



CISUFLO

CIRCULAR SUSTAINABLE FLOOR COVERINGS



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White paper: strategy for implementing industry-wide collection schemes for the flooring industry



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ASSOCIATIONS



Abbreviations

AgPR	Arbeitsgemeinschaft PVC-Bodenbelag Recycling
CFA	Contract Flooring Association
CPA	Circular Plastic Alliance
D	Deliverable
DIY	Do-it-yourself
EC	European Commission
ECRA	European Carpet and Rug Association
EPLF	European Producers of Laminate Flooring
ERFMI	European Resilient Flooring Manufacturers' Institute
EU	European Union
EUFCA	European Floor Coverings Association
GHGs	Greenhouse gas emissions
HDF	High density fiberboard
MDF	Medium density fiberboard
MSW	Municipal Solid Waste
PA 6	Polyamide 6
PVC	Polyvinyl Chloride
WFD	Waste Framework directive
WP	Work Package

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Executive summary

This white paper, being drafted in the framework of the European CISUFLO project, aims to propose a strategy for the successful implementation of collection schemes for post-consumer flooring waste generated in both the commercial and residential sectors. The proposed strategy aims to promote sustainability, circular economy principles and responsible waste management practices in the flooring industry. This paper is a discussion document to promote further engagement within the industry and help to define a collection system for floorcoverings that will be the cornerstone of the development of the circular economy for the flooring sector. The paper focuses on laminate, textile, and resilient floorcoverings.

This document gives an overview of the flooring market, and the amounts of waste generated within. For each of the flooring types, the existing collection schemes are mentioned, and the related key barriers and challenges are listed, as the legislative drivers and incentives.

The legal and regulatory aspects which need to be considered when implementing a collection system for floor coverings are discussed like the Waste Framework Directive, waste shipment regulations and pre-demolition audits and waste management plans.

Best practices of collection and sorting schemes for vinyl, laminate and textile flooring across Europe are mentioned.

Key points that need to be kept in mind when designing an industry-wide collection scheme are listed, followed by a proposal on how the collection schemes of flooring waste should ideally look like, with individual requirement for each flooring type. This results in the description of an implementation plan of the proposed collection schemes.

Key stakeholders in the collection process are flooring specifiers, flooring installers/contractors, wholesalers, distributors and retailers, waste management companies and logistics companies. Their role in the collection of flooring waste has been described.

A strategy to raise awareness on the importance of participation in the collection systems is proposed.

The document also highlights how the monitoring of the effectiveness of the collection schemes could be done via collected waste volumes, reuse rates, recycling rates and landfill and incineration rates. Some mechanisms which are already in place are described (PolyCert Europe and Polyrec).

This document also covers several open questions that still need to be answered in order to implement collection schemes.

1 Introduction

This white paper aims to propose a strategy for the successful implementation of collection schemes for post-consumer flooring waste generated in both the commercial and residential sectors. The proposed strategy aims to promote sustainability, circular economy principles and responsible waste management practices in the flooring industry. This paper is a discussion document to promote further engagement within the industry and help to define a collection system for floorcoverings that will be the cornerstone of the development of the circular economy for the flooring sector. The paper focuses on laminate, textile, and resilient floorcoverings as these are in the scope of the CISUFLO project.

This report is a deliverable that is related to work package (WP) 5 “Industrial Uptake”, Task 5.1 “Collection schemes”. This task starts in month 4 (September 2021) and has a term of 44 months. It is led by CISUFLO project partner EUFCA (European Floor Coverings Association).

1.1 The floorcoverings market

It is estimated that approximately 1.4 billion m² of textile, laminate and vinyl floorcoverings were placed on the market in Europe in 2018¹ (see Figure 1).

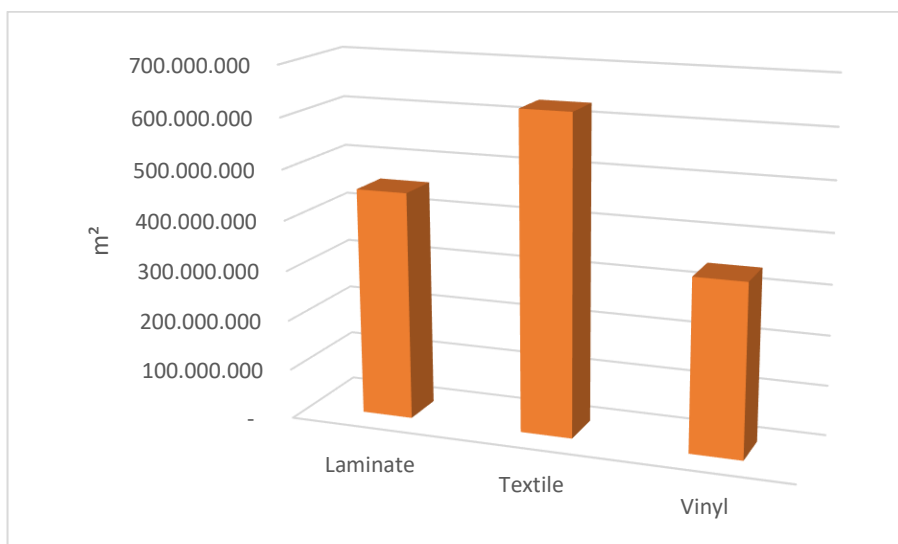


Figure 1: Approximate m² of laminate, textile and vinyl floorcoverings placed on the market in 2018



This equates to approximately 5 million tonnes² of floorcoverings placed on the market.

¹ Data collated by the European Floorcoverings Association (2018 used as the reference year as data was available for all three floorcoverings type for this year)

² Conversion used:

- Laminate floorcovering: 7.09 kg/m² Source: EPD for Laminate Floorcovering www.eplf.com
- Textile floorcovering: Average weight 1.69 kg per m² Source: ECRA www.ecra.com
- Vinyl flooring calculated according to average weight per m² per product category – source ERFMI www.erfmi.com

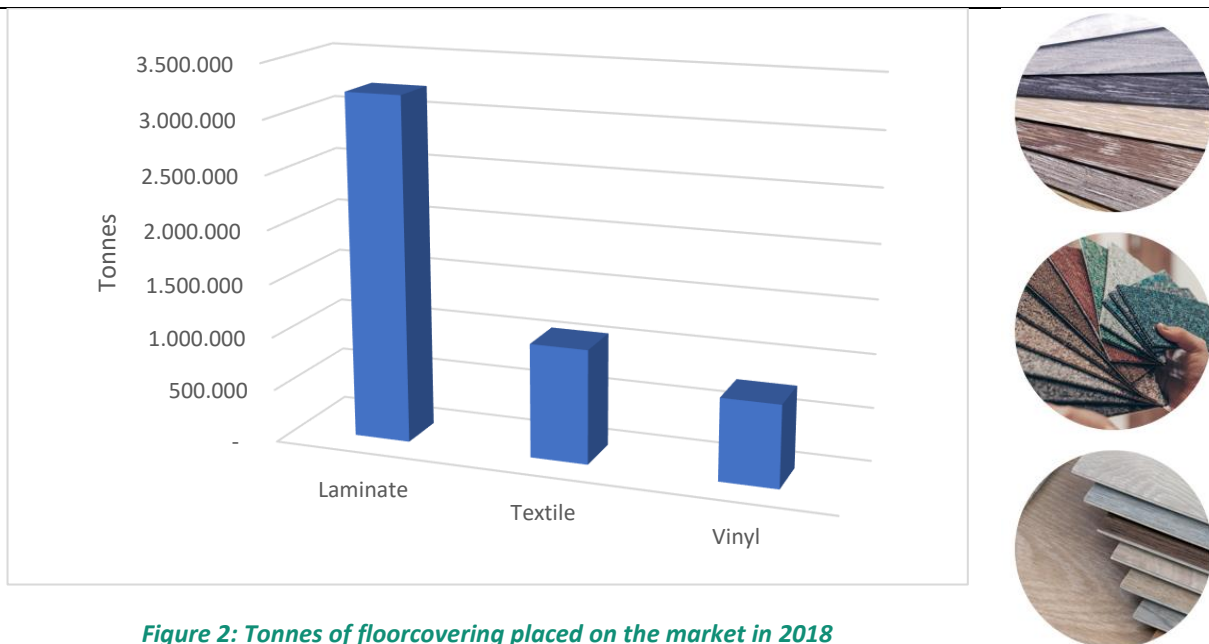


Figure 2: Tonnes of floorcovering placed on the market in 2018

The ratio of laminate to textile and vinyl changes greatly when calculated in tonnes, as laminate flooring is much heavier than textile and vinyl (see Footnote 2 for conversion calculation).

The CISUFLO project deals with the realisation of circular economy products and the implementation of more environmentally friendly and sustainable flooring products. In particular, products from the laminate, carpet and vinyl sectors are considered. The product design, recycling techniques, identification and return systems are among the core elements. However, for a circular economy model, not only the existence of functioning techniques, take-back systems, etc. are important. For the appropriate planning of such models, knowledge of the waste streams that arise is also necessary. Unfortunately, this data is not easy to obtain as different lifetimes and different types of products all have to be taken into consideration.

1.2 Waste arisings

The European Carpet and Rug Association (ECRA) has therefore developed a tool within the framework of the CISUFLO project that enables good approximations for current and future waste streams.

The volumes of goods produced and/or traded in a given year do not give a direct indication of the waste generated in that year. One reason for this is the different lifetimes of the respective products. Products that are produced today do not become waste in the same year. With the help of the waste stream tool, current and future waste quantities can be estimated. Sales and production quantities of the respective product serve as the basis. The tool is flexibly adjustable in different ranges and can therefore be used for all flooring products.

The tool has already been used to calculate waste arising from textile and vinyl floorcovering, the calculations for laminate floorcovering had not been completed at the time of writing this paper. It is less crucial to calculate the exact volumes for laminate floorcovering waste, as laminate floorcovering is collected in the wood waste stream and so does not have to be collected separately³.

³ EPLF position paper on collection

1.2.1 Waste flow for textile floorcoverings

The waste flow model for wall-to-wall carpets shows waste arising from 2016 onwards and estimates the waste arising up to 2030 (Figure 3). The model calculates the m² arising for woven, tufted and needled wall-to-wall carpets. Figure 3 shows that the total m² in the waste stream has remained relatively steady since 2016, with a predicted slight decrease by 2030.

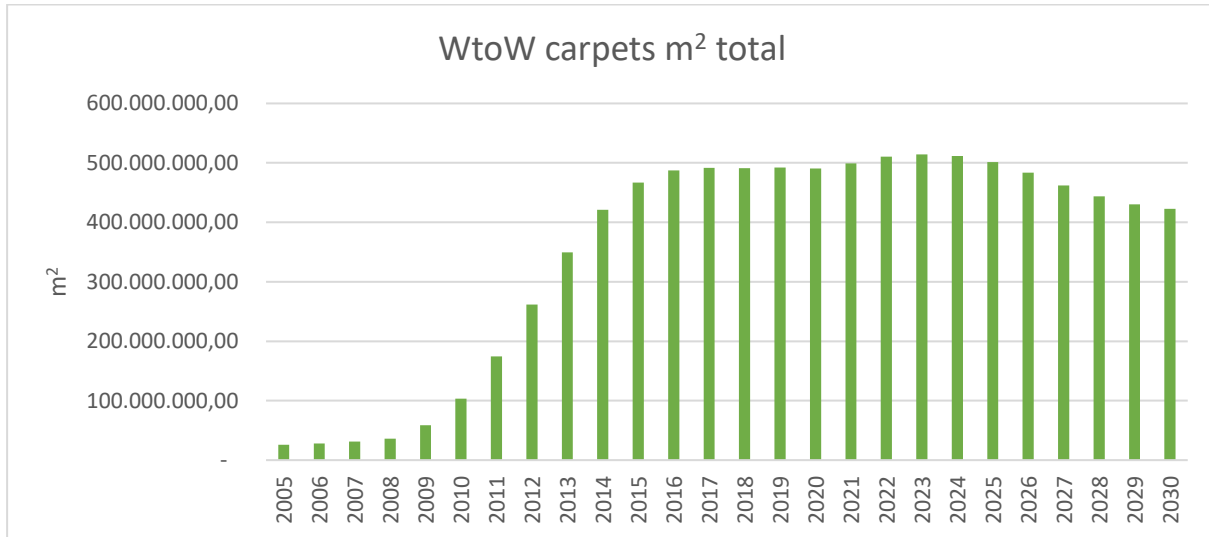


Figure 3: Wall-to-wall carpet waste arising in m²

As waste is dealt with in tonnes and carpets are sold in m², the tonnage of carpet waste in the waste stream has been calculated by converting m² into tonnes. This has been calculated using an average conversion rate of 1.69 kg per m².

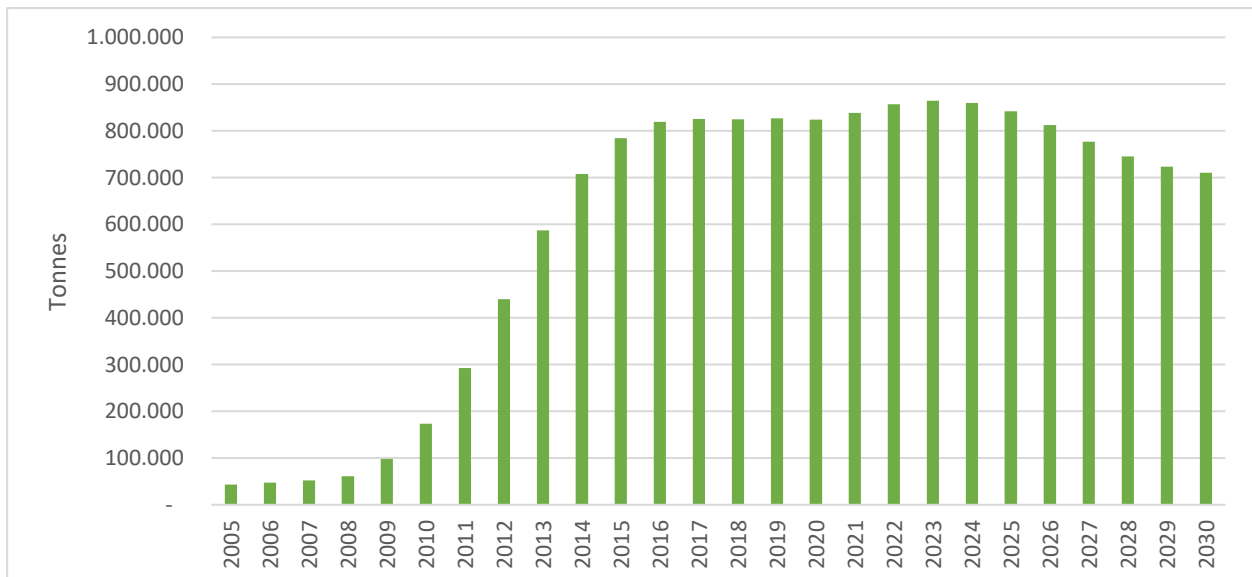


Figure 4: Wall-to-wall carpet waste arising in tonnes

Figure 4 shows that in 2023 there will be more than 860,000 tonnes of carpet waste generated, falling to around 700,000 tonnes by 2030.

1.2.2 Waste flow for vinyl floorcovering

The European Resilient Flooring Manufacturers' Institute, ERFMI, has used the same system to calculate waste arising for vinyl floorcovering. As shown in Figure 5, the model estimates that in 2023, just over 400,000 tonnes of waste vinyl floorcovering will be generated rising to an estimated 653 000 tonnes by 2040.

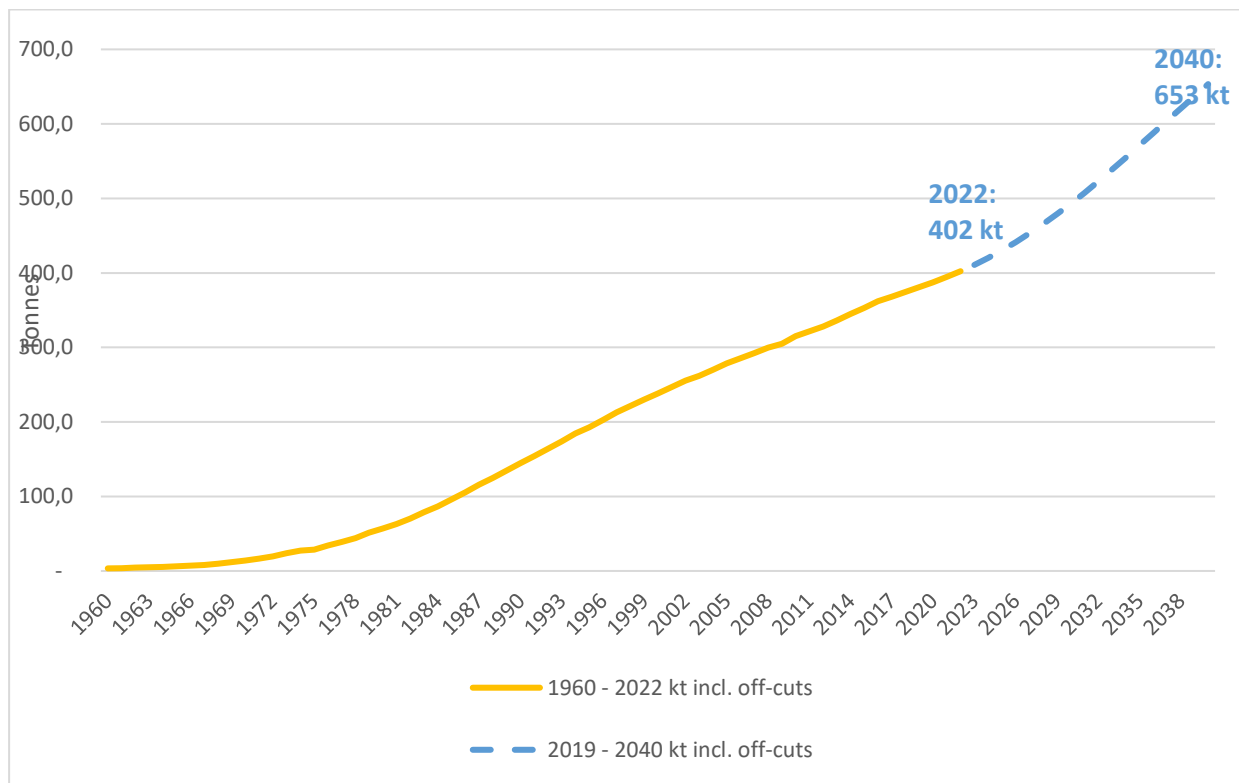


Figure 5: Vinyl flooring waste arising in EU 27 plus UK

1.2.3 Flooring waste arisings in context

In total, in 2023, around 1,2 million tonnes of carpet and vinyl flooring waste is expected to be generated. This flooring waste will be present both in the construction and demolition waste stream and in the municipal waste stream. Considering around 3 million tonnes of laminate floorcovering waste, based purely on sales rather than on the waste generation tool, it can be estimated that there will be a total of 4.2 million tonnes of flooring waste generated.

According to Eurostat, more than 374 million tonnes of Construction and Demolition Waste, excluding excavated soil, arised in the EU 28 in 2016.⁴ The flooring waste fraction for carpet and vinyl is around 0.3% of the construction waste stream. If you include laminate flooring this rises to around 1% of the construction waste stream. Although this is a significant volume, it does pose a considerable challenge with regard to collection and sorting of the flooring waste out of a mixed construction waste stream, when buildings are crushed/collapsed rather than being deconstructed, which will consist mainly of rubble, steel, metal, concrete, bricks, plaster etc.

Strategic collection is key to capturing these volumes and recovering the resources to use them in a second life. This white paper investigates where the volumes of waste arise and what the challenges for

⁴<https://www.eea.europa.eu/themes/waste/waste-management/construction-and-demolition-waste-challenges>

collection are, look at the legal frameworks and regulations that are in place and can support the collection of floorcovering, highlight some best practice examples and finally propose some options for implementing successful collection of floorcoverings.

2 Collection - current status and challenges

The main collection options for floorcoverings in Europe do not differ greatly across EU 27 plus UK. Floorcovering waste from refurbishment and construction ends up in the construction waste stream. The main collection systems for this waste stream are as follows:

- Unsorted waste collected in a container with mixed construction waste.
- Waste separated on site as combustible waste by a waste management company.
- Waste separated as recyclable waste into separate containers on site and collected by a waste management company.
- Waste separated on site into various recyclable waste fractions and collected directly by a material specific recycler.

Generally, construction and demolition waste, including flooring, is collected by privately owned waste management companies based on private commercial arrangements. In some cases, the waste is collected by contracts with municipalities.

For high value waste with a known outlet, waste is sorted on site into the various categories and picked up in separate containers by the waste company or in some instances by the recycler themselves.

The Deloitte report⁵ published in 2017 on improving management of construction and demolition waste states that several countries have a national or regional obligation to collect construction material separately. Separation of different materials is then usually required on site using different containers for each material. This applies in 14 Member States including AT, BE, NL, BG, CZ, DE, DK, EE, FI, HU, LU, SK, SI, SE, UK. However according to the report, this legal obligation is often not enforced.

Flooring waste arising in household waste stream, found either in the disposal bins or at the recycling centre, will generally end up in mixed collection containers, the contents of which will be incinerated or landfilled depending on the practices of the given Member State.

2.1 Flooring waste collection per type of flooring – current status

There are several examples of flooring waste being collected for recycling today, which will be highlighted as best practice in Section 5. However, the vast majority of post-consumer floorcoverings in Europe is still generally collected in mixed containers and then either sent for energy recovery or landfilling depending on the regional options for disposal of waste.

2.1.1 Laminate floorcoverings

The Association of European Producers of Laminate Flooring (EPLF) has carried out a survey amongst its members on recycling and reuse of laminate flooring in Europe⁶. Feedback was collected on the status in twenty-four countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the UK.

The survey found that laminate flooring is generally considered as wood waste. In some countries it is considered as non-recyclable wood-based product and is mixed with residual waste.

There are several waste wood collection schemes across Europe, with some variations. In France, natural wood and furniture are both collected in separate containers, whilst in Spain they are collected together but they can be separated according to their value/quantity/quality.

⁵ Resource Efficient Use of Mixed Wastes Improving management of construction and demolition waste Final report October 2017

⁶ EPLF [overview-of-laminate-floors-collection-and-recycling-final.pdf \(eplf.com\)](#)

In most countries and cities in Europe there are municipal waste collection parks, or commercial waste collection points, which are usually accessible to both professional trades and private individuals. Drop-off at these sites is usually free to private individuals, whilst professionals must pay.

Once wood waste arrives at the recycling plants, it is sorted and chipped. In Germany, for example, the process is more complex, with four different sorting categories (A1, A2, A3, and A4) depending on the properties of the wood (mechanically processed, varnished, with or without preservatives). The sorting takes place at the collection points. In Sweden, the sorting process is different, wood waste is usually sorted at source into untreated and treated wood to facilitate material and energy recovery.

When it comes to the cost of collection, transport, and recycling of flooring waste, municipalities, companies, installers, and individuals are responsible for the costs. In some countries, residential users are encouraged to dispose of their wood waste in designated collection point for free (e.g., Norway where a limited number of deliveries by car is free per year).

In most of the countries surveyed, recycled wood is used for energy recovery and particle boards, also known as chipboards.

However, there are several projects ongoing looking into the recycling of laminate floors (e.g., industrial pilot project to produce MDF/HDF panels from old recovered (steamed) laminate flooring, which is further being developed in CISUFLO. Section 5 also highlights a collection and recycling scheme for laminate floorcoverings run by Unilin.

2.1.2 Vinyl Floorcovering

There are several collection schemes for vinyl floorcoverings across Europe, as described in more detail in Section 5 of this white paper. According to the Recovynil system around 140,000 tonnes PVC flooring were collected and recycled in Europe in 2022 including 4000 tonnes post-consumer floorcovering waste.

There are several collection schemes for off-cuts from the installation of vinyl floorcoverings. These are generally operated by manufacturers, who collect off-cuts from their own projects and recycle the material back into new floorcoverings. Any flooring that is unsuitable for recycling back into floorcovering is recycled into applications such as building membranes and traffic calming products. These examples are described in more detail in Section 5.

Flooring which is not collected separately for recycling, is generally collected with mixed construction waste if it arises at a refurbishment or construction site. If the flooring waste is generated from DIY projects or the installer leaves the waste with the householder, it will either be collected in the municipal waste stream or be taken by the householder to a household waste collection/recycling centre, where it is generally collected in the mixed waste fraction. This material is generally landfilled or incinerated, depending on the waste management disposal systems in the various Member States.

2.1.3 Textile floorcovering waste

As shown in Section 5 there are recycling and reuse schemes for carpets across Europe. However the majority of floorcoverings will currently go into landfill or be incinerated.

There is virtually no adequate system for collection, sorting and reprocessing of carpet waste as there is no EU wide take back system for this product category. The end result of the reality today, the vast bulk of the carpet waste goes to landfill or energy recovery including incineration. Both end-of-life solutions are not aligned with circular economy and climate change objectives.⁷

⁷ European carpet and rug association (ECRA): Leading the Carpet Industry towards the Circular Economy - a 2030 Strategic Approach, January 2021,
URL: https://circulareconomy.europa.eu/platform/sites/default/files/ecra-2030_action_planhq.pdf

2.2 Key barriers and challenges



There are a number of key barriers and challenges that are blocking the development of collection schemes for floorcoverings. These include:

- 1) Lack of recycling options for floorcoverings
- 2) Legacy substances in floorcoverings
- 3) Economic feasibility
- 4) Lack of incentive

1 Lack of recycling options for floorcoverings: Today there are limited recycling options for floorcoverings. There are of course the examples listed in Section 5, but generally speaking recycling capacity is low and not fully developed. There is no incentive to collect floorcoverings separately or develop widespread collection schemes if there is nowhere to recycle them.

2 Legacy products: Given floor coverings have a long lifecycle, typically between 20 to 40 years, depending on the product and application, there is a strong possibility that flooring in the waste stream today will contain so called legacy substances, i.e substances that were deemed safe for use when the flooring was manufactured, but are no longer permitted for use in new products today.

3 Economic feasibility: The recycling of all three types of flooring products covered in the CISUFLO project is still a very costly process requiring significant investment, which is not always reflected in the value of the resultant material.

4 Lack of incentive: Historically there has not been sufficient incentive to motivate industries to take control of the end-of-life of their products.

2.3 Legislative drivers and incentives

There are a number of emerging regulations driving the need for change. Many of these have been discussed extensively in Deliverable 3.1, therefore we will only focus on the key regulations here.

The European Green Deal is a major driver for change across all industrial sectors in the EU. The overall aim to achieve climate neutrality by 2050, as well as a circular economy in which growth is decoupled from resource, means that companies are having to look at their practices from product development to placing on the market to end-of-life.

EU initiatives falling under the Green Deal such as the **Revision of the Construction Products Regulations (CPR)** and the development of the **Eco-design for Sustainable Products Regulations (ESPR)**, will lead to manufacturers having to change the way they work in order to comply.

These regulations include the need for product passports to provide more information on a product, likely comprising requirements for minimum recycled content as well as mandatory information on Greenhouse Gas Emissions (GHGs).

There are also a number of regulations in Member States that are driving the need for change. This includes the **French Extended Producer Responsibility** scheme, the Responsabilité Élargie des Producteurs (REP) Bâtiment for construction products. Under this scheme producers pay into a producer responsibility organisation, PRO, which then takes over the responsibility for collection and sorting of waste from construction products. It will be interesting to follow the development of this EPR as it affects flooring products and will demonstrate how collection systems for flooring are working in France. The PRO Valobat has decided to collect PVC floorcoverings in a mixed plastics container. The container will be

sorted into the various categories of plastics at a sorting center. It will be free of charge for installers to drop off their flooring. This will be a very interesting case study to see what volumes are collected and how the sorting at the collection hubs work.

Carpets will be collected in mixed containers for combustible material.

The flooring sector is gearing up to be able to meet all these requirements and is in the process of implementing actions to accelerate the development of the Circular Economy for floorcoverings which includes the collection of products once they have reached end-of-life.

3 Benefits of industry-wide collection schemes for flooring



There are a number of clear benefits to develop collection schemes for flooring within the context of the Circular Economy. It is important for the industry to be at the forefront of the circular economy, both in terms of complying with developing regulations and with regard to its reputation within the construction products sector.

The development of the circular economy within the flooring sector can ultimately also be an advantage for the sector, as within a well-developed circular economy in which products are designed with circularity in mind and resources are recovered and reused in new products, companies will essentially be securing a steady supply of resources and secondary raw material for use in their products.

4 Legal framework and regulations

The following legal and regulatory aspects need to be considered when implementing a collection system for floor coverings.

4.1 Waste Framework Directive



The **Waste Framework directive (WFD)** is the directive which governs all waste collection and handling across the EU. Article 3 of the Waste framework directive defines separate collection of materials to prepare for reuse and recycling according to the waste hierarchy.

Article 11 specifies that Member States should take measures to promote preparing for reuse activities, notably by encouraging the establishment of and support for reuse and repair networks, and by promoting the use

of economic instruments, procurement criteria, quantitative objectives or other measures.

Furthermore the directive states that Member States shall take measures to promote high-quality recycling and, to this end, subject to Article 10 (2) and (3), shall set up separate collection of waste.⁸

The WFD also specifies that Member States shall take measures to promote selective demolition in order to enable removal and safe handling of hazardous substances and facilitate reuse and high-quality recycling by selective removal of materials, and to ensure the establishment of sorting systems for construction and demolition waste at least for wood, mineral fractions (concrete, bricks, tiles and ceramics, stones), metal, glass, plastic and plaster.

4.2 Waste Shipment Regulations

Waste Shipment Regulations govern the transport of waste across European borders. They state that the environmentally sound management of waste is the responsibility of the waste producers. This requires prior notification and movement documents for waste shipments to be, where practicable, filled in by the waste producers. In most EU countries this regulation is translated into law by stipulating the need for waste carriers' licenses which mean that the carrier of the waste has notified his handling of waste to the authorities. It is also important that regulations do not hamper the transport of waste across EU borders as the Circular Economy Action plan foresees the implementation of a single market for secondary raw materials across Europe, which can only be achieved if shipment across borders is facilitated.

4.2.1 Member States laws on shipment of Waste

In all EU Member States there are obligations for carriers, dealers or brokers of industrial waste to register with the national authorities. Details of the licensed waste collectors are then included in a national database of carriers.

4.3 Pre-Demolition Audits and Waste Management Plans

The European Commission Construction & Demolition Waste Management Protocol published in 2016⁹ provides non-binding guidelines to improve waste identification, source separation and collection. It

⁸Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

⁹ https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en

promotes the use of **pre-demolition audits and waste management plans** which need to be carried out before any renovation or demolition project.

As laid out by the protocol, a pre-demolition audit should be undertaken before the project is carried out to plan how the building should be demolished, identifying any materials that should be reused, recycled or treated separately e.g. hazardous materials.

According to the protocol a good pre-demolition audit should consist of:

- Information on the quantity, quality, and location in the building of all waste materials to be generated.
- Information on which materials should be separated at source, which materials can be recycled.
- Information about how the waste will be managed and what the recycling options are, considering local markets for the individual waste streams.

According to the Deloitte report on improving management of construction and demolition waste¹⁰, 17 countries have made pre-demolition audits either mandatory or regulated regionally or on a voluntary basis. **Figure 6** shows countries that have embedded the pre-demolition audits in their law in green and those that have regional requirements or voluntary codes for pre-demolition audits are shown in blue.

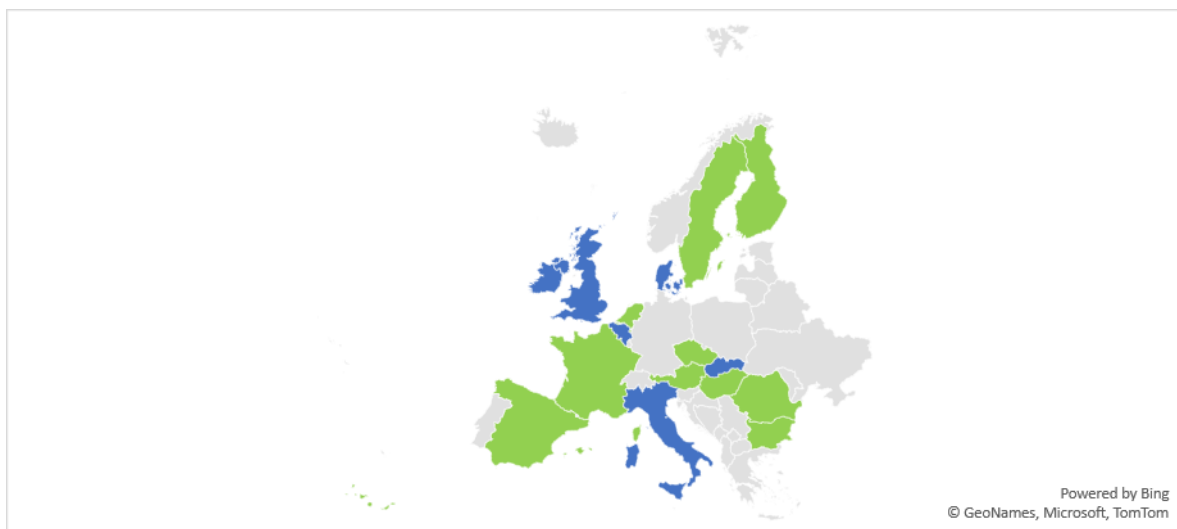


Figure 6: Countries that have implemented pre demolition audits in law = green, companies that have implemented them only in specific regions or on a voluntary basis = blue

It is difficult to say what percentage of demolition and refurbishment projects currently use pre-demolition audits. The Deloitte report states that in many cases the audits are not strictly enforced. However, it also states that the impact of these pre-demolition audits on recycling may not be known yet. Currently the data is not available to judge the effect of the legal requirement for pre-demolition audits on the overall recycling rate for plastics from construction. However, this data should become available once the CPA Monitoring system is in place.

It should also be noted that pre-demolition audits will be greatly helped by the use of product or building passports, which identify the products used in the building, the materials they are made of etc. These are only available in newer buildings and are not mandatory, but the impact of product passports on

¹⁰ Resource Efficient Use of Mixed Wastes Improving management of construction and demolition waste Final report October 2017

demolition projects in the future should be significant. Digitalisation will play a key role in identifying product composition at end-of-life and should greatly increase the potential for collection and sorting.

Some of the best examples of collection and sorting of plastics from construction demonstrate that separate collection leads to a higher rate of recycling.

5 Best practices

There are already several collection schemes across Europe for vinyl and textile floorcoverings. These are usually material specific and, in many cases, operated by manufacturers. Laminate floorcoverings is generally collected as wood waste and described in more detail in Section 2.¹¹

This section highlights a few examples for each flooring type.

5.1 Vinyl Floorcovering

There are a number of good examples of collection and sorting schemes for vinyl flooring across Europe.

Figure 7 shows the countries in which there are collection scheme for VinylFlooring in place. The schemes highlighted are run by manufacturers, they collect both installation off-cuts, as well as uplifted vinyl floorcoverings.

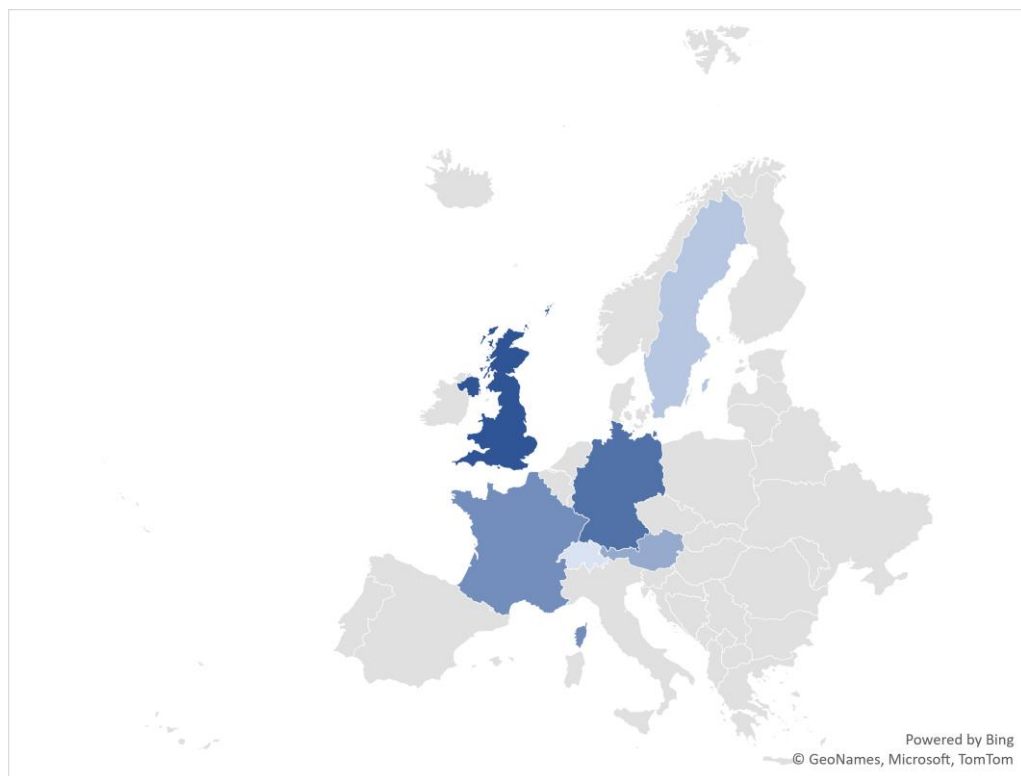


Figure 7: Countries with dedicated collection and recycling schemes for PVC floorcoverings

Recofloor

Recofloor¹², operational in the UK, is a scheme, founded and funded by flooring manufactures Altro and Polyflor, which collects both off-cuts from the installation process and uplifted flooring directly from construction sites, from fitters or from distribution sites. The collection system uses backhaul collections to collect waste flooring from distribution sites. Flooring fitters drop off their waste at the distributors,

¹¹ <https://eplf.com/storage/files/overview-of-laminate-floors-collection-and-recycling-final.pdf>

¹² www.recofloor.org

when they go to pick up new flooring. Manufacturers collect the waste from the distributors, when they deliver new flooring. The material is sorted on site.

The contractors are incentivised to collect the flooring separately from other waste by providing a service that is cheaper than the cost of landfilling the material. The contractors that collect the flooring are also given certificates which they can show to future clients. This often helps them gain further work for public authorities and large companies, as it demonstrates their commitment to sustainability. The collected flooring is recycled into new flooring or other applications such as traffic management products depending on the type and contamination of the flooring collected.

Other collection schemes for resilient flooring are also existing such as PVC Next in France¹³, GBR Floor Recovery in Sweden¹⁴ and ARP Schweiz in Switzerland¹⁵.

Manufacturer's own schemes

Several manufacturers have their own schemes whereby they collect off-cuts from the installation process directly from site. This enables them to collect material which is clean and can be used in the production of new flooring. This material would otherwise be lost in large mixed skips and end up in incineration or landfill.

AGPR

AGPR¹⁶ is a collection and recycling programme for PVC flooring based in Troisdorf Germany, it is an initiative by flooring manufacturers Altro, Gerflor, Polyflor and Tarkett. It collects pre-sorted waste for recycling, from waste management companies in France, Germany, Switzerland and Austria and recycles the material into a powder which can be used in the production of new flooring.

5.2 Carpets

There are several examples of collection schemes for carpet tiles in Europe, either for reuse or recycling.

5.2.1 Collection for reuse

Greenstream flooring¹⁷ is a social enterprise based in South Wales, UK, that collects separately sorted carpet tiles from refurbishment sites. Carpet tiles are taken out of the building and stacked on pallets. The pallets are then collected by Greenstream Flooring and taken back to their warehouse, where they are graded and sorted and then sold on to start up companies, social housing and disadvantage households.

5.2.2 Collection for recycling

Example of Manufacturer own run scheme

The flooring manufacturer Tarkett has set up a system to collect separated carpet tiles from construction sites through their ReStart take back and recycling programme and send them to their plant in the Netherlands where Polyamide 6 (PA6) face fibre is separated from the EcoBase® backing.¹⁸ The PA6 is then recycled back into yarn by their yarn producer and partner Aquafil and used in the production of

¹³ <http://solspvcpro.com/environnement-et-sante/collecte-et-recyclage.html>

¹⁴ www.golvbranschen.se/miljo-hallbarhet/golvatervinning

¹⁵ [PVC-Bodenbelag Recycling | ARP Schweiz](http://PVC-Bodenbelag%20Recycling%20|%20ARP%20Schweiz)

¹⁶ www.agpr.de

¹⁷ <https://www.findcarpettiles.co.uk/>

¹⁸ <https://www.tarkett.com/en/content/tarkett-and-aquafil-close-loop-carpet-tiles-key-step-towards-circular-economy>

new flooring. The EcoBase® backing can be directly recycled in the production process into backing for new carpet tiles backing.¹⁹

*Carpet Optimum*²⁰

The Optimum project is a French carpet tile recovery programme organised by the Belgian Waste Collection and Recycling company Van Heede. The project was designed in collaboration with the French Union of Carpet Makers (UFTM) and the National Union of Technical Floor Coverings and French Buildings Federation (UNRST-FFB). The Optimum service collects post-consumer textile floorcoverings from construction and refurbishment sites. The material is transported to a dedicated processing centre, where the carpets are recycled. Carpets are recycled as well as turned into alternative fuels.

5.3 Laminate floorcovering

Unilin have established take back programmes for wood waste from construction sites, as well as municipal waste sites and in 2022 collected 25,000 tonnes of chipboard through these programmes. The chipboard is taken back to Unilin's site in France where it is processed into MDF panels. These panels can then be used as the core layer or substrate layer for new laminate floorcoverings.²¹

¹⁹ <https://www.youtube.com/watch?v=DcZ57qVhQDE>

²⁰ <https://www.recyclage-moquettes.fr/lengagement/>

²¹ <https://www.unilinpanels.com/en/about-unilin-panels/sustainability/circularity/take-back-programme>

6 Designing the industry-wide collection schemes for flooring

The first thing to consider when implementing collection schemes is where the flooring waste arises, as this will determine how the waste is collected. The CISUFLO project aims to develop floorcoverings that are recyclable and therefore have a clear recycling path. The circular floorcoverings designed in CISUFLO will also be easily identifiable via a digital marker which, when scanned, will provide detailed information about the product. However, as floorcoverings are very long lasting, it will probably be more than 10 – 20 years before the waste generated contains a significant volume of this type of flooring. In the meantime it will be necessary to establish a system which can deal with ‘old floorcoverings’ which have not been specifically designed with the circular economy in mind, as well as with CISUFLO floorcoverings.

Flooring can be divided into two broad segments:

- Commercial floor covering, which is supplied to commercial settings, such as hospitals, schools, offices and hotels.
- Residential floorcovering.

Figure 8 shows the different waste flows for these two main segments. The red arrow follows the waste flow for one particular example and shows the various choices that can be made.

The waste flow varies depending on the following key factors:

- The application area, e.g. contract or residential
- Availability of product information, e.g., ePRODIS
- Possibility of sorting on site
- Transportation options for the material
- End-of-life options for the product: reuse, recycling, incineration
- Location of reprocessing site

In the contract area it is possible to identify various types of floorcoverings more easily, as there is generally no DIY and specifiers of floorcovering will be aware of the type and size of the project they are working on. Therefore, it makes sense to collect the material from as close to the point at which it arises as possible.

In the residential area there are a number of options:

- DIY refurbishment: The householder will take the waste to a recycling site where it will currently most likely be placed in a mixed container. For laminate flooring, the waste can be placed into the container for wood, which is generally collected separately.
- Refurbishment replacement by a flooring contractor:
 - The flooring installer takes the flooring waste back to his site after the project. This provides a good opportunity to collect the waste directly from the contractor’s site.
 - The flooring fitter leaves the waste with the householder and ask him to take the waste to the local recycling/ bring centre themselves. This is due to the fact that commercial waste is chargeable, whereas householders do not have to pay (or only limited) for using household waste facilities.

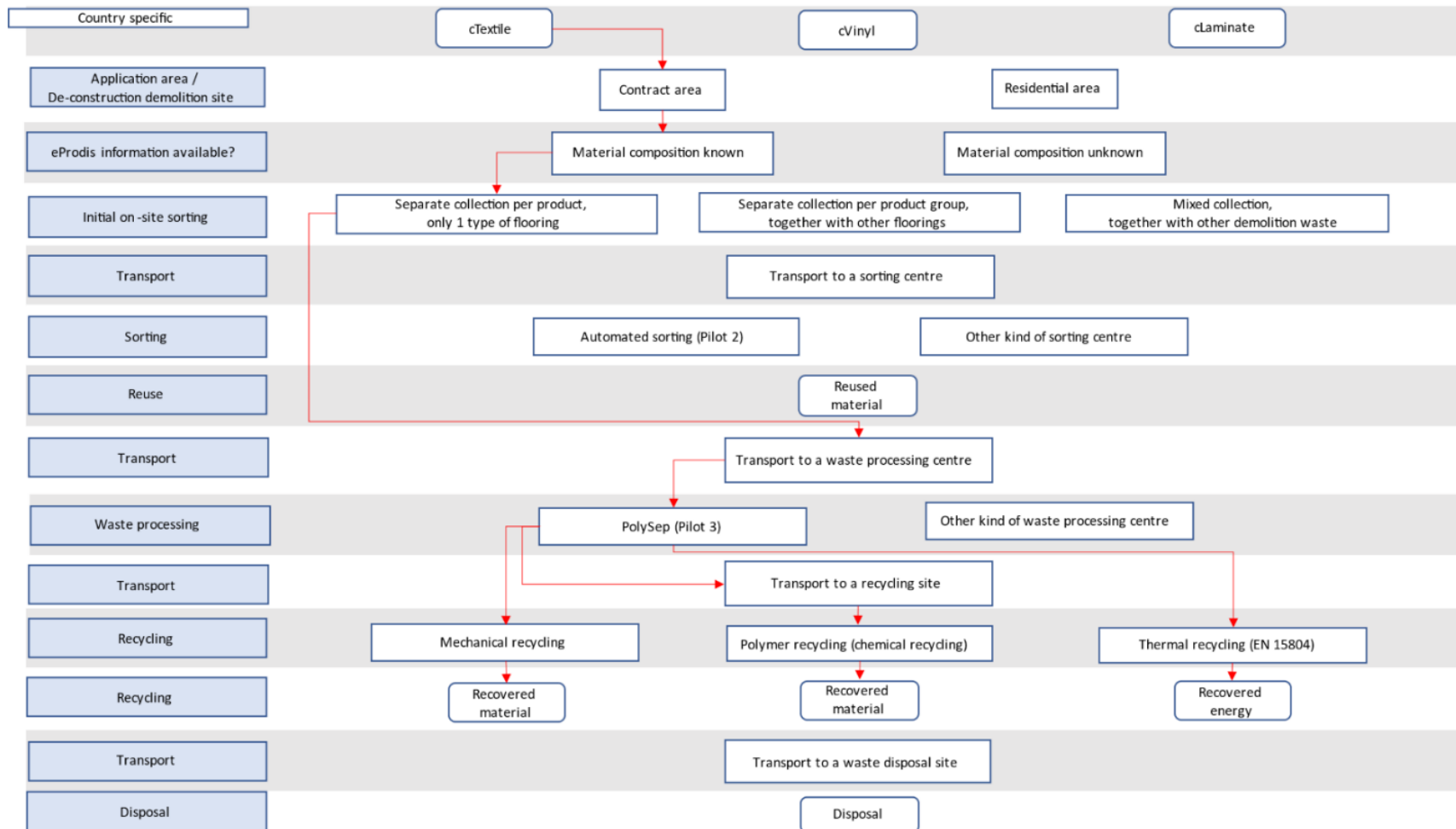


Figure 8: Flooring waste flow diagram

6.1 Collection scheme proposal

It is generally accepted that separate collection of waste is key to achieving a clean stream of uncontaminated material for recycling.

Article 3 (11) of the Waste Framework Directive (WFD) defines separate collection as the collection where a waste stream is kept separately by type and nature, so as to facilitate a specific treatment. The obligation to separately collect Municipal Solid Waste (MSW) from households, as well as public and private establishments, is set out under Article 10 (2) (WFD). The article requires that waste shall not be mixed with other waste or other materials with different properties in order to facilitate preparing for reuse, recycling and other recovery operations in line with the waste hierarchy.

A collection scheme for floorcoverings should follow this rule. Carpet, laminate and vinyl floorcoverings should be collected separately as far as possible, unless it makes sense from a logistics point of view to collect them together. Collecting different flooring types together would for example make sense if there are several types of floorcovering arising from a demolition and refurbishment site and each floorcovering type arises in relatively small volumes.

6.2 Individual requirements per product type

6.2.1 Carpets



As defined by the European Carpet and Rug Association (ECRA) in their action plan to 2030, an important stepping stone towards the development of a circular economy for carpets is to ensure appropriate collection and sorting schemes so that the product's potential value is maintained. In order to be recycled at end-of-life, carpet must be kept dry, uncontaminated, and sortable. The same principles apply to any manufacturer's B2B or B2C take back schemes to recover carpet when new products are delivered.

The first step toward achieving full circular economy for the carpet industry is a new system that allows for better collection and sorting of carpet in an optimised way and avoid contamination. This is key to incentivise recycling over non-circular practices such as energy recovery and landfill. ECRA recognises the need for the European carpet industry to engage with its partners, including the waste management partners and customers, to create a system that facilitates better collection, sorting and separation of the carpet waste stream.

6.2.2 Vinyl



Post-consumer vinyl floorcovering should be collected separately if at all possible. The German PVC floorcovering recycler AgPR²² stipulates the following acceptance criteria for the PVC floorcoverings waste:

- Cement or glue residues adhering to the PVC do not present a problem, provided their weight is markedly less than that of the PVC floorcovering.
- Floorcoverings must not be contaminated with oil, solvents, or other dangerous substances.

²² <https://agpr.de/en/acceptance-conditions/>

The already existing manufacturer schemes for installation waste, as described under best practice, should be maintained and expanded. It makes sense for manufacturers to collect their own off-cuts from projects such as hospitals, schools etc. where large quantities of one specific flooring type is used.

6.2.3 Laminate flooring



As specified in the EPLF position paper, laminate flooring can be collected and processed together with wood. Once the recycling options for MDF based wood products expands it would make sense to either specify this as a separate category within the wood category, so that it can be recovered out of the existing waste stream or to collect the waste separately.

6.3 Collection principles that relate to all 3 floorcovering types

Business to Business – Commercial waste

- ❖ Flooring should be collected as close as possible to the place at which it arises.
- ❖ Installation off-cuts should be collected separately to uplifted flooring as they are of known composition and uncontaminated and therefore a valuable material for recycling.
- ❖ Wherever possible the supply chain of the flooring should be utilised for collections. This means that whenever possible the flooring should be taken back by the contractor to their site or to the site from which they buy new flooring, so that it remains out of the general waste stream and is not contaminated with other waste.
- ❖ Backhaul logistics should be implemented wherever possible, so the waste could be collected by the manufacturer or distributor on the return route from dropping of new floorcoverings. This utilises empty space in trucks on the return to the manufacturer or wholesaler or distributor once flooring has been dropped off.
- ❖ Collection depots could be set up for individual flooring types so that the waste can be sorted at the depot if needed and then forwarded to the ultimate recycling site.

Business to Consumer - Household waste

- ❖ There should be separate containers for flooring available at Household waste sites. At least for carpet and vinyl, as laminate can be placed in the collection container for wood.
- ❖ Waste sorting centres which are trained to sort floorcovering should be set up to sort the material into the separate waste stream.
- ❖ The same collection hubs could be used for mixed flooring waste from demolition sites.

7 Implementation plan

The European flooring industry must engage with its partners, including the waste management partners and customers, to create a system that facilitates the better collection of the flooring waste stream. To achieve this, EU policymakers and local, regional and/or national authorities must play their full part as this cannot be achieved without their participation. This means introducing new policies making recycling more competitive or indeed preferable from a cost perspective and raising awareness to the sustainability benefits of recycling floor coverings. This includes green building certifications, green public procurement and collaboration with waste management partners to identify the most efficient approach to collection.

It should also be noted that the collection models described in this white paper can only be implemented in those areas where there are recycling options for the product in question. Sorting options for floorcovering need to be established, as is being done within the framework of the CISUFLO project and there needs to be a strategy for tackling waste containing legacy materials, as is being currently done in the REMADYL project²³ and in the Circular Flooring project²⁴, as well as by the European Resilient Flooring Manufacturers' Association (ERFMI).

Having said that it makes sense to start trialling the collection systems described as soon as possible so that a waste and resource flow can be established and be in place for circular flooring products once they have been developed.

In order to implement the key steps listed in step six, the various industries need to be prepared to work together and to collaborate with the supply chain. The mindset needs to change to see waste as a raw material rather than a contaminated product that can't be transported with 'clean' material.

7.1 Key stakeholders

Key stakeholders within the collection system, are:

- Flooring specifiers
- Flooring installers/contractors
- Wholesalers, distributors, and retailers,
- Waste management companies
- Logistics companies.



Flooring specifiers can stipulate that the flooring being replaced by the material should be recycled and that installation off-cuts should be recycled via an industrial recycling scheme. It is already the case in the UK that flooring tenders, particularly on local authority projects, stipulate that off-cuts from the installation process should be collected and recycled via Recofloor, the vinylflooring take back scheme.

Flooring installers need to be on board with the collection system. Several countries have associations for flooring installers, such as the Contract Flooring Association (CFA) in the UK and Branche Vereniging Projectinrichting (BVP) in the Netherlands. Engaging with flooring contractors will be essential for the success of any collection scheme.

Wholesalers, distributors and retailers need to be encouraged to be part of the end-of-life arrangements for floorcoverings. They can act as a collection hub for floorcovering.

Waste management companies, especially those managing household waste centres and drop off sites need to be encouraged to set up separate containers for floorcoverings at their sites.

²³ <https://cordis.europa.eu/project/id/821136>

²⁴ <https://www.circular-flooring.eu/>

Local authorities need to be engaged, particularly in those countries where carpet waste is collected at kerbside with their bulky waste collections, and be encouraged to collect carpets separately.

It should be defined who is responsible for the collection and sorting of the specific flooring waste, so setting up a coordinating body will be beneficial. The collections could be coordinated by industry bodies and by individual sector associations.

7.2 Communication and awareness-raising strategy



It is important to implement an awareness-raising strategy to communicate the importance of participation in the collection system. The Transition Support Tool, being developed in the CISUFLO project, will play an important role. It can highlight the collection criteria for each floorcovering type and also list collection points and systems that are up and running. It will be important to keep the Transition Support Tool updated.

Most flooring manufacturers have training schools to teach installers how to install their particular flooring. End-of-life collection and recycling options should become part of the curriculum. The flooring contractors associations in the various countries should provide regular updates on the collection options to their members.

7.3 Open questions for discussion



This white paper has been developed as a discussion document to stimulate reflection within the flooring sector on how to progress with the setting up of collection systems. The paper is being issued in month 24 of the project, but the collection element of the CISUFLO project runs until month 44. This gives the consortium 20 months to discuss the options and provide answers to the following questions:

- Who will coordinate the collection systems?
- Should there be one central coordination system, or should coordination be devolved to the associations within the Member States?
- How will collection be financed?
- At which stage should collection be implemented? It makes little sense to collect flooring for which there are no recycling options, except to establish a waste stream that can then be diverted into recycling options as they are developed.

These questions will drive the discussion within CISUFLO in the coming months.

8 Monitoring and continuous improvements

The effectiveness of the collection scheme will ultimately be measured by:

- collected waste volumes,
- reuse rates,
- recycling rates,
- landfill and incineration rates.



There are already several mechanisms in place through which this success could be measured:

PolyCert Europe



The European converters of polymeric materials, within the framework of the European Plastics Converters Association, have established a platform called MORE in order to register the use of plastic recyclate in new products and to enable the industry to demonstrate its commitment to reach the target of the European Commission of 10 million tonnes of recycled polymers reused annually by 2025.

PolyCert Europe has been set up to quantify and audit the volumes reported into the MORE platform. The auditing is carried out by a third-party auditing system based on a network of accredited certification bodies and independent auditors to ensure impartiality. The objective of PolyCert Europe is to provide quality certification and verification of recycled content in converted products.

Polyrec



Polyrec is another monitoring system established in 2021 to align data collection and reporting for all polymers to ensure traceability, transparency and trust in recycled material along the entire plastics value chain. Polyrec collects volumes via the RecoTrace™ data collection system to monitor, verify, and report polymer recycling and uptake in Europe. RecoTrace™ builds upon Recovinyl's 18 years' experience of collecting credible recycling data.

These systems could be used to monitor and verify the collection of polymeric floorcovering materials.

9 Summary and call to action

Floorcovering waste should be collected separately from other waste streams in order to ensure a clean uncontaminated flow of material for recycling.

It makes sense to collect each type of floorcovering separately unless they arise in the same place.

Regulations, such as pre-demolition audits, need to be enforced to ensure that materials can be collected separately from the general construction and demolition waste stream. This will of course be greatly eased when product passport systems such as the e-PRODIS system are fully implemented.

The flooring sector needs to engage with its supply chain in order to get them involved in the collection process. This includes manufacturers, flooring installers, wholesalers, distributors, logistics companies and waste management companies. Although this paper advocates for separate collection of the different types of floorcovering waste where feasible, it is important to realise that in most cases the stakeholders that need to be involved are the same across each flooring category, i.e., retailers, installers, national authorities. Therefore, it is important to approach these stakeholders together as an industry to advocate for their involvement in the development of the circular economy for our sector.

The CISUFLO project provides an ideal platform for all these stakeholders to engage and to answer the key questions:

1. Who will manage the collection schemes?
2. How will they be financed?
3. How can we work better together as an industry?

This paper is designed to induce discussion across these topics to come to a common understanding of what the best collection options for each floorcovering types are.

The CISUFLO project should be the platform in which these topics are discussed in the next 20 months.

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