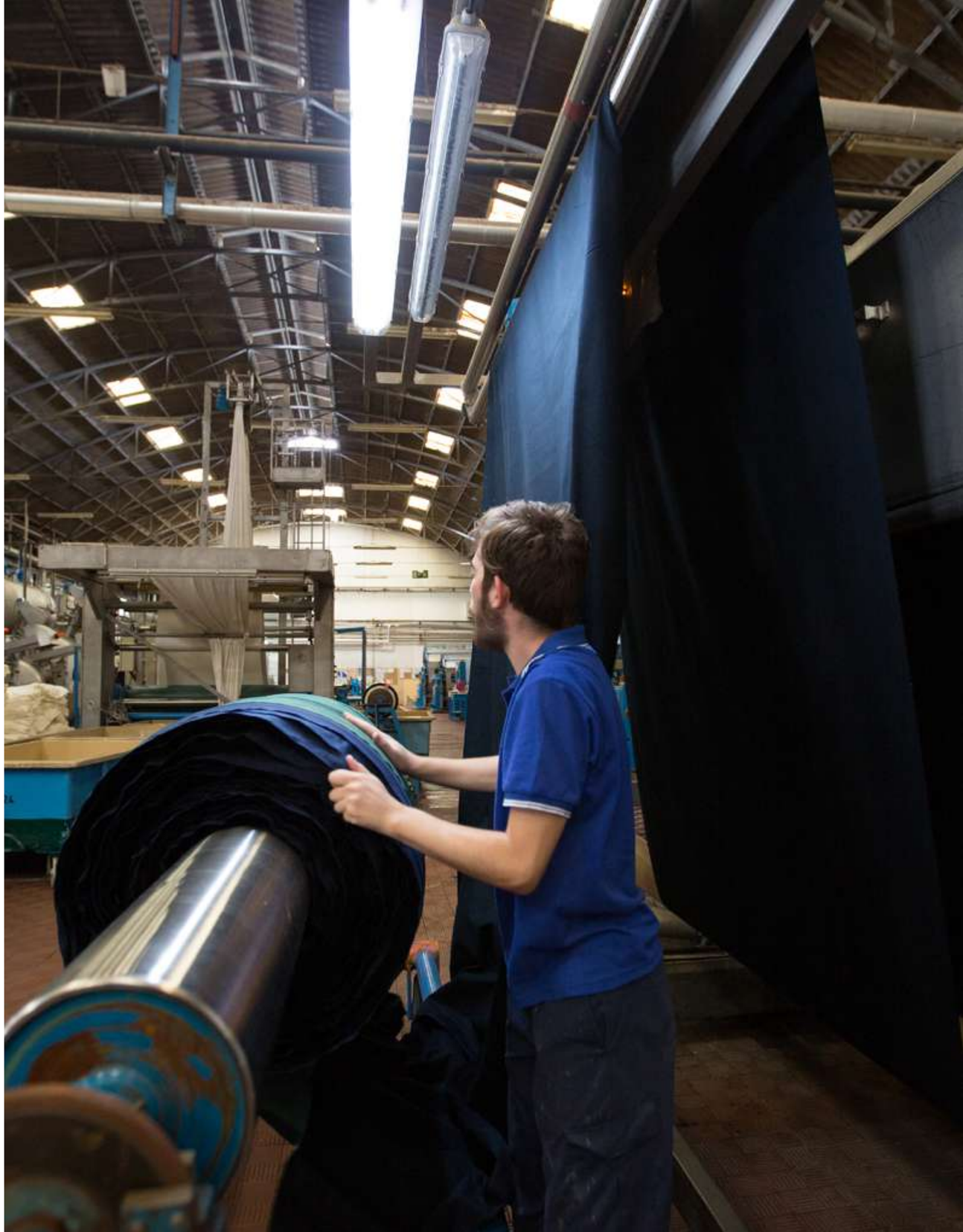
RIOPELE

In the last decade Riopele has invested 35 million euros in the transformation of the production units, with Industry 4.0 and sustainability as drivers, reflecting the ambition of being the most modern factory in Europe.
In the Dyeing area, the companies last generation autoclaves support the technological and sustainable progress, meeting the strictest international environmental requirements and reducing our liquor ratio water consumption by 40% while also increasing our operational efficiency.
In the Finishing area, Riopele has a 70-meter-long stenter machine, a 2 million machine, that is the largest machine of its kind in Europe. With 12 chambers, this stenter machine combines production efficiency with excellent energy efficiency, ensuring a continuous production flow, positively impacting delivery time.
Also, at Riopele, the goal is to eliminate all hazardous chemical substances from the supply chain.
The company has established programmes seek to ensure that the processes use as few chemicals as technically possible, reducing the consumption of water per process and per kilogram of processed material and minimising the intensity of the end-ofline treatments.

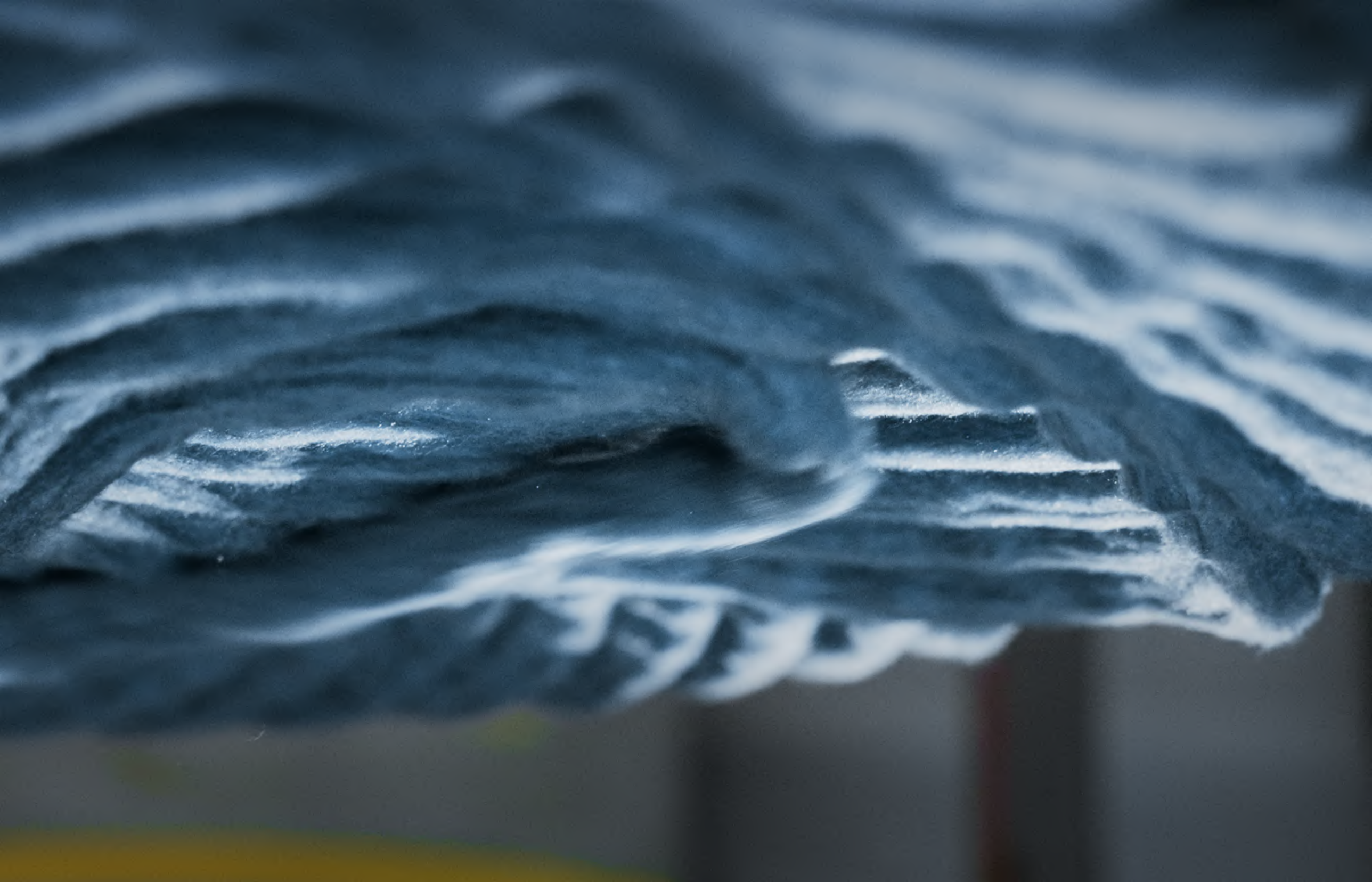
FINISHINGS

ADALBERTO

Is dedicated to improve textile finishing processes in order to create more durable and comfortable products while, ate the same time, being environmentally friendly.
In fact, it is part of the company DNA the constant concern with the environment and sustainability. The constant investments in 100% renewable energy resources, with the instalment of solar panels and thermal energy systems, the shift to electric cars, and the constant incentives to use 3D prototyping are just some examples of small changes with huge impacts in the company processes.
Adalberto has also chosen fibres with a low carbon footprint for its collections and implemented more eco-friendly finishing processes. During the past year, Adalberto developed Bio Ultimation Process in which it's used bio dyeing replacing petrochemical products. This process is developed with biodegradable bio chemicals and it has a much more efficient use of resources by consuming less energy and water.
The process includes biowashing and natural dyeing. It uses biotechnology for softening rather than petrochemicals or animal products, frequently used in this industry.
The Bio Ultimation process is highly sustainable, reducing electricity consumption by 50%, water by 27%, chemical products by 30%, and greenhouse gas emissions.



RECYCLING



In a world increasingly torn between excessive consumption and a newfound ecological awareness, the possibilities brought about by recycling act as a beacon of hope for a sector that has long contributed to the growing impact of climate change and pollution. Although the textile industry has made great strides in tackling this aspect, statistics show that only 1% of all new textiles result from recycled materials. This is a but a microscopic percentage when accounting for an increasingly massive production that is responsible for generating millions of tonnes of waste every year, worldwide, and wreaking a most tremendous adverse effect on the environment. As such, one asks: what must be done in order to change the way people perceive clothing and textiles, as a whole, while encouraging their reuse and boosting their durability?

One of the measures aimed at improving this key component of an ideal circular economy is the Waste Framework Directive, a newly implemented rule, in Europe, which shall come into effect in January 2025. In addition to the plastic, paper and glass recycling containers, there shall, too, be a textile container. Old, worn out or damaged fabrics are to be placed there and later selected in the recycling process.

From the consumer's point of view, it provides them with an entirely different perspective: by no longer needing to hoard unusable textiles at home (which would often end up in organic waste bins), they too become material suppliers. From the producer's point of view, it represents the possibility to be part of a well--oiled circular system, from which they may benefit greatly. Therefore, between these two sides, a relationship of greater reciprocity is created.

For the time being, the utilisation of post-consumer fabrics is still residual. However, as producers' flow management responsibilities broaden, the industry is showing a progressively greater interest in the technical efficiency of recycling.

The collection of clothing and textiles, an initiative implemented by some brands, is one of the new trends in upcycling, a concept that seeks solutions to extend the life of various materials. In the fragmented process of textile production, spanning anywhere from spinning to making, technology is able to generate new ways of implementing efficient post-consumer recycling systems.

The aforementioned measure of compulsory collection of textile waste from their designated containers is deeply aligned with a strategy presented by the European Commission in March 2022 (EU Strategy for Sustainable and Circular Textiles). Its aim is to encourage the production of durable, recyclable textiles made from recycled fibres and free of toxic substances, while reducing water use and energy expenditure.

Traceability is also a fundamental element toward warranting a greater transparency of information on the origin of garments and textiles, and toward contributing to the decrease in the number of collection cycles per year — which should be kept as low as possible, lest there be an increased demand for novelty and, subsequently, an increase in mass production.

A recent study by Fashion for Good, conducted in partnership with Circle Economy, has shed new light on the current situation of post-consumer textiles in Europe. The analysis of Sorting For Circularity Europe: An Evaluation And Commercial Assessment Of Textile Waste Across Europe was carried out taking into account the reality of six countries: Germany, Belgium, Spain, the Netherlands, Poland and the United Kingdom.

Of all the materials analysed (where cotton was the dominant fibre, followed by other fibre blends), 21% allowed for mechanical recycling, while 53% allowed for chemical recycling. However, as the study points out, “it needs to be technically and financially viable to remove disruptors for chemical recyclers, otherwise only around one fifth of the total potential feedstock for chemical fibre-to-fibre recycling would be available”.

This analysis, and the project it is featured on, aim to "increase harmonisation between the sorting and recycling industry, stimulating a recycling market for unwanted textiles that can generate new revenue

streams for sorters and unlock demand for recyclers and brands". To reach this end, the aforementioned lists different digital tools and platforms which may aid in building a robust and streamlined infrastructure — from a business investment point of view.

Given that the amount of available textile waste is predicted to upsurge in the future — due, on one hand, to an exponential increase in consumption and, on the other, to new waste routing guidelines — this kind of approach is absolutely paramount so as to implement a new mindset for the circular economy in the textile industry.

Waste, a term that progressively haunts us, may soon have its negative connotation noticeably altered. In pre-consumption, leftover fabrics have become a valuable product toward the creation of new fibres. Nowadays, one may already identify a cooperation between companies, by means of the sale of industrial surpluses resulting from the cutting of fabrics.

Out of the main types of recycling, the mechanical kind is the most common one in our country, being firmly implemented as a key process in the reuse of cotton and wool. Alternatively, chemical recycling leads to the production of artificial fibres. Cellulose is removed from end-of-life textiles. Cotton, the most used material in the textile industry, is a source of cellulose. Nonetheless, everything suggests that the sources of artificial fibres shall hold the most diversity, including anywhere from micro-organisms, to forestry and agro-food industry waste. The greater the investment in this area, the lesser the dependence on imported fibres.

This is also another step toward sustainability. Two of the greatest advantages of man-made fibres are their renewable source(s) and their non-fossil origin. In the "Action Plan for Sustainable Bioeconomy – Horizon 2025", Portugal sees biological raw materials in Portuguese territory as a most promising investment in sustainable production processes, as is the case of the textile and clothing industry, one of the country's main industries.

For now, synthetic fibres have been the most used for recycling and, coincidentally, are the ones that show the most potential. Polyester is the indisputable champion among its peers, as this material presents an end result that is very similar to the quality of the original — even more so than cotton (which has a shorter life cycle than the aforementioned). Fibres sourced from recycled polyester and polyamide waste, resulting from cellulose waste, plastic bottles and fishing nets, are now starting to earn their place in the market. The latter solution would be a perfect two-in-one, on one hand, it would make the most out of a nearly endless supply of waste, and, on the other, it would work to remove — from the oceans and seas — the abnormal arrays of abandoned nets that affect the lives of all kinds of animals and lead to the destruction of marine ecosystems.

Portugal is ripe with examples of companies dedicated to innovation in the recycling area, where their own waste and the waste from other factories is duly recycled. Likewise, by combining other fibres, such as lyocell or seacell, new fabrics and paper are created at an astounding rate.

The greatest challenge in post-consumer recycling is to overcome the difficulties of separating materials that may not be recycled together — such as different types of fibres, buttons, zips and decorative plastics. Such inadvertent mixing may act as a brake on recycling. The higher the number of these components, or disruptors, the higher the difficulty of the overall sorting process. In production and consumption, this will be a new paradigm in our way of thinking about and perceiving fashion design.

Recycling, thus, begins during the design process, in the very initial choice of materials — for the aim here is to keep them in the circuit for as long as possible. A jumper that is exclusively made out of cotton, which includes no zips nor plastic, may be used in its entirety to produce new fibres, as will a polyester garment, which may already be the result of prior recycling. This is an example of the so called eco-design taking shape and dictating the new rules for manufacturing — the main one being to stop looking at clothes with the idea that they should come to an end.

With more used textiles on the market, the possibilities for recycling increase, resulting in a plethora of new opportunities for companies both in this sector and beyond it. The life cycle of these different fibres could culminate in the creation of a new fibre or another material, depending on the latter's desired strength and properties.

When buying a garment or any other textiles, consumers will also be granted the added responsibility and the pleasure of choosing garments with fewer to no disruptors. This, too, is an innovative way of thinking about consumption: to look at the garments we wear from a new perspective, with a new sense of care, taking into account whether they might have been sourced from eco-friendly or recycled fibres and whether, in the future, upon becoming aged or worn out, they may be recycled yet again.

Recycling is one of the big steps towards providing production processes — which are highly fragmented — with an upgrade that is felt on other levels. Recycled fabrics must also be subject to dyeing and finishing — processes where the greatest volumes of water and energy are used —, but new artificial fibres, extracted from renewable sources, may lead to the development of extremely comfortable fabrics, such as viscose, lyocell and modal, all while using fewer resources and having a lesser impact on nature.

RECYCLING

A. SAMPAIO

Textile waste is a direct consequence of the increasingly larger and short-lived consumption of textiles, aggravated by fast fashion. A. Sampaio supports a sustainable approach to textile waste and has been down this road for several years. The company encourages a circular economy and believes the thrive while reducing, reusing and recycling as much as possible. Nonetheless, A. Sampaio can't avoid producing some waste as a natural consequence of the knitting process. The company assumes the responsibility to place every effort to recycle and reduce the overall amount of textile waste that ends its life cycle in a landfill.

Clean waste has the potential to be 100% recycled, and A. Sampaio follows different separation methods of textile waste (by yarn/fabric nature and colour) to allow their retrieval and proper recycling and/or reuse. The company partners also guarantee that the textile waste with dangerous substances is safely separated.

The fabric developments provide quality and durability while prioritising recycled and recyclable fibre blends, ensuring that their end-life is as green as possible, with the possibility to be transformed into new yarn and new fabrics. The company, too, develops closed-loop projects directly with the clients and their textile waste.

RDD TEXTILES

On its strategy of introducing new technologies and innovative materials into the market, RDD works in close cooperation along with the partner Valérius 360. The company works towards a more circular industry, by recycling textile cutting waste, overproduction outcome and unsold stocks – originated from partner brands and from internal manufacturing units – which are then used to produce high quality sustainable yarns, jersey fabrics and finished garments.

The products develop involves industry innovation for a responsible consumption and production, for example, making possible the production of new fabrics based on the original colours of the recycled fibres (i.e. without a re-dyeing process). Within this partnership the company has been creating responsible jersey fabrics, with bio-based, natural and recycled materials, considering the environmental impact across the entire material's life cycle. In the fabrics RDD Textiles used a blend of the recycled cotton (from 30% up to 50%) with virgin organic cotton, Lyocell, Lyocell Seacell™, recycled polyester and polyamide.

WONDER RAW

Participates in the development of circular systems to recycle old products and reuse raw materials, keeping them out of waste streams. As an example, Wonder Raw participate in the FIBERLOOP project, which offers a 100% sustainable process by allowing the reuse of waste/scraps originated during production and representing about 20% of the total customer order, thus transforming this amount of raw material into upcycle. In this process, the yarn composition is 50% organic cotton and 50% recycled cotton.

FAMILITEX

Despite adopting highly technological processes, Familitex is primarily committed to the team and all the human value that surrounds us. For this, in the Familitex group, we implement incentives in order to increase recycling among employees. In addition, the use of textile remains is practiced, together with partner companies, transforming them into new fibers and products. Less waste. More recycling.

RIOPELE

Riopele developed Tenowa, a low impact fashion fabric rand, which combines recycling and reusing the waste.

Following the circular economy model and a second-life approach, the company reintroduce textile leftovers into the fashion value chain at their highest value.

In partnership with universities and research centres, the company moves ahead, looking for new solutions that support our creativity and help us innovate.

So Riopele collects leftovers by type and color – cut, shred and pull into a new and recycled fiber – to finally create fabrics with diverse structures and designs.

Supported by an effective, innovative and efficient sustainable production process, Tenowa involves the transformation of textile leftovers into a recycled fashion fabric.

Being the perfect combination of responsible production with recycled fibres, Tenowa is an acronym for "Textile No Waste" and it has been distinguished with the Product Innovation Award COTEC and iTechStyle Awards – Sustainable Product.

RECYCLING

POLOPIQUÉ

Recycled Cotton - A new beginning for textile industry

The textile industry generates industrial by-product textile materials in terms of fibres, fabrics, and over-production, resulting in post-industrial or pre-consumer waste, and post-consumer waste. Nowadays, the textile industry is considered one of the most pollutants, not only because of the raw materials used, which depend on the resources, but also because of the amount of clothing that ends up in waste after it ends to be useful. Polopiqué have been developing ring spun yarns with recycled cotton pre- and post-consumer, from mechanical recycling process, to promote sustainability. The recycling process do not use any chemicals and water and reduce the chemicals during dyeing and finishing process. Based on the new fibers, it was possible to develop outstanding knits and woven, with diverse colours, depending on the textile waste, and can be blended with cotton, wool, lyocell, seacell, among others. Recycled cotton reduces production costs, energy chemicals usage and water. This project is particularly important to find a way to a more sustainable textile industry.

LURDES SAMPAIO

A recycling project promoted by Lurdes Sampaio, at the service of fashion clothes brands to respond to environmental issues, considering the principles of the circular economy and focusing on the importance of recycling in the textile universe.

The company can support and share the traceability with the clients since the recycling step until manufacture. All chain information is provided to achieve a truly circular fashion process, we supported this with GRS certification and LCA methodology.

Lurdes Sampaio is a portuguese knitter and the leader of the project.

The partnership with Recutex, portuguese recycling company and Fiavit, Portuguese spinning turns this project an “all made Portugal circular economy”.

Is a close loop, we collect the waist pre and post consumer of the brands and manufacturers and transform them according to the needs of the brand in a new fiber, new yarn , new clothes, new life...less waist.

The eco-design starts here. The environment savings were tested by LCA methodology: 90% reduction greenhouse gases; 70% energy saving; 60% less water consumption; No chemicals.

RECYCLING

GREEN WAYS FROM PORTUGUESE TEXTILE COMPANIES · GREEN WAYS FROM PORTUGUESE TEXTILE COMPANIES ·

JF ALMEIDA

In the area of Sustainability based on the Circular Economy, JF Almeida highlight a development that has been worked on and studied since 2018. The company has been working hard to promote it as a 100% sustainable product.

We are talking about JFA 360 Recycled Yarn, which is a yarn produced only with textile waste from the process to which a small percentage of Recycled Polyester is added. This recycled polyester is used because the company has to give the yarn strength so that it does not lose characteristics that could worsen its performance in the production process.

It took years of research and development, which today allow JF Almeida to have a 100% sustainable yarn with which we can obtain a consistent product without losing quality compared to a virgin product. At the moment, around 10% of the turnover is related to this Sustainable yarn.

Adding this new project to the existing Recycled Yarn JFA 360, the company can proudly say that have found a way to bring 100% of the textile waste to life, even down.

At project level: continue to develop the JFA 360. The company is currently producing yarns for weaving. The goal is to produce finer yarns and with that to be able to enter the knitwear market.

JF Almeida has two more projects based on sustainability that are at an early stage and in which is place a lot of hope. One of them is an international project whose main focus is Sustainability based on the Circular Economy that involves many European companies.

TEARFIL

ECO HEATHER

TEARFIL'S reborn yarns range.

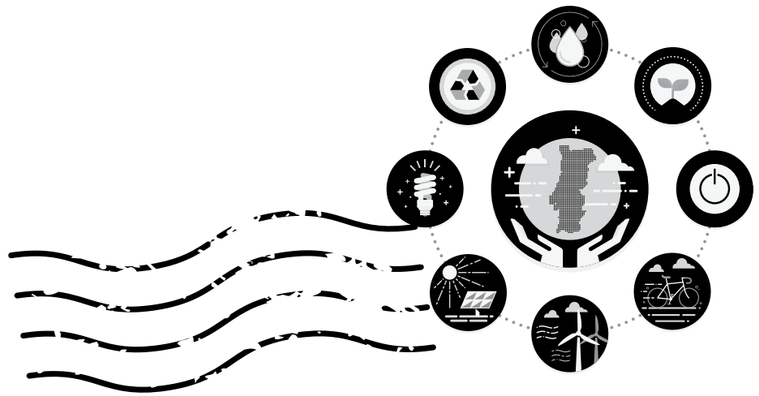
Waste involved in standard spinning production is not desirable and yet, inevitable. But also, only a problem if we don't take the opportunity to rethink it. That's why Tearfil decided to reuse, recycle and upcycle all their spinning waste, and give it a fresh new life.

Tearfil's Eco Heather brand was born from this circular idea. Their water-conscious colored ECO HEATHER mélanges are produced through their in-house water-efficient process, where their own spinning waste is recycle into true quality and sustainable yarns, available in a broad variety of shades.

Tearfil's Reborn Yarns Range products contain the lowest possible amount of virgin materials and contribute to saving the water that would be used for growing virgin fibers.

Properties: 100% Recycled; Softness; Durability.

FROM PORTUGAL

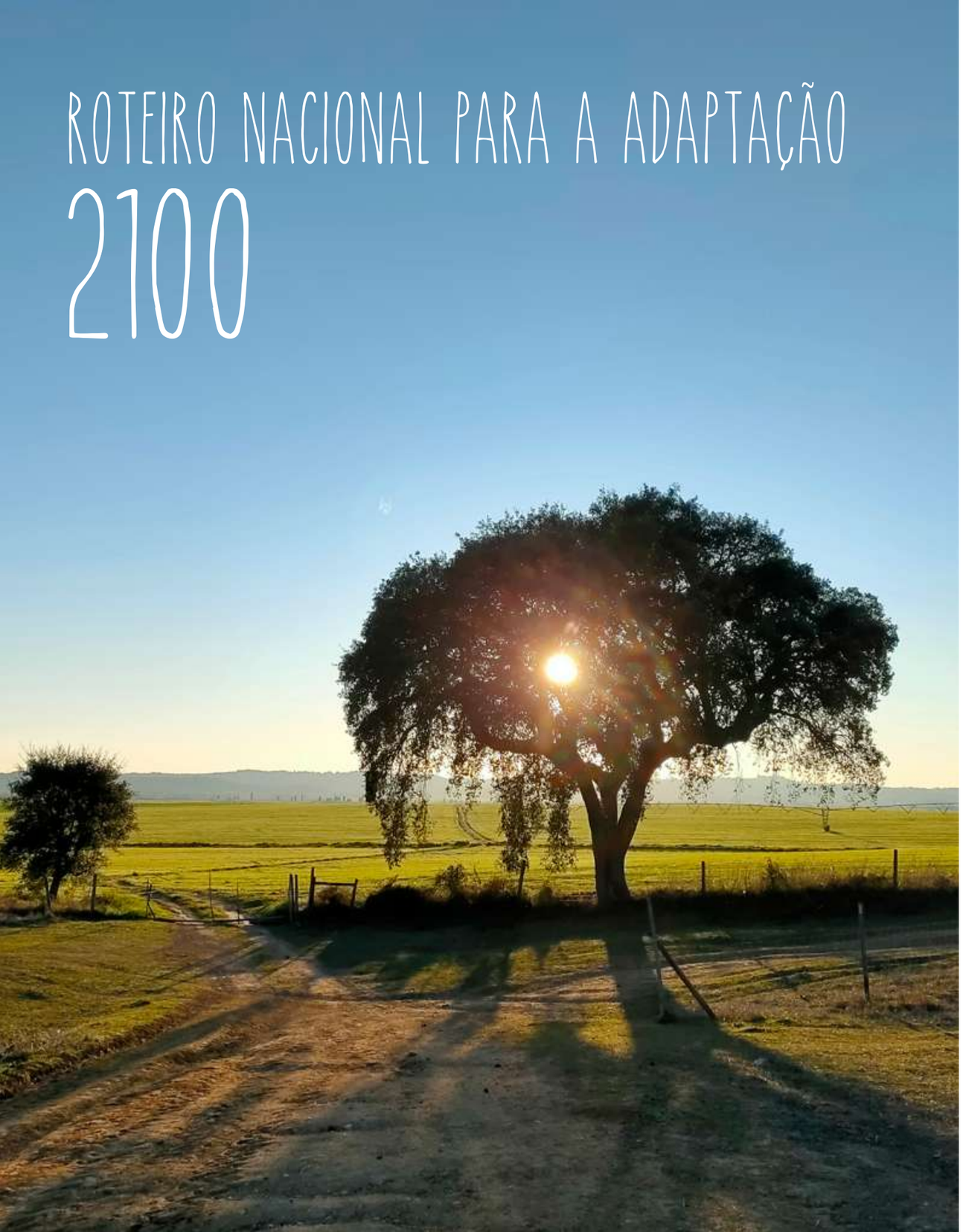


GREEN PROCESSES

POST OFFICE ATP 2023 POST OFFICE

TO A BETTER WORLD

ROTEIRO NACIONAL PARA A ADAPTAÇÃO 2100



NATIONAL ROADMAP FOR ADAPTATION 2100

Portugal combines several factors that make it the most vulnerable country to climate change in Europe. Increased temperatures in the southern region, droughts, reduced periods of rain, the occurrence of extreme phenomena such as storms, floods and fires and the proximity to a vast ocean that also suffers from the pollution and climate crisis that we are experiencing.

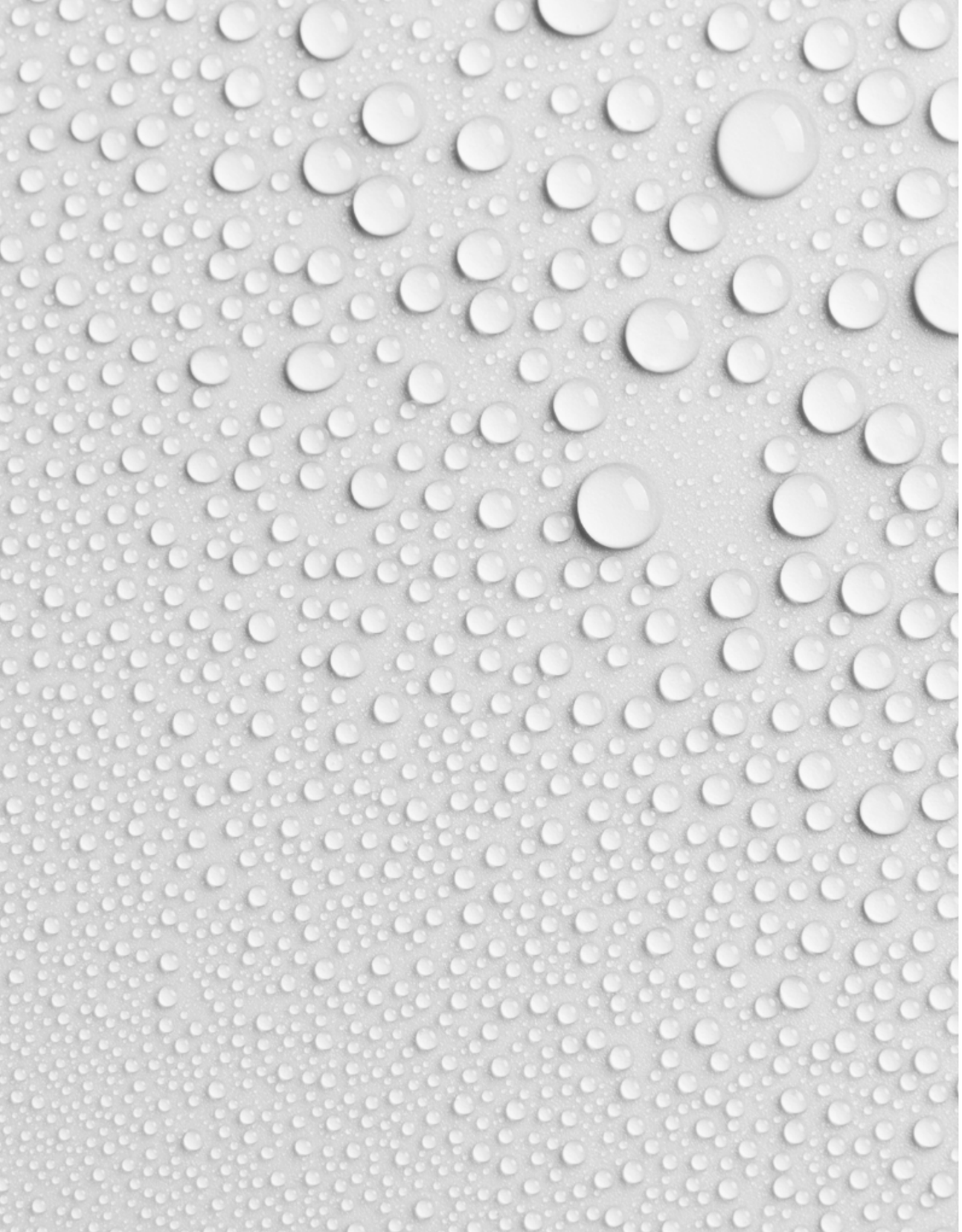
Among the studies and reports that have demonstrated scientific evidence for the urgency of mitigation measures (avoiding the worst) and adaptation, there is a vast amount of authorship by Portuguese researchers. Due to our geographic position and the scientific knowledge of our institutions, this country has produced important advances in the field of global study on the impact of climate change.

One of the scientists most dedicated to this area is Pedro Matos Soares, an atmospheric physicist and researcher at Instituto Dom Luiz, Faculty of Sciences in Lisbon. He is part of an international regional climate modeling consortium (CORDEX) and is the author of reports published by the IPCC (Intergovernmental Panel on Climate Change).

Currently, he coordinates a project that brings together different entities and will bring a new vision on the subject in Portugal, including costs in the economy. The National Roadmap for Adaptation 2100 is a project co-financed by the EEA Grants and the Portuguese Environment Agency (APA), involving the Portuguese Institute of the Sea and the Atmosphere (IPMA), the Directorate-General for Territory (DGT), the Faculty of Sciences of University of Lisbon (FCUL), Banco de Portugal (BP) and the Norwegian Directorate of Civil Protection (DSB). It started in 2020 and is expected to end in 2023.

Coordination is by Pedro Matos Soares, who explains the scope of the study. The aim “is to collect all the modeling information that exists in the world, assess the quality of these models and carry out new projections for the country.” For this, three scenarios are pointed out: one with the goals of the Paris Agreement from the point of view of the trajectory of emissions; one intermediate; one more severe in which we would have greenhouse gas emissions as we have had, that is, the usual business-as-usual scenario.

“In a final working package”, explains the researcher, “we are, for the first time, studying the impacts of climate change on the macro-economy and the costs and benefits of adaptation and non-adaptation in Portugal.” In this regard, he also refers that “in recent years we have shown as a society that by reducing the use of fossil fuels, the economy continues to grow.” This means that “there is already an economic decoupling that should clearly force a faster energy transition.” This and other issues will be demonstrated in this project, which will also allow for new business strategies in all sectors of the country.



WATER CYCLE

ATP RESEARCHES WATER CYCLE SUSTAINABILITY

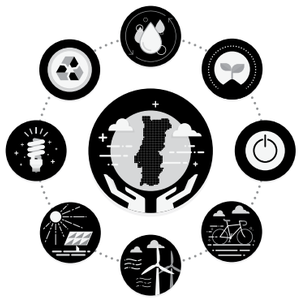
ATP is one of 15 entrepreneurial and academic entities involved in the recent creation of the Collaborative Laboratory (CoLAB) led by Águas de Portugal Group, which focuses on research and development to solve the main problems of water natural cycle in its various aspects. Called Water-driven Collaborative laboratory for Resilient communities (Water Co-Re CoLaB), the laboratory is a fundamental instrument in the framework of sustainability.

Topics as the efficient use of water, solutions for water reuse, climate change, sustainability, circular economy, resilience of infrastructures, digitalization of water and water/energy nexus are part of the agenda of the Water Co-Re CoLaB.

The application for constituting this CoLaB was submitted in December 2021, with the respective public presentation in January 2022, before an international jury created for this purpose by the Science and Development Foundation (FCT) and was one of the six applications approved last June by the FCT, from a set of 19 applications submitted.

Additionally to "evaluate and plan the most appropriate lines of research at this stage and bearing in mind the pressure this essential to life good is increasingly subject" the association must now hold its first General Assembly and elect the associative bodies, needs to update the initial business plan, and interact with the competent bodies – FCT and National Innovation Agency – in addition to the Ministry of Science, Technology and Higher Education in the context of the funding model of CoLAB, says Águas de Portugal in a statement.

Besides ATP, the laboratory also comprises AdP – Águas de Portugal, Fraunhofer Portugal Research Association, AST – Soluções e Serviços de Ambiente, DouroECI – Engenharia, Consultoria e Inovação, EDIA – Empresa de Desenvolvimento e Infraestruturas do Alqueva, GALP, Instituto Politécnico do Porto, Instituto Superior Técnico – Lisbon University, Super Bock Bebidas, Ventiláqua, Veolia Portugal, Minho University, Porto University – Engeneering and Requimte – Chemical and Technology Network.



BLUE BIOECONOMY

The Pacto da Bioeconomia Azul embraced the challenge of reindustrialising Portuguese industries through the integration of bluebiotech solutions in value chains, leveraging the sustainable use of marine bioresources to increase added value through decarbonising innovation. This Consortium will bring the Ocean to shelves by investing in 7 sectors:

1. Biomaterials applications;
2. New paradigm for Bivalves production;
3. Marine-based Textiles;
4. Sustainability in the Food sector;
5. Scale-up Algae production;
6. Circular Feed solutions;
7. Bioinformatics for the Fishing sector

At the same time, the consortium will work on 3 transversal initiatives overarching projects, aimed at accelerating the development and commercialisation of products and services of the sector:

1. The Portuguese Blue Biobanks network;
2. A digital platform for the valorisation of marine co-products;
3. The promotion of start-ups and SMEs' growth and internationalisation.

In the specific case of marine-based textiles, marine residues and resources will be used towards the development of novel textile products and processes. For this, the project will follow three major research lines:

- Fibres from fishing nets and algae;
- Novel finishing technologies incorporating algae;
- Textile industry effluent treatment with algae.

Taking into account this R&D strategy, the major outcomes of this project will be:

- The development of novel woven and knitted fabrics incorporating polyamide recovered from fishing nets;
- The development of novel woven and knitted fabrics incorporating fibres containing algal biomass;
- The development of knitted and woven fabrics incorporating algae and algal extracts as dyes and/or functionalisation ingredients;
- New integrated effluent treatment process, using innovative algae-based CO_2 fixation stages, with improvements at the sustainability and efficiency levels.

www.citeve.pt

GIATEX

The GIATEX (Intelligent Water Management in the Textile and Clothing Industry) project was created to respond to the challenges faced by textile finishing companies in terms of intensive water consumption. To accomplish this major goal, the project aims at developing:

1. Novel processing technologies that allow companies to reduce their specific water consumption (e.g., use of less intensive finishing technologies and adoption of treatment technologies that allow water recycling and reuse);
2. Intelligent technologies to support production managers on the decision about the destination to give to the water involved in the finishing processes (through the integration of online monitoring systems and automation technologies for process control).

Therefore, this project was outlined taking into account the following strategy:

1. Study and characterization of wet processes in the textile companies integrating the consortium;
2. R&D in intelligent systems for process monitoring and control;
3. R&D in innovative textile finishing technologies with reduced water consumption;
4. R&D in effective water and wastewater treatment technologies;
5. Implementation of the developed technologies at pilot scale;
6. Development of a software to support the decision-making process for the effective water management.

The consortium of the GIATEX project is composed by 27 partners, of which 5 are Non-SME companies, 12 are SME companies, 8 are R&D Institutions and 2 are Local Administration Institutions. The leading company is the ESTAMPARIA TÊXTIL ADALBERTO PINTO DA SILVA, S.A. (hereafter designated as ADALBERTO). CITEVE, the Technological Centre for the Textiles and Clothing Industries of Portugal, is the Scientific Coordinator.

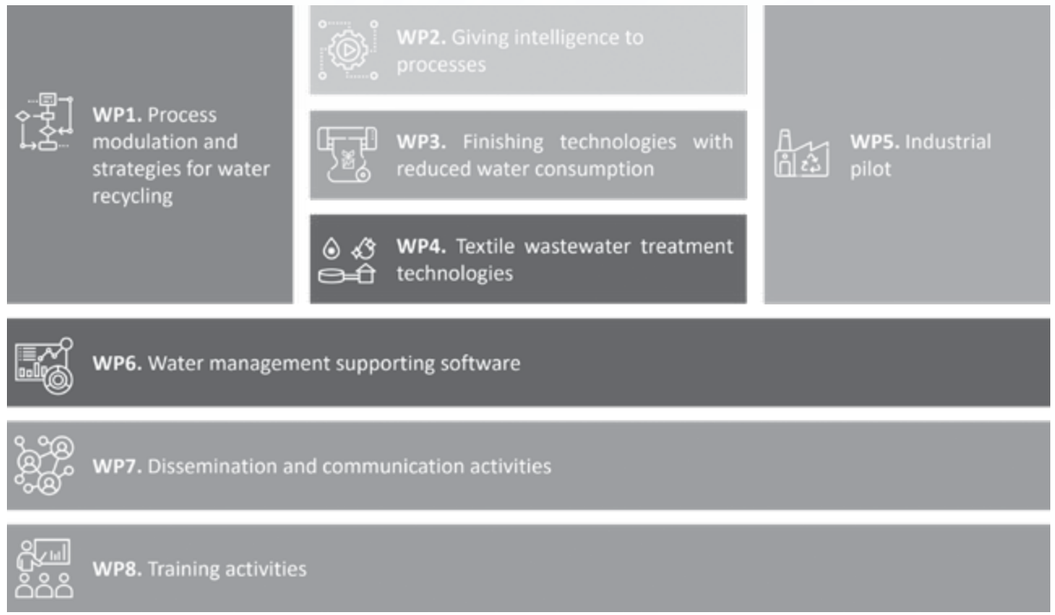
Among the companies, 12 are textile companies representative of the different textile finishing processes (fibre, yarn, terry, and woven and knitted fabrics dyeing companies, conventional and digital printing companies, among others). The other beneficiaries were carefully selected to ensure the complementarity of competences, as well as the establishment of synergic relationships between them.

In terms of organisation, the GIATEX project is divided in 8 Work Packages (WPs), which are aligned with 4 Strategic Pillars of the Recovery and Resilience Programme (PRR): (i) Green Transition; (ii) Digital transformation; (iii) Intelligent growth; and (iv) Economic resilience. Each WP is further divided into several specific tasks.

The major outcomes of this project will be the development of the following products, processes and services:

- Consulting services in good practices for water management and rationalisation;
- Novel eco-functional products and textile structures;
- Innovative and sustainable products/systems to assist wastewater treatment processes;
- Software to support water management decisions.

Overall, this project will contribute to an effective reduction of water consumption in the textile companies, which is estimated to be of up to 40%. A 30% reduction in greenhouse gases emissions is also expected at the end of this project.



SMARTEX

Has developed hardware-enabled, machine-vision-driven software to detect textile defects in real-time, reducing textile waste, CO_2 emissions, energy, water, production time, and capital expenditure by automatically halting production in order to prevent the waste of materials. Defects tend to compound, leading to entire rolls of fabric being discarded or burned, causing environmental and financial burden.

The textile and fashion industry is the 3rd most polluting industry in the world – producing a monstrous amount of textile waste each year with no signs of slowing down. It is estimated that 150 billion garments are produced annually in this $3T industry which accounts for 20% of global water waste and 10% of global carbon emissions.

The textile industry operates on thin margins and has a considerably high defect rate. The industry is currently dependent on human vision and manual inspection to detect textile defects. Smartex empowers textile manufacturers to take control of their production line through real-time defect detection and data-driven analysis.

As the global sustainability movement continues to gain traction, consumers and regulators are increasingly pushing the fashion and textile industry to adopt cleaner, more responsible production. The European Commission has recognized Smartex as fundamental for Industry 4.0 Projects in textile factories.

Smartex was founded in 2018 by three Portuguese Forbes 30 under 30 founders to address textile waste with a preventative solution and improve production with higher quality, higher margins, and fewer defects.

BE@T – BIOECONOMY AT TEXTILES FROM NATURE, IN A CIRCULAR AND SUSTAINABLE WAY, TO PEOPLE

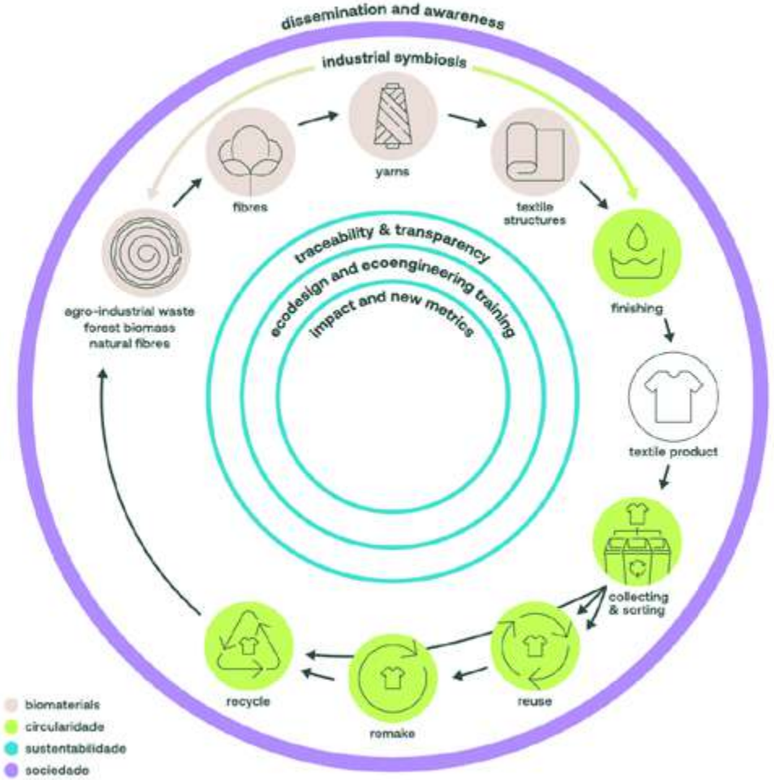
Textiles are the fourth highest-pressure category for the use of primary raw materials and water (after food, housing and transport) and the fifth for greenhouse gas (GHG) emissions. They are part of many global industrial value chains (VCs), including clothing & fashion, home textiles, healthcare, protection, transport, construction, agriculture and fishing.

Within this framework, CITEVE (the Portuguese Technological Centre for the Textile and Clothing Industries) boosted the project be@t, that pretends to change this paradigm, by adding value from biological resources and developing alternatives to fossil-based raw materials.

The project be@t is a national PRR funded project, under the component C12-i01.01 – Bioeconomia, being leaded by CITEVE and bringing together 54 entities in search of solutions for the conversion of the textile and clothing sectors on topics such as traceability and transparency, ecodesign and ecoengineering, impact and new sustainability metrics. For more information, please visit our website: www.bioeconomy-at-textiles-com.

With an inevitable shift from fossil-based to more renewable feedstocks and the advent of more circular and local value chain models, the EU textile industry needs a sound long-term strategy for a sustainable, safe and cost-effective supply of local bio-based fibres and feedstocks. This is the main goal of be@t, that aims to reduce the T&C industry GHG emissions from the change of synthetic fibres to alternative natural ones, with a much lower impact than cotton and from the development of textile materials and processing technologies with the lowest environmental impact in the state-of-the-art (SoA), resulting from the lowest environmental impact of the feedstocks used, the implementation of local territorial solutions that decrease GHG emissions due to transportation, and the use of the Best Available Techniques (BAT) and sustainable methodologies during their flow in the T&C value-chain.

The projected impacts will encompass the whole textile production value chain, ranging from the sourcing of material to raw material production, fibre spinning, textile structures and clothing production.



The projected strategy is, therefore, straightforward: to invest on the collaboration between industries from separate sectors within a new value-chain, supported by the resilience and willingness of the local industry to adapt to low carbon processes, and endogenize novel technologies that in turn will comply with the demands to adapt the carbon intensive T&C industry to the challenges of decarbonization of industry, and the market demands for increasingly sustainable solutions. The envisaged evolution claimed by be@t is, therefore, underpinned by integration and upscale of innovative technologies and the full engagement of a new sustainable value chain, earmarked by a low carbon footprint.

In particular, be@t project pretends to develop a set of complementary projects (58 in total), to capacitate the Portuguese T&C industry and provide key competences in the sustainability, bioeconomy and circular economy areas.

The project be@t is structured into 4 main pillars: biomaterials, circularity, sustainability, and society. Each pillar has a scope of different projects (infrastructure, capacitance, and R&D projects) aligned with the different objectives and aims.

In conclusion, be@t project will create a competitive bio-based infrastructure in Portugal, transforming a traditional and resource intensive sector like the textile industry in a highly innovative and sustainable industry, aligned with the European vision. It will also support the scaling up and valorisation of alternative raw materials that could substitute synthetic ones and thereby increase the share of natural fibres in the textile sector by increasing the amount of textiles coming from agricultural & forestry by-products.

sampLESS

Digital Sampling Solutions

Empowering the Fashion Industry for the Future of Digital Fashion by democratizing the access and the use of 3D Technologies.

Why continue wasting so many materials and energy in expensive and polluting physical samples, also known as “mook up” products that are not even going to be sold ?

Much has been said about the millions of tonnes of garments thrown away each year, but, what about the huge environmental and social impact associated with the design process itself?

Fashion sustainability starts at the very beginning of the design process and sampLess is on the MISSION of setting the industry standards for digital sampling, as a way to reduce up to 70% of the resources consumed in the traditional physical prototyping process, by the use of 3D technology.

The digitization of the fashion industry's supply chain is mandatory to maintain economic competitiveness and sustainability goals.

The creation and sharing of digital material libraries is the first step, allowing real time simulations of materials behavior in 3D models, without consumption of natural resources and logistics.

Digital materials advantages:

- Faster time to market;
- Shortens sample prototyping process and the material sourcing time;
- Decrease the numbers and the waste of disposing outdated fabric swatch books;
- Avoid up to 86% of greenhouse gas emissions when compared to a traditional process, improving transport pollution problems caused by sending physical fabric swatches.

HUB – Training and Services Center

Designed to allow industry professionals, including material and fashion designers, pattern makers among others, to learn and gain experience in creating 3D apparel, with a focus on 3D Technology, processes and Human Resources.

COMPANIES

(with processes news in this magazine)

All the data (or content) is provided by
the Companies, Assotiations
and Technologic Centers

A. SAMPAIO › www.asampaio.pt

ACATEL › www.acatel.pt

ADALBERTO › www.adalberto.pt

FAMILITEX › www.familitex.pt

JF ALMEIDA › www.jfa.pt

LASA › www.lasanet.pt

LEMAR › www.lemar.pt

LURDES SAMPAIO › www.lsmalhas.com

POLOPIQUÉ › www.polopique.pt

QUINTA & SANTOS › www.quintasantos.pt

RDD TEXTILES › www.rddtextiles.pt

RIOPELE › www.riopele.pt

SAMPLESS › www.sampless.io

SMARTEX › www.smartex.ai

SOMELOS › www.somelos.pt

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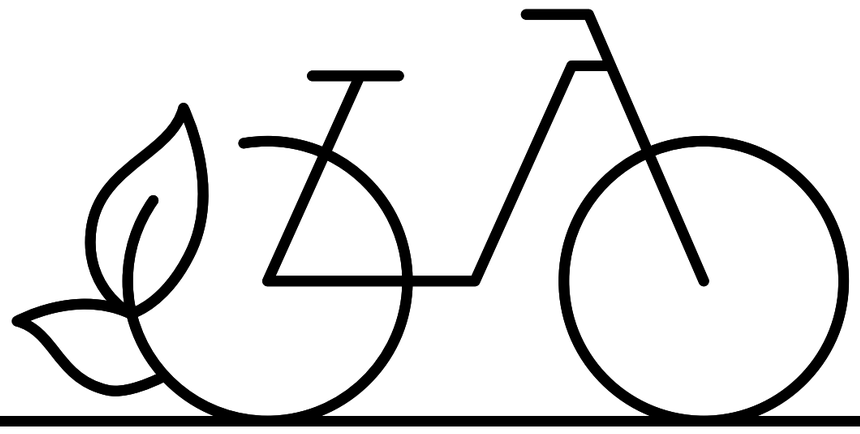

MODELS

VITÓRIA MOTA

AGENCY | L'AGENCE

GONÇALO COSTA . ALICE VON SANDIZELL . ANGELINA . GELSON . AFONSO SERRANO . JOÃO MENDES . CAROLINA MONTEIRO

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The power of youth is the common wealth for the entire world. The faces of young people are the faces of our past, our present and our future. No segment in the society can match with the power, idealism, enthusiasm and courage of the young people. Kailash Satyarthi

FINAL WORDS

Textile and fashion industry´s sustainability has been in the spotlight lately imposing a profound analysis and transformation.
Portugal is one of the leaders of this transformation. As one of the most important players at European level, with an incontestable importance in terms of development and industrial production, the Portuguese textile and fashion industry adopted new processes, techniques and technologies and invested in new equipment so that the entire production made in Portugal could be more and more sustainable and a world example.
The purpose of this magazine was to make you aware of several initiatives and projects implemented by the Portuguese companies towards sustainability and circularity, in areas as diverse as water or energy, dyeing, printing, or finishing processes, among others, as well as some initiatives to improve traceability of products or to promote recycling and reuse and/or reduction of waste.
This is just a small illustration of what is happening in Portugal that we are very happy to share with you, as we have been doing throughout the Sustainable Fashion From Portugal project.

Mario Jorge Machado
ATP President

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SUSTAINABLE FASHION
FROM PORTUGAL