

Roads to INNOVATION

2016 EDITION

#5

Editorial

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CROSS PERSPECTIVES

PARTNERSHIP BETWEEN
LES FILATURES DU PARC / BONOBO

Recycled jeans, from initial idea to design

Interviews with
Xavier PRUDHOMME & Fabrice LODETTI

“In 2013, Bonobo and Les Filatures du Parc, a project holder supported by Eco TLC, joined forces to create a yarn from recycled denim. Their partnership gave rise to Rebirth, the first line of recycled jeans and a huge success in the shops.

Xavier PRUDHOMME: Bonobo's interest in the circular economy is nothing new. Our brand, whose flagship product is jeans, has been actively involved in recycling since 2009 with collections of old jeans in stores, in partnership with Le Relais. It was not long before we decided we wanted to go further than just collection, and to make new jeans from the old jeans that had been collected. Nobody had succeeded as yet in making yarn with post-consumer denim as it is difficult to obtain a long enough fibre. So we looked for an enterprising partner for the research and development work. And of course the obvious solution was for us to approach Les Filatures du Parc. We knew them slightly but this was a genuine meeting of the minds on the personal level discussing professional values. We set out our brief for “recycled jeans for less than 50 euros” to them and they replied: “You're on, we'll give it a go!”

Fabrice LODETTI: At Les Filatures du Parc, thanks to Eco TLC's funding, we developed knitwear from recycled wool, which Bonobo and the Beaumanoir group are familiar with and use in some of their products. They valued our expertise in textile innovations and came to see us in 2013 with a complicated yet interesting idea: making new jeans with post-consumer denim. We were encouraged by the technique we had developed for woven fabrics (wool) and so we took up the challenge. Two years of research and development followed, in a full partnership with Bonobo: using the raw material from Le Relais, which had stripped the fibres and garnetted the stock, we refined the yarn technique →

Fabrice LODETTI

Manager of the family-owned company Les Filatures du parc



Xavier PRUDHOMME

Bonobo Jeans
Brand Director
Beaunoir Group



“ Bonobo’s jeans collection made using the yarn created by Les Filatures du Parc has been named Rebirth and was launched in store in September 2015. It’s a real success in terms of business and image.”

at Les Filatures du Parc to ensure that it was as robust as possible. For their part, Bonobo carried out the weaving and quality testing with its partners. Each of us had our own area of responsibility, ours was to create the yarn and theirs to create the textile article. After two years of joint work, in early 2015 we produced a pair of jeans made from 100% recycled yarn obtained from 50% post-consumer denim and 50% recycled plastic bottles (PET).

Xavier PRUDHOMME: Bonobo’s jeans collection made using the yarn created by Les Filatures du Parc has been named Rebirth and was launched in store in September 2015. It’s a real success in terms of business and image. Since then we have developed the collection further and we are continuing by incorporating the Rebirth process in as many products as possible. I hope that tomorrow it will no longer be an exception but the norm at Bonobo and at other companies too! We are very happy to have developed this new concept and that our partnership with Les Filatures du Parc has given rise to a new recycled yarn. We hope that once the short period of exclusivity we enjoy with them for the denim yarn is over, they will be able to market it to the maximum so that as many of us as possible will be able to create recycled products and help our planet to benefit from it. We also wish to Les Filatures de Parc a great commercial success with this yarn: the stronger our partners are, the stronger we are too!

Fabrice LODETTI: We have been very lucky to have encountered Bonobo, a family business whose values are so very close to ours! In the end we did not even sign a contract with them: it was all based on trust and we are very happy to have found partners in the true sense of the word. Thanks to Eco TLC’s support we have been able to grow and thanks to Bonobo’s trust we have been able to take up the challenge of being the first to create yarn from recycled jeans! Today I’m even wearing a pair of these jeans and I can assure you they are just as good as jeans made from new fibres.

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Rebirth Collection



SCIENTIFIC COMMITTEE

Eco TLC's action to encourage R&D 5 years on!

In 2015, following to the 6th edition of calls for project proposals, four new projects were selected by the Scientific Committee, bringing the total number to 22 since the launch of the initiative in 2010.

Without jumping to conclusions or anticipating the final findings, we are about to reach an initial assessment of the Scientific Committee's first five years of existence and work, and also of the scheme implemented to promote innovation in the sector.

- **THE EXISTENCE AND ACTIONS** of Eco TLC Scientific Committee are now well known and recognised by the industry's players and government bodies, and are spread outside the sector.
- **THE SCHEME** established in 2010, when things first had to be set up, is working smoothly and has proved its effectiveness over time.
- **THE PROCESS** now functions well and Eco TLC's actions have been consistently recognized.

Apart from some changes involving members of the Scientific Committee, a sense of identity and community has been created that keeps growing constantly.

We are proud to have supported all these innovative firms and hope that they will all succeed in taking things to the next level, namely that of preparing their project for the operational phase and industrial application.

We are proud to have supported all these innovative firms and hope that they will all succeed in taking things to the next level...

The approach we take towards these projects reinforces our sense that the greatest difficulties still lie ahead of us: ensuring that these ideas are transformed into tangible achievements, turning these projects into real industrial applications. In its initial analysis, Eco TLC has observed that the project holders often remain too isolated. It is crucial for the sector that the projects supported are not limited to an academic work or basic research but provide practical solutions in the short or medium term for materials intended for recycling.



Jean-Luc BARTHARÈS,
Director of Member Relationships and R&D at Eco TLC

REMINDER ABOUT THE PROJECT SELECTION PROCESS

THE SCIENTIFIC COMMITTEE IS MADE UP OF 14 MEMBERS

who represent the industry's direct and indirect stakeholders: suppliers, Ademe, representatives from collectors, sorters and recyclers, technology centres for textiles and leather, associations and experts (specialist advisors, researchers).

THE SCIENTIFIC COMMITTEE HAS DEVELOPED A SCORE SHEET FOR PROJECTS

that lists 11 different criteria, with scores from 0 (no information) to 4 (very good): environmental benefit of project, economic impact on the sector etc.

The process consists of two stages:

the Scientific Committee makes a preliminary selection from among the applications by scoring them according to the different criteria. The chosen candidates are then interviewed by the Scientific Committee. Following these interviews, the Scientific Committee makes its recommendation for consideration by Eco TLC's board, which ultimately decides on whether to give financial support and how much.

SUPPORTED PROJECTS

As innovation is at the very core of the sector's project, Eco TLC has doubled the budget for supporting R&D projects within the context of 2014-2019 accreditation. Each call for project proposals (available in French and in English) is open to all types of project holders and aims to encourage research into new outlets for clothing, shoes and household textiles or improvements in various operations that could result in a reduction in processing costs. Every project selected is assisted throughout by a monitoring group (progress meetings and phase validation).



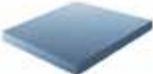
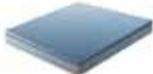
Overview OF THE 22 PROJECTS SUPPORTED BY



ECO-DESIGN PROJECTS

COMPANY	GOAL	TLC COVERED	RESULT	PROGRESS	PAGE
	Developing a model for an eco-design shoe with a knit upper				6

OPEN LOOP PROJECTS

COMPANY	GOAL	TLC COVERED	RESULT	PROGRESS	PAGE
	Developing a silencer that is ecologically sustainable for ventilation in homes				7
	Creating a decorative sound-absorbing material from recycled textiles				10
	Developing textile tiles for suspended acoustic ceilings				11
	Improving the purity of the resulting materials (leather/rubber) and output from the recycling line				14
	Developing an innovative textile insulation				16
	Incorporating end-of-life textiles as inert fillers in decorative plates				16
	Developing an exterior sound insulation shield in lightweight concrete				16
	Recycling of cotton and polyester fibres for use as reinforcement in the plastics industry	 COTTON COTTON/POLYESTER			16
	Developing an industrial grinding and separation process to find added value recycling outlet				17
	Creating a new plastic using textile as a inert fill				17

CLOSED LOOP PROJECTS

COMPANY	GOAL	TLC COVERED	RESULT	PROGRESS	PAGE
	Recycling of damaged socks by creating a yarn for making new clothing				12
	Making use of old cotton/polyester clothes for spinning of recycled materials employing a method of defibration that is suitable for weaving or knitting new articles of textile clothing	 COTTON/POLYESTER			13
	Manufacturing polyester yarn from post-consumer polyester clothing, shoes and household textiles	 POLYESTER			16
	Transforming used woven material made out of wooly fibers into new yarns of the same quality	 WOOL			16
	Recycling rubber soles into a new product				17

SEPARATION AND PREPARATION TECHNIQUES

COMPANY	GOAL	TLC COVERED	RESULT	PROGRESS	PAGE
	DécoTex II : Moving to the pilot scale of DécoTex I project (FEYECON) - CO ₂ sc. bleaching technology	 POLYESTER			8
	Studying and refining of a new sorting method for the purpose selecting secondary materials not destined for second-hand clothes trade				9
	Optimising a process of end-of-life textiles to achieve an improvement in the percentage of "old" textiles unravelling in the process				11 12
	Developing a process for selective chemical recycling of used mixed textiles (2 projects)	 MIXED FIBRES			15 16 17
	DécoTex I : Developing an un-dye process for polyester fabric based to enable its recycling	 POLYESTER			17

NEW PROJECTS

SPORALTEC - ECTOR

An environmentally friendly shoe that is easy to recycle



Robin Lamy

Innovation & Sport
Project Manager (replaced
since then by Olivier Pignet)



ROBIN LAMY

How did your project get off the ground?

Sporaltec is an alliance of businesses that works like a competitive cluster, dedicated to innovation in sport. When it came to this project, we approached Insoft, a very innovative shoe manufacturer from the Romans region, with Richard Frères, a specialist for weaving and shaped knitting, in particular in the medical field (bandages, orthotic devices, splints etc.) Insoft, which has already demonstrated its innovative strength on the environmental level, for example, with shoes that had a limited number of seams, was keen to make a shoe where the upper was made of 100% knitted materials and which was recyclable.

What is the environmental advantage of the procedure?

A conventional type of trainer is, for example, composed of numerous pieces in different materials, which generate a lot of cut-to-measure offcut, and sewing yarn, glue etc., which make it hard to recycle. Today, technical knitting allows you to just use a small amount of raw material, without wastage, and to recycle the shoe by unravelling it. On the other hand, a knit upper is not necessarily homogeneous, since a tight knit allows you to reinforce sections of the shoe that require this, and in contrast, to use a fine knit for areas that require breathable properties. The third advantage in terms of the environment: this knitting method makes producing the uppers far more simple, and hence reduces the cost of labour, making it viable to manufacture in France.

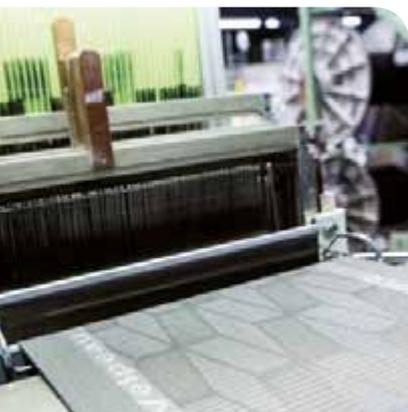


What are your goals?

We will first start by identifying the most suitable raw materials from the aspect of ease of knitting/unravelling and appearance. We will also need to develop a simple procedure for separating the upper and the sole, and find manufacturers who are capable of doing this on a large scale and of recycling the sole. By March 2017 we hope to have created a prototype for the "urban sports shoe" product that will be ready for the launch of the



industrial stage. We should have also completed an environmental study for the project, demonstrating all the environmental benefits of the method and we should have launched a crowd-funding campaign that will launch the commercial part. Insoft, in keeping with the crowd-funding culture, has already completed out three successful crowd-funding campaigns for innovative and environmentally responsible shoes. The latter made it possible for INO to be realised: a trainer made exclusively of two constituents: rubber for the soles and felt made from recycled plastic bottles for the upper. Let us hope that this new project for a knitted shoe will meet with similar success!



Richard Frères
weaving machine

PROJECT AT A GLANCE

GOAL: Developing a model for an eco-design shoe with a knit upper

DURATION: 12 months (until March 2017)

LEVEL OF SUBSIDIES FROM ECO TLC: €44,663

TYPE OF TLC COVERED: Footwear

CONTACT

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WECOSTA - SILENCIO

A CMV* silencer made from recycled textiles



HUGUES BROUTÉ

How did your project get off the ground?

Wecosta is traditionally a supplier of products for the automotive industry. We have specialised in the design, development and thermo-compression of fibre-based products with acoustic, thermal and mechanical properties. In particular we manufacture fibre-based acoustic ducting for reducing engine noise for major manufacturers: Audi, Jaguar Land Rover, Fiat, Ford, McLaren, Maserati, Mercedes, Opel, Peugeot, Renault, etc. Until now, we had not worked with the construction industry but following personal experience in building a single-family home, we, several co-workers and I, found that as a result of insulating homes as we do nowadays, we have considerably reduced the noise emanating from outside and that we now found some noises on the inside of the home disturbing, in particular noises associated with CMV. It therefore occurred to us that we could apply our knowledge of controlled mechanical ventilation to produce a 100% fibre-based CMV silencer using thermo-compression technology.

Aren't silencers for CMV already available?

Those that already exist are made of several different materials, consisting of metal, plastic, foam, and glue to assemble it all. They are not very innovative, expensive and hard to recycle. As far as we were concerned, we wanted to exploit our expertise in the thermo-compression of fibres in order to create a fibre-based silencer, which could therefore be recycled and which was composed of over 80% recycled textiles. So in 2015 we completed a prototype of a fibre-based silencer to demonstrate that reducing the noise impact from CMV in the home was feasible.

What does the project backed by Eco TLC involve?

This initial prototype still needs to be perfected, and this is the aim of the project: our partner Minot Recyclage Textile (Le Relais), which supplies us with the raw material, will be helping us to identify the most suitable textiles, the right blends which will result in the ideal composition for our product. They will be passed to our second partner, the Silac Industrie group, which will be responsible for manufacturing the technical felt. They will get back to us once they have ascertained the ideal geometry for maximising acoustic performance. In parallel with these technical tests, we will also conduct market research in order to confirm the expectations we have for the potential success of this product.

What is your goal?

We hope to have developed a finished product in the form of a prototype by September 2017. If this is the case, we will be in a position to scale up to industrial production with our partners. Our market research will also need to have confirmed that there is a demand, but we have little doubt about this, considering the advantages of our product in terms of costs and ecology, and knowing that there is a CMV in each home with at least three air vents. It would really be an unwelcome surprise if our silencer does not see the light of day.



Hugues Brouté

Product Manager



➤ Frayed material

➤ Thermocompression press



PROJECT AT A GLANCE

GOAL: Developing a silencer that is ecologically sustainable for ventilation in homes

DURATION: 18 months (until September 2017)

LEVEL OF SUBSIDIES FROM ECO TLC: €153,215

TYPE OF TLC COVERED: Recycled textiles

CONTACT

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*CMV : Controlled Mechanical Ventilation

NEW PROJECTS

SEPAREX - DÉCOTEX II

Recycling polyester textile waste using environmentally friendly bleaching



SÉPARÉX received the "FUTURE MATERIAL AWARDS 2015" at the ITMA Milan for this project

Members of the DécoTex II team at Separex are:

(top, from left to right) :

Jorge Berriatua – Research and Development engineer,
Audrey Common – Research and Development coordinator,
Jérôme Aguilar – Industrial designer,
Audrey Ngomsik-Fanselow – Managing director.

Audrey N., Audrey C. et Jorge were already part of the team at DécoTex I.



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AUDREY NGOMSIK-FANSELOW

Is this project a continuation of the previous one?

There have been some changes: I was appointed as managing director of Separex, the French branch of the Feyecon group, which has relocated its textile research section to France. But yes, DécoTex II is the second stage of DécoTex I: we have succeeded in demonstrating that it is possible to bleach the colour from fibres in synthetic fabrics, from polyester, using CO₂ in a supercritical state. We had already been carrying out CO₂-based dyeing previously. It is now possible to bleach the colour from any polyester fibre whatsoever using this same procedure, which is totally non-polluting, unlike other methods. The goal of this second stage of the project is to demonstrate its viability on a large scale.

How do you intend to achieve this?

We want to prove that by using bleached polyester fibres from textile waste, it is possible to re-create a textile article of the same quality. To achieve this, we are going to scale things up by moving from grams to kilograms. This means we will need to redefine and upgrade all the parameters for the procedure. At the same time, we will conduct characterisation of the bleached fibres and a very detailed study in order to ensure that the scale-up is carried out in the most effective way. In the end we want to demonstrate that the textile article obtained from recycled fibres is of the same quality and has a comparable price to an article produced from virgin polyester. This project will conclude with an environmental assessment of the procedure and a design for a semi-industrial bleaching unit.

What are the environmental advantages of your procedure?

In bleaching polyester waste, we give it a second life. We are thus helping to reduce textile waste. And we are doing it by using an environmentally friendly procedure, as opposed to conventional methods. Current methods of bleaching entail a considerable cost, both in environmental and economic terms; the solvents used are extremely toxic and they necessitate thorough pollution control of the waste water. For our part, we do not use water but CO₂ in a supercritical state, an industrial waste product that we recover and recycle (we do not dispose of it by releasing it into the atmosphere). The environmental advantage of our procedure is therefore obvious. It still has to be shown that this advantage also represents an economic gain, which is what we are going to do.

What stages are planned next?

We are first looking for a means of regenerating the CO₂ to the optimum. Next, we intend to conduct tests of substantial quantities of the raw material; then we will characterise the results of these tests on a large scale with our research institute. Afterwards we will move on to the design phase for the semi-industrial bleaching unit. In the long term, we hope to be able to bleach and re-dye a polyester garment with the same machine. Numerous other avenues for experimentation are feasible with our CO₂ treatment method, which allows us to make textiles water-repellent and to clean clothes while retaining fabric properties, but also to clean circuit boards or to extract essential oils. To put it in a nutshell, we discover new applications every day for this method!

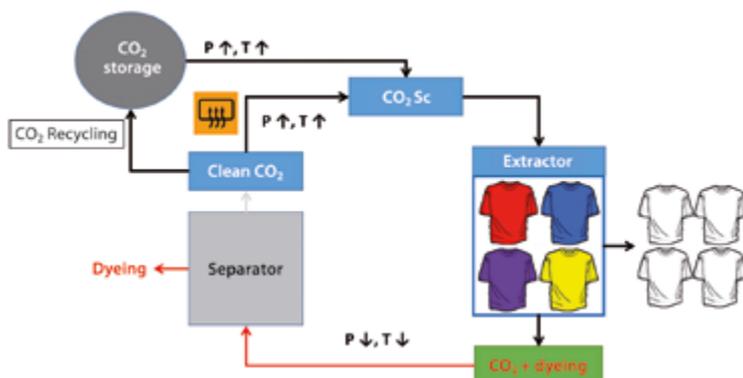
PROJECT AT A GLANCE

GOAL: DécoTex II: moving to the pilot scale of DécoTex I project (FEYECON) - CO₂ sc. bleaching technology

DURATION: 24 months (until March 2018)

LEVEL OF SUBSIDIES FROM ECO TLC: €295,416

TYPE OF TLC COVERED: Polyester textiles



SYNERGIES TLC AND VALVAN BALING SYSTEMS - AUTOTRI

Automating the sorting process



THOMAS FRAINEUX

Who is Synergies TLC?

It is a consulting firm for textiles, household linen and old shoes. It was established in 2014 by four textile sorting businesses so that they could pool their resources in order to conduct research and development in textiles recycling. These four businesses are Provence TLC, Alpes TLC, Cobanor Tritex (from Caen) and Recycollecte (Luxembourg and Belgium). Auto-tri is the first among the projects carried out by Synergies TLC and it provided the stimulus for setting up this consortium. Synergies TLC also aims to support all types of projects related to textiles, household linen and old shoes by establishing a new sorting facility, setting up selective collections or developing an R&D project investigating recycling.

Who is Valvan Baling Systems?

It is a Belgian machinery manufacturer (based near Lille). Valvan develops and builds bale presses and sorting plants (used in the second-hand clothes sector among other things). It is the world leader in this field. One of its new plants is the FIBERSORT, a machine that sorts textiles according to the fibre composition (and potentially according to colour as well). The machine uses an optical detector to carry out this sorting.

What does the Auto-Tri project involve?

It involves testing the FIBERSORT with regard to certain categories of composition and colour that we find of interest. Synergies TLC had the idea of designing a machine which was able to sort these categories automatically. Then, during the course of our research, we discovered that Valvan Baling Systems had already developed a machine that did exactly that. Synergies TLC in the first instance planned on working with Valvan as a supplier but the machinery manufacturer soon became a full partner in the project. This way we can work together and discuss things openly when deciding where the machine's software could be improved to better detect the different categories. One of Valvan's programmers will then adapt the software.

What will the different stages in your project involve?

In mid-April, Synergies TLC signed a partnership agreement with Valvan for testing their machine and developing a software specifically for Synergies TLC's categories. We are therefore going to start out by testing the machine to measure how efficient it is: we first need to decide on the most suitable materials, according to their composition and colour, and then sort them manually. Then they will all be mixed up, this mix will be put into the machine and the quality of the resulting sort will be examined. Then we will compare the two sorting methods: the difference between manual sorting and automatic sorting will allow us to measure performance of optical sorting. Whenever we have doubts as to the contents of the textile (as manual sorting and optical sorting do not



Thomas Fraineux

Development & Marketing
Manager



match up), the content will be checked by chemical means to determine the content with absolute certainty. We hope this will allow us to identify the obstacles to finalising our software design. We will then carry out some modifications as needed. In the meantime we are busy with other projects with the aim of finding commercial outlets for textiles obtained from sorting. For it is not just a question of creating a design for the sole needs of the four stakeholders in Synergies TLC but rather of allowing all the firms in the textile sorting business with a potential interest to take advantage of this. As we hope to use the machine in our businesses within 3 - 7 years' time at the most, these other firms will be able to discover the potential of FIBERSORT, which is marketed by Valvan.

CONTACT

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PROJECT AT A GLANCE

GOAL: Studying and refining of a new sorting method for the purpose selecting secondary materials not destined for second-hand clothes trade

DURATION: 9 months (until December 2016)

LEVEL OF SUBSIDIES FROM ECO TLC: €44,960

TYPE OF TLC COVERED: Cotton/polyester/acrylic/wool textiles

WHERE ARE THEY AT?

COLLECTIF PRÉMICES - BÉTON DE CHIFFON

A sound-absorbing material made of recycled textiles which will look good



Amandine Langlois

Designer

Prémices
architecture - design - graphisme



AMANDINE LANGLOIS

How far has your project got?

We've found partners we can work with for garnetting and needling and we are making progress with the composition of the raw material required. It is essential for our finished product of rag concrete since, as designers, we want to develop an insulating material that is attractive, the colours of which are always similar and which is composed only of used textiles. We also need to take the safety aspect into account, in particular fire safety standards, and to improve the product's thermal performance. We were hoping that the project would have been completed by now and that we would have a prototype to show all those who have indicated their interest in the product. However we have had to extend our research work in order to satisfy the requirements for our absorbent material.

What stages are planned next?

Our partner Innortex is continuing to work with us on rag concrete during the research and development stage. Between now and July 2016 we will together finalise three prototypes in different colours: concrete grey, slate blue and stone white. We first need to ensure a regular supply of raw material for every colour. Next, the acoustic properties of these prototypes will have to be improved in relation to the current properties. In the end we need to make sure that they satisfy the standards so they can be used in buildings open to the public. Simultaneously we are going to prepare for the product launch with brand identity, website, marketing campaign etc. In addition, we are looking for partners and investors for commercialisation of the project. Afterwards we will develop new colours but that will be in the course of the next project stage.



PROJECT AT A GLANCE

GOAL: Creating a decorative sound-absorbing material from recycled textiles

DURATION: 27 months (until July 2016)

LEVEL OF SUBSIDIES FROM ECO TLC: €49,290

TYPE OF TLC COVERED: Used textiles

CONTACT

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LE RELAIS - MÉTISSE

Recycling textiles by creating tiles for suspended acoustic ceilings



VIANNEY SARAZIN

How far has your project got?

We are in the development stage. Encouraged by our experience, we and our partner Wecosta knew that recycled textiles offered good potential for use in acoustic insulation. We therefore began a first phase of experiments in 2015 with the aim of establishing whether it was possible to develop a tile for suspended acoustic ceilings that offered good acoustic insulation in addition to its aesthetic properties. Various fibre compositions were selected, then subjected to thermal compression and moulded. However we failed to arrive at a satisfactory result in terms of rigidity of the finished product.

PROJECT AT A GLANCE

GOAL: Developing textile tiles for suspended acoustic ceilings

DURATION: 18 months (until October 2016)

LEVEL OF SUBSIDIES FROM ECO TLC: €169,740

TYPE OF TLC COVERED: Used textiles

How did you rectify this problem?

We started a second development phase and concluded that we needed to divide our product into three parts: one part in thermoformed polyester with a geometry affording rigidity, an acoustic felt, and a surface coating to finish the product as a whole.

What are the next stages in development?

We have completed a number of tests for dimensioning and have had some press tools made in order to determine the characteristics and select the geometry for the structural part. We are currently evaluating a tool that will allow us to mould the tile with the chosen geometry. As far as the acoustic felt is concerned, we are studying different compositions (polyester, acrylic, cotton etc.) in order to decide on the most cohesive mix so that we can best comply with the technical requirements in the specifications for the finished product. We are also making progress with our research into a technical surface coating. We hope to have the prototypes ready before summer and then conduct the economic and environmental studies, which will allow us to complete the project by the end of 2016.



Vianney Sarazin

Production Manager

LE RELAIS



Métisse® thermoacoustic insulation

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MINOT RECYCLAGE TEXTILE

Including more post-consumer clothing in garnetted stock



MARC GALMICHE

What progress have you made over the past year?

Our goal is to produce unravelled fibres containing as much post-consumer clothing as possible, but this clothing contains two features that need to be eliminated: dust and "hard spots". My predecessor Bertrand Cherpin first completed

a review of the available literature about known technologies for eliminating "hard spots" and dust. He then attempted to quantify their presence in post-consumer clothing.

What procedure did he follow?

Several tests were conducted in 2015, by varying the proportion of recycled clothes in our mix, and by examining the hard spots and dust that needed to be eliminated. Where hard spots are concerned,



Marc Galmiche

Industrialization Officer

WHERE ARE THEY AT?



🔍 Removal of the hard points (buttons, zippers, jeans rivets)

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the initial results from a batch of about 40 kg are inconsistent. Where dust is concerned, the protocols we tested with a laboratory in Belgium and another one in Lorraine, France, have also proven unsuccessful.

What will the next stages be?

We will resume testing on a sample of 500 kg for quantifying of hard spots, and with the Belgian laboratory on the basis of new protocols for dust. At the same time, we are making progress on solutions that enable us to remove these adverse factors: we are confident that we will soon find a procedure for removing dust, preferably by blowing the fibres. Where machines for removing the hard spots are concerned, we have completed trials at Laroche. We are also in contact with machinery manufacturers in Italy and Turkey. We hope to have obtained conclusive results between now and September!



🔍 Fibres after treatment (left) and collected dust (above)

PROJECT AT A GLANCE

GOAL: Optimising a process of end-of-life textiles to achieve an improvement in the percentage of "old" textiles unravelling in the process

DURATION: 12 months (until September 2016)

LEVEL OF SUBSIDIES FROM ECO TLC: €38,254

TYPE OF TLC COVERED: Used textiles



Marcia De Carvalho

Fashion Designer and founder of Chaussettes Orphelines

CHAUSSETTES ORPHELINES
Márcia de Carvalho
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Marcia De Carvalho

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CHAUSSETTES ORPHELINES - ANIMA

Making yarn and clothing from socks



MARCIA DE CARVALHO

What has your project accomplished so far?

We are in the product development stage. We have already succeeded in creating the yarn and in knitting socks, gloves, scarves, hats and clothing from old socks. Today we are aiming to produce a finer yarn, which we can then use to create summer clothes, from a batch of old socks composed of a variety of materials.

Which phases have been completed over the last year?

We first established that the fibres obtained from old socks were not adequate. We need to add cotton to the blend in order to create a summer yarn. We therefore experimented with several types of cotton in the laboratory. Following a series of tests and initial poor results due to abrasion, we found a satisfactory cotton. We have also been looking into the question of colour and dyeing. We tested one dye, which produced very fine rende-

ring but was extremely expensive, and another one, which had the advantage of being organic but which might bleed, which we do not want. So we are continuing our research into that aspect of things. Similarly we discovered that it was possible to make our yarn finer by adding PET (from recycled plastic bottles). We are also conducting tests on this. And with each test, we create the yarn and go as far as making some textile items corresponding to what we are hoping to achieve: socks of course but also gloves, hats and scarves, as well as trousers, dresses, cardigans etc.

PROJECT AT A GLANCE

GOAL: Recycling of damaged socks by creating a yarn for making new clothing

DURATION: 15 months (until May 2016)

LEVEL OF SUBSIDIES FROM ECO TLC: €25,000

TYPE OF TLC COVERED: Damaged socks





↳ Frayed woolen material sorted by colour

FILATURES DU PARC

Making yarn from post-consumer cotton/polyester clothing



FABRICE LODETTI

How did your project get off the ground?

We have made good progress since the first trials were launched in September 2015. Today we are in the sixth cycle of tests, which each time include tests for defibration of the intimate blend of the raw cotton-polyester material. If the fibre obtained is to our satisfaction, we start pilot testing on our mini spinning line and subsequently conduct full-scale trials on our industrial production line. Both these stages are necessary so that we can carry out modifications for the following tests. The modifications concern defibration and carding. There are a large number of them given the technical complexity of each stage.

What are the next stages in planning for the project?

We have a long way to go to improve the product. Our goal is to offer a yarn of sufficiently high quality so that it can be woven or knitted without

any difficulty at all. Once we have succeeded in obtaining this yarn, we will conduct tests of woven fabrics in addition to knitwear items. Afterwards these items will be sent to an independent specialist laboratory to carry out different tests, including abrasion resistance which is of the greatest importance for us. As far as possible, we would like use nothing but the intimate cotton-polyester blend as raw material. However, if necessary, we will not reject the option of incorporating other recycled fibres in the blend, like wool from old coats for example, following a process that we succeeded in developing during our first project under the programme. The ultimate goal is to provide a market for post-consumer clothing made of an intimate cotton-polyester blend and also to manufacture a yarn that can offer the same characteristics in terms of quality as a yarn made from virgin fibres.



Fabrice Lodetti

Manager of the family-owned company Les Filatures du Parc



CONTACT

Fabrice Lodetti

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↳ [Ecoplanet range brochure](#)

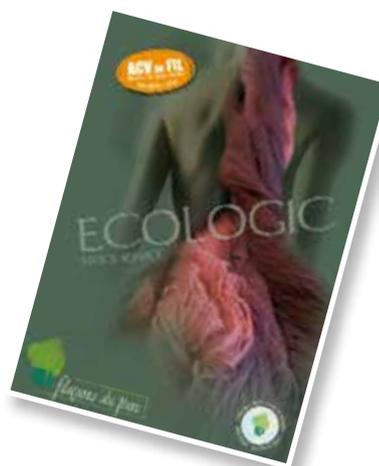
PROJECT AT A GLANCE

GOAL: Making use of old cotton/polyester clothes for spinning of recycled materials employing a method of defibration that is suitable for weaving or knitting new articles of textile clothing

DURATION: 30 months (until October 2017)

LEVEL OF SUBSIDIES FROM ECO TLC: €145,000

TYPE OF TLC COVERED: Cotton/polyester textiles



WHERE ARE THEY AT?



Benjamin Marias

Founder and manager of AIR - Innovation Agency



✓ *Coating stripper which enables to separate strips or layers which are more or less welded*

AIR - SOEX

Recycling the raw materials from leather/rubber shoes



BENJAMIN MARIAS

How did your project get off the ground?

It is a continuation of the initial project, which reached the conclusion that it was possible to separate the materials from leather/rubber shoes and to find outlets for recycled materials made from leather and rubber. We launched this new project in June 2015 with three objectives: to improve both our yield and the purity of the materials obtained and to consolidate outlets with our network of end users.

What phases have you already completed?

We have increased the size of our machines (shredder, coating stripper and vibrating separator), which has allowed us to increase our production capacity and thus to become more profitable. Our coating stripper has also undergone improvements, with a dual gyroscopic motion that enables finer separation of materials. There are also two vibrating separators now. And finally, we will soon be acquiring a granulator that will allow even greater precision. These developments have put us in a position where we can plan on finding new outlets. There are two options open to us at present for material recycled from rubber: incorporation into

outer soles for shoes, with the Insoft company, and manufacture of rubber insulation mats. Two further options are available for materials made from leather: midsoles for shoes and sound insulation boards. We hope to find other outlets and soon be able to process 100 kg of shoes a day; our long-term goal being to process a ton a day.



PROJECT AT A GLANCE

GOAL: Improving the purity of the resulting materials (leather/rubber) and output from the recycling line

DURATION: 24 months (until June 2017)

LEVEL OF SUBSIDIES FROM ECO TLC: €188,475

TYPE OF TLC COVERED: Leather/rubber shoes

CONTACT

Benjamin Marias

✉ b.marias@air-agence.com

☎ +33 (0)9 83 38 91 02

FINISHED PROJECTS IN 2016

PÔLE DES ÉCO-INDUSTRIES - MULTITEX

Outlets for recycling mixed used textiles



DAMIEN DELETRAZ

Was your project completed as planned?

Yes, all went as we had hoped. Our patented method for chemical recycling is now in operation on a large scale and the economic interest of the procedure has been validated on a pilot scale. Today we are continuing our search for industrial and financial partners to develop the procedure.

What does your method involve?

Starting with batches of various mixed textiles, we create individual chemical reactions depending on the classes of materials. This procedure allows us to isolate the elements in succession and to generate molecules with high added value: protein, glucose and plastic. This means we can process all the mixed materials selectively and ensure a market for used textiles, for which there is currently no means of recycling.

Which stages have you reached this year?

In 2014, we strengthened the procurement phase for textile materials without a market with Valoris Textiles. We completed several substantial batches of mixed textiles, for which Valagro has improved all the various phases and the entire procedure in the laboratory. In 2015, in conjunction with

Éco-éthanol, we successfully implemented the procedure on a pilot scale with three different 100 kg batches of mixed textile materials. Industrial scale-up is now feasible, especially as we have also completed an economic analysis according to different scenarios, the results of which are very encouraging for the development of a large-scale project. A stage of negotiating with interested manufactures should now aim to get interested manufacturers on board so they can take advantage of this innovative procedure, which provides a solution for a real problem in this sector.



Damien Deletraz
Eco-design Officer

PROJECT AT A GLANCE

GOAL: Developing a process for selective chemical recycling of used mixed textiles

DURATION: 20 months
(until end of April 2016)

LEVEL OF SUBSIDIES FROM ECO TLC: €112,917

TYPE DE PRODUIT TLC COUVERT : Textiles composed of blends of synthetic/natural fibres

CONTACT

Damien Deletraz

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Crushed textiles

Hydrolysis tank



Project partners



Organisation for developing projects in the circular economy



Laboratory and research centre for green chemicals



croix-rouge insertion
FONDÉ PAR LA CROIX-ROUGE FRANÇAISE

VALORIS TEXTILE
An employment reintegration facility for collection and processing of old textiles



Green chemicals test platform for process development

FINISHED PROJECTS

FINISHED IN 2016



Mehdi Zerroug

President



FRAMIMEX

Insulation made from concrete and used textiles



MEHDI ZERROUG

What has your project accomplished so far?

We are still in the product development stage, contrary to what we were hoping. Unfortunately it was not possible to complete our Viacover project in April 2015 as planned because our research has been very time-consuming. The results obtained to date have not been totally satisfactory; we are experimenting with new compositions.



Estelle Villegas-Court

Development Officer



MAPEA

Using recycled textiles as reinforcement in plastic materials



ESTELLE VILLEGAS-COURT

What is the outcome of your project?

Very positive! It was completed as planned in December 2015. Mapea has succeeded in incorporating cotton/polyester fibres in polypropylene or polyamide-based plastic materials. Textile fibres improve both the thermomechanical properties of compounds and the environmental footprint of the finished product, as the recycled textiles replace fibreglass or minerals previously used as reinforcement. The formulations are thus perfectly capable of competing with the existing solutions for reinforcing plastics. Éco-charges has enabled us to learn about, compare and select the technologies for preparing textiles for the purpose of compounding, and to tackle the crucial question of the textile supply chain. Today we have reached the industrial development stage with our partners Armor Lux, which supplies the raw material to be compounded by Mapea, and Plastigray, which converts the plastic material.

2010 PROJECTS

BIC / Mr Kekayas

m.kekayas@cobic.fr

TLC COVERED: Used clothing

GOAL: Developing an innovative textile insulation

5 months / Ended January 2011

€34,000

NOVAFLOOR / Mr Forget

vf@ecolomy.com

TLC COVERED: Textile sorting mixed rejects

GOAL: Incorporating end of life textiles as inert fillers in decorative plates

16 months / Ended May 2014

€32,252

DECATHLON / Mr Ventenat

vincent.ventenat@decathlon.com

+33 (0)6 24 32 04 10 / +33 (0)3 20 33 73 43

TLC COVERED: Polyester fabrics

GOAL: Manufacturing polyester yarn from post-consumer polyester clothing, shoes and household textiles

36 months / Ended June 2014

€286,000

2011 PROJECTS

ECO-INDUSTRIES DU POITOU CHARENTES

Mr Bataille / fbataille@valagro-rd.com

+33 (0)5 49 45 40 28

TLC COVERED: Mixed fabrics

GOAL: Developing a chemical process to separate synthetic and natural fibers

15 months / Ended; project extended for validation at pilote scale

€32,952

FILATURES DU PARC / Mr Lodetti

filatures.parc@wanadoo.fr

+33 (0)5 63 74 01 64

TLC COVERED: Wool textiles

GOAL: Transforming used woven material made out of wooly fibers into new yarns of the same quality

18 months / Ended April 2014

€100,000

🏠 TRUCS-TROUVAILLES / 👤 Mrs Dameron

✉ sylvie.dameron@gmail.com

📞 +33 (0)1 47 00 66 10

TLC COVERED: Rubber soles

GOAL: Recycling rubber soles into a new product

🕒 13 months / 📍 Ended June 2014

€ €34,980

2012 PROJECTS

🏠 A.I.R. / 👤 Mr Marias

✉ b.marias@air-agence.com

📞 +33 (0)9 83 38 91 02

TLC COVERED: Leather shoes, rubber or leather soles

GOAL: Developing an industrial grinding and separation process to find added value recycling outlet

🕒 14 months / 📍 Ended November 2014

€ €86,000

🏠 FRAMIMEX / 👤 Mr Zerroug

✉ mehdi.zerroug@ecotextile.fr

📞 +33 (0)3 44 43 81 00

TLC COVERED: Residue from mixed textile sorting

GOAL: Developing an exterior sound insulation shield in lightweight concrete

🕒 48 months / 📍 Ended April 2015

€ €53,500

🏠 FEYECON / 👤 Mrs Ngomsik-Fanselow

✉ audrey.ngomsik@feyecon.com

📞 +33 (0)3 83 31 24 24

TLC COVERED: Polyester textiles

GOAL: Developing a un-dye process for polyester fabric based to enable its recycling

🕒 25 months / 📍 Ended June 2015

€ €188,600

🏠 CC DU PAYS DE COLOMBEY ET DU SUD TOULOUS

👤 Mr Petitdémange

✉ e-petitdémange@pays-colombey-sudtoulous.fr

📞 +33 (0)3 83 52 08 16

TLC COVERED: All textile end waste

GOAL: Creating a new plastic using textile as a inert fill

🕒 14 months / 📍 Ended June 2014

€ €43,550

2013 PROJECTS

🏠 MAPEA / 👤 Mrs Villegas

✉ e.villegas@mapea.com

📞 +33 (0)4 77 40 18 38

TLC COVERED: Cotton and polyester textiles

GOAL: Recycling of cotton and polyester fibres for use as reinforcement in the plastics industry

🕒 21 months / 📍 Ended December 2015

€ €116,000

2014 PROJECTS

🏠 ECO-INDUSTRIES DU POITOU CHARENTES

👤 Mr Deletraz

✉ d.deletraz@eco-industries.poitou-charentes.fr

📞 +33 (0)5 49 44 76 69

TLC COVERED: Textiles composed of blends of synthetic/natural fibres

GOAL: Developing a process for selective chemical recycling of used mixed textiles

🕒 20 months / 📍 Ended April 2016

€ €112,917

🏠 COMPANY

👤 PROJECT MANAGER

✉ EMAIL

📞 TELEPHONE

🕒 DURATION OF PROJECT

📍 END OF THE PROJECT

€ TOTAL FUNDING FROM ECO TLC

Good to know

THE PROJECT HOLDERS TOOLKIT

Do you want to submit an R&D project in September?

TO SUPPORT YOU WITHIN THE PROCESS, ECO TLC PROVIDES A TOOLKIT FOR PROJECT HOLDERS.



You will find practical information there (not exhaustive) to help you find various organisations that may provide support or back your project.

AVAILABLE ON WWW.ECOTLC.FR
under Innovation > La boîte à outils

GO FOR ECO-DESIGN!

THE CENTRE FOR ECO-DESIGN AND LIFE CYCLE MANAGEMENT

is the national resource center for best practices in the development of products integrating environment, corporate responsibility and circular economy considerations.



Samuel Mayer

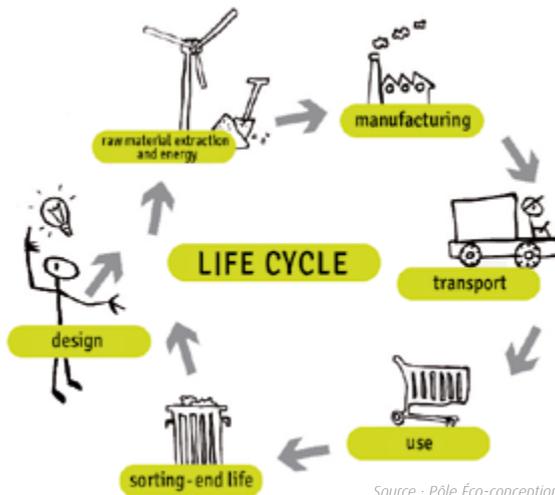
Director of Centre for eco-design and life cycle management



1) Find this study: <http://www.eco-conception.fr/ressources/fonds-documentaire/etudes-et-recherche/4-recherche/resume-etude-la-profitabilite-de-leco-conception-une-analyse-economique.html>

IS THERE A DEFINITION OF ECO-DESIGN?

There are many ways of defining it, but they all include these three aspects: a focus on the design of the product or service, reducing the environmental footprint and the notion of life cycle. This is the definition we use: eco-design means taking the environment into consideration throughout the product development process with a concept for the life cycle, in its various phases, and considering the environmental aspects as a whole (multi-criteria).



Source : Pôle Éco-conception

HOW DO YOU APPLY ECO-DESIGN TO TEXTILES, HOUSEHOLD LINEN AND SHOES?

Naturally. The first steps involve procuring the raw material, either organic or recycled for example, eco-efficient finishing and the least polluting method of transport. Then come the use and care of clothing, and finally their recycling. People frequently do not realise that the main environmental footprint from textiles occurs when they are cleaned: washing machines and laundry agents cause most pollution during the life cycle of a garment.

WHAT ADVICE WOULD YOU GIVE ANYONE WANTING TO DEVELOP ECO-DESIGN?

You need to be bold, accept these constraints and take risks. We have conducted a study¹ that demonstrates that 95% of eco-designed products are more efficient than rival products based on conventional design, and in 45% of cases the eco-design approach increases the gross margin for the product! Of course, eco-design is difficult as the materials used to make textiles and shoes are increasingly blended, fashion entails a time frame that makes polluting transport necessary, etc. However there is a solution for every problem and we are there to advise companies, without cost, and help them eliminate the obstacles to eco-design. They shouldn't hesitate to call on our services!

Visit www.eco-conception.fr



OKAÏDI

Respecting our planet

Isabelle Anton, Collection & Purchasing Director

okaidi

Visit www.okaidi.fr

What does eco-design mean to you in practice?

At Okaidi, eco-design starts with the fibres: we are working on sourcing cotton responsibly. We have just joined the Better Cotton Initiative, which aims to promote cotton that is produced under fair conditions: for those who grow it, for the environment and for the future of the sector. Eco-design is central to our efforts, respect for our planet being one of the values upheld by Okaidi.

Are other aspects of eco-design observed at Okaidi?

Of course! We have been collecting used textiles in our shops since January 2008. And we have launched a programme in partnership with the Lille school of textiles (ENSAIT): a student is working for us and is now focused on two topics. The first is to set up standardised training for Okaidi's teams to observe the principles of eco-design. The second is more technical in nature and

involves improving our products' recyclability. The hard spots are indeed a problem when used textiles arrive at garnetting firms. We are looking into solutions that will make garnetting of our products far simpler. In future, we also hope to develop our procurement of post-consumer fibre, but with our assembly factories in Asia, we are finding it difficult to obtain post-consumer fibre there. We are conducting research in this area so that we maintain our progress in eco-design.

PICTURE ORGANIC CLOTHING

Eco-design or nothing!

 **Florian Palluel**, Manager for web marketing/
POS promotions/sustainable development

What led you to start working with eco-design?

We are something of a special company since eco-design is at the very heart of our brand, it is our vocation. If we are unable to create the product as we want to – in an ethical and environmentally friendly way – then we will not launch it. We make clothing and accessories for surfing, snowboarding and skating and we want to leave the oceans, mountains and cities cleaner than we found them for our children.

*From left to right:
Jérémy Rochette,
Vincent André and
Julien Durant,
the 3 founders*

What does eco-design mean to you in practice?

We work with raw materials that have been sourced ecologically: certified organic cotton and certified recycled polyester. We aim to make products that are composed of a single material as far as possible. In order to reduce our carbon footprint each year, we calculate it at each stage of the manufacturing chain: raw material, factory, transport, delivery and use. We have also run a recycling programme for three years with collectors of all brands of old clothes

at our points of sale. We donate them to local non-profit organisations, we recycle the single-material textiles and we set up a system for manufacturing simple articles using the remaining textiles.

Ultimately we want to make a greater commitment in the community sector, in partnership with the WWF, and to set up a crowd-funding site in the area of the environment and education. We find no lack of projects - always relating to eco-design!

Visit www.picture-organic-clothing.com



LA GENTLE FACTORY

Environmental responsibility across the board

 **Christèle Merter**, Managing director

What led you to start working with eco-design?

In 2009, the Happy Chic group, which includes the three brands Jules, Brice and Bizbee, expressed a wish to halve its carbon footprint by the year 2020. A life cycle analysis and an assessment of the carbon footprint were conducted and we established that a large share of the carbon footprint for our clothes stemmed from their use, when they are worn, washed and discarded. We therefore wanted to recover the old clothes and make new products with them. This is how the "Gentle Factory" came into being: it designs, distributes and markets fashion clothing for the active urban man.

What does eco-design mean for you in actual practice?

We manufacture our clothing locally, in France for the most part, using organic (not treated with pesticides) and recycled fibres (offcuts from production and old clothes). We



work with collectors of clothing, shoes and household textiles (CHLS) but we have also set up our own system for an annual collection of old clothes in the shops. Our partners - garnetting firms and spinning mills - allow us to incorporate these materials back in our production. Gentle Factory also offers a very environmentally innovative service on its website called "Gentle Dressing". You can sell or buy second-hand, swap or hire your clothes. We hope to create a community with different consumer habits: our products are contemporary but not labelled as fast fashion, they are long-lasting and can therefore have a second, third or fourth life!

Visit www.lagentlefactory.com/le-gentle-dressing



MATERIALS SORTING COMMITTEE

Producing more secondary material from recycled textiles



The Materials Sorting Committee brings together all the stakeholders in the sector in a participatory approach with the aim of developing sorting to produce more raw material from used textiles.

WHAT IS MATERIALS SORTING?

Materials sorting means the finer sorting of specific categories of used clothing, shoes and household textiles by segregating them or separating them into their components (according to material and/or colour) in order to upcycle them into new products or new materials. It is an additional stage in sorting of used clothing, shoes and household linen in order to make them suitable for recycling.

WHAT PROGRESS HAS THE COMMITTEE MADE OVER THE PAST YEAR?

After a meeting in 2015, an agreement was reached to launch a call for project proposals for experiments. The objective was to run full-scale projects that allow testing of the technical and economic viability of materials sort operations in addition to standard sorting. They are for a specific timeframe and with the aim of performing measurements at different stages of the process (from sorting right through to the applications that make use of the recycled material). Reporting is expected from project initiators before, as needed, any plan for implementation. This call for project proposals aims to provide data enabling to draw conclusions about the interest in implementing materials sorting and that make it possible to assess the costs, in order to offer adequate support.

Developing outlets for recycling used textiles is the stated goal of the “Materials Sorting Committee”, which was established in 2014.

WHICH PROJECTS HAVE RESULTED FROM THIS CALL FOR PROJECTS?

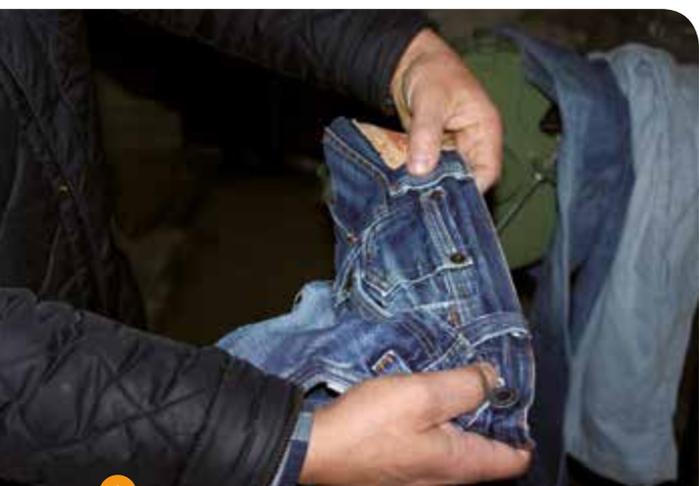
When the Materials Sort Committee met on 12 April 2016, three projects were proposed:

- The project initiated by Synergie TLC aims to sort knitwear by knit, colour and material in order to produce recycled wool or acrylic yarn to make hats and scarves.
- The project initiated by FEDEREC aims to sort the knitwear by material (wool/synthetic/cotton) in order to produce garnetted fibres for different markets (non-woven, automotive etc.).
- The project initiated by Happy Chic whose goal is to sort jeans and T-shirts by colour in order to produce recycled cotton yarn.

The Materials Sort Committee is in favour of these projects. There are some points that need elaborating and these are the subject of consultations at the Scientific Committee. The level of funding from Eco TLC will be decided shortly.



Isabelle DESCOS,
Service
Development
Manager
and Project
Engineer



Cutting of jeans, removal of hard items to prepare the fraying of material.



It exists, in the field of textile, footwear and household linen, a large number of practices and benchmarks. Meetings within the Materials Sorting Committee are the opportunity to link actors of the industry with one another, enabling thus to ease partnerships, and also to identify interesting and innovative solutions, to develop a common vision of customers' expectation, etc.

ALL THE EDITIONS OF “ROADS TO INNOVATION” ARE AVAILABLE ON www.ecotlc.fr IN THE SECTION: L'INNOVATION > LES PROJETS SOUTENUS

