

innovation

#09

Re_fashion

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2019 Innovation
Challenge

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The Eco design
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INNOVATING IS RECYCLING



Voted in February 2020, the French law on Waste Management and Circular Economy clearly indicates the areas of change for our clothing/footwear industry to become exemplary and responsible. These new measures affect all parties involved in a product's lifecycle (marketers, collection, sorting and recovery operators, local authorities) and provide Eco TLC with an opportunity to boost its role in assisting these parties to move towards a 100% circular industry.

With an authority approval renewed for a further 3 years (2020-2022) speeding up industrial recycling is one of our major transformation projects, with two key tools: the Innovation Challenge and downstream working groups on composites and non-wovens for the transport industry.

For its 10th edition, the Innovation Challenge, Eco TLC's call for R&D proposals, has been recasted: strategic areas have been redefined (see pg. 3) as well as the Scientific Committee's Missions (see pg. 4) and the recruitment of new members (see pg. 5).

2019 was a particularly good vintage, with 9 winners and €730K of funding to finance innovative industrial and business solutions that optimise clothing and footwear recycling. This magazine presents each of these in detail in pages 6-23. In 10 years, Eco TLC has funded 52 projects for a total amount of €4.7M (see overview of projects on pg. 28).

Another major area of transformation to be unveiled on 1 September 2020 is the "Eco design platform". Aimed at brands' product teams, this awareness raising tool to clothing and footwear eco design shares a common language and makes it possible to co-build an eco-design approach with as many stakeholders as possible (see pg. 24).

Since March 2020, the halt in production, consumption, collection, sorting and recycling of CLF (clothing, linen and footwear) has put our entire ecosystem in jeopardy. Major upheaval should be expected. What's the future of the clothing /footwear industry? How do we recover from this unparalleled crisis? At the time of writing this editorial it is impossible to predict what the industry will be like tomorrow. This is why we are convinced that we have to speed up stakeholder commitment on circular business models: generalise sustainable eco-design initiatives; produce closer to distribution locations; consume better with less; sort more and sort wisely; and above all industrialise used CLF recycling in France and in Europe in synergy with other sectors.

It is up to us, together, to reinvent our industry.

Maud Hardy
Circular Economy Director

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Innovation Challenge REAL IDEAS TO REVOLUTIONISE CLOTHING AND FOOTWEAR RECYCLING

Over the last 10 years, the call for R&D proposals organised by Eco TLC has funded 52 projects in order to optimise clothing and footwear recycling. The 9 winners of the 2019 edition are also going to participate in speeding up the development of a circular industry.

By creating its R&D call for proposals in 2010, Eco TLC had two main aims. The first was to find innovative industrial and business solutions to optimise clothing and footwear recycling. The second, to speed up the development of a more circular industry in synergy with other sectors (construction industry, automobile industry, etc.).

Ten years later, the aims have not changed and the challenge is still to recycle every year **100,000 tonnes of non-reusable worn clothing and footwear, i.e. for 2019 40% of the 250,000 tonnes that are collected and sorted**. To achieve this, in compliance with its authority approved specifications, every year Eco TLC organises a call for R&D proposals, i.e. the Innovation Challenge. For this 2019 edition, 9 projects were selected by a Jury from Eco TLC's Scientific Committee, thereby joining the other 43 projects funded since 2010. All of these result from the creativity and know-how of the industry's different stakeholders, committed in optimising clothing and footwear recycling and in speeding up circular development.

In 2019, the projects submitted to the Innovation Challenge Jury were required to meet at least one of the three strategic areas defined by Eco TLC:

- A project could involve **the preparation of materials derived from used clothing and footwear**. It thereby covered sorting techniques, characterisation methods, separation and preparation of materials or the logistical organisation of product take-back and the bulking of material feedstock.
- It could also deal with **the incorporation of recycled materials from the CLF industry into products for other industries** (construction, automobile, etc.).
- Finally, the last strategic area, **the eco-design of CLF industry products**. Projects addressed problems in material disassembly and separation, reduction/removal of elements that disrupt recycling, incorporation of recycled materials from textile/footwear waste, the extension of products' lifespan or the creation of new circular materials.

Moreover, in order to be eligible for the Innovation Challenge, a project has to provide genuine industrial perspectives and have a real impact for the industry. The aim here is not to fund fundamental research but to assist the tangible implementation of innovation through a mid-term industrial and business development plan. Similarly, the project has to deliver an environmental benefit compared to other existing products and processes.

Open to all, €500K per year is allocated to the Innovation Challenge, not including participation, nor licence fees. Eligible costs that can be borne by Eco TLC include the following: personnel, research equipment, material procurement, consumables and supplies related to the project, etc. Corresponding to a net subsidy, Eco TLC's funding cannot exceed 50% of the project's total cost. So, before applying for the 2020 edition, discover our special section on the 9 2019 Innovation Challenge winners.



Materials from clothing recycling.



— EXPERTS COMMITTED TO SERVING THE CLF CIRCULAR ECONOMY —



THE 2019 INNOVATION CHALLENGE JURY

*Members of the Eco TLC Scientific Committee,
the 2019 Innovation Challenge Jury has nominated the 9 winners.
Who are the experts who make up the Jury?*

Eco TLC holds a vision of the future: one of a 100% circular clothing and footwear industry. This meets an urgent need in environmental protection and a technological challenge on which Eco TLC's Scientific Committee, an expert and assessment body, provides a key insight.

Since 2010, its thirty or so members are selected for their experience in the CLF industry or their authority in used CLF recovery solutions for use in other industries (plastics, non-wovens, composites, etc.). Representing public authorities, competitiveness clusters, higher education and research, marketers and collection, sorting and recycling operators, the members identify the drivers and obstacles for deploying circular economy in the industry. The Scientific Committee thereby promotes eco-designed products and fosters solutions that recycle non-reusable CLF items.

Responsible for conveying best practice, innovations and feedback in the research field in order to widen knowledge-sharing, the Scientific Committee also identifies, through the Innovation Challenge Jury, the most promising innovation projects to industrialise non-reusable clothing and footwear recycling. The 21 members that we introduce here have selected the 9 2019 Innovation Challenge winners and committed to follow each stage of their development.

Erwan Autret - ADEME

Engineer at the ADEME for the last 18 years, Erwan has held several positions on waste management. He then became Circular Economy Research Programme Manager. For the last 3 years, he's been coordinating the Design Division in the ADEME's Products and Material Efficiency Department and is specifically in charge of monitoring CLF EPR.



Joël Barrault - VALAGRO Recherche

PhD in Physics, green chemistry and catalysts. Honorary Research Director at the CNRS and Scientific Advisor at Valagro Research for the last 4 years.



Romain Benkirane - ENSAIT / GEMTEX

Post-doctorat researcher at ENSAIT in the GEMTEX laboratory, Romain assists companies in the areas of circular economy and eco-design.



Sylvain Bignon - TEXCELIS

CEO of Texcelis since 2013, a French company unravelling and recycling different textiles into felts and specific non-woven materials.



Florence Bost - SABLE CHAUD

A graduate from the National Industrial Design School in Paris, specialist in the integration of new technologies in the textile sector, Florence coaches companies and teaches in several faculties.



**Jean-Claude Jégou -
Fédération de la Chaussure**

Former footwear manufacturer CEO, who is today responsible for innovation and development within the Fédération de la Chaussure; UICOS vice-president and coordinator of the ResoCUIR Nouvelle Aquitaine cluster.



Ludovic Koehl - ENSAIT / GEMTEX

Engineer/researcher and Doctor in Philosophy. Scientific Advisor at GEMTEX, Ludovic is involved in a large number of projects on optimising textile quality and comfort by integrating physical measures and human knowledge.



Maxime Lerbut - PROMOD

An ESTIT textile engineer. Maxime was Procurement Manager for Kiabi and then Pimkie and is currently Sustainable Development and Supply Manager for Promod.



Régis Léty - CTC

Sustainable Development Manager at the Centre Technique du Cuir since 2002, Régis works on footwear and leatherwork lifecycle analysis; the carbon footprint of companies and on several research projects on recycling waste produced in the industry.



Claire Loire - LACOSTE

An ESTIT textile engineer, Claire was Clothing and Footwear Quality Manager at Auchan. For the past 16 years she has been Quality Manager at Lacoste.



Jeanne Meillier - EURAMATERIALS

Project Manager at Euramaterials (merge of UP-tex and Matikem competitiveness clusters), Jeanne supports European circular economy projects in the textile industry.



Kim Picard-Chaibi - TECHTERA

Engineer from the INSA Engineering School in Lyon, Kim is responsible for recycling and circular economy projects at Techtera: launching, coordinating collaborative innovation projects and facilitating the textile sector.



Clara Potton - SYNERGIES TLC

Engineer specialised in innovation management, Clara was Textile and Circular Economy Projects Manager for 5 years at Techtera. Today she is Textile Recycling Projects Manager at Synergies TLC.



**Karine Sfar - Fédération de la Maille,
de la Lingerie & du Balnéaire**

Karine is an engineer graduate from the Industrial Chemistry National School in Lyon, was Environment Technology Manager for 14 years and then Delegate General for the last 9 years at the Fédération de la Maille, de la Lingerie & du Balnéaire.



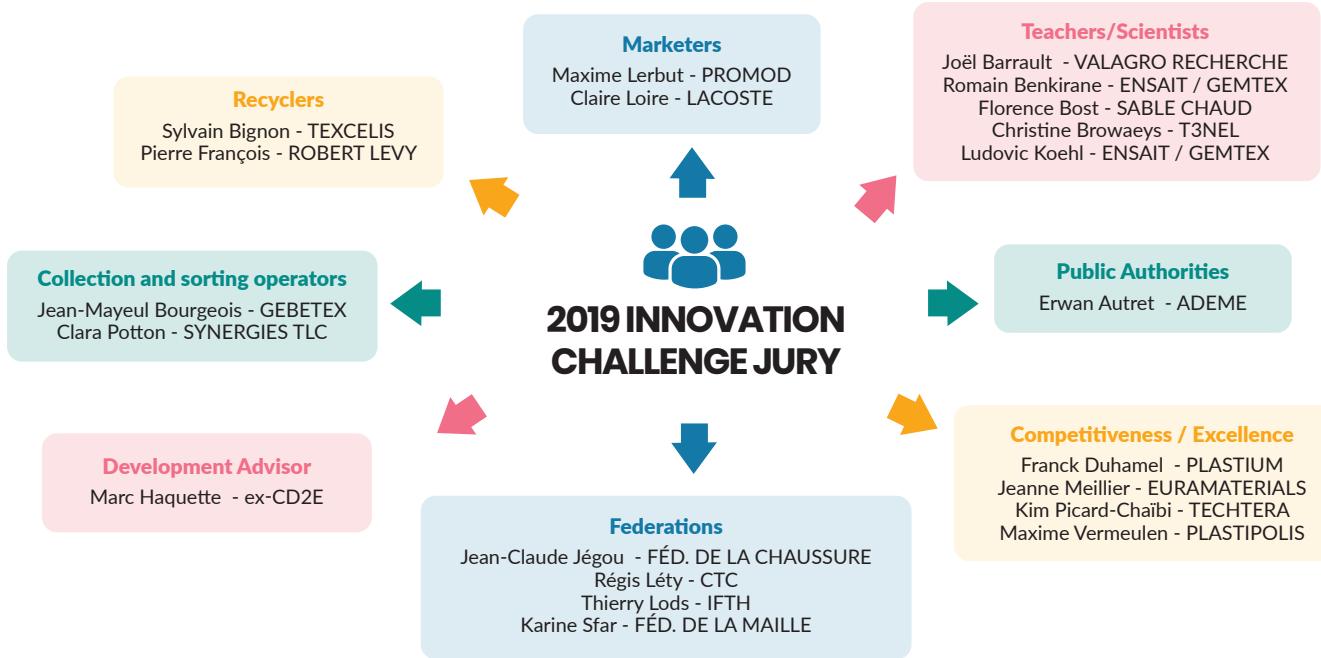
Maxime Vermeulen - PLASTIPOLIS

Graduate from INSEEC, Project Officer in Economic Development and Innovation in the automobile industry and then in the sustainable development and construction sectors, Maxime is now 'Future Industry' Project Manager at Plastipolis focusing on the ecological mutation of the "Plastics & Composites" sector.



Thierry Lods - IFTH

An ENSAIT Engineer, Thierry has worked in all areas of the textile industry (spinning, weaving, knitting, dyeing, and tailoring) in several sectors (underwear, apparel, automobile, technical fabrics, furnishings, baggage). He has been Industrial Director at IFTH for the last 5 years.



- THE 2019 INNOVATION CHALLENGE WINNERS -

Hervé Guerry
CEO, Cycl-add
hguerry@cycl-add.fr



Project: TEXTIC

TEXTILES WILL TURN INTO PLASTIC...

The additives created by Hervé Guerry for Cycl-add will transform polyamide textiles into a new plastic for the industry.

Your goal is not to recycle used textiles into textiles but to create a new plastic material for the industry. Why?

Recycling textile into textile is very complicated because there is practically no textile industry left in France. However, France has a very strong plastics industry and therefore our project consists in recycling used, non-reusable clothing into plastic parts. Our technology already enables us to recycle complex plastics and we will apply the same concept to clothing.

You do indeed state that 90% of our clothes are plastic!

Polyester is the same synthetic material as that of mineral water bottles. Polyamide is also a plastic. Even a cotton T-shirt is rarely 100% cotton; it

often contains polyester. Therefore, for us clothing is a gigantic source of materials. Clothing is often complex and multi-fabric, in several layers. For example, a ski jacket is comprised of, amongst other things, polyester and polyamides. We know how to recycle polyester but not polyamide mixes. So, landfilling polyamides has a cost for a recycling centre, a cost which is included in the price of polyester recycling. And there's a lot of polyamide out there: tights, T-shirts, sportswear often with elastane too. The question therefore is: how can these materials be separated to create others but at a viable cost? This is the balance that we must check within the framework of the Textic project.

This plastic will have new qualities. How?

The problem is indeed to give new properties



Shredded textiles



Recycled polyamide granules.

“ Our Textic project consists in recycling used clothing into plastic. **”**

to this material according to the target market: resistance to collisions in sports-leisure wear and the automobile industry, how it handles moisture, responds to weather conditions, etc. To provide a solution we have invented an unprecedented technology. We use industrial waste to create additives. These are mainly powder paints, but also toner from printing ink cartridges, waste that up to now was simply landfilled. Cycl-add collects this waste from industrials and invented a process that enabled two boosters to be created (Antiparos and Tinos) and an environment-friendly dye (Persissa). These additives provide the material with resistance properties that are required, for

example, against fire. Ultimately, from polyamide clothing we will obtain a polyamide material for technical uses such as car motor parts, ski fittings, parts for swimming pools, etc.

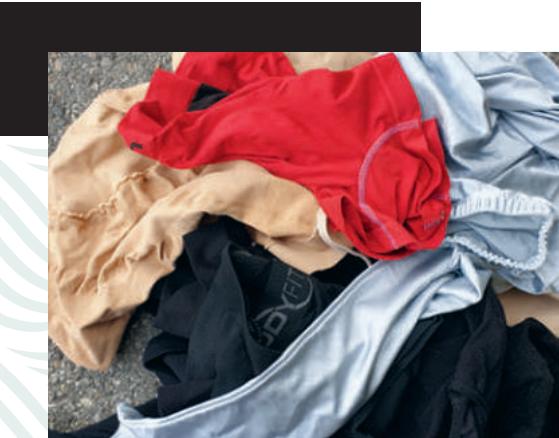
At which phase of the project are you at?

With lockdown we have suffered delays but the first trials carried out in our Oyonnax plant, in the "Plastic Valley" (Ain county, France) are very satisfactory. Firstly we have to define how we will prepare the polyamide clothing (shredding and sorting) then how we process them with our additives in order to obtain a new material. Also, the laboratory tests are very encouraging. We will then have to test this material with technical applications, study the characteristics obtained and lastly modify them according to specs. The project will last for a total of 13 months.

THE JURY'S OPINION

"This project is a true innovation because it should enable traditional additives to be bypassed. Sound and well built (trials, partnerships), it provides a genuine industrial process."

Joël Barrault
Scientific Advisor - Valagro Recherche



Clothes containing polyamide.

— PROJECT SUMMARY —

OBJECTIVE: Developing a recycling chain for polyamide-containing clothing in order to manufacture plastic parts.

Project duration
13
MONTH

PROJECT STRATEGIC AREAS:
■ Preparation materials for recycling.
◆ Incorporation of materials coming from CLF recycling into other sectors.

Type of CLF covered
CLOTHING

Eco TLC funding: **€60,000**

- THE 2019 INNOVATION CHALLENGE WINNERS -

Clarisse Merlet
Founder of FabBRICK
 cm.fabbrick@gmail.com



Project: FabBRICK

BE DARING WITH A BRICK... MADE FROM RECYCLED FABRIC!

Created by Clarisse Merlet, founder of FabBRICK, this new construction material for partition walls and seating will provide an innovative solution for recycling clothing.

How did you get the idea of making bricks from recycled clothing?

When I was studying my 3rd year of architecture in Rouen, I visited a travelling exhibition called "Matière Grise" (grey matter) at the Pavillon de l'Arsenal that exhibited small architectural designs made from waste. Knowing that the French people throw away a large quantity of clothes every year, I thought about making bricks using collected, sorted and shredded clothes". These bricks are thereby comprised of several fabrics (cotton, polyester, viscose, elastane, etc.). The aim isn't to build houses in cotton bricks, but to replace plasterboard sheets with acoustically and thermally insulating internal partition walls, and to create furniture and seating. My project may represent an alternative for

brands that must give a second life to their unsold items under the French law of 10 February 2020 on Waste Management and Circular Economy.

What are the project phases and ultimate goal?

Today, 17,000 bricks have been made and more than 8 tonnes of collected items of clothing have been recovered in our workshop. Production is currently handmade using compressors designed with my father, an industrial designer. I'm currently working on the industrialisation of this process with the project of a small pilot factory in Paris. Furthermore, R&D on the material is ongoing in order for it to be a construction material, accessible to all specialised shops. My material remains too

In the 19th district of Paris, clients can see the partition walls and furniture produced in the FabBrick showroom.

“The aim is not to build houses in cotton bricks, but to replace plasterboard sheets with acoustically and thermally insulating internal partition walls, and to create furniture and seating. **”**

light to be used for a supporting partition wall. For the moment, I make my bricks for decorative and insulation purposes, that can be affixed to existing partition walls. By profession, I'm an architectural designer and interior designer. The challenge is to work with qualified persons to develop a self-supporting material.

Is the secret of your recycling solution a glue that you invented?

Yes, it is. It took me 6 months, all by myself, to create a glue that perfectly binds the textiles, that is not chemically-based nor polluting. It is made from ingredients that do no deteriorate over time.

Designed by the agency Malherbe Paris, partition walls and shelving in recycled denim decorate the Jules shop in Bordeaux



An essential stake: how does your brick respond to fire?

My material is currently certified M3 to "fire resistant" standards, i.e. "a combustible material that cannot easily burn". The purpose of the research funded by Eco TLC is to obtain the classification M1, "non-flammable combustible", or even M0, "combustible-proof".

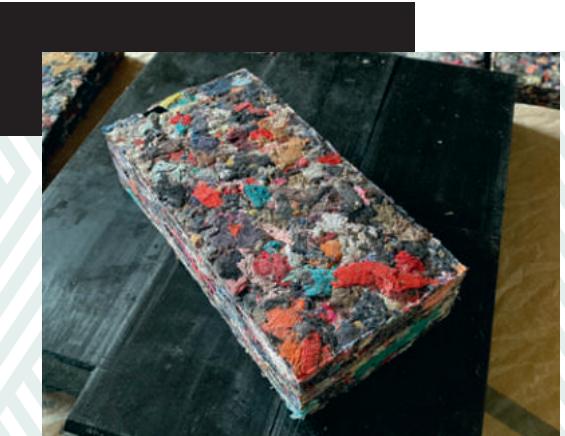
The menswear brand Jules strongly supports you to the point of entrusting you to decorate its shops. How did you meet?

The brand wanted to redecorate its shops but in an environmentally responsible, zero waste way. Jules managers had heard about my work and loved the bricks. So they ordered 5,000 bricks in October 2019 to furnish 7 of their shops (Bordeaux, Tours, Amiens, etc.). At each inauguration, the bricks were well received so the brand ordered thousands for its hundred or so shops.

THE JURY'S OPINION

"What interests me about this project is the goal to create new construction material from these recycled textile bricks and thereby provide a solution to the world of construction."

Maxime Vermeulen
"Future Industry" Projects Manager - Plastipolis



Using 3 non-reusable T-shirts, FabBrick obtains 400g of textile that, once glued and compressed, makes a brick.

— PROJECT SUMMARY —

OBJECTIVE: Developing a structural, insulating and aesthetic construction material made from recycled textiles.

Project duration
12 MONTHS

PROJECT STRATEGIC AREAS:
Incorporation of materials coming from CLF recycling into other sectors.

Type of CLF covered
CLOTHING AND LINEN

Eco TLC funding: **€90,532**

- THE 2019 INNOVATION CHALLENGE WINNERS -

Fabrice Lodetti
CEO, Filatures du Parc
filiatures.parc@wanadoo.fr



Project: PAMREC

FOR QUALITATIVE AND COMPETITIVE RECYCLING OF POLYAMIDE

Filatures du Parc's aim is to create the first 100% recycled polyamide yarn made from end-of-life clothing.

Why isn't polyamide from used textile currently recycled into yarn?

No-one has yet addressed this problem. Indeed, this is an elastic and resistant fibre making it difficult to recycle. Thanks to our patented defibering machine and our experience we have decided to rise to the challenge with the Pamrec project! Polyamides, invented in 1927 by Dupont de Nemours, have become popular synthetic yarns found in the composition of many clothing items (tights, T-shirts, sportswear, etc.). Unfortunately a significant amount is currently lost. The environmental balance is poor and, for the moment, polyamides are not part of a 100% circular economy.

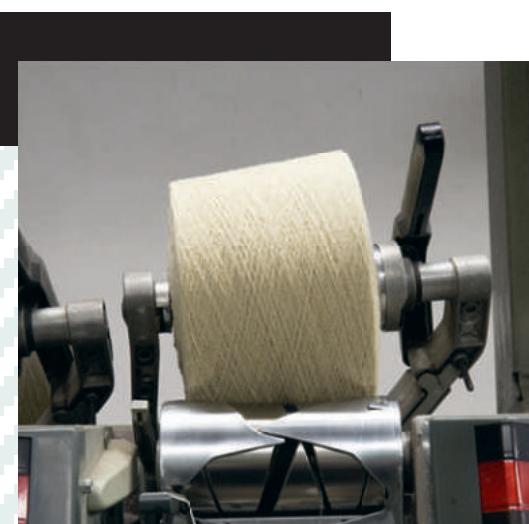
What solution does the Pamrec (recycled polyamide) project provide?

Filatures du Parc have developed a defibering technique allowing to recover fibres from used clothing, with properties close to those of virgin fibres, especially fibre length. We have also managed to create recycled wool and recycled cotton yarns for knitting and weaving. Our know-how in defibering and the means of adjustment of our machines lead us to believe that we should be able to maintain a high enough quality for recycled polyamides in the footwear articles (stockings-tights, socks). The Pamrec innovation project focuses on creating a 100% recycled polyamide yarn of sufficient quality to create wovens or knitwear.

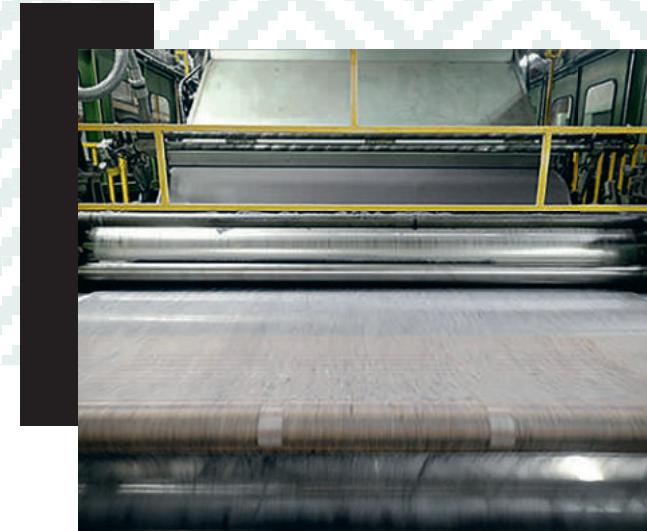
THE JURY'S OPINION

"This is an interesting project because it is being led by a major player in the recycled material sector in France that is part of an entire ecosystem. In particular, it will ultimately provide the opportunity to have a closed loop, polyamide recycling value chain, i.e. manufacturing yarn made from used clothing."

Kim Picard-Chaïbi
Project manager - Techtera.



An automatic spooler.



Carding machine.



Spinning machine.

“ Filatures du Parc have developed a defibering technique allowing to recover fibres from used clothing, with properties close to those of virgin fibres, especially fibre length. **”**

What are the project's phases?

Based on the selective sorting of end-of-life clothing, an industrial feasibility study needs to be undertaken. The first stage is to study the sector's structure (collection, sorting, disassembly) and the corresponding economic impacts. At the same time, a study on the industrial spinning line will also be undertaken by finding adjustments and the material transformations required for manufacturing this new yarn. We'll check the technical feasibility,

ensure that the material's quality is maintained for reuse in the industrial sector, and will address the economic viability of this recycling chain. Lastly knitwear industrials, and maybe weaving, will be invited to make sample items that will be tested (abrasion, sizing stability, etc.).

What are the sales outlets?

The socks and tights brand, Bleufôret (Tricotage des Vosges) will make prototypes and will characterise them according to their technical specifications. Hélène Verhelle from Povera will make fabrics with recycled yarns made by Filatures du Parc. Our main goals are to offer a collection of yarns made from 100% recycled polyamide and to be able to offer our clients 100% recycled yarn from their own pre- or post-consumer waste.

- PROJECT SUMMARY -

OBJECTIVE: Recycling used clothes made from polyamide to make a 100% polyamide yarn for the footwear articles sector and to create new fabrics.

Project duration

33 MONTHS

PROJECT STRATEGIC AREAS:

- Preparation of materials for recycling.
- Eco-design of products in the CLF industry

Type of CLF covered

CLOTHING

Eco TLC's funding: **€ 172,240**

- THE 2019 INNOVATION CHALLENGE WINNERS -

Anne-Céline Humeau
CEO - Humeau-Beaupréau
ac.humeau@bopy.fr



Project: ReBoot

THE 7 LIVES OF PVC

Despite the company already recycling its own production waste, Anne-Céline is widening her process by collecting sandals and boots to recycle up to 7 times the PVC they contain!

Why is PVC's ecological image so negative?

Firstly, for a long time PVC contained phthalate, a chemical considered to be potentially harmful to health. Humeau-Beaupréau, the last French PVC boot injector hasn't used this for the last 20 years. This corresponds to our undertaking in product safety and we request the same from our suppliers. We test our products every 6 months to check them. PVC recycling processes do not exist in France. PVC footwear at the end of its service life is simply incinerated. However in reality the negative image of single-use plastic disposal doesn't apply to PVC. Our sandals and boots last for 15 years and are 100% recyclable 7 times without the PVC losing any of its properties. And we already do this internally.

How do you do this?

Since 2014, we recycle up to 99% of PVC scraps and waste coming from our footwear articles. We can do this thanks to the acquisition of a bi-material shredder unit enabling PVC to be separated from textiles because in a boot, PVC is integrated to a fine textile sock that lines the boot. Upstream we have implemented colour sorting in order to obtain 4 colours by adding dyes to shredded PVC: black, green, brown and midnight blue. For 1 tonne of PVC boots production waste we are able to recover 900 kg of PVC with the same quality, for reuse into the production chain.

“ Our PVC sandals and boots last for 15 years and are 100% recyclable 7 times without the PVC losing any of its properties. ”

So the ReBoot project extends this production waste recycling process to the recycling of post-consumer footwear?

Yes exactly. We want to recover our end-of-life products and give them a second life. We sell 1 million pairs per year and the idea is to collect our products first, then step by step, extend collection to all used PVC footwear. One of the difficulties is to avoid collecting products that contain phthalates in order to maintain the PVC's integrity in our footwear. Indeed, phthalate has only been prohibited for the last 5 years and can therefore still be found in some of our competitors' end-of-life products.

Are you going to start by a feedstock study?

Indeed, we are going to examine what we can recover and under which conditions. We have to

get organised with a collector, find out the exact composition of products which aren't ours, and think about how to give a second life to products, textile waste and PVC that we won't retain. It is also important to design the cleaning stage. A pair of work boots used in farming may contain traces of fertiliser. We must work on a cleaning and drying unit, even including disinfection, so that the boots are completely clean before they are recycled. In parallel we're also studying the cost of this recycling process.

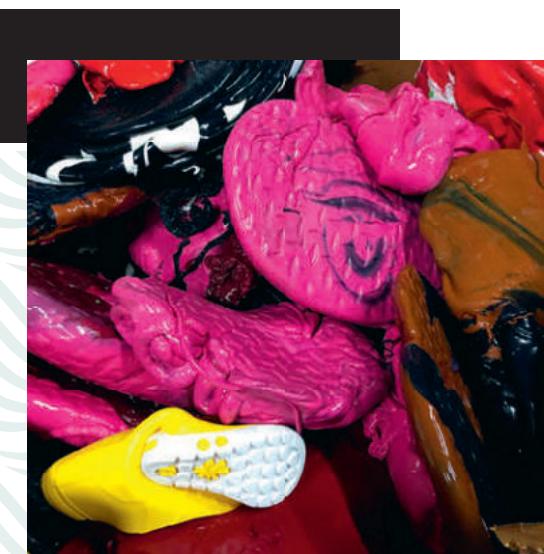
Will collection operations be launched in January 2021?

Due to lockdown, the project has been slightly delayed but we have already started to contact retailers in the Pays de Loire region. At the beginning of next year, we will carry out a collection test in order to confirm the semi-industrial process while checking its financial and operational feasibility. There are no major technical obstacles and the creation of a recycling loop for end-of-life PVC footwear items will be a true innovation for the industry.

THE JURY'S OPINION

"This project is a first that is of interest to the entire industry because no-one currently recycles PVC. Products are sent to waste treatment centers to be incinerated and this cannot continue. Recycling PVC is a true challenge."

Jean-Claude Jégou
Innovation and Development Manager -
Fédération de la Chaussure.



PVC production waste to be recycled.



Regenerating recycled PVC granules from factory production waste.



Recycled PVC granules.

- PROJECT SUMMARY -

OBJECTIVE: To perform a pre-study on the feasibility and the costs of recycling end of service life PVC footwear.

Project duration
19 MONTHS

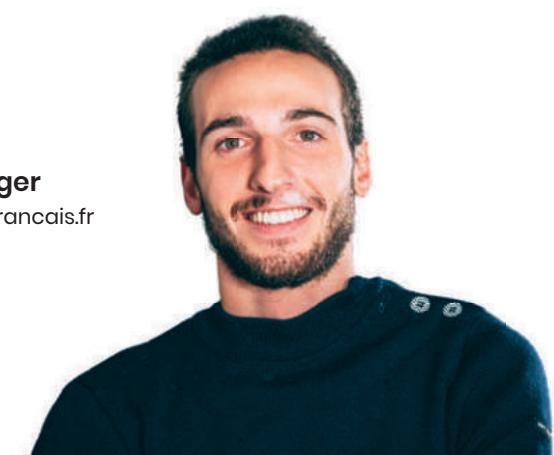
PROJECT STRATEGIC AREAS:
Preparation of materials for recycling.

Type of CLF covered
FOOTWEAR

Eco TLC funding: **€ 80,000**

- THE 2019 INNOVATION CHALLENGE WINNERS -

Antoine Morel
Bon Sens (or CSR
- Corporate Social
Responsibility) Manager
 antoinemorel@leslipfrancais.fr



Project: LE SLIP CIRCULAIRE

THE SLIP FRANÇAIS WANTS BRIEFS ...TO BE CIRCULAR!

By designing a new recycled cotton yarn, the famous briefs brand intends to offer The Circular Briefs in its shops by January 2022.

Why doesn't underwear made from recycled materials exist?

Each year, 2.8 million items of clothing are put on the French marketplace⁽¹⁾ and less than 1% is recycled to make new clothes. In regards to underwear and socks this is zero. For maximum comfort, most of the underwear and socks manufactured over the last twenty years are comprised of two mixed materials: cotton and elastane. However, as we don't know yet how to separate these materials, recycling mixed materials remains more complicated than recycling mono-material clothing. The purpose of the Slip Circulaire project is to develop new recycling techniques in order to obtain a quality cotton yarn that is thin enough and of good quality to remanufacture underwear. We would thereby be able to offer truly eco-responsible fashion.

How was the Moncoton project created, that you have now joined?

It was initiated 3 years ago by the 1083 team, a French jeans manufacturer. Funded by Eco TLC and the ADEME, 1083 managed to develop a recycled cotton yarn from used jeans. So, we have the same approach with a technical difference: cotton yarn used for underwear is much thinner than that required for weaving jeans. The aim of the Slip Circulaire project is to create a finer yarn from clothes other than jeans. In regards to the research, we have a partnership with the Lorraine Cetelor Laboratory that works with machines provided by MK2T. Together, we're going to study how used clothes respond to different garnetting processes and see if we manage to obtain a sufficiently qualitative recycled cotton yarn.

Different garnetting processes will be used for each source in order to try and find the most suitable method to obtain the longest fibres possible.

“The Moncoton project aims at developing new recycling techniques in order to obtain a sufficiently thin and qualitative yarn to remanufacture underwear. **”**

In which phase is the project today?

We should have started the collection phase on 11 March but with lockdown, this has been delayed by two months. We work with the sorting operator Le Relais Val de Seine who will supply us with our first 20kg batch of "all sorts", underwear and socks which composition is mixed and unknown. We collect our own brand end-of-life products from consumers (second 20 kg batch) in-store because we have the responsibility of knowing how to recycle clothes that we sell and because we know the exact textile composition of our products. We will therefore have a baseline that will enable us to understand the effects of composition on garnetting. Le Relais deals with trimming, i.e. removing the elastic and the label in order to obtain a uniform material ready to be recycled.

Fibre length after garnetting will define the level of new material necessary to incorporate in order to create a quality yarn.



THE JURY'S OPINION

"The interest here is that the project is both upstream, with the feasibility of a recycled yarn as fine as possible and with the highest possible recycled cotton content, and also downstream with industrialisation issues (adjustment of machinery) and the final product design."

Marc Haquette
ex-CD2e



From material knitting to packaging including the elastic and labels, all supply and manufacturing stages are carried out in France.

OBJECTIVE:

Development of a suitable yarn for knitting underwear with the highest possible recycled cotton content.

Project duration
17 MONTHS

PROJECT STRATEGIC AREAS:

- Preparation of materials for recycling.
- Eco-design of products in the CLF industry.

Type of CLF covered

CLOTHING

Eco TLC funding: **€47,750**

- THE 2019 INNOVATION CHALLENGE WINNERS -

Jennifer Weimmerskirch
Innovation and
Eco-responsibility Manager
 projet@billion-mayor.com



Project: ReSY

AT LAST AN ECO-FRIENDLY ELASTIC YARN

At Sofila, Jennifer Weimmerskirch works on an elastic yarn that is innovative, environmentally-friendly and made in France.

In what way do the elastic yarns that we know pollute?

An elastic yarn is made of elastane that has elastic properties, covered by another fibre, cotton or polyester, in order to make it more resistant.

Elastane (an oil derivative) pollutes because its manufacturing process requires toxic solvents and at the end of its life cannot be recycled. We cannot separate elastane from cotton or polyester and we end up with waste that is impossible to recycle and that is either incinerated or landfilled.

1 million tonnes of elastane were produced in 2019, 75% of which in China⁽¹⁾. Relocating back to France the production of a yarn with the same properties as that of elastane is also another stake.

Does your ReSY (Recyclable Stretch Yarn) project meet the Fashion Pact goals, launched at the G7 meeting in August 2019, aiming to reduce the environmental impacts of the textile industry?

Indeed it does. Elastic yarns are present in a huge amount of sports clothing, socks and limited lifespan medical compression items, etc. We can therefore improve the environmental impacts of these products by replacing elastane with a new, innovative, environmentally friendly process and allowing end-of-life products recycling.

What is this new process?

Sofila is a milling - texturing company, a yarn specialist having a laboratory and two factories

Coton-elastane yarn, manufactured using traditional braiding.

“The manufacturing method that we're developing is quick, doesn't require any solvents and results in an intrinsically elastic yarn that can be recycled. **”**

in France. Along with our partners, the French Institute of Textile and Clothing and Innothera, a company in the health sector, we're going to manufacture a bi-component yarn, based on polyamides and thermoplastic elastomer. The process known as "high-speed melt spinning" already exists for manufacturing polyamide or polyester yarns, but it has not yet been technically studied for making an elastic multi-filament. This is where our innovation lies: include elasticity in

an existing process. The manufacturing method that we're developing is quick, doesn't require any solvents and results in an intrinsically elastic yarn that can be recycled. The materials are bio-sourced and avoid, of course, oil-based products.

What are the next steps in the project?

In the first instance, choosing materials with a view of getting a high performance and spinnable mix. After testing, we'll proceed with spinning tests in the laboratory to characterise the stretch profiles, mechanical properties, dyeing problems, etc. Lastly, we'll adjust milling and texturing processes in order to obtain unprecedented mechanical and uniform dyeing properties.

(1) Source : Man Made Fibers Year Book 2018.



THE JURY'S OPINION

"ReSY is a well-structured project that addresses a genuine problem: the non-recyclability of elastane. The creation of a new material would be revolutionary and would find a huge number of applications."

Kim Picard-Chaïbi
Project manager - Techtera

— PROJECT SUMMARY —

OBJECTIVE: Development and industrialisation of a new, high performance, eco-friendly elastic yarn

Project duration
12 MONTHS

PROJECT STRATEGIC AREAS:
 Eco-design of products from the CLF industry

Type of CLF covered
CLOTHING AND LINEN

Eco TLC funding: **€45,300**

- THE 2019 INNOVATION CHALLENGE WINNERS -

Clara Potton
Synergies TLC
Innovation Manager
 c.potton@synergies-tlc.com



Project: UTILE

TAILOR-MADE RECYCLING

At Synergies TLC, Clara Potton is undertaking a study on the industrialisation of textiles preparation for recycling in order to meet the technical specifications of each recycler.

In 2015, why did 6 CLF collection and sorting centres join forces to form Synergies TLC?

Recycollecte, Recytex, Vosges TLC, Alpes TLC, Tri Vallées and Provence TLC, all CLF collection and sorting centres in France and Belgium, joined forces because they share a common goal: to industrialise end of life clothes recycling. Currently, trimming and sorting tasks are carried out by hand. The process is therefore slow, not very precise due to the material mix in textiles, and expensive, thus preventing a viable economic model to recycle these textiles.

What does the UTILE project consist of?

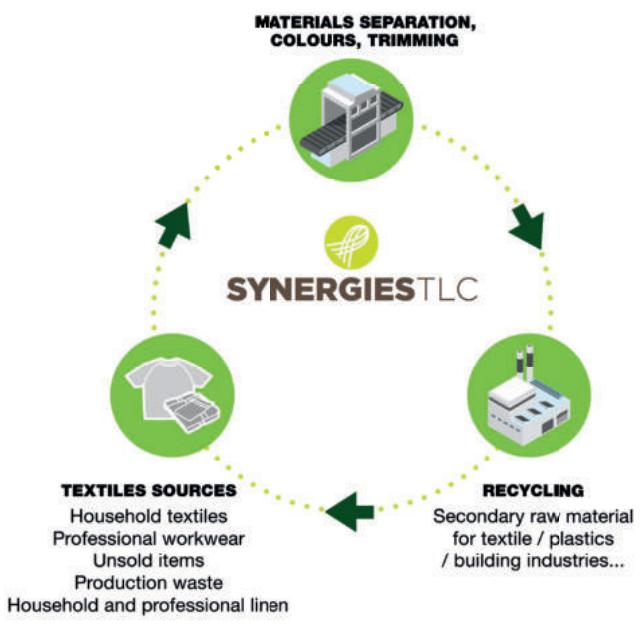
The UTILE project (industrial trimming and sorting of clothing and linen) that Synergies TLC leads consists in validating the economic and technological feasibility data for a future industrial

unit that will process the 50% of clothing which, after sorting, is not currently reusable on the second hand market, and therefore shipped abroad for recycling⁽¹⁾.

What are the project's key points?

To work with recyclers in order to understand their needs in terms of raw materials, understand the properties that they look for in regards to fibres, composition, preparation and colours. Once the different technical specifications have been defined, we'll study the existing equipment in order to identify those that are the most suitable to meet the specifications. The technological tools must enable the materials and colours to be precisely identified. Some machines may need to be modified and we must think of the best way to make these machines

UTILE project diagram by Synergies TLC.



Manual sorting zone in a Synergies TLC centre..



precise sorting per material. Or that the material supplied is shredded or cut into 4x4cm squares. Let's take the example of a jeans recycling company. It has implemented in-store collection with a view of garnetting these used jeans. They can work with us to supply used jeans of a certain colour in order to have uniform batches or get more if collection is too low. We will supply them with jeans after having removed the hard points so that they can process the material. This tailor-made approach means that we can work to order, following the requirements.

Is the field of potential applications significant?

It's enormous. In fine, these recycled textiles will be transformed into yarns for the textile industry, insulation for buildings, into compounds for the plastics industry, etc. Our work is to envisage all possibilities too.

(1) Source : Eco TLC

“Currently, trimming and sorting tasks are carried out by hand. The process is therefore slow, not very precise due to fabric mix and expensive, which prevents a material recycling economic model to be found.”

work together. The study that runs until July 2021 must validate the future industrial unit's economic model in relation to the market's needs. The next stage will be its construction.

In what way is your solution “tailor-made”?
The purpose is to meet a recycler's specifications as best as possible. We will supply them with exactly what they require. One will only want white, regardless of the material. Another will require

- PROJECT SUMMARY -

OBJECTIVE: Testing and demonstrating the feasibility of an industrial unit for trimming and sorting cotton, polyester and polyamide textiles (100% and mixes).

Project duration
18 MONTHS

PROJECT STRATEGIC AREAS:
Preparation of materials for recycling.

Type of CLF covered
CLOTHING AND LINEN

Eco TLC funding: **€ 116,822**



Material from sorted and chopped used clothing.

THE JURY'S OPINION

"This project is interesting because of its industrialisation ambition by replying to current obstacles in the industry, i.e., sorting of materials and the removal of hard points."

Marc Haquette
ex-CD2e

-THE 2019 INNOVATION CHALLENGE WINNERS-

Maurits Vandeputte
Engineer and Project
Manager Valvan
 maurits.vandeputte@valvan.com



Project: TRIMCLEAN

TRIMCLEAN, THE END OF HARD POINTS

By using artificial intelligence, the tool designed by Valvan will enable trimming of used clothing to be industrialised.

Your Trimclean project targets trims.
Are these a significant obstacle in the recycling of non-reusable clothing?

In the fashion industry all materials other than fabric that are directly attached to an item of clothing are called trims. These include zips, buttons, embroidery, labels, patches, beads, motives, etc. Textile sorting and recycling companies consider this problem as "THE" bottleneck preventing the industrial recycling of textiles. Numerous automated solutions for the different parts of this recycling value chain already exist, but their interconnection is still missing. With Trimclean, an automated trimming technology for used clothing, Valvan would like to find the missing link for eliminating trims.

So is the solution to cut out the parts of the clothes containing these hard points?

Yes exactly. The technology cutting clothes into small shreds already exists in France and in Italy. So we're not going to focus on cutting but on a technology that recognises trimmings in order to sort the small shreds. This doesn't exist and this operation is currently carried out manually, using scissors. We have some leads, especially in using artificial intelligence. This is at the heart of the Trimclean innovation. With the help of Eco TLC funding we're going to study, develop and test Trimclean.

How do you intend to proceed?

The idea is to cut up clothing into pieces of around 60x60mm before removing the pieces containing trims. These pieces will be spread out so that

“With Trimclean, a used clothing cleaning technology, Valvan wishes to find the missing link to removing accessories.”

different inspection and detection techniques can be used to gather information for each individual piece of clothing and its trims. The combination of this information will feed a smart algorithm, capable of detecting pieces containing trims. Then these will be ejected from the conveyor belt by air jets. At the end of the process we will obtain material free from any hard point, ready for the mechanical/chemical recycling of used clothing.

So Trimclean cannot be dissociated from one of your other innovations, Fibersort?

That's right. One works after the other in an automated sorting chain. Fibersort is a technology which enables us to automatically sort large

volumes of post-consumer clothing based on their fibre composition. The scanning technology utilised is NIR spectroscopy, a spectroscopic technique based on the molecular absorption measured in the electromagnetic spectrum's near infrared part. Fibersort thereby enables the clothing's fibre types to be determined (cotton, wool, polyester, mix of these fibres, etc.) and to sort by fibre type. The Trimclean algorithm will use the information obtained during the Fibersort stage and this will enable us to personalise Trimclean's detection parameters based on fibre type and colour. The Fibersort/Trimclean combination will then enable the industrialisation of recycling at an acceptable cost.

At which stage of the project are you at?
We should have started the 1st research and development stage in March 2020 but with the health crisis, it will only start in June or July. This is the stage of the project funded by Eco TLC. So, our goal is then to build an entire industrial chain integrating Fibersort and Trimclean.



THE JURY'S OPINION

"Valvan is addressing one of the major recycling obstacles: hard points. The advantage is that Valvan sits in an entire value chain for preparing materials. Lastly, the idea of using artificial intelligence is interesting. It is a form of robotisation that makes the process economical."

Jeanne Meillier
Project Manager - Euramaterials

60x60 mm T-shirt cuts, enabling those with trims to be isolated.

— PROJECT SUMMARY —

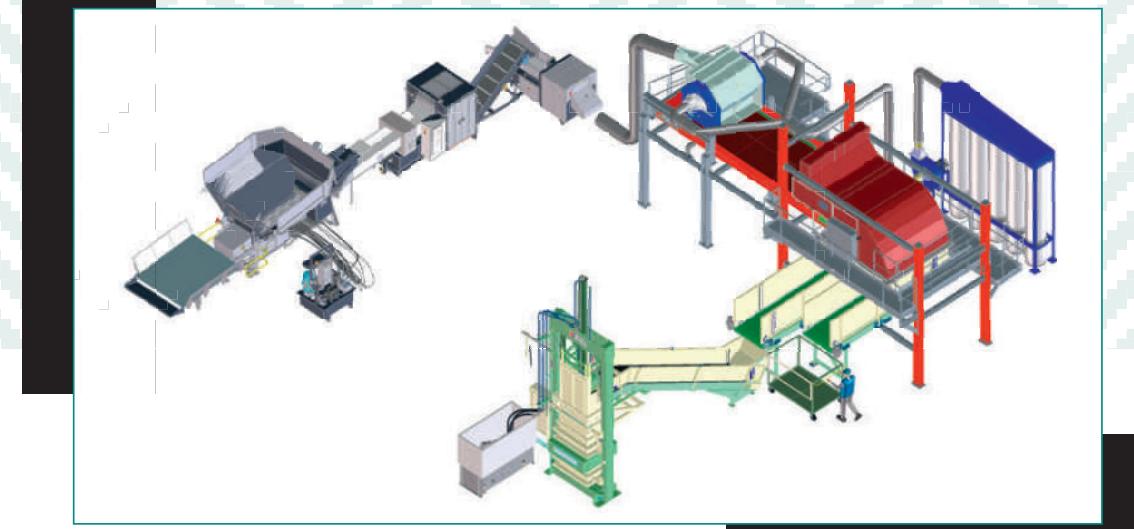
OBJECTIVE: Developing a technology able to remove trims from used clothing in order to generate material which is ready for use in recycling.

Project duration
18 MONTHS

PROJECT STRATEGIC AREA
 Preparation of materials for recycling.

Type of CLF covered
CLOTHING

Eco TLC funding: **€61,213**



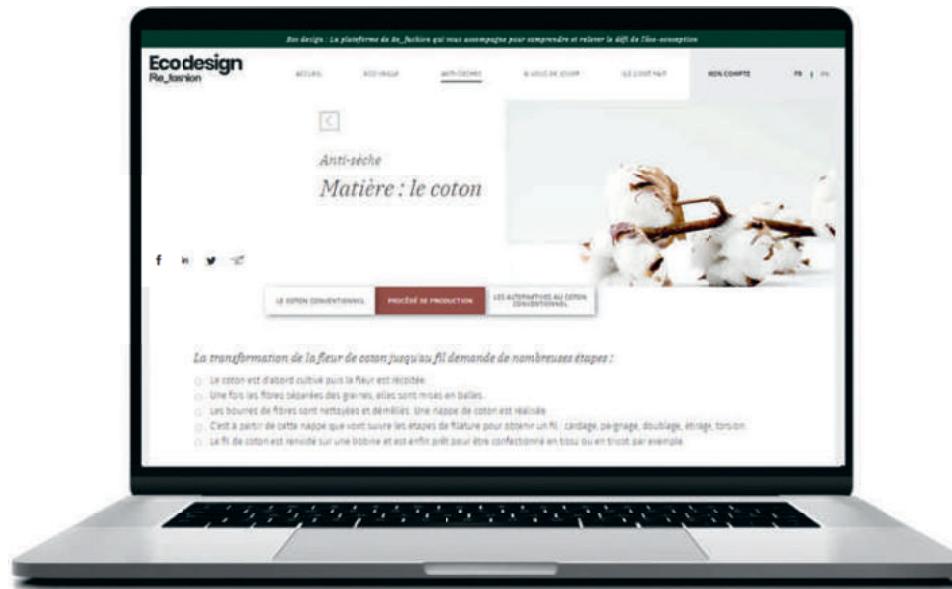
3D drawing of the Trimclean facility.

— NEW, THE ECO DESIGN PLATFORM! —

Eco design Re_fashion



www.re-fashion.fr/eco-design/fr
a.routhiau@ecotlc.fr



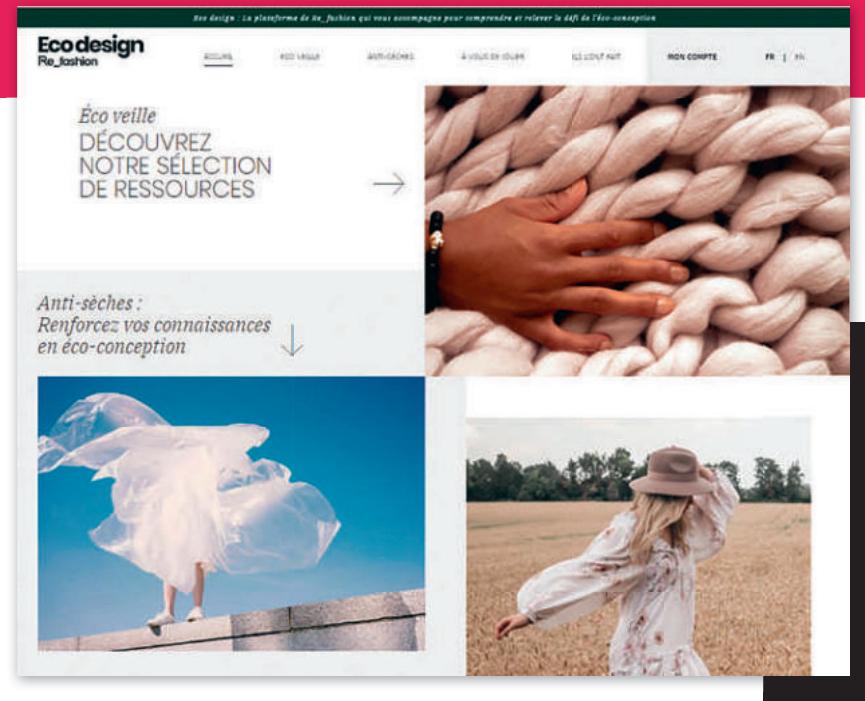
ECO DESIGN, THE ECO-DESIGN GUIDELINE

New and unprecedented, this digital platform, created by Eco TLC, provides information and support to clothing and footwear brands in order to rise to the challenges of eco-design.

Everyone is talking about it, but few know how to implement it: the circular economy is growing and with it eco-design, a powerful driver for changing the clothing and footwear industry model. Producing more sustainably, reducing the quantity of waste and working towards recyclability: such is the battle that we face today. To win this battle, Eco TLC has created, in partnership with the ADEMIE, the DGE and an experts committee that has validated all the project phases, the Eco design digital platform, a concise and accessible tool for raising awareness in eco-design and supporting brands.

The eco-design reflex.

"Eco design is aimed at fashion professionals such as designers, technologists, product or collection managers because it is them who now have the power to design their products in an eco-friendly way". Eco-design starts with a designer's sketch!" explains Adèle Routhiau, Eco-design Project Manager at Eco TLC. Aesthetically pleasing, the Eco design site covers the visual conventions of fashion sites and can be consulted by everyone: brands, suppliers and partner manufacturers (including internationally via the site's future English version) as well as fashion students. Aware right from the beginning of their studies, these students are future fashion professionals for whom eco-design must become an automatic reflex. The platform thereby provides all the basic knowledge needed: understanding about materials, dyes, possible alternatives, lifecycle analysis, etc. Eco design is a tailor-made eco-design guideline!



Practical and tangible fact sheets.

"We also want to help brands take action" continues Adèle Routhiau. "On the site there's the tab 'Your turn to act' providing practical fact sheets to assist, step by step, product managers, designers and buyers to switch to eco-design. Each fact sheet includes a dozen stages to be followed one by one. For example, with the fact sheet "Design a more easily recyclable textile product", professionals can learn about those who are taking action, what type of partnerships they need, what financial savings are expected and how long it takes to implement. It's extremely practical". The heading "They did it" also provides feedback from those marketers already practicing eco-design (methodology, obstacles encountered and drivers for success). Eco TLC already thinks of new functionalities for the Eco design platform such as a tool allowing fashion professionals to contact collection and sorting operators in order to implement product recycling initiatives. Or also an environmental calculator that will enable fashion brands to evaluate the environmental impact of their products throughout their lifecycle in just a few clicks, according to the materials chosen, manufacturing methods, etc.

A participative platform.

"For this project, brands were involved in all stages of the project's development: questionnaires, interviews, workshops, etc. This gave many opportunities to hear and note their needs and advice for developing a tool that meets their expectations in terms of content and format", concludes Adèle Routhiau. Eco design won't exist without its users, the clothing and footwear brands. Their experience is worth sharing and will constitute the backbone of tomorrow's Eco design platform!"



Product development teams are Eco design's priority target.

WHAT DID THEY BECOME?

Spotlight on 4 Innovation Challenge winners:

At what stage are they now and what are their next steps?
Let's return to the innovative ideas that are becoming a reality...



Isabelle Dayde
Textile Procurement group
Manager at Auchan
 idayde@auchan.com



From telephone cases to daily objects.

Telephone cases made from recycled textiles: this was Auchan Retail France's Recyc'lab project, thanks to a thermal induction process by the industrial plastic specialist, Roctool. "We managed to obtain a satisfactory thermoformed material, the case existed" happily says Isabelle Dayde. "However, it became clear that for the case to adhere well to the telephone, we had to carry out an additional injection of plastic into our material. This required a significant but unprofitable, financial investment. Indeed, as telephones change shapes every year it was impossible to have a return on investment for two types of moulds over such a short period of time". As the material existed, Auchan started to think about manufacturing products that only required a single mould. Several areas then opened up: decorative items, trays, hangers, etc. The Recyc'lab project is therefore going to continue and develop with new products, as soon as the health crisis is over.



Charlotte Wallet
Textile Project Coordinator
at Audacie
 c.wallet@audacie.org

Olivier Civil
Business
Development
Manager
 olivier@plaxtil.com

A new plastic has arrived!

The ecological plastic project funded par Eco TLC in the 2017 Innovation Challenge under the name of Plas'tile, has really progressed! This new material made from textile waste (up to 40% pure or mixed textiles) and an oil-based or natural origin mould is now called Plaxtil and was officially presented at the end of October 2019 at the K2019 trade show in Düsseldorf, the plastics industry's main event. "The commercial brand was created as well as the internet site and communication around the product" rejoiced Charlotte Wallet and Olivier Civil. "We are now prospecting the market for companies who have textile waste to recycle and are offering them a comprehensive and circular solution. With their textile waste we are offering to replace traditional plastic objects that they have with new ones made from ecological plastic". Negotiations are underway with several marketers, with manufacturers, etc. The waste from the milliner, Crambes, is transformed into a hard supporting medium for the inside of caps. Visors, door openers, sanitizing gel bottles, coat racks and open front storage boxes are also available. Our aim for 2020 is to produce 250 tonnes of Plaxtil from 100 tonnes of textile waste", conclude Charlotte Wallet and Olivier Civil. There are plans for a dedicated production line to be created in the CDA development factory, Plaxtil's parent company.

RECYCLED JEANS AND CELL-JEANS

David Leromain
Equipe 1083 Innovation
R&D Manager
 david@1083.fr



The gradual industrialisation of jeans made from 100% recycled cotton

A winner of the 2016 Eco TLC Innovation Challenge, the 100% recycled cotton jeans project by Equipe 1083 is finished. "It's a success", says David Leromain, very pleased. "We've created 2 yarns, first a 75% recycled cotton - 25% virgin cotton one and then a 100% recycled cotton one. We then launched the "Moncoton" project, winner of the ADEME's innovation competition in their Investissements d'Avenir programme in 2019, that aims at industrialising our process". Also, Equipe 1083 is currently acquiring machines in order to be able to produce a much larger quantity of yarn at the beginning of 2021. "We are scaling up and by 2022 we will be able to offer jeans made from 100% recycled cotton", concludes David Leromain.

A second project, Cell-Jeans, a winner of the 2017 Innovation Challenge is ongoing. This involves manufacturing a new yarn from the cellulose in used jeans. Indeed, fibres obtained from unravelling are often too short to be used in traditional spinning and Equipe 1083 wants to extract the cellulose in order to manufacture new regenerated fibres. "Cell-Jeans is therefore an entirely complementary project to the 100% recycled cotton jeans project", emphasises David Leromain. "By working with the CANOE technological hub located in Pessac, we have managed to obtain a yarn that we are currently looking to optimise. Indeed, the CANOE equipment is sized to produce a thick yarn whereas we require thin yarns. Today, we are looking for a partner who has this technology in order to progress. Unfortunately, none exists in France. Discussions are being held with several companies in Europe, to implement the industrialisation of this yarn produced from the cellulose of used jeans". Watch this space...



Gauthier Bedek
R&D Manager at La Manufacture Eram
 gbedek@eram.fr



Tests on an industrial scale.

With the Design for Repair project, Eram aimed at developing a new footwear design and manufacturing process that would enable all the components of footwear to be easily disassembled at end of life in order to be recycled. "We are currently filing patents and carrying out tests on an industrial scale for two product categories: boots and sneakers", explains Gauthier Bedek R&D Manager at La Manufacture Eram. "The technology (glue formulation to assemble the upper and sole of footwear) and pilot tests have been validated". We are presently working with our suppliers on the recycling process. The question is how can end-of-life soles be returned in order to reintegrate them into new products? What is the maximum percentage that can be reintegrated into new soles? How profitable would this be? We reach one brick in this circular economy project and we must now close the loop with all the chain's stakeholders". In the 3rd quarter of 2020 we will start to collect used footwear and carry out large scale tests. Lastly, having studied all the possible options to capitalise on our footwear disassembly process Eram is launching a reconditioned footwear collection, "As New", after having been rented out in the "Atelier Bocage" service; and Sessile, a range of eco-designed sneakers that can be disassembled, repaired and recycled.

OVERVIEW OF PROJECTS FUNDED BY ECO TLC SINCE 2010 WITHIN THE INNOVATION CHALLENGE

KEY

Strategic area	Status	CLF category
Preparation of materials for recycling.		
Incorporation of materials coming from CLF recycling into other industries.		
Eco-design of products in the CLF industry.		
		Finalised projects/ industrial pilots.

N°	Name of project leader Project name	Project	Contact	Mail	RFP year	Strat. area	Status	CLF category
1	BIC ISOKTEX	Developing an innovative textile insulation.	Michel KEKAYAS	m.kekayas@cobic.fr	2010			
2	NOVAFLOOR NOVATEX	Incorporating end-of-life textiles as inert fillers in decorative plates.	Vincent FORGET	vf@ecolomy.com	2010			
3	DECATHLON OXYLANE	Manufacturing polyester yarn from post-consumer polyester textiles.	Raffaele DUBY	raffaele.duby@decathlon.com	2010			
4	POLE ÉCO-INDUSTRIES POITOU-CHARENTES MULTITEX	Developing a process for chemical separation of used mixed textiles.	Damien DELETRAZ	d.deletraz@pole-ecoindustries.fr	2011			
13	POLE ÉCO INDUSTRIES POITOU-CHARENTES MULTITEX 2	Feasibility study of a pilot enabling the chemical separation of used mixed textile materials.	Damien DELETRAZ	d.deletraz@pole-ecoindustries.fr	2013			
5	FILATURES DU PARC FILATURES DU PARC	Manufacturing recycled wool yarns of the same quality as yarns made with virgin wool fibres.	Fabrice LODETTI	filatures.parc@wanadoo.fr	2011			
6	TRUCS-TROUVAILLES TRUCS-TROUVAILLES	Recycling rubber soles into new soles.	Sylvie DAMERON	sylvie.dameron@gmail.com	2011			
7	AGENCE AIR COOP FOOTWEAR RECYCLING PROJECT	Developing and testing an industrial grinding and separation process in view of creating a footwear recycling pilot line.	Benjamin MARIAS	bm@air.coop	2012			
18	AGENCE AIR COOP FOOTWEAR RECYCLING PILOT LINE	Improving the purity of the resulting materials (leather/rubber) and output from the recycling line.	Benjamin MARIAS	bm@air.coop	2014			
8	FRAMIMEX VIACOVER	Developing an exterior sound insulation shield in lightweight concrete integrating post-consumer textile fibres.	Mehdi ZERROUG	mehdi.zerroug@ecotextile.fr	2012			
9	FYECON SEPAREX DECOTEX 1	Developing an undyeing process for used polyester clothes to enable their recycling.	Daniela TRAMBITAS	daniela.trambitas@feyecon.com	2012			

21	SEPAREX DECOTEX 2	Moving the DécoTex I project (FEYECON) - supercritical CO ₂ undyeing technology to pilot scale.	Daniela TRAMBITAS	daniela.trambitas@feyecon.com	2015			
10	CC PAYS DE CO-LOMBEY & SUD TOULOIS RECYTEX	Technical, economical and commercial feasibility study of creating a rigid decorative tile integrating 20 to 50% of used textiles.	Raphaël KUENY	raphael.kueny@univ-lorraine.fr	2012			
11	PRÉMICES & CO. BÉTON DE CHIFFON	Creating a range of decorative acoustic products entirely made from recycled textiles.	Amandine LANGLOIS	amandine@premicesandco.com	2013			
27	PRÉMICES & CO. PIERRE PLUME	Finishing the "Béton de chiffon" project and developing it to industrial scale.	Amandine LANGLOIS	amandine@premicesandco.com	2016			
12	MAPEA ÉCO-CHARGES	Recycling of used cotton and polycotton clothes for use as reinforcement in the plastics industry.	René GENILLON	r.genillon@mapea.com	2013			
14	LE RELAIS EKOROOM	Developing acoustic suspended ceiling tiles from recycled textiles.	Jean-Paul LOPEZ	jlopez@lerelais.org	2014			
15	FILATURES DU PARC PARCOT	Developing a defibration method for recycling used polycotton clothes into materials suitable for weaving or knitting new clothing products.	Fabrice LODETTI	filatures.parc@wanadoo.fr	2014			
16	MINOT RECYCLAGE TEXTILE MINOT RECYCLAGE TEXTILE	Optimising the end-of-life textiles recycling process in order to achieve a higher percentage of used textiles in the garnetting process.	Jean-Luc DUSSART	jldussart@lerelais.org	2014			
17	CHAUSSETTES ORPHELINES ANIMA	Recycling used socks into a recycled yarn for use in hosiery.	Marcia DE CARVALHO	contact@marciadecarvalho.fr	2014			
19	WECOSTA SILENCIO	Developing an eco-friendly acoustic silencer for housing ventilation systems.	Hugues BROUTÉ	hbroute@wtxautomotive.com	2015			
20	IN SOFT ECTOR	Developing an eco-designed shoe with a knitted fabric upper.	Patrick MAINGUENÉ	pamainguene@in-soft.fr	2015			
34	IN SOFT ECTOR SE RECYCLE	Recycling the Ector eco-designed shoes.	Patrick MAINGUENÉ	pamainguene@in-soft.fr	2017			
22	SYNERGIES TLC AUTOTRI	Studying and developing a new sorting method for non reusable textiles in order to use these secondary materials.	Thomas FRAINEUX	thomas.fraineux@synergies-tlc.fr	2015			
23	CETI DELISS	Studying and developing either automatic or semi-automatic processes for removing trims from used clothing to facilitate recycling.	Pascal DENIZART	pascal.denizart@ceti.com	2016			
24	CTC GROUPE THERMICUIR	Recovering heat from waste leather from end-of-life shoes.	Régis LETY	rlety@ctcgroupe.com	2016			
25	LA MANUFACTURE ERAM DESIGN FOR REPAIR	Developing a new design and manufacturing process allowing for easy disassembly of all components in a shoe at end of life.	Gauthier BEDEK	gbedek@eram.fr	2016			

KEY								
Strategic area			Status			CLF category		
Preparation of materials for recycling. Incorporation of materials coming from CLF recycling into other industries. Eco-design of products in the CLF industry.			Project abandoned/iconclusive results. Finalised project/conclusive results but no industrial development planned. Projects in progress. Finalised projects/industrial pilots.			Textiles Footwear		
N°	Name of project leader Project name	Project	Contact	Mail	RFP year	Strat. area	Status	CLF category
26	L'ÉQUIPE 1083 JEANS RECYCLÉS	Developing a recycled cotton yarn from old jeans.	David LEROMAIN	david@1083.fr	2016			
28	SILAC INDUSTRIE ECO3F	Making a range of acoustic insulation for the automotive industry from used textile materials.	Valérain HIEL	vhiel@silacindustrie.com	2016			
29	IFTH / UTT / LE RELAIS CAREFIL	Improving the quality of yarns made from recycled used clothes.	Philippe MESNAGE	pmesnage@ifth.org	2017			
30	CID PROCESS CID PROCESS	Mechanical separation of cotton and elastane in used jeans.	Roland GUIBERT	roland.guibert@wanadoo.fr	2017			
31	L'ÉQUIPE 1083 CELL-JEANS	Wet-spinning cotton waste from used jeans in order to create a man-made cellulosic fibre	David LEROMAIN	david@1083.fr	2017			
32	CAMY HOEI	Designing and developing a modular, monomaterial and recyclable shoe.	Benjamin CAMY	benjamin@hodei.fr	2017			
33	AUDACIE PLAS'TILE	Recycling used non-reusable textiles into plastic resins.	Charlotte WALLET	c.wallet@audacie.org	2017			
35	AGENCE AIR COOP REVIVE/RECYCLE	Setting up a pilot project for repairing used clothes and preparing them for recycling.	Virgile AYMARD	va@air.coop	2017			
36	LES TISSAGES DE CHARLIEU LES TISSAGES DE CHARLIEU	Improving, in terms of technology and industrial process, an article entirely made of recycled post-consumer polyester from Europe, and assessing the difference between the cost price and the market price.	Éric BOËL	e-boel@ltc-jacquard.com	2017			
37	AUCHAN RECYC'L'AB	Recovering fibres from end-of-life clothing into mobile phone cases using the Roctool induction heating technology.	Isabelle DAYDE	idayde@ auchan.fr	2018			
38	DECATHLON 4RFID	Developing a pilot to achieve textiles' traceability, allowing for their end-of-life management, thanks to the RFID technology.	Stéphanie BAILLY	stephanie.bailly@decathlon.com	2018			
39	FCBA MOBIOTEX	Assessing the possibilities of using recycled textile fibres as an essential component of wood framed constructions.	Zaratiana MANDRARA	Zaratiana.Mandrara@fcba.fr	2018			
40	MAXIMUM TISSIUM	Developing a rigid material made from textile waste fibres intended for furniture manufacturing for the tertiary sector.	Romée DE LA BIGNE	romee@maximum.paris	2018			
41	TECHTERA JEPLAN	Assessing the reliability of an implantation project in France of a JEPLAN's plant for recycling used polyester textiles into recycled PET pellets.	Julie RAFTON -JOLIVET	jrafton@techtera.org	2018			
42	VERT-TICAL NORD ÉCO-LOGIC WALL	Developing a green wall using recycled textiles to replace substrates and sphagnum (natural moss) currently used.	Frédéric LOGEZ	contact@vert-tical.fr	2018			
43	WECOSTA QWIET	Developing solutions to improve the acoustic comfort in public spaces (offices, industrial premises, etc.) by using ecological materials including materials from the used textiles sector.	Hugues BROUTÉ	hbroute@wtxautomotive.com	2018			
44	CYCL-ADD TEXTIC	Developing a recycling process for used non reusable polyamide clothing, including sorting, trimming, characterisation, micronization and compounding for plastics making.	Hervé GUERRY	hguerry@cycl-add.fr	2019		NEW	
45	FABBRICK FABBRICK	Developing a structural, insulating and aesthetic construction material from recycled used textiles.	Clarisse MERLET	cm.fabbrick@gmail.com	2019		NEW	
46	FILATURES DU PARC PAMREC	Recycling used polyamide clothes into a recycled yarn for use in textile products	Fabrice LODETTI	filatures.parc@wanadoo.fr	2019		NEW	
47	HUMEAU BEAUPRÉAU REBOOT	Pre-study on the feasibility and cost of recycling used PVC footwear; and testing of a recycling loop with defining specifications for setting up the recycling loop at an industrial scale.	Anne-Céline HUMEAU	ac.humeau@bopy.fr	2019		NEW	
48	IDEALAM RECHAUSS	Developing an innovative technology for delaminating shoes (leather/textile) by supercritical fluid and a new recycling loop for used shoes.	Eric DURIVAUT	eric.durivault@idealtechnologies.fr	2019		NEW	
49	LE SLIP FRANÇAIS LE SLIP CIRCULAIRE	Developing a yarn containing the highest possible % of recycled cotton with a fineness up to 1/60Nm from used underwear and socks for use in the making of Le Slip Français' products.	Ludovic BIDET	ludovicbidet@leslipfrancais.fr	2019		NEW	
50	SOFILA RESY	Development of a recyclable and sustainable stretch yarn	Jennifer WEIMMERSKIRCH	projet@billion-mayor.com	2019		NEW	
51	Synergies TLC UTILE	Feasibility study of setting an industrial unit for the trimming and sorting of used cotton, polyester and polyamide textiles (100% and blends), based on materials specifications defined with recyclers.	Clara POTTON	c.potton@synergies-tlc.com	2019		NEW	
52	VALVAN TRIMCLEAN	Development of an automated integrated solution that allows the removal of trims (including labels, buttons, zippers etc.) from used clothing.	Maurits VANDEPUTTE	Maurits.Vandeputte@valvan.com	2019		NEW	

— THE 2019 INNOVATION CHALLENGE —

9 WINNERS



TOTAL AMOUNT OF FUNDING

€729,307

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