

Roads to INNOVATION

2018 EDITION

#7

Editorial

SUCCESS STORIES

THEY HAVE BEEN PUT ON THE MARKET!

PAGES 6 & 7

NEW

LEARN ABOUT TWO RESEARCH STUDIES

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Better production, better consumption and better conversion of post-consumer Clothing, Linen and Footwear (CLF): this concerns each and every one of us

Maud Hardy,

Circular Economy Manager at Eco TLC



“I joined Eco TLC in September 2017 to put my experience to use in projects for the producer responsibility organisation. From October 2017 to January 2018, Eco TLC took part in developing the Road Map for the Circular Economy (RMCE) as part of the sustainable consumption/production work group.

Last April the government published the RMCE, which focuses on 50 key measures to help the country succeed in the transition to a 100% circular economy. The goal is to get all the stakeholders on board and to take action on the seven key elements of the circular economy as defined by ADEME: reducing and optimising our consumption of resources; eco-designing products and services in order to keep their environmental footprint to a minimum; making use of industrial and land ecology to find common ground for stakeholders' needs; developing a 'functional service' or performance economy that favours use over ownership; promoting responsible consumption; prolonging the useful life of products by having them repaired, reused and recovered; and lastly, developing recycling of waste on a massive scale in order to convert it into new raw materials.

Eco-design of products in general, and in the CLF sector in particular, thus constitutes a fundamental feature. The goal is to increasingly adopt and implement this approach, resulting in practice in better capacity to:

- reduce all forms of waste of unused products and materials, →

As part of its mandate, as described in its terms of reference, Eco TLC is committed to promoting the circular economy and implements.

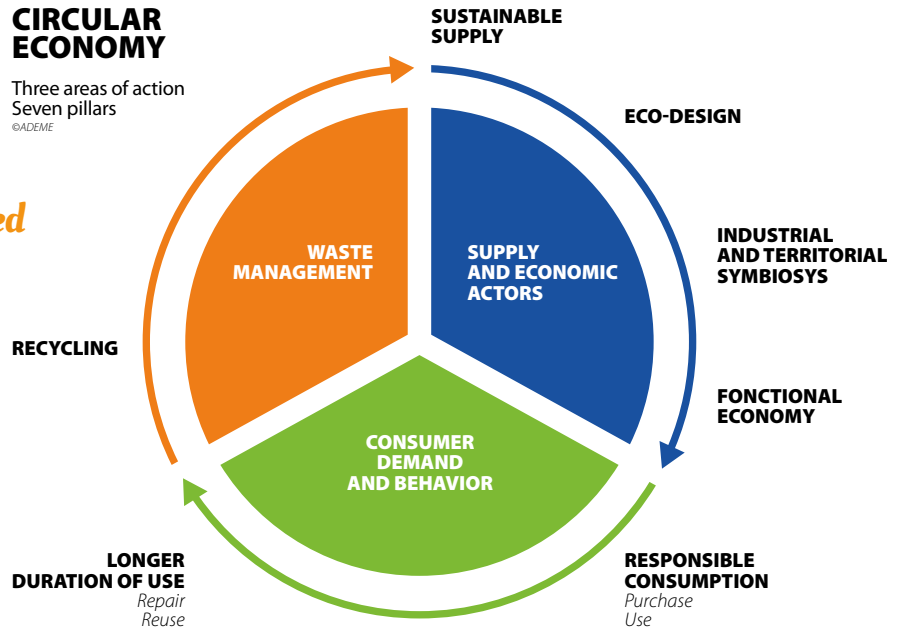
- incorporating raw materials obtained from recycling into new products,
- promoting sustainability of products, reuse and repairing,
- provide other ways to access use, such as renting,
- eliminate pollution, in particular marine pollution, linked to the use of polyester that fragments,
- use eco-labelling for products and services aimed at consumers.

As part of its mandate, as described in its terms of reference, Eco TLC is committed to promoting the circular economy and implements: actions to assist businesses in the CLF sector and measures to help them adapt their strategies to follow this new business model, such as:

- providing and promoting initiatives to marketers;
- a call to action, thanks to variations in the scale of “eco-contributions” according to criteria of sustainability and inclusion of recycled materials. And soon to come, according to new criteria for reparability or recyclability;
- funding for four experiments approved by the Materials Sorting Committee;
- selection by the Scientific Committee of 8 new R&D projects in 2017, in addition to the 28 projects supported since 2010;
- training sessions organised for students in schools of fashion and design;
- Presentations at numerous meetings and conferences for professionals in the textiles industry;

CIRCULAR ECONOMY

Three areas of action
Seven pillars
©ADEME



- participating in plans for the avoidance and reduction of waste in the various regions of France.

Furthermore, two projects with high priority have been set up, in line with the targets in the RMCE:

1. CREATION AND PROVISION OF A PLATFORM WITH TOOLS for eco-design and sustainable procurement, aimed at marketers.

2. MAPPING OF SOLUTIONS FOR THE RECOVERY of post-consumer CLF in order to identify and provide incentives for businesses from related sectors likely to replace virgin materials with recycled material made from post-consumer CLF.

Work has started and a progress report will be provided regularly. We hope you enjoy reading this new edition!

Website for the French version of the RMCE:
<https://www.ecologique-solidaire.gouv.fr/feuille-route-economie-circulaire-frec>

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The Scientific Committee, a catalyst for the sector

The Scientific Committee is made up of 14 members who represent the industry's direct and indirect stakeholders: ADEME*, associations and experts (specialist advisors, researchers), representatives from collectors, sorters and recyclers, suppliers, technology centres for textiles and leather.



© ADEME

Interview with Erwan AUTRET

ADEME - Coordination of the Design Hub
Research, development and innovation
Extended producer responsibility sector,
Clothing, Linen & Footwear

HOW DOES ADEME VIEW ECO TLC'S SCIENTIFIC COMMITTEE?

“ It is a very robust and well-structured body, with regular calls for relevant project applications, a real guarantee of quality for project owners. The scientific

committee's influence extends beyond the producer responsibility organisation: when a project developer consults ADEME, if their topic involves textiles, I try to find out if it has been approved by Eco TLC. If

this isn't the case, I automatically send them to the Scientific Committee at the producer responsibility organisation. Today it is the benchmark organisation representing the sector and a prerequisite for R&D projects in the textile industry. At present, the sector is relatively linear – you buy, you buy something new to replace it and you discard it – there is not a natural tendency towards the circular economy. Eco TLC's work therefore goes against this line of thinking by promoting eco-design approaches and in encouraging the extension of the product life cycle.

Today Eco TLC's Scientific Committee is the benchmark organisation representing the sector and a prerequisite for R&D projects in the textile industry.

REMINDER ABOUT THE PROJECT SELECTION PROCESS

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:

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, linen and footwear 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).

WHAT HAVE YOU PERSONALLY LEARNED THIS LAST YEAR?

2017 was my first year as a member of the Scientific Committee and I found it to be a real technical forum with in-depth discussions. It's inspiring to discuss what will be placed on tomorrow's market with a qualified group that represents the sector as a whole: buyers of raw materials, marketers, academics, competitiveness clusters, technical hubs and centres of excellence, consultancies, operators for collecting, sorting and recycling, etc. My wish today is that Eco TLC goes even further, by using its project portfolio to exert its influence on the policies adopted by other backers such as ADEME, the state, BPI France, the regions or European funding. ”

*ADEME: Agency for the Environment and Energy Management



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Jean-Luc BARTHARÈS,
Director of Members
Relations and R&D at Eco TLC
© Raphaël de Bengy

8 YEARS OF RESEARCH AND DEVELOPMENT

Report on key success factors and subjects for further investigation

Since the initial call for project proposals was launched in 2010, Eco TLC has provided financial backing for 36 projects, amounting to a total commitment of €3.2M. A breakdown of the projects according to their state of progress indicates that 17 projects have been completed, 10 are ongoing and 9 are in the process of starting up.

FEEDBACK has allowed us to classify the projects according to outcomes and/or their potential. Eco TLC has broken down the projects into the following categories:

- 9 projects in the start-up phase,
- 10 ongoing projects, where it is too early to assess the market opportunities and outcomes,
- 5 completed projects where results are not conclusive and/or with no follow-up likely,
- 4 projects completed but which require (or have required) validation to take things to a further stage (industrial-scale pilot),
- 6 projects that can be realised on an industrial scale and that face significant hurdles & projects at the production stage with limited opportunities,
- 2 projects implemented on an industrial scale.

THE PICTURE is therefore mixed since, if the final or intermediate results for the great majority of projects attest to the relevance of the goals and technical feasibility, just two projects to date have resulted in industrial scale application allowing quantities of materials made from post-consumer CLF to be absorbed.



👉 *Pierre Plume® by Prémices and co. A range of acoustic products with visual appeal, made entirely from recycled textiles.*

On the other hand, we should emphasise **THE SUCCESS OF SOME PROJECTS** that resulted in the marketing of products using recycled yarn or material or in eco-designed products and which have met with real commercial success, even if these products remain niche products for the present.

There are also projects with very promising potential but which have been put on ice for an indefinite time and for various reasons: substantial investments needed, price competition for virgin raw materials puts secondary raw materials at a disadvantage, lack of manufacturing partners for the project, failing projects.

On the other hand, these hurdles highlight **THE KEY SUCCESS FACTORS TO BE CONSIDERED** by project owners:

- The need to forge partnerships with manufacturers who are liable to pursue the project beyond the pilot phase is an indispensable prerequisite for success. Project owners themselves should ideally be users of the secondary raw material obtained.
- The second point that project owners should also consider is found in the analysis of projects' profitability and viability in the medium and long term, which is often neglected or treated superficially or with exaggerated optimism.

The need to forge partnerships with manufacturers who are liable to pursue the project beyond the pilot phase is an indispensable prerequisite for success.

As to **THE 2018 CALL FOR PROJECT PROPOSALS**, which will be launched in early September, Eco TLC intends to keep accepting projects that fall under the four main categories:

- 👉 **ECO-DESIGN PROJECTS**
- 👉 **CLOSED-LOOP PROJECTS**
- 👉 **OPEN-LOOP PROJECTS**
- 👉 **PROJECTS INVOLVING THE SEPARATION OF COMPONENTS AND/OR PREPARATION FOR RECYCLING**

However it draws applicants' attention to the very patchy potential in the various areas: it seems evident that so-called open-loop solutions for recycling offer a distinctly better outlook.

There remains substantial progress to accomplish concerning recycling of shoes, something which is still a black spot: it is important to bear in mind that the part of "traditional" component materials of shoes (leather, natural rubber) are in decline compared with new materials (thermoplastics in particular). It is also evident that some product groups like stockings/tights, which essentially have a single component, or brassieres, on account, conversely, of the diversity of their components and structure, could be an useful subject for R&D projects in order to improve their recycling.



👉 *Tiles for suspended acoustic ceilings from recycled textiles. Métisse®*



👉 *The Eram group is developing a new design and manufacturing procedure that will permit easy disassembly of all components in post-consumer shoes.*

© Studio Graphique Groupe Eram

... The so-called open-loop solutions for recycling offer a distinctly better outlook.

INNOVATIONS ALREADY



Success for the first eco-designed bat

ARMOR-LUX / CORNILLEAU / MAPEA / PLASTIGRAY

INTERVIEW OF Grégoire GUYON
Head of communication at Armor-Lux

Where did the idea for your project come from?

Cotton and polyester textiles account for two thirds of the production of textile materials on the global level but they are only recycled or recovered to a very small extent. At the same time, the requirements for recycling and recovery/re-use of end-of-life clothing are increasing substantially and are making brand names and businesses face up to their responsibilities. So back in 2014, Armor-Lux wanted to play an active role in an open-loop R&D project, backed by Eco TLC, called "Eco Charges". Its goal was to recover these cotton & polyester textiles by adding to their value as components in the formulation of innovative plastic materials. Through Mapéa as an intermediary, which was responsible for managing the project for two years, we met Plastigray, a company specialising in manufacturing injection-moulded parts. After 18 months, the latter confirmed that it was technically feasible to use cotton & polyester textiles



© Armor-Lux

in the manufacturing process of a plastic object and indicated that one of their clients was interested in this: Cornilleau, the specialist in the design and manufacture of table tennis tables and bats.

How did things go from there?

In 2016, we investigated the feasibility of the project on an industrial scale. Once the green light was given, the first outdoor table tennis bats produced from recycled textiles were launched on the market by Cornilleau in September 2017. Under the name of "Softbat", they are offered at a price under ten euros, with special packaging that explains the ecological approach. Around 100,000 bats have already been sold through specialist sports distribution channels, which represents around 15 tons of recycled textile fibres. The textile raw material supplied by Armor Lux as part of this project comes from two sources: our production arisings on the one hand and end-of-life clothes from our old collections on the other. In addition to these encouraging figures, there is the prospect of development which is interesting. We also have other projects on the go that are based on the manufacturing industry used for this bat.



© Cornilleau

What makes this project so exemplary?

First of all, because this bat made it possible to get several French manufacturers together and to pool their respective skills and expertise: Armor-Lux, Plastigray, Cornilleau, and not forgetting Mapéa. Then, because this bat was designed to be used in all weathers and by all players. It is resistant, ergonomic, robust and recyclable. Finally, because this bat proves that there are outlets for recycled textiles in an unexpected branch like plastics processing, which increases the realm of possibilities for our sector.



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LAUNCHED ON THE MARKET

A stylish, eco-designed acoustic insulation panel

MINOT/LE RELAIS/WECOSTA

INTERVIEW OF Jean-Christophe MINOT
CEO of Lille Airport

Where did the idea for your project come from?

Lille airport has a lot of glass walls, as do many airports. All this glass causes problems as regards insulation, in particular soundproofing. For example, our restaurant and our mezzanine are glazed and echo. So we were looking for a practical and attractive solution for soundproofing and, as we are very committed to taking an ecological approach, we concentrated on eco-design.

How did things progress?

We conducted numerous technical and acoustic trials and tests for appearance, and after a year working with our partners, we have just completed the design for a stylish, insulating acoustic panel that is self-supporting and detachable and which is in line with the principles of the circular economy. It is in the form of double-sided panels, whose three-dimensional surface affords ideal acoustic insulation. It is extremely stylish, is available in several colours and can be moved around on wheels. In open spaces such as our restaurant, where it will be installed from now on, it makes it possible to divide rooms and create spaces. It is already greatly

appreciated by our guests and the acoustic gain is substantial, since noise level has been reduced fourfold!

Who was involved in the project?

The firm of Minot Recyclage Textile, which is now one of Le Relais' partners, supplied the garnetted stock needed for making the panels. This garnetted stock was thermoformed by our partner Wecosta.

Where Le Relais was concerned, it supplied the eco-designed Métisse insulating felt, which was sandwiched between two panels of thermoformed garnetted stock. The entire structure was covered with a fine, non-woven web that gives the panel its colour. This project is in keeping with the spirit of the REV3 programme led by the Chamber of Commerce and the Regional Authority for the Hauts de France. Let's not forget that in addition to the ecological approach, there is the community involvement: all those involved in creating these panels are located in the Hauts de France region, so the local economy can benefit.

When will these panels be put on the market?

They are ready to be launched on the market by Wecosta. All that remains is to establish a marketing strategy and an industrial manufacturing process, but the product has been completed and satisfies all the requirements, particularly in terms of price. It is no more expensive than rival products, which are often made of polyurethane foam, whereas our panels are mainly made of natural materials derived from recycled materials, and which, it goes without saying, are recyclable! The fact that this project is supported by an organisation with public access like Lille airport provides it with incomparable exposure. The managers of a French high-volume retail chain, who saw our panels, have already expressed their interest, although the panels were only put up in our restaurant two weeks ago!



© DR



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NEW PROJECTS

Refurbishing repairable textiles and preparing others for recycling

Project : REVIVE/RECYCLE



INTERVIEW

Benjamin MARIAS

Founder and Co-director

© AIR



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What is the aim of your project?

It is based on a threefold observation: firstly, the huge significance of the rate of returns in the textile industry, especially in e-commerce –25-30% on average– and up to 50% around Christmas. Purchased products are returned to sellers, either slightly damaged or with a minor flaw. These products cannot be sold as is. Despite being new, they are not put on the market because of marks, missing buttons etc. The lost revenue is considerable. Secondly, and this is a related issue, there is the lack of services for refurbishing and straightforward repairs on an industrial scale. Lastly, a third observation: textile products sold in France are frequently difficult to recycle due their complexity, such as jeans where the hard points can be removed but not in an automated process. These observations were our starting point. The goal of our project is to return repairable products to the market in order to avoid landfill or incineration and to increase recyclability. This way we hope to offer a new business model that combines reparability and preparing for recycling. It involves two complementary projects that go to make up one main project: on the one hand, refurbishing of clothes to return them to the market and, on the other hand, developing the technology for recycling. We are partners with Recuprenda, a Spanish firm, located near Valence, that collects and sorts waste, and with Dr Mike Lee, who is based in England, for the purpose of developing the technologies for cutting and separation.



© Kris Atomic

What will the different stages in the project involve?

We have planned for three stages. First, we will be working on refurbishing and repairing. We are going to choose machinery and train footwear designers, which will enable us to test our theories regarding feasibility and returns. At the same time together with Dr Mike Lee, we will be developing a method for preparing articles for recycling with a prototype for a machine that identifies the metallic and non-metallic parts, thanks to visual recognition and infrared detection. We will then commence the second stage, when we will install the repairs line under real-life conditions on the one hand, and on the other hand, we will move on to the pilot aspect for the prototype of the detection machine. The third stage will consist of conducting economic modelling and a study of the environmental footprint. We will also produce, as we did in the case of the shoes, a guide that provides advice for marketers on designing textiles with the aim of improving their reparability and recyclability.

Do you hope to realise this project in partnership with a marketer?

Today, committed firms such as Patagonia already offer an after-sales service for repairs to their products, which, for the French market, is done near Annecy. However, it is not certain that firms that produce less expensive textiles will adopt a similar philosophy. This remains to be seen. In the United States, there is already a service for refurbishing clothes that we find extremely encouraging: The Renewal Workshop. Ultimately, we are of course interested in a partnership with one or more firms in order to roll out this pilot scheme.

PROJECT AT A GLANCE

GOAL: Setting up a pilot project for repairing clothes and preparing them for recycling

YEAR OF PROJECT SELECTION: 2017

DURATION: 18 months

LEVEL OF SUBSIDIES FROM ECO TLC: €97,450

TYPE OF CLF COVERED: All textiles from clothing



Making plastic with our old clothes

Project : PLAS'TILE

What is the aim of your project?

We are an association for integrated employment and our work concentrates on collection and sorting of post-consumer textiles. We have a lot of leftover goods in our centres, clothes that have failed checks for re-use and re-sale in second-hand clothes shops. These unsaleable goods are destined for export and we have long wanted to find another more local use for these arisings of material. This is now the case, we have found a solution: re-processing the textiles in order to produce a new raw material as an alternative to plastic.

How did it get started?

We were really able to get things off the ground when the CCI in Vienne put us in contact with a local partner, which we had been seeking for a long time: a compounding firm. Futuramat specialises in compounding biomaterials and is located less



Plas'Tile Team. ©Charlotte Wallet

than fifteen kilometres from our firm. We are also working with two other partners: a plastics processor, CDA, which is also local, and the Pôle Eco-Industries, which helps us with administrative monitoring of the project as well as with the environmental review of the products we develop.

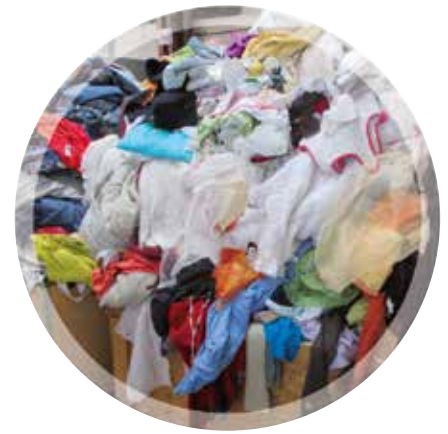
What will it involve?

We've already made progress on several points: after investigating various projects funded by ADEME and Eco TLC, we concluded that an interest in compounding existed. It requires manual removal of hard points but that is one of our operations as

a social integration enterprise. Once the partners came together, in the first half of 2017, we prepared the dossiers for the funding and launched the initial tests. Today our preparatory work on the textiles has been completed. We're going to work on three types of arisings: cotton, a blend and a qualified blend. At present shredding has been outsourced but as we are looking to develop our sphere of activity, we are eventually going to do this ourselves. Now it is time for the most difficult step: the grading of the textiles. With the machinery available at Futuramat, compounding has to be limited to producing a type of flock. We have experimented with extrusion, with and without mixing talc, without success. Our aim now is to avoid this extrusion phase, to advance straight to compression: for now, the products tested are then compressed in the machines that are available to us, but new tests should allow us to move straight on to injection compression at the plastics processor CDA.

What stages are planned next?

Each product that we obtain depending on the different formulations will undergo a whole battery of mechanical, thermal and visual tests in the lab. We will then keep the three best formulations with our partners in the project and establish their related environmental profile together with Pôle Eco-Industries. We will also simultaneously be working on a prototype of the product destined for 3D printers. We hope to have the results by the end of the year and thus be able to satisfy clients, who have already expressed an interest in our product, by next year.



📌 Cotton and mixed used textiles.
© Charlotte Wallet

📌 Internal parts of a ventilator.
© Charlotte Wallet



INTERVIEW

Charlotte WALLET
Coordinator of the textile project
© Charlotte Wallet

AUDACIE
CONVERGENCE POUR L'INSERTION

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PROJECT AT A GLANCE

GOAL: Recycling cotton textiles to make plastic resins

YEAR OF PROJECT SELECTION: 2017 •

DURATION: 12 months

LEVEL OF SUBSIDIES FROM ECO TLC: €8,407

TYPE OF CLF COVERED: Cotton and blends

NEW PROJECTS



INTERVIEW

Benjamin CAMY

CEO Hodei France

© Hodei France



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At last, a 100% recyclable shoe

Project : HODEI

How did your project get started?

My brother and I have long dreamed of making a shoe that conforms to the principles of the circular economy. This is a real challenge as the composition of shoes (some thirty different materials on average, sewn or glued together) makes it more or less impossible to develop a strategy for efficient and profitable recycling. Right now, the majority of even “green” shoes fail to enter any loop for recovery or recycling and end up in landfill or are incinerated.

What does this project involve?

Our goal is to create the first French shoe that is entirely recyclable and will be returnable. The customer will be able to return their pair of old shoes to us free of charge in order to recycle them, either to recover their deposit or to buy a new pair at a lower price. In order to simplify recycling, we have designed a product based on a single material, in EVA foam (ethyl vinyl acetate). So we bypass the two most important and costly problems in recycling shoes: collection and the separation of the materials.

What will this shoe look like?

The base is a very lightweight, white inner shoe (120 g), and we have worked extensively on improving the design. You can wear it on its own like a slipper or lightweight shoe.

It is this EVA base that is 100% recyclable and returnable. Other parts are then attached on top, laces or parts of the upper, made of leather or various materials, which will be sold as a kit and assembled by customers themselves.

What does each development phase entail?

We have already made significant progress on this project. At present we are working on the polyurethane prototypes, which do not cost much. They allow us to refine the design of our inner shoe, the shape and properties such as flexibility, upkeep and ventilation. If the results of the last prototype are conclusive, we are going to start production of the prototype in EVA in June with our partner Plastyrobel from Riom. Plastics processing is far more expensive with EVA since we need to make a steel mould, costing €12,000. It is thanks to funding from Eco TLC that we will manage it. Our goal is to accumulate the necessary funding to make 10 moulds (for 10 sizes) and to put our first collection on sale via a crowdfunding campaign with a target of 1000 pairs. This crucial phase, which will attest to significant interest on the part of the public, will be the springboard for launching manufacture of the moulds and starting production. To date we have not yet contacted any manufacturers but we would like to be able to develop this project in a partnership, as it would allow us to make much faster progress.

How will recycling happen in actual practice?

The user separates the different parts of the shoe before sending the returnable inner shoe back to us. So they become an active player in the loop for reprocessing the shoe. Where the recycling procedure is concerned, there is already an American firm that shreds its old flip-flops and re-incorporates 15% of them in the manufacture of new flip-flops. So we will use this model as the starting point, and hope to improve on it. Our products are intended to have a useful life of two years, so once the products have been sold, we will have two years in which to maximise the percentage of used shoes in the new shoes that we will be making.



PROJECT AT A GLANCE

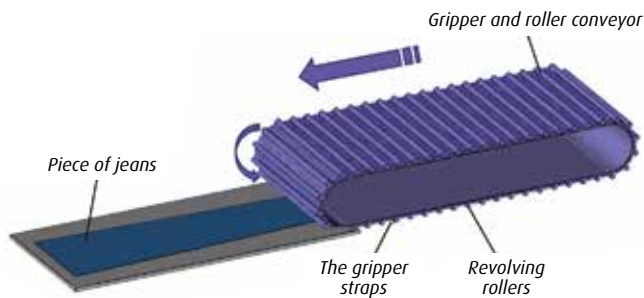
GOAL: Design and development of a modular shoe in a single type of material that can be recycled

YEAR OF PROJECT SELECTION: 2017

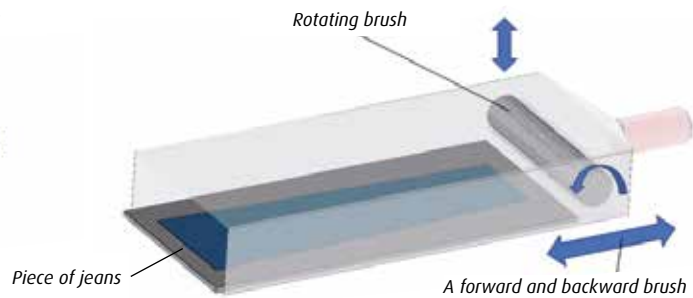
DURATION: 24 months

LEVEL OF SUBSIDIES FROM ECO TLC: €16,000

TYPE OF CLF COVERED: Shoes



📌 **Gripper and roller conveyor.**
© Roland GUIBERT



📌 **Mechanical separation by brushing.** © Roland GUIBERT

Better separation for better recycling

CID PROCESS

How did your project get started?

This project is the fruit of discussions held early last year between Thomas Huriez, the founder of Modetic and the 1083 label, and myself. Being very committed to recycling, Modetic was seeking to develop a solution for segregating cotton and elastane in old jeans in order to produce jeans entirely from recycled denim. As there is no R&D department at Modetic, I have been assigned this role.

What is your area of expertise?

I have extensive experience in special-purpose machinery. It has been my passion and main area of interest for as long as I can remember. I spent 30 years in a whole range of positions in a robotics company: first in manufacture, welding, painting, fine tuning, assembly and afterwards in the engineering and design department, then business manager and finally in R&D. We designed some fascinating machinery that led to a drastic reduction in manufacturing costs at major clients such as Vuitton or Renault, etc. We worked in a whole range of fields, from the agri-food business to the nuclear industry. In the end I was offered the post of technical director, but I wanted my independence and I had been thinking of setting up my own firm to specialise in recycling for a long time. So that is what I did in setting up CID Process in March 2017. At the moment I am also developing a 3D silicon printer together with a PhD researcher. I don't only work in recycling but there is so much at stake that it is what interests me the most.

What does your project involve?

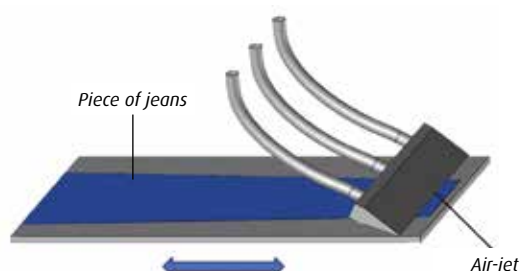
Nowadays we know how to convert cotton into cellulose, unless the cotton contains elastane. But all of today's jeans, or nearly all of them, contain elastane. In garnetting we manage to recover the cotton fibres from old jeans but we only obtain short fibres. So our idea is to attempt to recover the elastane using a new garnetting technique in order to obtain cotton that can be converted into cellulose or to unravel it better and obtain long fibres, which allows new yarn to be made.

Which methods do you use?

Today, when confronted with a huge pile of jeans, I cut them up and test different types of brushes, actions etc.; I'm first looking for manual solutions. We don't move on to the machine phase until my theories have been validated. I need this manual step in order to progress to the next one. And there are numerous theories to verify: for example, I have put jeans in the freezer to assess the effect on the fibres. I'm open to all solutions and this is what makes research so enjoyable. You need to be constantly on the lookout: occasionally I organise meetings with children whose spontaneity sometimes allows one to come up with surprising ideas.

And what obstacles will you be facing?

The main hurdle is the financial one, this is why I am very happy to benefit from funding by Eco TLC. Depending on the results, we may need to ask for further funding in order to complete a bespoke machine, but we haven't reached that stage yet!



📌 **Mechanical separation by air.** © Roland GUIBERT



INTERVIEW

Roland GUIBERT

CEO at CID-Process

© Roland GUIBERT



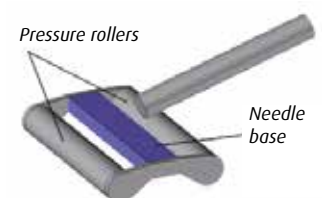
CONTACT

🏠 **CID PROCESS**

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📌 **Manual brush.**
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PROJECT AT A GLANCE

GOAL: Mechanical segregation of cotton and elastane

YEAR OF PROJECT SELECTION: 2017 •

DURATION: 13 months

LEVEL OF SUBSIDIES FROM ECO TLC: €59,750

TYPE OF CLF COVERED: Jeans

NEW PROJECTS



📍 To the left: spools of thread. ©UTT

📍 To the right: defibrillating machine. ©IFTH



Le Relais sorting center. ➔
©F.BaronMorin



Improving garnetting operations to recreate yarn

Project : **CAREFIL**

How did your project get started?

The idea came from another project called Calafil, which we were involved in with our partner UTT, a producer of dyed yarns. Overseen by the CD2E, the Centre for Excellence for the Hauts-de-France region, the goal of this project was in particular the recycling of arisings from production. IFTH was consulted in order to conduct spinning tests using fibres garnetted with UTT. We obtained convincing results, but it also highlighted a few issues: What percentage of recycled garnetted stock to incorporate in the blend with the aim of making a new yarn? How to grade the resulting material? How to obtain high-quality garnetting with long fibres? The Calafil project came to an end in early 2017. Buoyed by this experience, we wanted to continue this research.

What does your project involve?

Today, garnetting is used mainly to produce insulation and non-wovens. We want to study garnetting to learn how to improve it as far as possible with the aim of a closed loop: reusing it to produce yarn. This project, which was approved by the Team² et Uptex clusters, involves three partners appointed by CD2E: IFTH, UTT and Le Relais. The latter plays a key role in refining materials sorting, as everything depends on the material available to us. We are going to work simultaneously on four sources: wool, cotton, polyester and acrylic.

What does each development phase entail?

Once the raw materials have been selected with Le Relais (a small volume of about 50 kg for each source), we're going to optimise cutting and garnetting on our machines at IFTH. This will enable us to create a frame of reference between the intensity of garnetting (aggressiveness of mechanical components) and fibre length. Depending on the properties of the fibres obtained, we are going to test three different spinning technologies (by UTT and IFTH). We will also need to determine the percentage of fibres from recycled textiles that can be incorporated into other fibres in order to obtain an ideal yarn. Then we will investigate the question of dyes: how to improve dyeing operations depending on the initial materials/colours. Trials will be interspersed with dyeing and knitting tests conducted by UTT. The products obtained will really need to meet customer requirements (in terms of feel and appearance) if we want to establish a market and make it sustainable. Using UTT's tools for dyeing affords this flexibility. These tools are suited to the eco-friendly approach of this project, thanks in particular to use of the unit for recycling dyeing wastewater. Simultaneously, throughout our research, we're going to carry out a technical and economic assessment of the products, a study of the environmental footprint and evaluate their life span.

What are the challenges facing the project?

The challenges are considerable as the demand from the firms and buying groups we work with is great and on the increase. UTT, which today sells four million kilos of yarn each year, has the ambitious goal of achieving half of its yarn sales through eco-friendly yarn within the next five years. If we succeed in incorporating 50% of post-consumer textiles in these yarns, we will have reprocessed one million kilos of textiles! And in doing so, we will have boosted the economic strength of collections of used clothing, shoes and household textiles.



INTERVIEW

Philippe MESNAGE

Head of the Research Unit at Recherche Technologies Textiles

©IFTH



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PROJECT AT A GLANCE

GOAL: Improving the quality of yarn obtained through recycling old clothes

YEAR OF PROJECT SELECTION: 2017 •

DURATION: 24 months

LEVEL OF SUBSIDIES FROM ECO TLC: €142,931

TYPE OF CLF COVERED: Textiles made of cotton, polyester, wool, acrylic

Recycling recycled shoes

Project : ECTOR SE RECYCLE

How did your project get started?

It follows on from an initial project, realised thanks to support from Eco TLC. Ector, the first eco-designed shoe to be knitted in France using PET yarn from recycled plastic bottles. Now that we have developed the recycled shoe, this second phase will enable us to determine the recycling process for this shoe so that it fully conforms to the principles of the circular economy.

What will it involve?

The question we are asking is the following: how do we go from an end-of-life shoe at the customer to a new shoe? We have identified four stages: find an appropriate and affordable solution for collections, separate the sole from upper, re-create a polyester yarn and recycle the sole.

What does each stage involve?

Where collection is concerned, we had already advised our customers at the time of the first crowdfunding sales in May 2017 that from October 2018 we would be developing a solution for collections in order to recycle the shoes. Apart from on our website www.ector-sneakers.com, Ector shoes are available from around forty stockists in France today, and mention is made of this undertaking. So we have until October to decide on the principle for collection - voluntary or with the incentive of vouchers, for example - the business model has yet to be decided. When it comes to separating the upper and the sole, we prefer using mechanical separation and are looking for partners who have the machinery. But we are not ruling out other solutions - thermal, chemical etc. - which we are still working on as well. In order to reproduce a polyester yarn based on our used knit shoes, we are working with Mapea on improving the combination between the PET recycled from bottles and from our used shoes (which thus show wear). We need arisings that are very homogeneous as the knitting technology for our shoe, carried out by our partner the company Richard frères, requires yarn that is free from any impurities. Once the correct ratio has been established, we can move on to larger volumes and so we are seeking spinning mills whose machines correspond to our needs.

Recycling the sole also involves including the old sole, in shredded form as it cannot be reused once it has been vulcanised, in the rubber blend, which serves today as the basis for our soles and which mixes natural and synthetic rubber. Here too, we are endeavouring to optimise the proportion of the recycled sole while maintaining a high-quality product.

Is it conceivable that a shoe could be made entirely of old shoes?

Today our product is 100% recyclable, which is a huge step forward, but of course our holy grail is the shoe made entirely from recycled shoes. Just as in the automotive industry where there has been tremendous progress, the issue at stake here is so great in terms of arisings that I am convinced that we will achieve it before long.



INTERVIEW

Patrick MAINGUÉNÉ

General manager

© Ector

Soft'in

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PROJECT AT A GLANCE

GOAL: Recycling the Ector eco-design shoe

YEAR OF PROJECT SELECTION: 2017 •

DURATION: 18 months

LEVEL OF SUBSIDIES FROM ECO TLC: €75,717

TYPE OF CLF COVERED: Shoes made of polyester yarn, rubber

NEW PROJECTS



INTERVIEW

David LEROMAIN
Head of Innovation and R&D
© Modetic



There's a future for cellulose from denim

MODETIC

How did your project get started?

We have been working on recycling since 2016 in order to make use of French arisings of cotton from old jeans. Last year we had already obtained funding from Eco TLC to investigate avenues that would allow us to make yarn from old jeans. Among the avenues we explored, and which we are still working on, that of wet spinning proved to be especially encouraging and merited a project in its own right. This is the object of this new funding.

What challenges do you face?

You need long fibres to produce yarn. However 70-80% of fibres from jeans recycled today are too short. At present, these fibres cannot be used in recycling and thus represent wasted resources. Yet there is a method for creating man-made fibres from cellulose (the main constituent in wood and plants). Having been criticised for the use of chemical products, this process has changed to become more environmentally correct and now

mainly uses wood pulp as the source for cellulose. Our idea involves using the same process but extracting the cellulose from old jeans.

And what obstacles will you be facing?

Studies we conducted with Plateforme Canôé (our partner for this project) have enabled us to prove that we can extract cellulose from old jeans and that it is possible to convert it into man-made fibres. However, this raw material demonstrates



© Modetic

characteristics that we are going to have to work on: unlike "pure" raw materials (wood and cotton), our source, old jeans, is very complex due to dyes, finishing products, laundry agents, etc. Our goal in this project is therefore to improve the process for extracting cellulose but first and foremost to work on stabilising the procedure for obtaining the fibres.

What will the various stages in your project involve?

In the first three months, we will primarily be working on improving the extraction of cellulose. Afterwards we will need to concentrate on the crux of the project: adjusting the spinning procedure. Work in the lab will allow us to measure the effect of the presence of all these products on the denim and to establish how to manage it. So in the next six to eight months, we are hoping to obtain a stable procedure and that we will be able to launch initial production of fibres.

What is your long-term goal?

We hope to incorporate these man-made fibres derived from old jeans in our products but also to use them in our work on recycling in order to guarantee a yarn made entirely of recycled cotton. We are also aware that arisings of old jeans in France are increasingly tending to be blends of cotton and synthetic fibres. This is why we are taking account of this development in all our research.



Cellulose fibre from jeans. © Canôé



Impregnation. © Canôé

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PROJECT AT A GLANCE

GOAL: Wet-spun cotton for the purpose of creating a man-made, cellulose-type fibre

YEAR OF PROJECT SELECTION: 2017

DURATION: 14 months

LEVEL OF SUBSIDIES FROM ECO TLC: €42,700

TYPE OF CLF COVERED: Cotton - jeans

Factory tests for tangible result

LES TISSAGES DE CHARLIEU

How did your project get started?

Our starting point was the observation that there are numerous projects and studies into the circular economy in connection with recycling used clothes but no one has managed to achieve mass production. We come up against the same problem every time: the price of the finished product. People compare what isn't comparable: products made in Asia on an industrial scale with products made in Europe on a non-industrial scale.

What does your project involve?

It involves setting up an industrial project for clothes designed on the basis of post-consumer recycled polyester (essentially polar fleeces) in a Franco-European network. Once the manufacturing process has been validated, we are going to work out the difference in price with the competitive sector and to identify where there is room for improvement (quantities, process, channels, etc.).

What will the various phases in your project involve?

Today it is difficult to process polyester from old clothes since arisings are not homogeneous: they are dyed, they've been washed using different laundry agents, and so on. So we're going to work on improving the recycled polyester yarn in three phases, each of which should take us a year. First we're going to attempt to include as much yarn from recycled old clothing as possible, using mechanical recycling. Our goal in the first instance is to obtain a product composed of at least 50% yarn made from recycling old clothes. The second industrial phase, still using mechanical recycling, will firstly be to increase the percentage of materials from old clothes to 70-80% but also to improve the technical grade of the yarn. The goal is to obtain a filament with fineness compatible



© Alain Gricourt/LTC

with industrial use that meets the customer's specifications. When it comes to the third phase, we are going to run tests with chemical recycling, which will allow us to re-create the raw material with the same properties as the virgin material but using a process that has a greater impact than mechanical recycling. So at the end of the three years, we will have processed 60 tons of yarn (20 tons in each phase) for 180,000 products sold. This industrial scale will allow us to set an "optimum" industrial price, both in the manufacturing processes and in the material streams, with two prices for the finished product on the market: depending on whether the process involved mechanical or chemical recycling.

What is your long-term goal?

We have twofold goals in this project to make the manufacturing processes incorporating post-consumer fibres from old clothes reliable and to assess their real cost in comparison with market prices. Once this price has been established, public authorities will have a real basis for deciding whether to create tax incentives. This will allow a French and European circular economy on an industrial scale that results in reducing the environmental impact and in creating jobs in the local region.



INTERVIEW

Éric BOËL

Director of Tissages de Charlieu

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 LES TISSAGES DE CHARLIEU

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PROJECT AT A GLANCE

GOAL: Making improvements, in terms of the technology and industrial processes, to an article made entirely of recycled post-consumer polyester from Europe and assessment of the difference between the cost price and the market price

YEAR OF PROJECT SELECTION: 2017 •

DURATION: 36 months (three 1-year phases)

LEVEL OF SUBSIDIES FROM ECO TLC: €84,000

TYPE OF CLF COVERED: Polyester from old clothes

ONGOING PROJECTS

Generating energy with leather from old shoes

Project : **THERMICUIR**

How far has your project got?

It was supposed to finish in April but, as a result of delays over which we had no control, it will not be possible to complete until the end of 2018. In the initial phase of the project, we were able to benefit, as anticipated, from the knowledge gained from the previous project carried out by AIR and Soex, who jointly created a machine that allowed them to separate the elements of a shoe, and in particular to produce leather granules. So, we collected 500 kg of leather granules from Soex from end-of-life shoes that allowed us to complete the gasification trials by the end of 2017.

What was the outcome of this?

We conducted these tests with the INSA engineering school at one of the few suitable facilities in France: Provademse in Villeurbanne. It was there that a machine failure caused a delay in the trials, the results of which will not be available until some point in the near future. As we are unable to move on to the second phase of our project (exploratory analyses and tests in the tannery) we have taken advantage of this delay to make progress on other issues.

What progress have you made?

On 28 March, we visited Soprema's factory in Strasbourg, as it has one of the two French plants for compact gasification. They use wood there and we want to use the same technique but with leather granules. It is very encouraging, just as we had

hoped: less smoke and fewer polluting residues than with combustion; a closed loop that requires no energy intake and a small facility that is viable on a minor scale, unlike incinerators.



 Biomass gasifier. ©CTC



INTERVIEW

Régis LETY

Sustainability Consultant

© CTC



 Shredded Output of shoes. ©CTC

PROJECT AT A GLANCE

GOAL: Recovering heat from waste leather from end-of-life shoes

YEAR OF PROJECT SELECTION: 2016 • **DURATION:** 18 months (extended until the end of 2018)

LEVEL OF SUBSIDIES FROM ECO TLC: €53,250


TYPE OF CLF COVERED: Leather shoe uppers

CONTACT

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An efficient attenuator that complies with tomorrow's standards

Project : **SILENCIO**

Have you been able to complete your project?

Yes and no! The initial project has been completed and we are very satisfied with it, however we have come up against an unexpected problem. We have in fact been able to create an attenuator for CMV that goes beyond our hopes in terms of using old textile material (75% rather than the 70% planned). It is very efficient in terms of soundproofing and it is competitive when compared with rival products made of synthetic materials. However, it may not be possible to launch our product due to an issue relating to standards.



©Wecosta

project on hold in order to refine it and prevent it from becoming obsolete as soon as it was launched!

What procedures do you need to set up?

RT 2020 (French regulations governing energy performance in buildings) will require that our product is completely air-tight, but this is not entirely the case. So we are investigating different solutions for airtightness. While we wait for a solution to be validated, we will keep working on the marketing aspects and the sales strategy. We hope to have a product that is ready to sell by the end of the year!



↗ Silencer during production. ©Wecosta

What is the sticking point?

The prototypes we have created were a resounding success with our contacts. This attenuator complies fully with the RT 2012 building standards [regarding energy performance] but when we presented the product to people working on the draft of the future standard RT 2020, we learned that there may be problems in complying with this standard. This is why we recently had to halt all work and put the



INTERVIEW

Hugues BROUTÉ

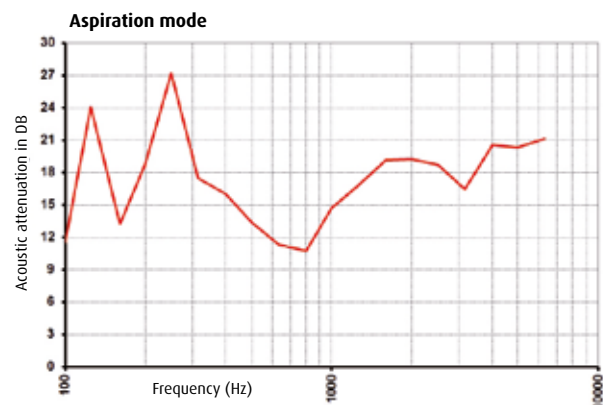
Product manager

©Wecosta



✓ Sound attenuation of silencer SILENCIO diameter 80 mm.

©Wecosta



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PROJECT AT A GLANCE

GOAL: Developing an eco-friendly acoustic attenuator for ventilation systems in homes

YEAR OF PROJECT SELECTION: 2016 • **DURATION:** 18 months (extended until July 2018)

LEVEL OF SUBSIDIES FROM ECO TLC: €153,125

TYPE OF CLF COVERED: Used textiles

ONGOING PROJECTS



INTERVIEW

Vianney SARAZIN

Head of Research and Development at Métisse®

© Le Relais

Métisse
L'isolation durable

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Suspended acoustic ceiling made of recycled textiles

Project : **EKOROOM**

How far has your project got?

In order to ensure viability, we wanted to conduct a full-scale trial in a large hall at Lille airport, which required the manufacture of 117 acoustic tiles to insulate the ceiling. Our partner Wecosta, whose schedule is very busy, needed to free up three full days for the thermoforming of these plates. Installing the tiles, which are covered in a non-woven coating, was finally completed in February 2018 and since then we have been measuring the results of this full-scale trial.

What conclusion have you arrived at?

We are satisfied with the homogeneity of the tiles and their appearance. A few problems remain to be overcome, such as cutting, which results in bulging on the edges, and a slight odour (resulting from heating of the polyester textiles) that persists after a month of use. There is also the

question of the cost: despite our endeavours, on the face of it the tiles are not profitable for small-scale production.

What stages are planned next in the project?

We're going to conduct a study of costing in order to arrive at an accurate figure for viability of the tiles depending on the different production amounts. And we are also working on resolving the problems with cutting and maintenance. We're also going to proceed with tests for the covering, acoustics and fire resistance. And we are looking for a lab to assess the emissions from volatile organic compounds by next July.



Thermoformed plates.
© Vianney Sarazin

PROJECT AT A GLANCE

GOAL: Developing tiles for suspended acoustic ceilings from recycled textiles

YEAR OF PROJECT SELECTION: 2015 • DURATION: 18 months (extended until July 2018)

MONTANT DES SOUTIENS ECO TLC : €169,740

TYPE OF CLF COVERED: Used textiles

Updated summary on the current situation as regards recovery, recycling and re-use of used Clothing, Linen and Footwear



Frédéric Michel, Waste expert/Administrator
Isabelle Descos, Service Development Manager and Project Engineer

Study conducted by RDC Environment
in 2017 for Eco TLC

INTRODUCTION

Currently the main outlet for collected clothing, linen and footwear is re-use (60%). So far, in addition to re-use, the two main applications for recycling have been wipers and non-woven felts for cars and construction. The proportion of recycled clothing, linen and footwear used in spinning is still very low. Other applications for recycling (compounds, geosynthetics, composite materials) are still little developed or at the experimental stage. Will these recycling industries be able to absorb additional volumes? Can they adjust to the potential changes in clothing, linen and footwear?

CONCLUSION

This analysis has made it possible to highlight building insulation as the primary sector for recycling old clothing and linen, given the current size of the market and the potential demand, finding a balance between sought-after fibres and fibres available at sorting centres (today and in the future), eventual competition with other fibres, obstacles that have been identified and possible levers.

NOTE: *this prioritisation does not mean that other sectors in recycling need to be abandoned.*

IN ADDITION, THE ANALYSIS HAS HIGHLIGHTED:

Two markets with increased potential:

- insulation for buildings
- RDF (Refuse Derived Fuel)

Three markets with average potential:

- felts for the automotive sector
- geosynthetics for civil engineering, agriculture and construction
- composite materials for concrete/cement and coatings, among other things

1 Factors favourable to the development of markets in secondary raw materials for recycled clothing and linen:

- A change on the part of contractors, who have generally fixed targets for including recycled and environmentally friendly materials as part of their corporate social responsibility strategies.
- Developments in the price for cotton: current increases in the price of virgin cotton make recycled products more competitive.
- The favourable political context that strongly encourages initiatives relating to the circular economy. The road map for the circular economy should be made public by spring 2018.

2 Obstacles hindering the development of markets in secondary raw materials for recycled clothing and linen:

- High cost of materials composition sorting and hard points removal in France. These two processes are currently performed manually in sorting centres and the quantities taken in by each facility are low.
- Competition from materials that are easier to work with and that cost less: arisings from textile production, textile waste from other branches (sheets and linens from laundries), non-textile waste from other sectors (PET bottles) or alternative products (rental towels, paper, glass and rock wool, virgin cotton or wool). The main ways of simplifying working with other products are: absence of hard points, a simpler structure that is more suitable for cutting/garnetting.
- Heterogeneity and difficulty in controlling the composition of clothing and household textiles, unlike arisings from production, where the composition is guaranteed.
- Under-investment in marketing and business: upstream operators need to adapt in order to respond to their new markets, made up of large organised groups.

3 Key actions to take:

- **Automating sorting and cutting.**
- **Massification:** in order to create economies of scale and to reduce logistics costs, and to guarantee sufficient volume of procurement for clients.
- **Developing synergies between players.**
- **Consultations with authorities and audit offices, especially as regards the process of certification and the types of tests to hold.**
- **Support for product marketing and direct marketing** for different types of customers and purchase consultants (design offices and architects, public contractors, private sector contractors, trade and DIY distributors, consumers).
- **Consultations with authorities about taxation of environmentally friendly materials for insulation.** This additional reduced level of taxation would also be a further argument to boost the market for insulation based on recycled clothing and household textiles.



The search for maximum possible sustainability is unquestionably the first prerequisite for an eco-design approach.

© Junko-nakase

‘ECO-MODULATION’ WITH THE SCALE FOR CONTRIBUTORS

A new type of ‘eco-modulation’ based on the principle of **sustainability**

Eco TLC is continuing its use of ‘eco-modulation’ in 2018 with the implementation of a new type of ‘eco-modulation’, which applies to amounts that were put on the market in 2017, and based on the principle of sustainability. The search for maximum possible sustainability is unquestionably the first prerequisite for an eco-design approach, since the “life expectancy” of a product depends on this, even if its useful life, for its part, does not and mainly depends on how the product is used and maintained. It is hardly possible to claim that a product, which is not designed to be sustainable, could be “eco-designed”, even if it is straightforward to recycle.

Two working groups, one focussing on shoes and one on textiles, were operating in 2017, and their recommendations led to Eco TLC’s board adopting and launching ‘eco-modulation’ based on criteria that are most relevant for ensuring sustainability.

Products eligible for this new ‘eco-modulation’ benefit from a **75% REDUCTION** in their ‘eco-contribution’.

THE CRITERIA FOR TEXTILES are different, depending on which categories are concerned in the ‘eco-modulation’ (T-shirts, jeans and sheets): abrasion resistance, dimensional stability, pilling, colour fastness (two criteria per category).

THE CRITERIA SELECTED FOR SHOES

are resistance to tearing between the upper and the sole and abrasion resistance of the sole.

This new type of ‘eco-modulation’ is in addition to two existing types:

- inclusion of recycled CLF materials in relevant products,
- either from post-consumer CLF (bonus of 50%),
 - or from production arisings of CLF (bonus of 25%).

Developing outlets for recycling used textiles

The Scientific Committee at Eco TLC was set up eight years ago. Each year it selects R&D projects and studies, which aim to discover new procedures and where the market opportunities are uncertain or not yet known when the project or study is implemented. Furthermore, when the industrial outlet exists for a materials sorting operation, even on a small scale, support for “materials sorting” is ensured by the Materials Sorting Committee.

The Materials Sorting Committee, set up in 2015, will define during testing: the specifications for the process, the financial calculation, confirmation of interest and scaling up of the programme with a related schedule.

THE OBJECTIVES ARE:

- monitoring development of the streams and the value chain (costs and revenue) in the different categories of contracted operators in France and Europe (including workshops for integrated employment);
- adapting production tools (including technologies for cutting rags and for hard points removal from knits) in order to increase the quality of the products supplied while reducing net operating costs, with a minimum of non-recoverable waste at the end of the process;
- increase recycling tonnage for used clothing, shoes and household textiles that are collected in France.

The impact of the financial measures for materials sorting will then be monitored, after the experiments, as part of the watchdog’s responsibilities.

The Materials Sorting Committee thus met in July and again in October 2017 to monitor the outcomes of the three experiments started in December 2016.

THESE THREE INITIATIVES THAT WERE LAUNCHED AND EVENTUALLY COMPLETED ARE:

- TRIMAILLE for producing yarn for hosiery, by Provence et Vosges TLC (Synergie TLC),
- KNITS for garnetting, by KFB and Le Relais Bruay,
- WIPERS for cutting, by BIC, KFB and Le Relais Bruay.

A 4th INITIATIVE, 100% cotton sorting was launched at the end of 2017 in the form of a call for proposals to supply 100% white cotton articles in order to re-create a yarn for weaving. This tender is part of the R&D REWIND project supported by several manufacturing and commercial enterprises and CETI (the European Centre for Innovative Textiles).

The firm of RDC Environment assists Eco TLC in monitoring and evaluating materials sorting operations, in particular:

- by providing tools for processing these data;
- by analysing the transmitted data;
- by drawing up a test report after follow-up visits to experiments.



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, linen and footwear in order to make them suitable for recycling.



Operators undertake to deliver the planned production relating to the required technical data and accounting information, in particular to the evaluation of the cost of materials sorting. For their part, the engineering and design office and the producer responsibility organisation undertake to maintain confidentiality regarding any personal data transmitted.

The progress status of these four initiatives is presented on the following pages.



TRIMAILLE by SYNERGIES TLC

Hats made with recycled yarn

Thomas FRAINEUX
Head of Development and Marketing

“ How did your project get started?

This project originated from our desire to find innovative, local solutions for recycling textiles. We were looking for a motivated marketer in order to get all the players in the branch involved and we ended up forming a partnership with the firm of Happy Chic with the objective of making hats and scarves from recycled yarn.

What does it involve?

We have concentrated on wool and acrylic pullovers. We first carried out meticulous sorting of nine categories of pullovers according to three colours (black, navy blue and grey) and in three compositions (wool, acrylic and a 50/50 blend of both). Then we progressed to the disassembling stage, which consisted of removing the hard points in readiness for recycling. Then it was the usual procedure: unravelling, spinning and knitting.

What were the results?

They are very conclusive since we succeeded in making a yarn of the same quality as that made from arisings from clothing production. The drawback is the excess cost related to sorting. The spinning mill we work with, Les Filatures du Parc, is in fact interested in this raw material. However financial support is required to compensate for the preparatory work for recycling. Where the partnership with Happy Chic is concerned, we completed the project in December 2017; the remaining phases are the knitting and stocking of shelves. So the hats could be marketed under “La Gentle Factory” label by October 2018. ”

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PROJECT AT A GLANCE

- GOAL:** Testing specific sorting of materials in order to establish potential support in preparing for recycling
- DURATION:** 18 months
- LEVEL OF SUBSIDIES FROM ECO TLC:** €41,000
- TYPE OF CLF COVERED:** Wool and acrylic pullovers



KNITS by LE RELAIS

Optimising sorting in order to recycle in France

Sébastien LEPILLIER
Head of sorting workshop

“ What’s the reason for this experiment?

The vast majority of French post-consumer knits was being exported to Asia, so our plan is to keep this raw material in France for the purpose of recovering and reusing it. Our garnetting clients are in fact searching for new markets as arisings from production are becoming more and more scarce in France. However, in order to increase the amounts of post-consumer textiles as a raw material from garnetted stock, you need to improve sorting in terms of quality and quantity of these knits.

What did it involve?

We installed two facilities at our Bruay La Buissonnière site to sort according to labels – currently the only way to achieve a quality sort. We actually worked with five specific product families: 75% cotton minimum, 70% synthetics minimum, 75% wool minimum, between 50% and 74% wool, and others, without a category or not identifiable. This

very time-consuming work was carried out at a pace of 800 kg per person per day.

What was the outcome?

We sorted 283 tons of knits in this way, and the feedback from our garnetting firm Minot has been excellent. Accurate monitoring allows us to establish the cost of sorting, which is not economically viable with the process as it is now. In future, we hope to develop a system for machine sorting using spectrometry, which will allow around 4,000 tons of textiles to be sorted per year on each line with three new jobs. Our idea is to create one centre in the north of France and another one in the south, which will result in 90 to 100 new jobs. We will thus gain in productivity, quality, reliability and volume. ”

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PROJECT AT A GLANCE

- GOAL:** Experimenting with materials sorting for garnetted stock
- DURATION:** 12 months
- LEVEL OF SUBSIDIES FROM ECO TLC:** €54,336
- TYPE OF CLF COVERED:** Woollen, cotton and synthetic knits



WIPING CLOTHS by BIC

Putting wiping cloths back at the centre of local recycling

Alexandre KEKAYAS – Director

“What’s the reason for this experiment?”

Today, wiping cloths are the main outlet in France in terms of volume for post-consumer textiles collected in France. Totalling 20,000 tons each year, they constitute 10% of the overall market for wiping cloths. The challenge facing us is working from the assumption that wiping cloths will amount to 30,000 tons once 300,000 tons of post-consumer CLF are collected.

Today the vast majority of recycling waste that is collected is exported to be cut up and then reimported into France, since, despite our national expertise, cutting up the textiles in France is no longer competitive. This experiment should allow us to establish an industrial and commercial process, which ensures, with better control over the value chain, that the market for wiping cloths Made in France is expanded and brings this environmental idiocy to an end.

What did the experiment involve?

Thanks to support for the experiment from Eco TLC, we simultaneously set up a sorting and cutting process, for 20 categories of different textile materials. We were able to recruit three members of staff and produce 277 tons of wipers in one year, so we were able to respond well to the demand for wipers made from white T-shirts, whose fine grade is suitable for printing, or from coloured sweatshirts, which are useful for machinery.

What was the outcome?

It is a good example of the circular economy aiming to optimise use of resources: keeping collection of recycling waste, sorting, cutting and consumption in France as far as possible. The absorption properties of wipers from post-consumer CLF are substantial and the environmental interest in replacing virgin materials with materials from recycling has

already been demonstrated. We have developed a distinct, premium range of products that makes good use of wiping cloths made in France from post-consumer CLF. Added to this is an innovative and pro-active commercial strategy. We intend to take this experiment further and transform it into a sustainable business. We still need to establish the framework and the relevant financial incentives in order to encourage innovation while complying with rules governing competition.”

PROJECT AT A GLANCE

GOAL: Recycling cotton textiles in the local area to produce wiping cloths

DURATION: 12 months

LEVEL OF SUBSIDIES FROM ECO TLC: €42,250

TYPE OF CLF COVERED: White and coloured blended cotton textiles

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100% COTTON SORTING by DECATHLON

End-of-life clothing, a resource for closed-loop recycling

Mathilde VINCHON and Pauline ARNOUX

Strategic Industrial Buyer and Engineer for Components and Technologies respectively

“What’s the reason for this experiment?”

We started with two premises: that the price of cotton is going to become prohibitive and that we have a local source as a result of used textiles. So, if we want to make a yarn from these textiles that is of the same quality as virgin cotton yarn, we need to find solutions for sorting clothing, shoes and household textiles (CLF) in order to separate the 100% cotton CLF and to improve its technical properties.

Do you work with partners?

We have set up a consortium to work alongside some French manufacturing experts: a specialist in garnetting machines, Laroche, an integrated spinning mill; TDV Industries; the European Centre for Innovative Textiles and the ICAM engineering school. We are also looking to include a waste collector/sorting operator to supply us with raw materials (used CLF) throughout this project and thereafter.

Which areas of the project is DECATHLON involved in?

During the three years that ADEME supports the project, we will be working upstream and downstream of the REWIND project. At present we are therefore developing collection procedures to obtain material that conforms to the specifications by automating the sorting process as far as possible. We are increasingly receiving requests from our sports brands wanting more sustainable components in their ranges of products. Recycled yarn is the perfect solution to meet this growing need but at present the sector is not yet set up properly to supply us with this yarn. This is why we are working along these lines, with waste collectors, sorting operators and Eco TLC!”

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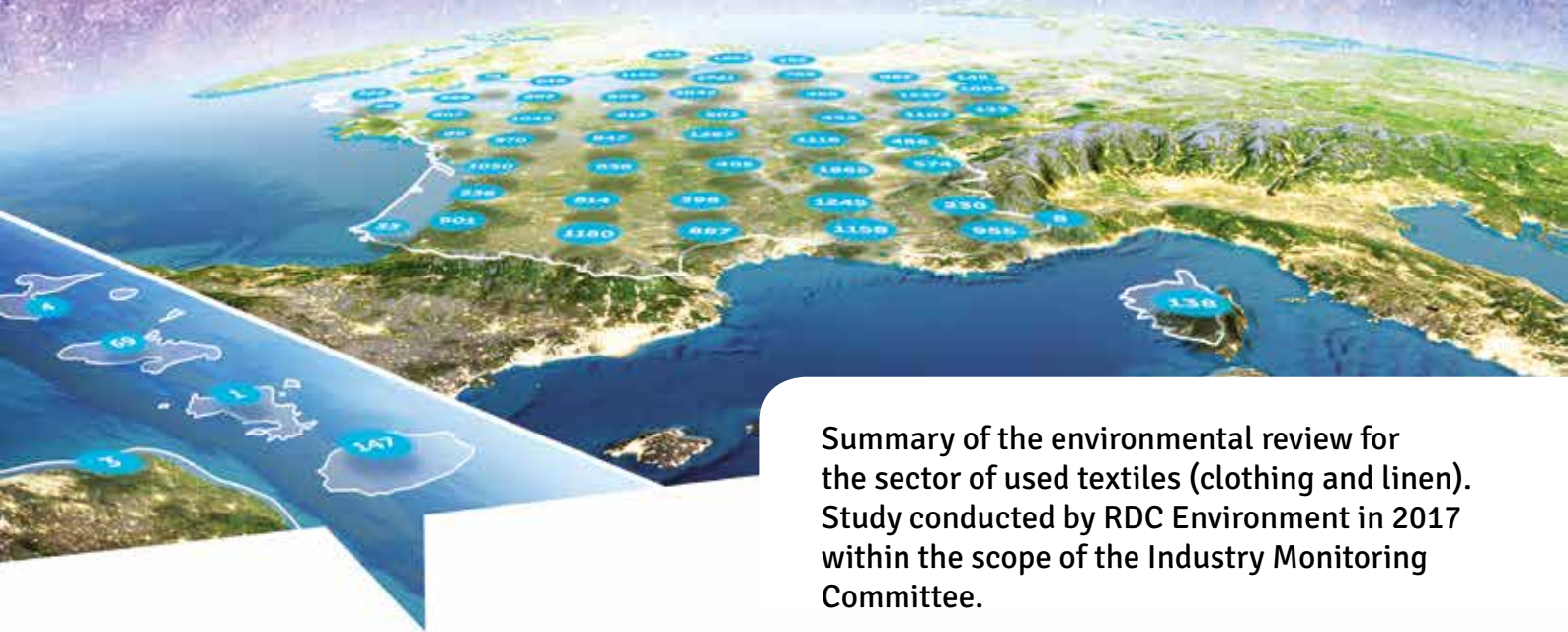
PROJECT AT A GLANCE

GOAL: Rethinking end-of-life solutions for cotton textiles in order to design more environmentally friendly textile collections

DURATION: 36 months

TYPE OF CLF COVERED: 100% cotton textiles

DIVERTING 1 KG OF TEXTILES FROM DOMESTIC WASTE AVOIDS 25 KG OF CO₂ EMISSIONS



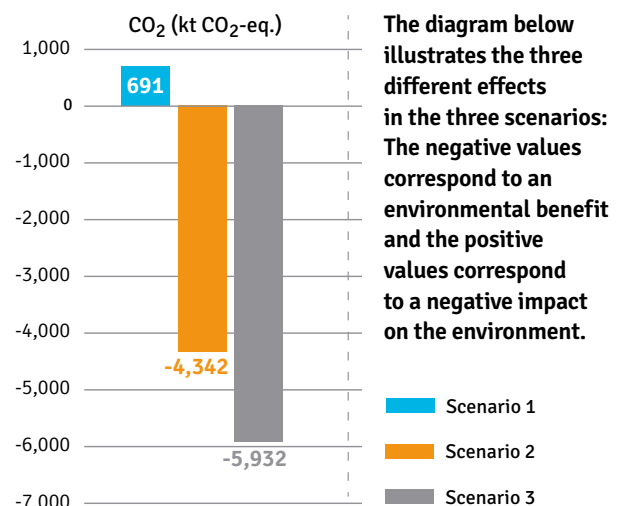
Summary of the environmental review for the sector of used textiles (clothing and linen). Study conducted by RDC Environment in 2017 within the scope of the Industry Monitoring Committee.

INTRODUCTION:

- The review concentrates on how the end of life for used clothing and household textiles, which are collected in France, is managed (apart from shoes as there is not enough data on composition). It does therefore not account for times of production and use of articles before so-called separate collection (used clothing, shoes and household textiles diverted from domestic waste).
- The review shows that on the 3 classes of effects (greenhouse effect, consumption of mineral and fossil resources and eutrophication), only the impact of greenhouse effect was really significant.
- The hierarchy of methods for waste processing is observed: reuse accounts for the greatest environmental benefit, followed by material recovery (wipers or garnetting), energy recovery and then elimination with household waste.

THREE SCENARIOS WERE EXAMINED:

- **Scenario 1** = in the absence of separate waste collection, residual household waste contains 100% of arisings of textiles;
- **Scenario 2** = current situation of separate collection and recovery accounts for 38% of arisings of textiles and the remaining 62% are collected and processed with domestic waste;
- **Scenario 3** = target set by accreditation, i.e. 50% separate collection and recovery of arisings of textiles (same breakdown in types of reuse/recovery as the current situation) and the remaining 50% are collected and processed with residual household waste.



Processing 1 kg of clothing and household textiles with a rate of separate collection of 38% makes it possible to avoid the equivalent of 8.7 kg of CO₂, so savings equivalent to 10.1 kg of CO₂, compared with throwing the same amount in kg of clothing and household linens into the dustbin.

DETAILS OF SCENARIO 2 IN ORANGE:

At present, the sector for clothing and household textiles currently allows an environmental benefit to be considered in terms of:

- greenhouse effect: equivalent to 4,342 kt of CO₂ emissions avoided;
- consumption of mineral and fossil resources (abiotic): the equivalent of 31 t of antimony avoided;
- eutrophication: the equivalent of 478 t of phosphorus emissions in water avoided.

