

Hair reuse



Description of the business

Context

When we think in terms of the circular economy, we immediately think of a multitude of natural resources, whether mineral (metal), organic (wood) or transformed (paper, plastic, etc.), being used sparingly or being recycled or reused. However, an alternative would be to avoid the use of such resources by replacing them with other materials or those that are readily available. One such example would be the interest in recent years in hair, an organic material of human origin.

Hair possesses amazing mechanical properties, specifically in terms of elasticity and geometry, which therefore makes it usable for a multitude of applications. With this in mind, in 2015, the French hairdresser Thierry Gras decided to look for outlets for what represents 50% of salon waste.

With the founding of 'Coiffeurs justes' (responsible hairdressing), he set out to structure the hair collection and recycling sector, with a focus on discovering avenues for reuse. Several possibilities became apparent, for example, its use as a fertiliser or concrete reinforcer or in insulation (see data sheet 2) or water filtration. Today, the capture and filtration of hydrocarbons in maritime port areas makes for the landmark application of the operation.

This application was invented by American Phil McCrory after observing images of the Exxon Valdez ecological disaster, in which wild animals were struggling to escape the oil slick due to its impact on their coats. Several years of experimentation and a patent later, he created the 'hair mat'. Today, his invention is valued by the NGO Matter of Trust which collects hair from all over the world, enlists volunteers to build such mats and seeks partners to set up workshops worldwide for their manufacture.

Starting off with heavy structuring of the collection process by offering hairdressers the option of storing cut hair in a dedicated box, Coiffeurs justes' operation is now gradually expanding. And so much so that Belgian hairdressers are starting to take an interest in it, such as the Brussels cooperative Rcoop and Amélie Rock, a hairdressing salon in Huy.

There are also other avenues for the reuse of hair, such as its substitution of fibreglass, polymers or aluminium. Indeed, hair is waterproof, fire resistant and neither rusts nor conducts electricity. It can therefore replace these materials in different blends to make furniture, clothing, shoes, boat parts and even structural beams. However, the other products that currently make up these blends are not particularly natural.

Industrial activities

It would be more logical to combine this circular recycling/reuse approach with a short channel approach. This has been well received by Rcoop, who declared in March 2020 that it was considering a more local solution than its involvement with Coiffeur justes.

A Brussels-based operation, where all the elements could be brought together at a local level, would make perfect sense, organising both the collection as well as the production of hair mats and their sale or distribution. In terms of outlets, to further accentuate the locality, it will be necessary to analyse what the demand would be in the port of Brussels and in other national ports (in particular Antwerp and Zeebrugge), as well as the equipment demand on commercial vessels and goods transporters for these booms (preventive or curative in the event of spills) and the potential demand in the cleaning of internal waterways (canals). In addition, it could also be relevant to investigate the use of these mats (or alternative format) in water filtration operations with

Vivaqua: this could be relevant as part of their wastewater and run off disposal activities. Interest from Vivaqua would be all the more likely considering it has been working for years to obtain the 'eco-dynamic company' label for its various sites in Brussels and its environmental plan favours commitments to recycling and reuse.

The associated activities would therefore include the following key stages:

- Hair collection network encompassing all hairdressers in the region
- Manufacture of filters, whether in mat form or otherwise
- Packaging and preparation for distribution
- Distribution and sales

Technical feasibility

The technical feasibility is clearly demonstrated since such a sector exists in France and the USA, from the collection operation to the installation of hair-filled booms in ports. Other outlets, including water filtration, will undoubtedly require investigation and experimentation, but which may be undertaken as the company evolves if a first market seems accessible using the technology immediately available.

First Elements to be analysed by the project team

- Contact the various existing stakeholders (Matter of Trust, Coiffeurs justes, Rcoop) to better understand their positioning and role within the economic model
- Most importantly, discuss with potential customers (the ports of Brussels, Antwerp and Zeebrugge and even Dunkirk, Calais and Rotterdam, cross-Channel passenger transport companies, large charterers of container ships or bulk freighters, inland water (canals) managers, Vivaqua and others to be identified) regarding their interest in the product and their possible order volumes
- Approve the economic model

Sources of inspiration

- Hair, ropes and physics: <https://www.refletsdelaphysique.fr/articles/refdp/pdf/2011/04/refdp201126p10.pdf>
- Matter of Trust: <https://matteroftrust.org/clean-wave-program/>
- Video of making a hair mat: https://www.youtube.com/watch?time_continue=227&v=odbZKK3NhJ0&feature=emb_logo
- The oil-filled hair mat is composted <https://www.youtube.com/watch?v=mccG1DdZB3c>
- Full video: https://www.youtube.com/watch?v=EwQOD_Ir2vQ
- Coiffeurs justes: <https://coiffeurs-justes.com/>
- Rcoop: <http://rcoop.be/2020/03/12/rcoop-est-le-1er-salon-bruxellois-a-recycler-les-cheveux/>
- Amélie Rock: https://www.rtb.be/info/regions/liege/detail_huy-amelie-rock-une-coiffeuse-qui-s-engage-pour-le-recyclage-des-cheveux?id=10367658
- Hair mats to counter oil spills: <http://www.cleantechrepublic.com/2009/05/05/des-tapis-de-cheveux-pour-contrer-les-marees-noires-et-faire-pousser-les-fleurs/>
- Several applications for the reuse of cut hair: <https://www.lscouffure.fr/blog-logiciel-gestion-coiffure/travailler-coiffure/salon-de-coiffure-ne-jetez-plus-les-cheveux>

Business potential

Market

On the supply side, although the number of hairdressing salons appears to be levelling off in Belgium at around 18,000 to 20,000 salons following yearly decline, consumer behaviour has now changed: Belgians go to the hairdresser less often, between 4 and 5 times a year on average, whereas 20 or 30 years ago, this figure was around 12 times. However, in a region like Brussels, with 1 million inhabitants and hair that grows on average at a rate of 1cm per month, there should be no shortage of stock.

On the sales side of the product, however, as a new and innovative concept, there is no market as such. It will be necessary to enter the filtration market, in particular for the filtration of hydrocarbons and certain specialised forms of water filtration (hair mats will not replace the entire process, nor the treatment plants). However, there is no specific public data on these sub-segments and it will first be necessary to explore avenues with certain stakeholders in the field to identify the real business potential and possibly to start phases of field tests.

Competition

A priori there is no direct competition, but evidently if the company offers an alternative to an existing solution (typically filtration), this will create a competitive situation.

On the supply side, there is most likely no competition. Initiatives such as Coupe D'Eclat that harvest hair to make wigs (especially in their case for sick people) require very long hair. The two activities can therefore coexist perfectly.

Circular nature of the business

Reuse is at the centre of the operation, which also prevents the depredation of other resources. So there is a definitive circular characteristic present.

Key figures

Assumptions

There are 18,000 hairdressing salons in Belgium, which cut the hair of 8.1 million people on average about 5 times a year.

Each month, a hairdressing salon produces 2 kg of hair waste, corresponding to approximately 220 cuts.

The 'statistical' average is 40 g of hair per inhabitant per year, which means that in Belgium there is a potential 440 tonnes to be collected, 40 to 50 t/year of which could originate in Brussels alone.

1 kg of hair filters 8 l of hydrocarbons: the booms and skirts are washable up to 10 times.

The collection component

Coiffeurs justes require a membership fee of €25 per year and €1 per collection bag to cover logistics costs.

Some hairdressers offset this by asking their clients for a contribution of €0.10 per haircut, in addition to reducing their waste by 50% (the balance being the packaging of the products used in the salon).

It seems relevant to us to also offer collection bags to individuals who cut their own hair, or even to set up voluntary collection points in towns (community centres, container parks, etc.)

In addition to hair, the manufacture of these mats also uses wool (sheep in Belgium, typically) and animal furs (a means of 'recycling' clothes that are no longer popular to be used for a good cause and also to forge supply partnerships with vets). In the USA they use dog hair to make mats.

It is therefore relevant to vary the sources of supply by finding outlets for wool (hardly reused in Belgium- there are still appreciable quantities to be separated from waste collections) and for animal hair, which could primarily entail partnerships with vets.

The sales component

The question of the economic model remains undetermined, because up to now the initiatives under way have mainly been in the associative field. It is therefore necessary to find an application generating sufficient income to allow the development of the others. It seems useful to us to continue in the field of water treatment by working with private partners (Vivaqua, SWDE) and a research project funded by Innoviris, while developing a secondary application in the maritime and waterway sectors for the treatment of hydrocarbons.

On this aspect, it would be advisable to try to make some direct agreements, such as with the ports on the treatment of hydrocarbon residues, with waterway managers and oil companies (spills, etc.), including on land if necessary (Total in Feluy?), but also shipowners, who have fleets of boats ready to test the system in preventive (floating booms secured around the boat) or curative (on-board booms ready to be launched in the event of a hydrocarbon spillage) mode. Regarding the aspects of prevention and compensation, discussions should also be held with insurers who could impose the use of these booms on users and thereby create a 'guaranteed market': these insurers would be in our opinion key partners in guaranteeing a stable business model. A final avenue would be to discuss with coast guards and other public agencies responsible for the sea and the management of 'ecological crises' to demonstrate the relevance of the process and to make them prescribers of the solution.

Finally, reuse of the 'hair' product in other sectors is not impossible (see above), with significant proven achievements in the field of fertilizers for flower beds in particular.

Assuming the collection of 20 tonnes of hair per year, combined with 20 tonnes of other materials of animal origin, this could result in the production of 40 tonnes of skirt, allowing the absorption of 3200 tonnes of hydrocarbons (per application - reusable after washing up to 10 times = total potential of 32,000 tonnes).

The product may be sold directly however we believe that the potential result from using the product is more valuable than the cost of the product itself. It is necessary to analyse whether the application of the product makes it possible to reduce the spread of a 3-hour oil spill (and therefore the full operation of rescue services), to limit the drift of slicks (and therefore to avoid their affects on the coastline), to avoid the pollution of fauna and flora, etc. These advantages are difficult to quantify but pertinent for insurance and reinsurance organisations. This analysis could support its use as a preventative solution and its subsequent promotion.

The quantification of ecological disasters is extremely complex and often significantly underestimated (the services provided by destroyed ecosystems are never quantified, for example). Therefore the damages estimated by the Exxon Valdez amount to \$7,500 million (for the 42 million litres of oil that escaped into the sea, or \$178/l), while those of the Prestige are still being debated but which are in the range of \$4,000 million for 63,000 tonnes (i.e. €63/kg). The question of the right pricing for a solution that saves time and avoids damage is therefore highly relevant, since prevention is key.

Assuming a price of 5% of the average compensation damages (€53/kg) or €2.65/kg of absorbable fuel, we arrive at $2.56 \times 3,200,000 = €8.2\text{m}$ per year for the single use of a boom, which is more than enough to cover the costs of collecting, manufacturing and processing the used booms, with teams ready to reach the places where these are being used.

Assuming that one meter of skirt weighs 2 kg, this amounts to renting the skirt out at €34/metre/month in preventive mode.

These figures will of course need to be refined based on discussions with the various stakeholders, but they allow us to foresee real profitability for this solution, which is useful for circularising resources by saving the environment and producing shared added values.

Potential for job creation

The team would grow with the increase in volume of tonnes collected and as the set up broadens. It should include collection coordinators, workshop managers and workers for the manufacture of skirt (sorting of raw materials, preparation of set up, manufacturing, packaging), logistics managers for shipments, reuse project managers who coordinate the various applications and those responsible for supervising and coordinating teams of field workers.

A yearly production output of 20,000 metres of skirt (40 tonnes of product) should require just 3 to 4 people in the workshop + 1 logistics manager and 4 people in procurement and, assuming that a project requires 400 metres of skirt, it will be necessary to manage 50 new projects per year (pre-commercial, commercial, implementation). Either a team of 4 to 5 business developers, then the monitoring of the application, which will require occasional call outs up to 10% of event of risk, or 5 projects per year cumulative over the years, which will also mobilise a team of 4 to 8 people.

Along with administration, finance and management, a team of 25 to 30 people will be created to manage the potential of the 40 tonnes of product.

Recycling potential in tonnes

- In Brussels: 40 to 50 tonnes of hair
- On a national scale: 440 tonnes
- In Benelux: around 1000 tonnes

This can be at least doubled using the addition of natural resources (animal furs, wool and animal hair).

Made in Brussels

Local procurement

The people of Brussels have their hair cut just like any other people and therefore the resource is there. A discussion with Rcoop should help to learn more.

Local partners

Customers & partners

- More than the distributors (see below), these are the genuine commercial partnerships, or even preferential customers, that the project will in all probability need for its success. See above: Ports, river infrastructures, owners of large passenger and goods vessels, insurers.
- Matter Of Trust must be considered as a partner with whom we trade to increase the reuse of their solutions.

Suppliers

There will be no suppliers as such for the main raw material, rather a collection network will be organised in the simplest, most convenient way possible for hairdressers to convince them to participate in the system (and to remain in it).

- Hairdressers
- Drop-off boxes in towns
- Vets for animal hair
- Reuse of wool not otherwise reused (directly with livestock farmers, shearing professionals or vets)
- Low-cost buyback of old animal furs

Distributors

As noted above, until the concept is refined and the company's product becomes 'standard', it will be difficult to distribute it. This will only come gradually, once a niche has been identified and product positioning has been carried out.

Subcontractors

A priori none, except perhaps Matter of Trust for the purchase and maintenance of the mat making machinery.

If gradually other products are conceived, whose manufacture differs from that of the preliminary mats, other items of machinery and techniques will no doubt be necessary, with an interest in tapping in to specialised subcontractors.

Competitors

None directly, but by looking for a niche, the project will certainly self-generate competition or join an existing ecosystem as a new stakeholder with different competing offers.

Location

Hair is light and takes up a relatively moderate amount of space. This should make it possible to start the activity, including production, in an area of less than 1000 m².

Key factors for success

Operational and commercial barriers

On the operational side, there is most likely no barrier, however coordination of the logistics will need to be well thought-out. Possibly a visit to Coiffeurs justes for inspiration, or even to establish a partnership with them.

The barriers are more apparent on the commercial side, where it will be necessary to create, defend and expand the niche. A commercial aim and an objective of profitability, which is clearly different from the model established by Coiffeurs justes and Matter of Trust.

Intellectual property

There is a patent on hair mats, which will need to be analysed.

Legislative obstacles

None.

Other risks

None.

Project team skills

This project does not a priori require specific skills, although knowledge of the environment where the products could be marketed would undoubtedly be of precious help, in this case in terms of water filtration and the capture/filtration of hydrocarbons.

In addition, the team will need classic entrepreneurial skills including management and finance and the right operational profile to ensure the organisation of the production process, as well as the collection logistics.

What the RBC (Brussels-Capital Region) can do to make it a success

- Facilitate contacts for the first contracts
- Make the collection of cut hair a requirement within its area of influence

References and links

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