SUMMARY

Environmental assessment of used household CHF treatment sector – 2025

Re_fashion

Editorial

The Extended Producer Responsibility (EPR) sector for Clothing, Household linen and Footwear (CHF) is moving. Collection is increasing, sorting is expanding, repair is being promoted, second-hand markets are growing, and recycling is becoming industrialised: the transformation is real and accelerating.

But transforming without measuring means moving forward blindly. Measuring environmental impacts is an essential compass for understanding where we stand, guiding our decisions and progressing together.

This environmental assessment is tangible proof of that. Carried out in accordance with the most demanding life cycle analysis (LCA) standards — ISO-compliant and subject to an independent critical review — it provides a snapshot of the situation in 2025: the impacts it generates, the benefits it delivers, and the contribution made by each link in the chain. It does not predict tomorrow. It states what we are doing today.

This sector relies on a value chain made up of collecting operators, sorting centres and recyclers. But above all, it begins with the citizen's action: sorting and dropping off clothes, linen and shoes instead of throwing them away. A simple, almost ordinary gesture — and yet a decisive one. The same item does not deliver the same outcome depending on where it ends up: when dropped off in a collection point, it avoids -0.88 $kgCO_2e$ per kilo; when thrown in the bin, it generates +0.74 $kgCO_2e$ per kilo. That is a difference of more than 1.6 $kgCO_2e$ per kilo. For one single action.

Refashion is fully committed, alongside all sector stakeholders, to ensuring that each edition of this assessment marks a further step towards a more efficient, more responsible and more circular sector — supported by ever-stronger collective mobilisation.

Véronique Allaire-Spitzer,
Director of Perma-circularity

Stefan Bachevillier,
Head of Impact

01. FOREWORD

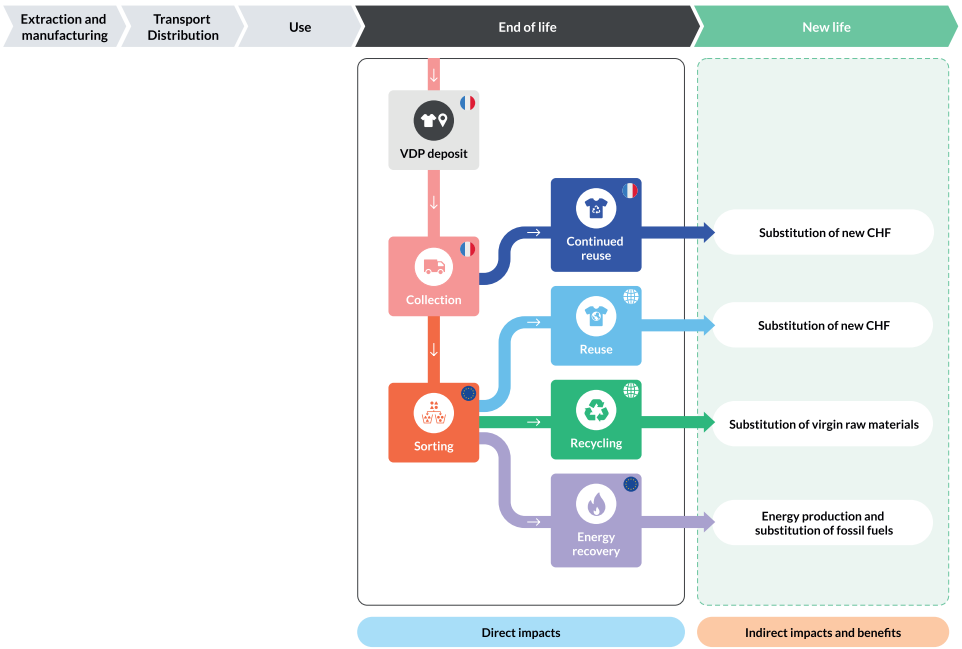
Introduction

In accordance with the 2023–2028 EPR specifications for CHF, Refashion conducted a study in 2024 on the environmental impacts of the post-consumer used Clothing, Household linen and Footwear (CHF) sector in France.

This document is the 2025 update of that study, together with two additional analyses covering the environmental impacts and benefits of repair and the end-of-life treatment of CHF in residual household waste (RHW).

This environmental assessment is based on the Life Cycle Analysis (LCA) methodology and covers the collection, sorting, reuse before and after sorting, and recovery activities of used CHF, including both the impacts directly generated and the potential benefits indirectly enabled by the used CHF treatment sector.

The end-of-life of a CHF item represents less than 5% of a product's total environmental footprint. This study focuses on this limited but essential scope, examined at sector level — from collection through to recovery routes — rather than at product level.



The study complies with the ISO standards in force at the time of publication and has undergone a critical review.

This document is the executive summary of the environmental assessment based on 2025 data.

The full detailed report is available from Refashion on request.

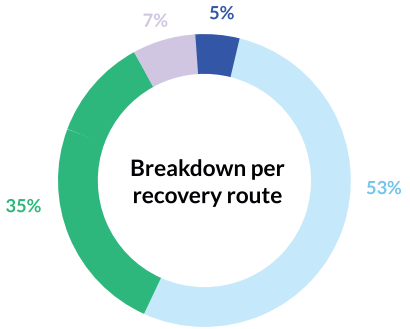
02. SECTOR OVERVIEW

The sector generates more environmental benefits than negative impacts

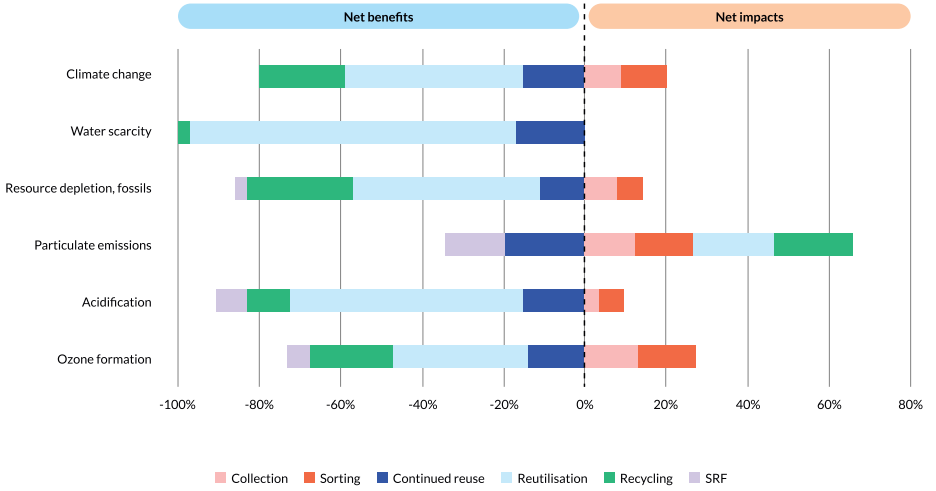
Sector average

-0.88

$kgCO_2e/kg$



In the chart, impacts are shown on the right-hand side as positive values, and benefits on the left-hand side as negative values.



Overall, the separate collection and treatment sector for CHF indirectly generates more environmental benefits than direct impacts: this is the case for 5 out of the 6 environmental indicators examined.

Most of these benefits are driven by the second-hand market, which accounts for the largest volumes and makes it possible, at scale, to avoid the production of new clothing. Recycling is also a major contributor to the sector's environmental benefits by replacing virgin materials with recycled materials.

At the scale of a CHF item

-0.27

$kgCO_2e$ / average CHF item collected

-0.3

$kgCO_2e$ / textile item collected

-0.01

$kgCO_2e$ / pair of shoes collected

Average weight of a clothing/linen item: 310 g
Average weight of a pair of shoes: 780 g

03. COLLECTION

The act of collecting is the starting point for the sector's environmental benefits

Average collection

0.14

$kgCO_2e/kg$

The collection of French CHF generated 38,000 tCO_2e in 2025, representing 16% of the sector's emissions

Collection is the first stage in the treatment of used CHF.

Citizens bring their CHF to voluntary drop-off points, generally in sealed plastic bags, to preserve the items. Collection operators then empty those collection points and send the materials either to consolidation centres or directly to sorting centres, depending on the volume collected.

Some collection points are run by reuse operators that carry out on-site sorting, known as "creaming"*, to extract the items that can be resold locally. Those volumes therefore do not reach sorting centres. The impacts and benefits of creaming and reuse are presented in the second-hand section.

The impacts of collection are concentrated in two main areas.

- The first is **the emptying of collection points:** light commercial vehicles, which are more impactful than larger-capacity vehicles, account for more than 90% of journeys for this operation.
- The second is the drop-off of CHF by citizens at collection points, and more specifically **the plastic bags used as packaging.** Polyethylene production weighs significantly on fossil resource use and water consumption. These bags also reappear at the sorting stage as packaging waste requiring treatment.

Two priority improvement levers emerge from these results:

- **Optimising collection rounds** in order to improve the logistics efficiency of light vehicles;
- **Developing alternative collection methods** to reduce plastic packaging.

* See definitions in glossary

04. SORTING

Sorting is a crucial stage for directing CHF towards the most appropriate outlet

Average sorting

0.18

$kgCO_2e/kg$

Sorting French CHF generated 46,000 tCO_2e in 2025, representing 19% of the sector's emissions

Once collected, CHF are sorted in order to send them to the most appropriate recovery path.

In 2025, sorting used CHF generated 46 $ktCO_2e$ of direct impacts. These impacts also include automated sorting for recycling. Since this practice applies to only 0.1% of streams leaving sorting, it is not significant in the results.

The largest contributing factor to climate change is the **transport of collected CHF to sorting centres, which accounts for** 70% of climate impacts. Waste treatment represents 23% of greenhouse gas emissions.

Treatment of waste generated by sorting represents 30% of fine particle emissions. Citizens' plastic packaging represents the largest waste stream.

The plastic packaging used to ship sorted CHF to recovery outlets mainly affects water scarcity, accounting for 62% of impacts on that indicator.

Priority levers for action:

- **Optimise logistics flows** to sorting centres to reduce distances.
- **Reduce plastic packaging** at source, the effects of which are felt across the entire chain, from collection through to sorting-waste treatment.
- **Develop sorting for recycling** to enable more precise direction towards the different recovery routes.

The benefits associated with sorting are indirect. Sorting makes second-hand and the different forms of recycling possible. However, these benefits are accounted for in the downstream stages rather than at sorting stage itself.

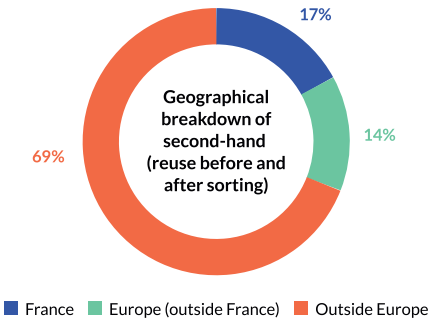
05. SECOND-HAND

Second-hand: the sector's leading source of environmental benefits

Average second-hand

-1.62

$kgCO_2e/kg$



Second-hand France	Second-hand Europe (outside France)	Second-hand outside Europe
-4.92 $kgCO_2e/kg$	**- 2.92** $kgCO_2e/kg$	**-0.55** $kgCO_2e/kg$

Once collected and sorted, CHF can be resold on the second-hand market — post-collection reuse* and post-sorting reuse* — both in France and abroad.

Second-hand in France: -121,000 tCO_2e of net carbon benefits in 2025

In practical terms, placing second-hand clothing on the market in France means that **16 kt of new clothing no longer needs to be produced,** thereby preserving natural resources and fossil fuels.

For cotton items alone, this represents -900 million m^3 of water saved, equivalent **to the annual water consumption of 16 million French people.**

The activity itself also emits **2.2 $ktCO_2e$,** mainly linked to waste treatment from high grade selective sorting and reconditioning, an impact largely offset by the indirect benefits.

Although it represents only **10% of the sector's volumes, second-hand sold in France generates 25% of carbon benefits while accounting for only 1% of carbon emissions.**

International reuse outside France: up to - 115,000 tCO_2e of net carbon benefits in 2025

This makes it possible to avoid the production of an additional 25 kt of new CHF, also saving -1.7 billion m^3 of water, equivalent to **the annual water consumption of 32 million French people.**

This pathway directly emitted **69 $ktCO_2e$ in 2025,** i.e. 29% of the sector's carbon emissions, mainly due to the end-of-life treatment of unsold items. Outside Europe, unsold CHF are sent to landfill or incineration. Transport to the country of sale also accounts for around one-third of impacts.

Develop desirable and local second-hand offer in order to reduce impacts and maximise benefits

* See definitions in glossary

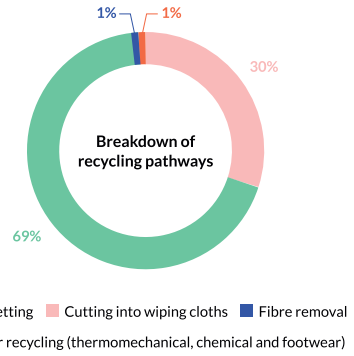
06. RECYCLING

Recycling is a source of environmental benefits that should be scaled up

Average recycling

-0.96

$kgCO_2e/kg$



Recycling Europe	Recycling outside Europe
- 1.60 $kgCO_2e/kg$	**- 0.13** $kgCO_2e/kg$

When textiles and footwear cannot be reused, some of them can be sent into recycling pathways.

There are two main categories of CHF recycling.

Open-loop recycling recovers CHF as substitutes for virgin materials in other sectors, such as building insulation or pellets for plastics processing.

Closed-loop recycling, on the other hand, aims to transform CHF into recycled raw materials (RRM)* that are reintegrated into new CHF, such as yarns, soles and other components. One example is cotton fibre recovery, which reduces dependence on highly water-intensive cotton cultivation.

Recycling CHF in Europe: nearly -72,000 tCO_2e of net carbon benefits in 2025, serving multiple sectors

Recycling in Europe produces 60 kt of RRM, thereby preserving considerable natural resources. In return, substitution of virgin materials with RRM enables potential benefits of -86 $ktCO_2e$ — **equivalent to the annual emissions of 8,700 French people** — for 14 $ktCO_2e$ emitted.

Direct carbon impacts are mainly linked to the energy and raw material consumed by recycling processes.

Recycling outside Europe: -6 $ktCO_2e$ in net carbon benefits in 2025

By substituting virgin raw materials with recycled raw materials (RRM), recycling outside Europe generates indirect carbon benefits of -67 $ktCO_2e$ — equivalent to the annual carbon footprint of 7,000 French people — compared with 61 $ktCO_2e$ of direct impacts emitted, and also enables water savings of 50 million m^3, equivalent to the annual water consumption of 0.9 million French people.

Outside Europe, direct climate impacts are mainly linked to **maritime transport to recovery operators, as well as to the energy mix of the countries where recovery takes place.**

* See definitions in glossary

07. SOLID RECOVERED FUEL

SRF: better than the bin

Average SRF

-0.26

$kgCO_2e/kg$

Processing non-reusable and non-recyclable CHF into Solid Recovered Fuel (SRF) generated net benefits of −4,500 tCO_2e in 2025.

When an item can be neither reused nor recycled, there is one final option left: using it as fuel to produce energy in the form of heat or electricity. This is the principle behind Solid Recovered Fuel, or SRF*.

SRF produced from mixed CHF is mainly used in cement works, replacing coal and petroleum coke, both of which are highly greenhouse gas intensive. To a lesser extent, it is also used in heating plants, replacing natural gas.

The main advantage lies in replacing fossil fuels that would otherwise have had to be extracted and burned. This is a real gain, especially in terms of fossil resource depletion and air pollution.

Overall, the net carbon benefits of -12 $ktCO_2e$ — which include both emissions from combustion and gains from replacing fossil fuels — outweigh the emissions generated by preparing CHF into SRF, 7.5 $ktCO_2e$, i.e. 4% of the sector's emissions, resulting in a net carbon benefit of -4.5 $ktCO_2e$. Pressure on fossil resources follows the same trend.

SRF is not, in itself, an ideal solution, but its environmental impact must be assessed by comparison with residual household waste or the absence of separate collection. It remains lowest priority recovery pathway, after reuse and recycling.

* See definitions in glossary

08. COMPLEMENTARY STUDIES

Household waste: the hidden cost of not collecting

Average CHF in RHW

0.74

$kgCO_2e/kg$

When a garment escapes separate collection, it is not recovered. This is the least favourable scenario and serves as the baseline for measuring the benefits of the separate CHF collection sector.

When a garment is not dropped off at a collection point and ends up in the regular household bin, it follows the residual household waste (RHW*) stream: incineration or landfill, with or without energy recovery.

This section presents the results of a complementary study on CHF treated as RHW, escaping the used CHF treatment sector. The results presented below are not included in the sector results presented earlier because, by definition, RHW is not part of the separate collection sector for CHF.

It is estimated that each year more than 649 kt of CHF waste is not collected even though it could be recovered.

Each kilogram of CHF treated as RHW generates 0.85 kg of CO_2 equivalent, mainly during incineration. RHW collection also consumes fossil resources and generates particulate emissions. In most cases, waste incineration allows energy to be recovered. This energy recovery reduces the net impact to 0.74 $kgCO_2e/kg$ of CHF.

These figures highlight what the separate collection sector helps to avoid. Despite its own logistics impacts, particularly those linked to transport for sorting and the different recovery routes — around 0.88 $kgCO_2e/kg$ — each tonne of CHF collected and recovered generates environmental benefits of around -1.8 $kgCO_2e/kg$. The benefits of second-hand, recycling and even energy recovery via SRF are all the more meaningful when compared with this scenario.

08. COMPLEMENTARY STUDIES

Repair means extending product life and postponing the production of a new item

The repair stage sits upstream from the used CHF treatment sector and was therefore not included in the results presented above. Nevertheless, we wanted to study the environmental impact of this practice, which delays the entry of a CHF product into the used CHF recovery sector.

This exploratory study is based on information collected from four repair stakeholders labelled under the Repair Bonus scheme — two for textiles and two for footwear.

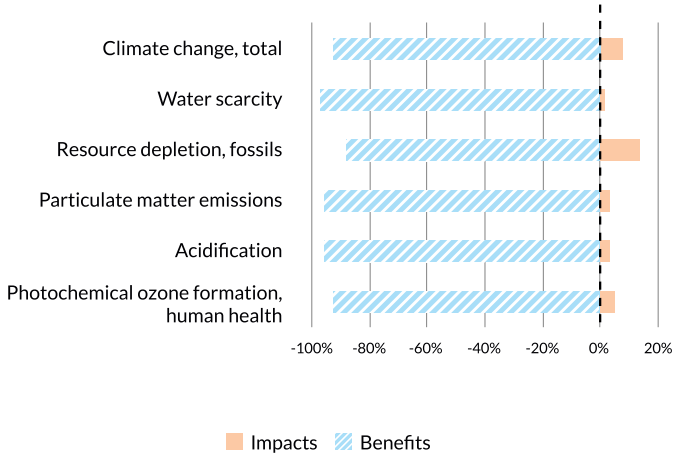
It is therefore not intended to be representative of the repair market as a whole.

With an average displacement rate for new items of 82%, repairing a garment rather than buying a new one is one of the most effective action from an environmental perspective:
in practical terms, out of every 10 CHF items repaired, 8 purchases of new items are avoided.

This avoids the production and consumption of resources such as polyester, cotton, leather, rubber and associated packaging materials. The burdens of the activity mainly come from the raw materials required for repair operations, particularly rubber for footwear repair.

Repair stands out in particular for the scale of its indirect benefits: on climate alone, the environmental benefits of repair are seven times greater than the impacts generated by the repair activity itself.

Repair would therefore rank at the very top of the recovery hierarchy, alongside second-hand in France and recycling in Europe, and far ahead of SRF or end-of-life treatment in household waste.



To confirm the full benefits of repair, a broader study that is more representative of the market is still needed.

09. CONCLUSION

Repair, local second-hand and local recycling are the most environmentally beneficial solutions in the sector

After repair, two possible actions with opposite outcomes.

The wrong action is the bin.

Today, this is still the fate of 2 out of 3 CHF items in France. They end up in household waste, are incinerated or landfilled, and generate 0.74 $kgCO_2e/kg$ of CHF.

The right choice is the collection point.

Once dropped off, sorted and directed to the right outlet, the CHF item enters the separate collection sector, opening up several environmentally beneficial outcomes, **with an average net carbon benefit of -0.88 $kgCO_2e/kg$.**

If it is still in good condition, it will be put back into circulation — in France, in Europe or outside Europe. It thereby avoids the production of a new CHF item and the resources this would have required: cotton, which needs thousands of litres of water, and polyester derived from oil. **In France, second-hand generates a net carbon benefit of -4.9 $kgCO_2e/kg$ of CHF, compared with -0.95 $kgCO_2e/kg$ for exported second-hand.**

If it cannot be put back on the second-hand market, it will be recycled. Its fibres will become building insulation, industrial wiping cloths, or new yarns for fashion. **For every kilogramm recycled, approximately -0.96 $kgCO_2e$ of net carbon benefits are generated.**

If it cannot be recycled, it will still be recovered as SRF to replace fossil fuels, with a net carbon benefit of -0.26 $kgCO_2e/kg$ of CHF; this is significantly better than the RHW scenario, which shows a net carbon impact of 0.74 $kgCO_2e/kg$.

Taken together, these pathways radically transform the impact of CHF waste.

In 2025, collected and recovered CHF generated an indirect benefit of -480,000 tCO_2e equivalent to the annual emissions of 48,000 French people, for only 240,000 tCO_2e in direct impacts.

10. APPENDIX

Results at the scale of the used CHF processing sector

LCA makes it possible to study 16 impact indicators.
In this document, we present the results for the six most relevant impact indicators, listed below.

Impact indicator studied	Unit	Description
Climate change	**t CO2 eq**	**Measures greenhouse gas emissions contributing to global warming.**
Water scarcity	**m3 depriv.**	**Measures the pressure exerted on available water resources, taking account local scarcity.**
Resource depletion, fossils	**MJ**	**Measures the consumption of non-renewable resources: oil, natural gas and coal.**
Particulate emissions	disease inc.	Measures the effects of fine particles and atmospheric pollutants — NOx, SOx, NH3 — on human health.
Acidification	mol H+ eq	Measures the effects of atmospheric pollutants — NOx, NH3, SOx — on the acidification of soils, forests and water.
Photochemical ozone formation, human health	kg NMVOC eq	Measures the formation of ground-level ozone, a pollutant harmful to health, resulting from the reaction between pollutants and solar radiation.

Impact categories	Unit	Net results of the sector
Climate change, total	kg CO_2 eq	**-2.40E+08**
Water scarcity	m^3 depriv.	**-2.79E+09**
Resource depletion, fossils	MJ	**-5.70E+09**
Particulate emissions	disease inc.	**7.00E+01**
Acidification	mol H+ eq	**-2.90E+06**
Photochemical ozone formation, human health	kg NMVOC eq	**-2.90E+06**

Glossary

Reuse before sorting

Any operation by which substances, materials or products that are not waste are used again for the same purpose for which they were designed.

EPR (Extended Producer Responsibility)

Obligation imposed on producers, importers and distributors of waste-generating products to provide for or contribute to the disposal of said waste, according to Article L514-10-3 of the French Environmental Code.

High grade selective sorting

Sorting operation to separate the cream, i.e. first-choice reusable used CHF, from the lower-grade fraction, i.e. lower-quality used CHF.

RRM

Recycled raw materials (RRM) come from waste which, after a material recycling operation, can be reincorporated into production processes as a full or partial substitute for virgin raw materials.

Reconditioning

Process encompassing all the preparation operations needed to make used reusable CHF ready again. It includes an inspection stage and one or more of the following stages: sanitising, using ozone or UV, washing, stain removal, drying, ironing and repair.

Reuse after sorting

Any operation by which substances, materials or products that have become waste are used again.

RHW (Residual Household Waste)

waste that remains after separate collections. This waste fraction is sometimes called the “grey bin”. The composition of residual household waste varies by location, depending on the types of collection.

SRF (Solid Recovered Fuel)

“A solid non-hazardous waste, composed of waste that has been sorted so as to extract the fraction recoverable as material under current technical and economic conditions, prepared to be used as fuel”, according to Article R541-8-1 of the French Environmental Code.

Study produced by
Deloitte Conseil

Independent critical review
Vanessa Pasquet, Consulting Director, Climact
Carolina Szablewski Colli, Operations Director, Weloop
Jérôme Douce, Consultant, JED innovation
Matthieu Vicard, Sustainable Development Project Manager — Footwear, CTC.

Layout and design
Vectors

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Full report
this summary is taken from the full LCA report available on request at www.refashion.fr — Environmental Observatory — Assessment of the environmental performance of the EPR sector for used CHF from household consumption in 2025, Deloitte Conseil for Refashion.

For any questions
information@refashion.fr

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Changeons notre mo(n)de, durablement.