



Swept under the Carpet:

The Big Waste Problem of the Carpet Industry in Germany

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Executive summary

The circular economy has developed into a key issue on the agenda of German and European environmental policy and is often among the key sustainability commitments of the business sector, political institutions and private actors. The circular economy model not only brings benefits to the environment, in the form of resource efficiency and climate protection, but also leads to economic benefits and job creation, as shown by multiple studies.

This report focuses on the implementation of circular economy principles in the carpet sector. In 2016, 700 million square metres of carpets were sold in the EU, which makes it the second biggest market, after the U.S. This sector has a significant impact on the environment, not only in the manufacturing process, but also at the end-of-life stage. Every year around 1.6 million tonnes of used carpets are disposed of in Europe – around 400,000 tonnes in Germany alone.

The carpet industry is a sector where **circular solutions already exist**, yet they need to be scaled up and implemented in the entire sector:

- Carpets need to be designed with reuse and full recyclability in mind;
- Infrastructure between manufacturers, retailers and municipalities for separate collection of carpet waste to prevent contamination and enable easier reuse and recycling;
- Recycling facilities that provide high quality recycling of carpet material back to carpet material, in a closed-loop system

The report describes a reality that is still far from this vision, and a sector still far away from a functioning circular economy with closed material loops. After its useful life, almost all German carpets are burnt in incinerators. In Europe, around 60 percent of carpets are land-filled while the rest is almost always incinerated. In the absence of any transparency on the recycling rates in the sector, the precise amount of recycled carpet in Europe is very difficult to establish. The authors of the report, however, believe that less than 3 percent of carpets sold are collected for recycling, and it remains unclear how much of this “recycling” is in reality “down-cycling” - a transformation into a product of an inferior quality that is generally not recyclable at the end of its useful life. Moreover, the term “recycling” is also used to refer to recycling of pre-consumer material or even for “thermal recycling”, i.e. incineration.

In addition to this, the research carried out for this report highlights that the two leading manufacturers in the EU market and self-proclaimed sustainability leaders, Interface and Desso, lag behind their own ambitious sustainability and circular economy commitments.

Desso and Interface: discrepancy between environmental claims and reality

For several years, these two manufacturers have set high environmental targets and sustainability commitments. Interface has committed to producing “zero waste” by 2020, while Desso says it will incorporate all its products into a “Cradle-to-Cradle®” system. These commitments have been very effective, as the two companies are frequently invited to share



their learnings on circular economy in the media or at events. However, the research for this report has revealed that Interface and Desso have recycling rates of carpets that seem at odds with their sustainability goals: the companies respectively reclaim only around 1.5 and 3 per cent of their sold carpets at the end of life for recycling.

Germany: Overcapacity and false incentives for incineration

The overcapacity for the treatment of municipal and commercial waste in Germany encompasses a total of 2 million tonnes and is contrary to the idea of the circular economy, especially since low prices encourage burning of recyclable materials and products, like carpets.

Conclusion: Transition towards circular economy must start immediately

To direct the carpet sector towards a true circular economy, immediate actions must be taken by carpet manufacturers, public authorities, consumers and retailers. Due to the relatively long lifespan of carpets, the impacts of these measures will not be visible immediately, but several years down the line. The report concludes that the transition must start immediately. Otherwise, the industry will be trapped for many years in a system with unsustainable waste disposal structures and a linear economic model.

Recommendations (see Chapter 5 for an extensive list of recommendations)

Carpet manufacturers must integrate reuse and recycling objectives into the design phase, increase collection and recycling rates, scale up recycling capacities in Germany and clearly label the materials used in their products to facilitate recycling by other actors.

German policy makers must introduce the principle of product stewardship, set standards for reuse and recycling by means of a mandatory bulky waste regulation, and make the incineration of recyclable materials financially unattractive by introducing an incineration tax.

Retailers must offer a wide range of sustainable products from recycled materials, inform consumers about the environmental benefits of reused and recycled carpet and offer take-back schemes in a consumer-friendly way.

Consumers should request information about the reusability, recyclability and environmental impacts of carpets and make sustainable decisions with this information when purchasing carpets.



Chapter 1

Circular Economy – on the way to a sustainable society

The idea of a resource-efficient, circular economy

The circular economy is an alternative to the traditional linear economy, in which resources are only used once and then disposed of. Countries lacking natural resources, like Germany, cannot afford to use them in a careless, inefficient way. Worldwide, we currently use 1.5-times more resources than the earth can regenerate. If everyone lived like a German, we would need 3.5 earths to accommodate the resource demands of the global population. The ultimate goal of the circular economy is to base our economic system on natural substance life cycles, and minimum resource use that will be detrimental to other nations or for future generations (UBA, 2015). The concept of the circular economy is based on the principle of a waste hierarchy, which ranks different options for dealing with waste.

The principle of a waste hierarchy

Reduce – reuse – recycle – recovery – disposal: these are the principles of the waste hierarchy on which waste management in Germany and the European Union (EU) is built upon. Waste management used to be synonym to disposal, but by now it has been recognised that waste is valuable raw material, which can be reused and recovered to save natural resources. Avoiding waste means using fewer raw materials and reducing the burden on the environment. Material recovery of waste means that raw and intermediate materials are fed back into the economy. The German waste industry, an important sector in Germany's economy, uses high-end technology to efficiently use waste as a resource and eliminate residual waste in an environmental way.

The German government's waste policy

The German government wants to further develop its waste policy to stimulate a circular economy with resource-efficient and circular material flows. Waste should be used entirely by systematically separating waste, preprocessing reuse and recycling, which will minimise incineration and eliminate the need for climate-damaging landfills. Crucial environmental progress has been achieved since the strict ban on the landfilling of untreated household and commercial waste, which was enacted on 1st June 2005. The German government aims to achieve high-quality recovery of municipal waste by 2020. This specific goals are 65 percent recycling and at least energy recovery of the rest.

Circular Economy Package in Europe

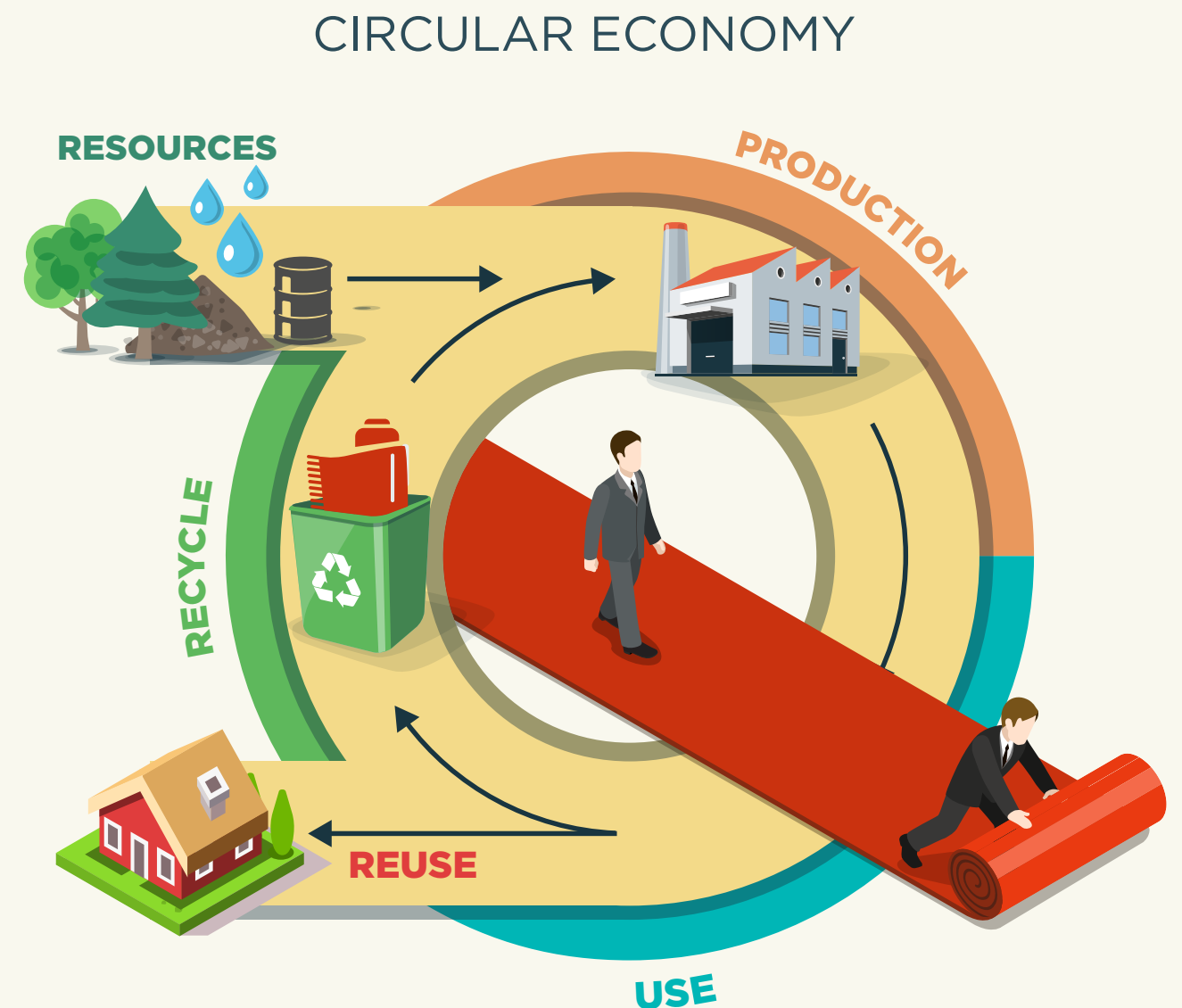
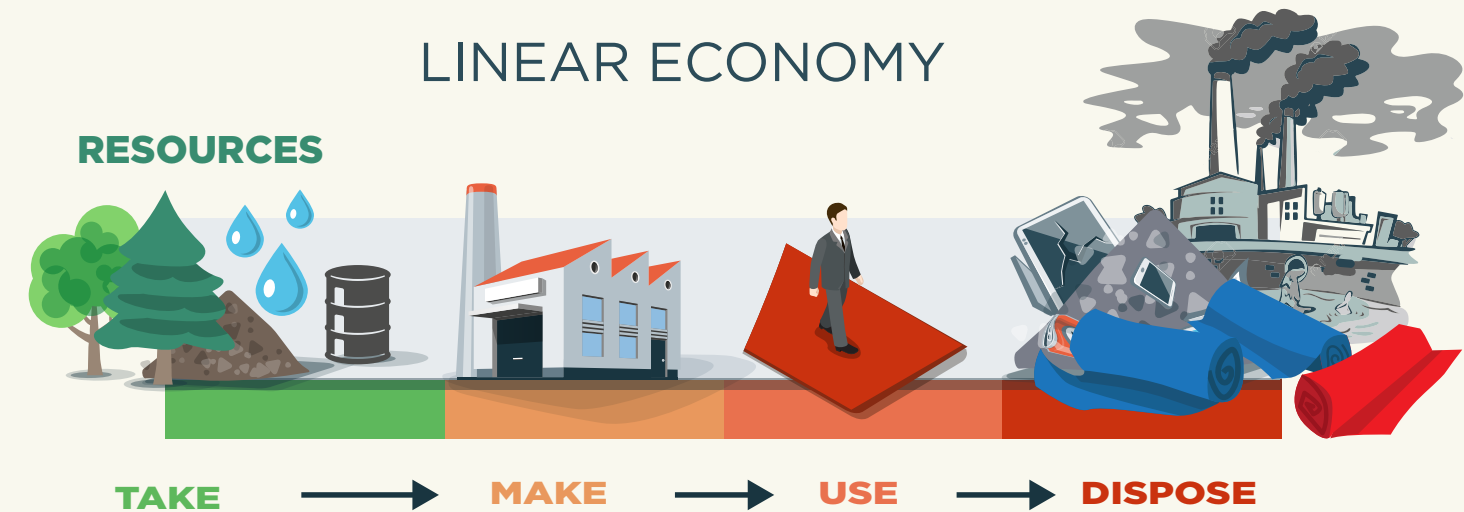
In December 2015, the European Commission introduced its Circular Economy Package (CEP). This aims to increase European resource efficiency for the entire product life cycle - from the manufacturing process to product design and the recycling of products. The Package contains recommendations for the revision of six waste directives and an action plan called "Closing the loop - An EU action plan for the Circular Economy". The Package, as proposed by the European Commission, includes a 65 percent recycling target for municipal waste and a target to limit landfilling of household waste to 10 percent by 2030. In order to reach these goals, the carpet industry has to play its part and recycle carpet instead of incinerating it or dumping it in landfills.

Circular Economy – a challenge for the carpet industry

In Germany, around 400,000 tonnes of used carpet are annually discarded, thereby creating a significant material flow* (Nikzad, 2000). Unfortunately, almost all used carpet ends up in the incinerators, rather than being reused or recycled. The disposal of carpet is significant environmental problem in Germany for several reasons: there is no comprehensive reclamation system available in Germany, recyclability of carpet is not included in product design and there is no big recycling facility in the country. This means that resources are unnecessarily wasted and the climate is harmed. Therefore, the carpet industry has to step up its game and implement the circular economy across the sector.



CIRCULAR ECONOMY VS. LINEAR ECONOMY





Chapter 2

Wasted Opportunities: What happens to carpet at end-of-life?

The general life span of a carpet is around 7 to 20 years, depending on the intensity of use and other factors, such as damage, changes in taste or changes in the facility's owner or usage purpose. In Europe, approximately 1.6 million tonnes of post-consumer carpet material is discarded annually (European Commission, 2013). About a quarter of this (400,000 tonnes of carpet) is discarded in Germany every year (Nikzad, 2000). There are several different end-of-life treatment options for post-consumer carpet.

In the EU, around 60 percent of carpet is landfilled and most of the rest is burned in incineration plants or cement kilns (European Commission, 2013). In Germany, landfilling carpet has been prohibited since 2005 and thus the large majority of the 400,000 tonnes of scrap carpet is incinerated. In order to divert end-of-life carpet from incineration or landfill (both of which present significant environmental burdens and a waste of precious resources), there are other circular options in line with the waste hierarchy: reuse, refurbishment and recycling at the end-of-life. Incineration or landfill, which are the lowest two levels of the waste hierarchy, should be avoided if possible. In an ideal circular economy, carpet materials are recycled through a closed-loop system back into carpet or similar quality products. Only when this is not possible, due to technical reasons, it can be down-cycled to other products with lower quality, for instance low grade industrial plastics. We will examine each of these options for carpet in more detail.

a. Reuse

Extending the lifetime of products by reuse leads to resource and energy savings in the production phase because fewer products have to be produced in order to fulfil the same functionality. Therefore, generation of waste can be reduced if products are used for longer periods of time. Additionally, reused carpet should be recyclable in order to prevent waste from going to landfill and to ensure a closed loop system (Sas, 2015). It's unclear what proportion of discarded carpet is reused in the EU or in Germany, as reuse is currently not measured. The European Circular Economy Package, which is currently being debated, includes a target of 65 percent for municipal waste prepared for reuse and recycling. Without a separate target on reuse, most of this waste will instead be prepared for recycling. The Environmental Committee of the Parliament (ENVI) has therefore proposed a separate target of 5 percent for municipal waste prepared for reuse. It remains to be seen if this will be adopted.

Carpet can be trimmed and cleaned; it can even be re-coloured for resale or redistribution. Some used carpet is sold in second hand stores and on online platforms like eBay. Investigations into large carpet manufacturers (Ecostorm Investigation, 2017) revealed that few companies offer a reuse option. Desso and Interface take back small shares of carpet tiles for reuse and recycling purposes (see more in Chapter 4). Overall, it seems

that the potential for reuse is much larger. However, the general poor quality of post-consumer carpet currently makes reuse an infrequent option. Separate collection from other waste streams that can contaminate or damage carpet is crucial here.

The most important factor in determining whether a carpet can be reused is the design, for instance which type of carpet is used (broadloom versus tiles). Due to the difficulties of ensuring that the carpet has the required dimensions for the second location, broadloom carpet is generally deemed unsuitable for reuse. The great advantage of carpet tiles is that they can be taken up and reused. Carpet tiles will usually be installed using a non-permanent bond, which enables tiles to be uplifted easily. Reuse is a key opportunity for carpet tiles as shown by several case studies in the United Kingdom (Carpet Recycling UK, 2013). Carpet tiles have a design life of more than 15 years, but in practice are replaced much earlier – after only 7 to 10 years (e.g. for aesthetic reasons). Therefore, this carpet still has another 5 to 8 years of life, which is why the opportunities for reuse could be better utilised.

Reuse in action: an example from Wales

The social enterprise Greenstream Flooring in Porth (South Wales) collects and reuses post-consumer carpet tiles from commercial establishments. Depending on the volumes of carpet tiles collected (in 2012: 213 tonnes per year), they use their own 3.5 tonne van or employ a sub-contractor.

About 80 percent of the tiles sorted are reusable and are sold either directly from the site in Porth or on the Greenstream eBay shop. The rest consist of offcuts or damaged tiles. Therefore, these tiles are donated for small-scale reuse (e.g. floor covering for garages) and those that cannot be re-used in any way are sent for energy recovery.

As well as environmental benefits, there are other significant benefits to carpet tile re-use which further strengthen its place at the top of the waste hierarchy. Working with a third sector organisation to reuse carpet tiles can also bring about considerable community and social benefits, including the provision of work placement opportunities. Reused carpet tiles are sold to housing associations and start-up businesses, as well as low income tenants, who could not normally afford floor furnishings. Greenstream Flooring also provides employment and training to people who struggle to find work, such as the long-term unemployed and people otherwise disadvantaged.

Source: WRAP n.d.

WASTE HIERARCHY IN A CIRCULAR ECONOMY



Incineration destroys materials

ENERGY RECOVERY



Disposal leaves valuable resources potential unused. Its the least enviromentally-friendly waste option

DISPOSAL



INCINERATION AND DISPOSAL DEPRIVE THE CIRCULAR ECONOMY OF PRODUCTS THAT SHOULD BE REUSED, AND MATERIALS THAT SHOULD BE RECYCLED

b. Recycling

Only a small percentage of carpet is currently recycled in the EU. The exact numbers are unknown, but investigations by Ecostorm (2017) have revealed even progressive companies, like Interface and Desso, take back at most 3 percent of their carpet for recycling (see more in Chapter 4). This is very small compared to recycling rates of municipal waste, which is 29 percent in Europe and 62 percent in Germany (Eurostat, 2015, EEA, 2013). The carpet industry will have to play its part in municipal waste recycling targets of at least 65 percent by 2030, which have been proposed as part of the EU Circular Economy package.

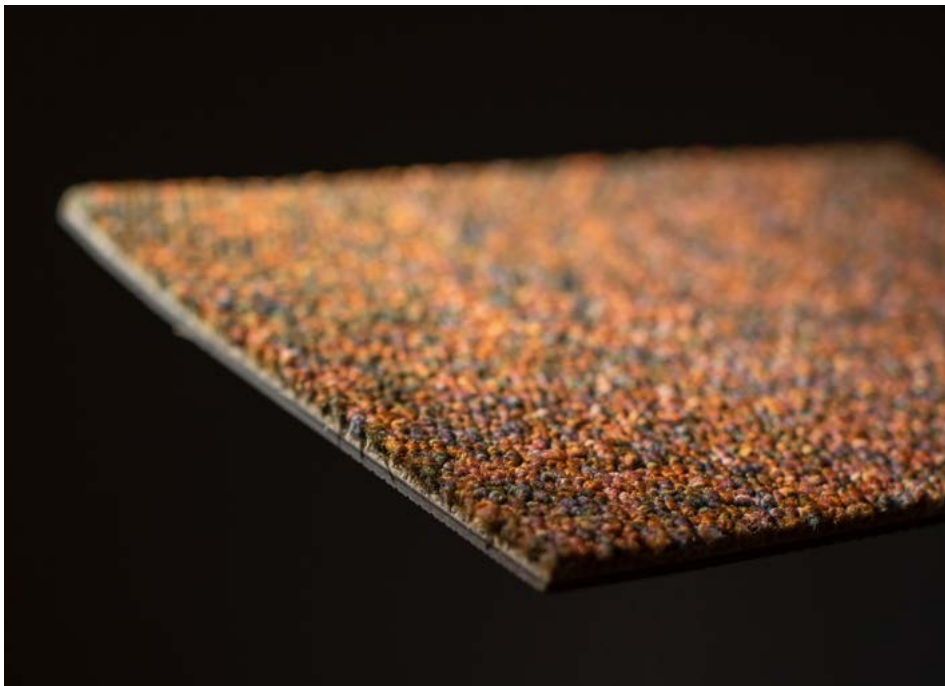
A carpet usually consists of three layers: the face fibre (which is the top), a primary backing (what the fibre is connected to) and a secondary backing. The primary and the secondary backing are usually glued together. The fibres are composed of thousands of small threads. In Europe, most carpet is made using synthetic fibres. Currently, the most popular face fibre is nylon, with a 40 percent market share, followed by polypropylene (PP 25%) and Polyethylenterephthalat (PET 15%). Backings are often made from mixed materials, including polyvinyl chloride (PVC) or PP (Freedonia, 2015).

Each face fibre is associated with varying quality and characteristics, such as stain resistance, wear, feel, and flammability. Sometimes face fibres are mixed to create a different look, feel or other characteristics. Carpet can be produced either as woven, needled, tufted or other carpet. In addition, it can be made in forms of broadloom, vehicular and carpet tiles. Tufted carpet is the most common (65%) and carpet tiles are increasing in popularity compared to broadloom (Freedonia, 2015).

A carpet is only fully-recyclable when the fibres can be easily separated from the backing and both layers are recyclable. Although many companies claim that they use recyclable materials in their carpet, most types of carpet on the market are currently only partially-recyclable, which means that only the face fibre or the backing can be (partially) recycled, while the rest finds another use, or ends up in incinerators or landfills. Often, the way the carpet is glued together prevents easy separation and collection of the full face fibre for recycling, making it less economically viable to engage in the collection and recycling efforts. The same is true for mixed face fibres. As soon as a carpet contains more than one face fibre material type (e.g. nylon 6 and wool) the recyclability fails and the material can only be down-cycled.

Carpet recycling processes rarely address the entire carpet. More often, recycling processes address specific components of the carpet. Only nylon 6, nylon 6.6 and PET fibres and backing can be recycled, and only the recycling of nylon 6 face fibre is currently economically viable to be recycled back into face fibre. PET and other face fibre materials are often downcycled to carpet backing or into other products such as artificial surfaces, low grade engineering plastics (such as washing machine parts and wheel trims) and plant pots or buckets.

The table at the end of this chapter provides an overview of the materials most often used



for face fibres, backings and fillers in their pure form and shows their characteristics, recyclability and downcycling options.

c. Incineration

Currently, almost all discarded carpet in Germany is incinerated, because landfilling is prohibited and recycling numbers are low (Ecostorm Investigation, 2017). As investigated for this report, even the carpet of market leader on sustainability only makes its way into recycling in very small shares (Ecostorm Investigation, 2017). The recyclability of the carpet is an important barrier that can only be solved by manufacturers. Until now, carpets that can be easily and economically recycled have not been on the market on a large scale. Instead of designing carpet to make it easily recyclable, the carpet industry seems to have accepted that their products end up in waste incinerators, waste-to-energy plants and cement kilns¹. As Germany has considerable overcapacity of waste incineration, carpet easily end up being burned.

Some manufacturers refer to this as “thermal recycling”. Recycling, however, can only be used if the materials are recovered, which is not the case when they are burnt. Therefore, incineration is only the fourth step in the waste hierarchy, and is not on an equal footing with recycling. Moreover, the levels of efficiency of incinerators when recovering energy are often low – around 20 percent –. As these incinerators need to be in production around the clock in order to be profitable, there is a constant ‘hunger’ for waste that burns easily. This serves as a big incentive to burn, rather than recycle, products like carpet. Therefore, it undermines the transition towards truly circular economy.

In general, burning waste releases persistent organic pollutants, endocrine disruptors, and other hazardous chemicals such as dioxin, mercury and lead. In the EU, the emission limits of hazardous air pollutants, as stipulated by the EU Air Quality Directives (AQDs),

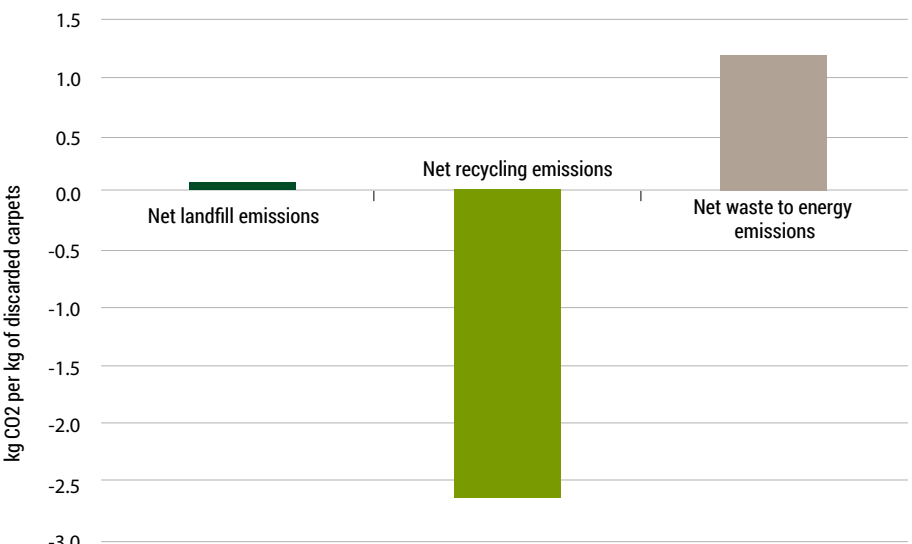


Figure 1: Per-kg comparisons of different end-of-life pathways for discarded carpet
Source: Horvath/Masanet (2012)

1. Incineration is used as generic terms, including co-incineration in cement kilns and waste-to-energy (WTE) plants

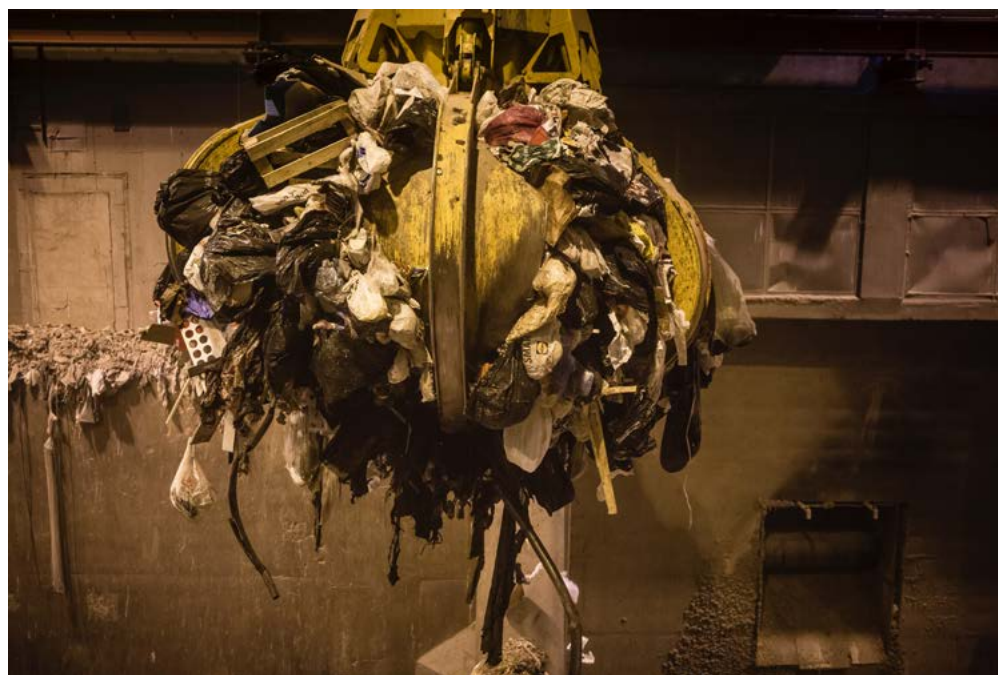
are significantly higher than the recommended safety limits from the World Health Organization (WHO), spawning uncertainty and potential safety risks for the environment and public health (ZWE, 2015). In addition, the monitoring of air pollution caused by incineration activities is done by the facilities themselves, and is not subject to independent monitoring (ibid), - its results are therefore questioned by environmental NGOs.

A large amount of carpet also contains PVC, which creates dioxin when burnt. Dioxin is among the most dangerous chemicals known and is a proven carcinogen (WHO, 2016). Dioxin is released into the air from incinerators and cement kilns, and is concentrated in the toxic fly ash, which is released from incineration and needs to be landfilled – thereby posing a burden for future generations. Even the most modern and expensive pollution control devices cannot prevent the escape of many hazardous emissions, such as ultra-fine particles and nanoparticles (Howard, 2009). These particles can be lethal, causing cancer, heart attacks, strokes, asthma, and pulmonary disease.

In addition to health concerns, waste burning is a poor choice for the climate in comparison to recycling. Burning waste releases high levels of greenhouse gases – per unit of energy produced, the carbon emissions are even higher than burning coal (Energy Justice, 2014). For most materials, recycling has been proven to reduce greenhouse gas emissions and conserve significantly more energy than incineration. This is also the case

Overcapacity of German Waste Incinerators

The treatment capacity of German waste incineration facilities, waste-to-energy facilities, mechanical-biological waste treatment facilities and co-incineration facilities is estimated to be around 32.3 million tonnes annually (Roll & Chartschenko 2010). In comparison, there is around 27.8 million tonnes of municipal and commercial waste and 2.5 million tonnes of mechanical-biological waste in the same time period (ibid). Therefore, there is a 2.0-million-tonne overcapacity for treating municipal and commercial waste (ibid). Several factors contribute to incineration facilities being evermore short of combustible materials: the obligation to separately collect organic waste since 2015, the voluntary introduction of recycling bins for packaging in more than 50 cities and municipalities, the amended Commercial Waste Ordinance and the proposed increases in recycling rates for packaging. The overcapacity of incineration facilities works against the idea of a circular economy: due to low prices of incineration, many recyclable materials and products, like carpet, end up being incinerated. Therefore, it's essential to eliminate overcapacity by closing facilities and making incineration more costly by raising taxes. This will promote the recycling of post-consumer carpet.



for carpets: by recycling instead of incinerating carpets, CO₂ emissions can be reduced. Moreover, recycling can create up to 20 times as many jobs as incineration (Tellus Institute, 2011).

Proposals to limit incineration have been significantly absent from the Circular Economy Package (CEP) that is currently going through the legislative process. Therefore, in February 2017, the Parliament's Environment Committee (ENVI) has made proposals to the CEP to limit incineration overcapacity and prevent a shift from landfilling to incineration.

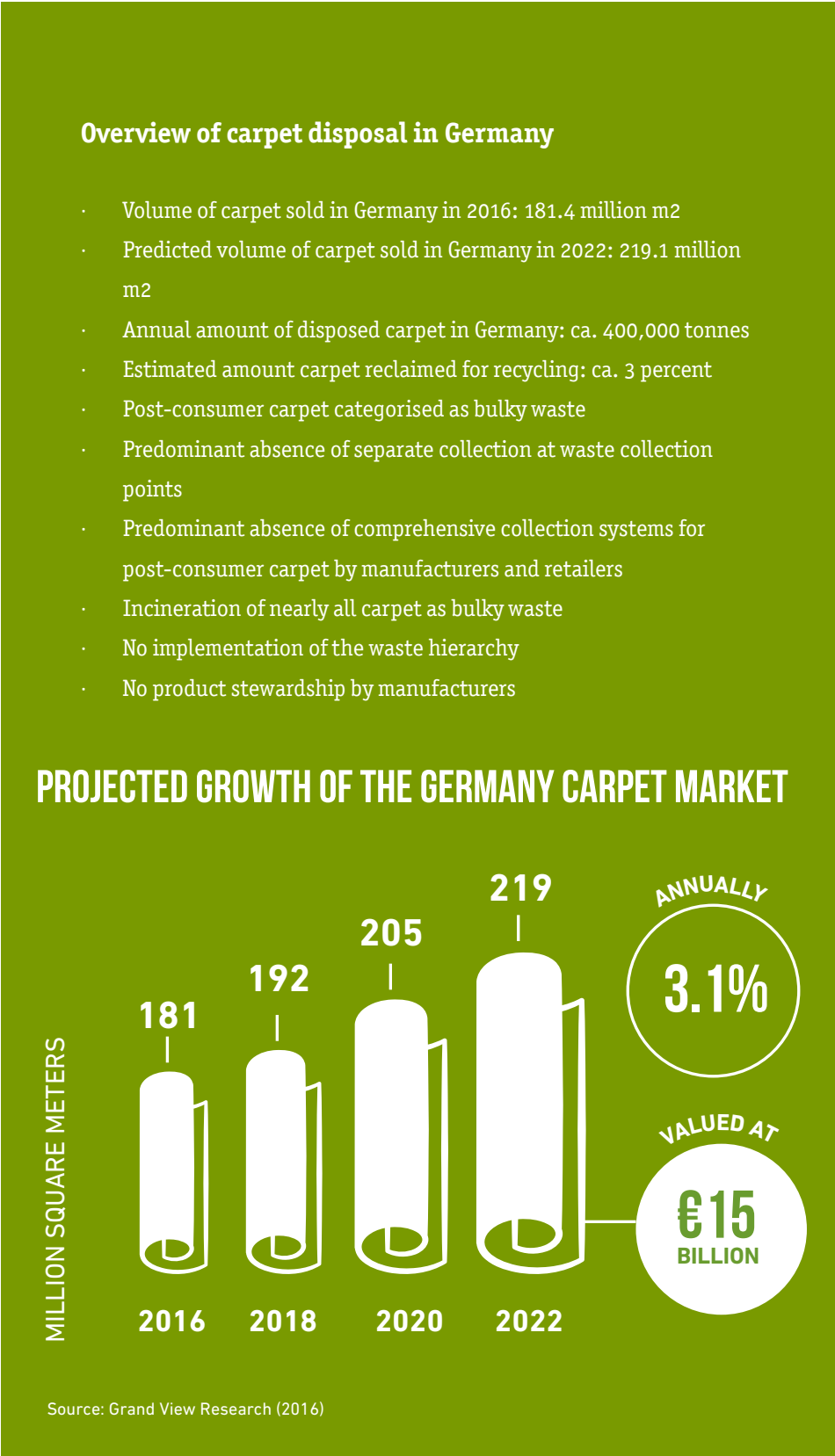
Elimination of the “calorific value provision” is an opportunity for carpet recycling

Incinerating waste with a high calorific value (more than 11,000 kilojoules per kilogram) such as carpet used to be seen as equivalent to recycling, because of the so-called calorific value provision (“Heizwertklausel”) in the German circular economy law (Kreislaufwirtschaftsgesetz). According to the Deutsche Umwelthilfe, the calorific value provision was a mistake which had negative effects on the recycling industry, since it led to large-scale incineration of recyclable waste. A change in the circular economy law will change the regulation of incinerating and recycling, which means incineration and recycling will no longer stand on equal footing in the future. The German parliament accepted the government's proposal to change the circular economy law on December 15th, 2016. Because of this, the calorific value provision will be annulled on 1st June 2017. This annulment will affect the disposal of chemical waste and, in particular, will affect the disposal of bulky waste and old tyres. Therefore, we can expect that annually 80,000 tonnes of bulky waste – including post-consumer carpet and old tyres – will find their way into recycling flows. This makes it even more imperative for the carpet industry to move towards design for recycling as soon as possible.

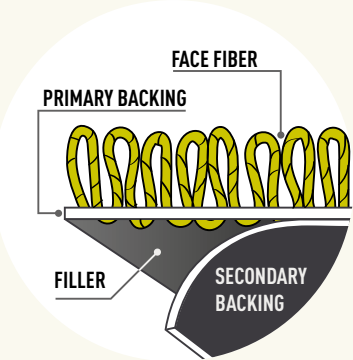
d. Landfill

In Germany, landfilling carpet is prohibited; but in Europe, around 60 percent of carpet is landfilled (European Commission, 2013). As well as being a waste of precious resources, landfilling has numerous negative environmental and economic impacts. Synthetic carpet biodegrades very slowly in landfills, it takes up space, and can leach dangerous chemicals. In a truly circular economy, materials and products would only end up in landfills in very rare instances; those in which there are no possible options for (re)use, recycling or energy recovery, or if landfilling is needed to protect public safety. The EU Circular Economy Package, currently in legislative process, contains the proposal to limit landfilling

to a maximum of 10 percent of municipal waste by 2030 and to ban landfilling of separate collected waste. This could be an important impetus to help shift the carpet industry away from use of landfill across Europe, and towards a circular economy.



RECYCLABILITY OF CARPET MATERIALS



	MATERIAL									
	 POLYAMIDE 6 (Nylon 6 / PA6)	 POLYAMIDE 6.6 (Nylon 6. 6 / PA6.6)	 POLYESTER (PET)	 POLY-PROPYLENE (PP, Olefin)	 WOOL	 JUTE	 LATEX	 CHALK	 BITUMEN	 PVC
CHARACTERISTIC										
USED AS: FACE FIBER										
FILLER										
BACKING										
RECYCLABLE BACK INTO FACE FIBER										
A. TECHNICALLY POSSIBLE							NOT USED AS FIBRE	NOT USED AS FIBRE	NOT USED AS FIBRE	NOT USED AS FIBRE
B. ECONOMICALLY FEASIBLE*							NOT USED AS FIBRE	NOT USED AS FIBRE	NOT USED AS FIBRE	NOT USED AS FIBRE
RECYCLABLE INTO BACKING:	NOT USED AS A BACKING	NOT USED AS A BACKING	 IF USED AS A PURE MATERIAL		NOT USED AS A BACKING			NOT USED AS A BACKING		
DOWN-CYCLABLE INTO BACKING:	NOT USED AS A BACKING	NOT USED AS A BACKING	 IF MIXED WITH FILLERS		NOT USED AS A BACKING			NOT USED AS A BACKING		
IN WHICH MATERIAL ARE THESE MATERIALS BEING DOWN-CYCLED	LOW GRADE ENGINEERING PLASTICS 	LOW GRADE ENGINEERING PLASTICS 	CARPET BACKING 	CARPET BACKING 	INSULATION 	INSULATION 		CEMENT 	ASPHALT 	CARPET BACKING 
			LOW GRADE ENGINEERING PLASTICS 	LOW GRADE ENGINEERING PLASTICS 	CARPET PADDING 	CARPET BACKING 		FILLER 	CARPET BACKING 	LOW GRADE ENGINEERING PLASTICS 
								LOW GRADE ENGINEERING PLASTICS 	LOW GRADE ENGINEERING PLASTICS 	

*The analysis of economic feasibility is based on the current situation and may change depending on the public policies, prices of raw materials, innovative recycling technologies entering the markets, growing fees on landfills and incinerations, etc.



Photo: Les Stone

Chapter 3

Rolling Out a Circular Carpet

a. Closing the loop starts with design

The key to a circular economy lies in better design. The overwhelming majority of a product's environmental impacts are set at this stage. Design determines the choice of materials, usage patterns, the ease of recovery, the potential for material reuse and recyclability. This means that whether a carpet can be usefully recovered at the end of its life depends mostly on how it was designed. It is therefore essential for carpet manufacturers to develop and bring to market products with recyclability and reusability integrated into their design.

Material choice can create a design impediment to recycling. For example, most carpet backing is made from materials mixed with fillers. These materials are not separable and therefore the backing is not recyclable in a closed loop.

Key characteristics of a circular carpet

- Tiles rather than broadloom so that individual tiles can be replaced if necessary
- Made from materials that are recyclable (see the full overview in table page 22-23)
- No mixed materials within each layer of the carpet, i.e. one material per layer
- Use of an adhesive that enables easy separation of carpet layers after use
- Ideally 'backstamped' - i.e. the used materials are indicated on the back of the carpet
- Installed without glue
- Avoiding materials that are dangerous to people's health or the environment

One of the biggest challenges to recycling carpet materials is that some materials are technically recyclable, but this recycling is not economically viable. An example of this is PET. As oil prices are low and imports from Asia (for instance) are cheap, there is little incentive to recycle PET carpet at end of life. Moreover, PET is hard to recolour during the recycling process, which makes recycling expensive. Some carpet manufacturers promote

carpet made from PET recycled from old plastic bottles as sustainable option; however, when this PET carpet is not recycled but downcycled or burned, PET often becomes a dead-end road for the truly closed loop system.

Avoiding hazardous materials is also an important element of design. Carpet should be redesigned to eliminate materials and additives that cause harm to human health or the environment, including volatile organic compounds (VOCs), carcinogens like styrene or PVC, brominated flame retardants and any other harmful flame retardants, fly ash, lead, cadmium, stain-resistant treatments like perfluorooctanoic acid (PFOA) (Consumers Digest, 2015) and perchlorate used in anti-static treatments (Pharos Project, 2015).

Right now, eco-design is not yet being pursued with the necessary rigor in the carpet industry. Some manufacturers are redesigning their carpet to be more recyclable. However, even then, it's not applied to the entire product range. Due to the long lifetime of a carpet, benefits from these efforts will not be seen for ten or more years from the introduction of such carpet to the market on a large scale. Transition has to start immediately or the industry is locking itself in at least another decade of unsustainable carpet, while other sectors get ahead in the transition to sustainability.

Most manufacturers lack the motivation to change the design of carpet solely to promote recycling, except for a few frontrunners with high sustainability ambitions. A change in design and production habits must have additional benefits, such as lower production costs, higher general savings, or perhaps providing a lower-cost feedstock than virgin material. In the future, higher oil prices or policies that increase costs of landfilling or incineration could set additional incentives to focus on design for recycling (Wuppertal Institute, 2016). Policy measures such as Extended Producer Responsibility (EPR) schemes and obligatory take-back by producers could stimulate redesign. In California, an EPR system for carpet already exists and – despite flaws in the design of this particular EPR and the industry's effort to undermine it²– the recycling rates of carpet are around 10 percent there, roughly 3 times as high as in Europe.

b. Improving collection systems and reverse logistics

In order for recycling to happen, the collection of post-consumer carpet in a nationwide, functioning and consumer-friendly way is needed. Discarded carpet is currently considered bulky waste in Germany. This means people can either bring it to local waste collection points, have them collected by the public waste disposal company for a fee or put them on the curb at the annual bulky waste collection. Carpets collected in this way, then tend to end up in incinerators, co-incinerators or waste-to-energy plants.

If all carpet were 100 percent recyclable today, they would still largely end up in incinerators via municipal bulky waste collection. While design of truly recyclable carpet needs to come first, infrastructural changes for collection will also take time and need to be ready for increased amounts of carpet recycling.

2. See for more information: *Exposing the Greenwash of The U.S. Carpet Industry* by GAIA and *Changing Markets* (2016).



Top tips for storage and disposal of your carpets

- Carpet tiles should be carefully uplifted, stacked well to avoid creases and cracks in the backing, palletised and shrink wrapped. In multi-floor buildings wheeled cages can be utilised as long as they fit into lifts and observe weight restrictions;
- Broadloom carpets from commercial properties should be split into sections and put into bags or small rolls to fit on pallets. Shrink wrapping of palletised material is recommended to ensure safe handling and transport to the recycler; and
- Underlay should not be mixed with the carpets and therefore requires separate storage. Felt underlays can be recycled for fibre recovery, but polyurethane and rubber will require guidance from their respective suppliers.

Source: WRAP (2014)

In order to enable carpet recycling, separate collection at waste collection points and comprehensive take back systems – for private consumers and business – are needed across the country. For collection, it's important that the carpet is not mixed with other waste streams, which often leads to contamination. If not correctly collected, even high quality carpet becomes unsuitable for recycling (Sas, 2015).

Collecting carpet together with other bulky waste is the least desirable collection method, due to the previously outlined reason of contamination. Preferred options are separate collections via a reverse logistics system. Collection in separate containers should be easily implementable at local waste collection points. An even more efficient solution would be for producers to offer a take-back system – ideally in cooperation with retailers. It's important to strike a balance between locality and economies of scale: the collection should be done as locally as possible, so as to be easily accessible for consumers and so that transport costs are minimised, while at the same time it needs to reach high volume capacity to make recycling economically viable (Sas et al, 2015).

- **Manufacturers of carpet.** Recyclable used carpet are valuable materials, so manufacturers should make effort to recollect back their carpet via take-back systems. Some manufacturers, such as Desso and Interface, already offer take-back programmes; however, as is shown later in this investigation, the amounts collected are very modest.
- **Existing waste collectors.** In Germany carpets are mainly disposed at local bulky waste collection points. These points should offer separate carpet intake and storage, so carpet manufacturers or their suppliers can collect the carpet there. Investigation has shown that, for instance in Berlin, carpet is already stored separately at the collection point due to its size. Even though it currently still ends up being incinerated, this example shows that separate storage is possible.
- **Flooring retailers.** As service providers, they can play an important role in taking back carpet, and an easy go-to point for consumers to either bring the carpet back or get it picked up. As discarding carpet often goes hand in hand with a purchase of new flooring, retailers could offer a discount on the next purchase and could sell the used carpet back to the suppliers. For the service of collecting used carpets, retailers could get a discount on new products from producers to whom the carpet is returned.

c. The need to scale up recycling capacities

In Europe, the investigation for this report has shown that very few carpet materials make it back into new carpet in Europe (Ecostorm Investigation, 2017). Most carpet is landfilled or, in the case of Germany, incinerated. Some carpet is down-cycled, and even among the perceived sustainability leaders amongst carpet companies, only maximum 3 percent of their carpet sales is recycled (ibid.).

On the one hand, this is due to design and collection, as we have seen above; a third



obstacle is the lack of recycling facilities. This is a bit of a chicken-and-egg story, because it is difficult to make recycling a viable option without better designed products and collection systems. But even with existing design patterns, there are currently not enough recycling facilities that recycle post-consumer carpet – including in Germany. Even for the face fibre, which is currently recycled the most, the largest European recycling facility only produces between 11,000 and 20,000 tonnes of recycled nylon yarn (Recycling Today, 2012 und Green Operations 2014), which represents between 7 and 13 percent of the total European demand for nylon carpet yarn.

There are new techniques and technologies on the way that enable the economic recycling of materials other than nylon, such as PET and PP. Recycling facilities using these newest technologies need to be brought to scale so that they are up and running when an increasing amount of carpet is returned to be recycled. Moreover, intelligent carpet design is an indispensable component.

The infrastructure between collection and recycling facilities needs to be carefully planned. Collection requires locality, while recycling facilities require economies of scale. Therefore, Europe needs several large recycling facilities. Germany is a large market - about a quarter of Europe's carpet is put on the market here. This makes it ideal to scale up recycling facilities for commonly-used carpet materials, and to make consumer-friendly collection structures work.



Chapter 4

Carpet Markets in the EU and the Major Producers

a. EU carpet market

This section provides information about the EU carpet market, growth projections and end-of-life treatment options in Europe. The European carpet market is the second largest in the world and, as such, also produces a lot of waste: Each year, 1.6 million tonnes of carpet waste ends up in landfills and incinerators (Cordis, 2003).

Europe is the second-largest market for carpet after the U.S. (Freedonia, 2015). In 2016, the European carpet demand was 698 million square metres and is projected to grow 2.7 percent annually, to 821 million square metres by 2022, valued at EUR 56 billion (Grand View Research, 2016). Carpet accounts for 40 percent of the total European floor covering market. The majority of European carpet is produced in Belgium – with 96 percent of their carpet being exported. Germany has the largest demand for carpet in Europe, followed by France, the UK, Italy and Spain. Unlike in the US, where the carpet market is very concentrated, the European market consists of multiple smaller players, such as Balta Group, Associated Weavers, Egetaepper A/S, Tarkett/Desso, Interface, Modulys, Forbo, Milliken, Balsan, and Burnmatex. The two largest carpet tile manufactures in Europe, Interface and Desso, claim to be the global leaders in sustainability in design and production of carpet and are strong promoters of circular economy and “Cradle to Cradle” approaches³.

The sustainability leaders?

Policy developments and societal concerns about resource efficiency and waste are driving more and more companies to integrate circularity and Cradle to Cradle⁴ principles into their business models. In the carpet industry, Interface and Desso claim to be the leaders in sustainability and circular economy. Compared to other carpet manufacturers, Interface and Desso have set far-reaching and ambitious visions and targets to make their business sustainable and circular, as we will investigate further in this chapter. Their image as leaders in sustainability and circular economy has been supported by positive stories in the media and multiple awards. For instance, both have been praised for sustainable approaches in the Guardian⁵. Interface has been called “a trendsetter in the sustainable business,” by the website Greenbiz⁶ and won the “Best Company Award” from the Ethical Corporations Responsible Business Awards in 2016. Desso has also won several sustainability awards, such as the Carpet Recycling UK Awards 2016, the Guardian Sustainable Business Award for Waste and Recycling 2012, the Big Tick Award for Sustainability from Business in the Community (BITC) 2013 and the IWA Resource Recovery Award 2015. However, as this chapter will show, despite both of these companies having made some progress in general sustainability issues, their core business is still unsustainable and far

3. <https://www.theguardian.com/sustainable-business/2015/sep/24/circular-economists-wasteful-manufacturing>

4. Cradle to Cradle is a “biomimetic” approach to the design of products and systems. It models human industry on nature’s processes viewing materials as nutrients circulating in healthy, safe metabolisms or cycles.

5. <https://www.theguardian.com/sustainable-business/2015/sep/24/circular-economists-wasteful-manufacturing>

6. <https://www.greenbiz.com/article/state-green-business-2017>



CARPET MARKET 2016

EUROPE IS THE SECOND BIGGEST MARKET FOR CARPETS

CARPET DEMAND BY SECTOR

55%

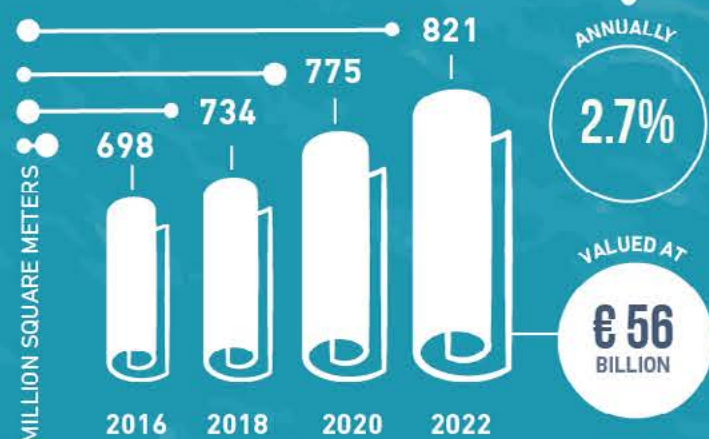
RESIDENTIAL BUILDINGS

39%

NON-RESIDENTIAL BUILDINGS

6%
OTHERS

PROJECTED GROWTH OF THE EU CARPET MARKET

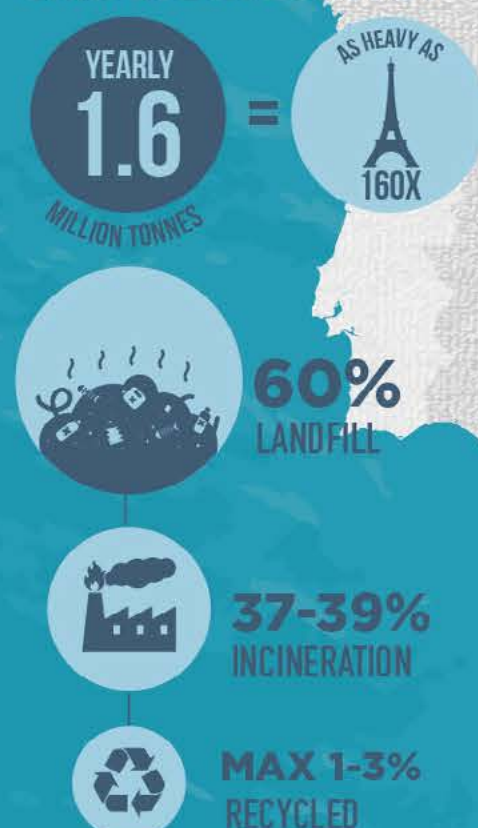


DEMAND
698
MILLION METRES²

NET REVENUE
€47
BILLION

BELGIUM
96%
OF THEIR CARPETS
ARE EXPORTED
BELGIUM IS THE SECOND
LARGEST CARPET
MANUFACTURER
WORLDWIDE AFTER THE US.

WHAT HAPPENS TO POST CONSUMER CARPETS IN EUROPE?



DESSO
WAALEWIJK

Interface
SCHERPENZEEL

NETHERLANDS

181.4
MILLION M² OF CARPETS

GERMANY
€ 12 BILLION
REVENUE

FRANCE
106
MILLION M² OF CARPETS
€ 7 BILLION
REVENUE

AQUAFIL

AQUAFIL
SLOVENIA

ITALY

FIBRE SENT FOR RECYCLING



SALES GLOBALLY



SALES IN EUROPE



RECLAIMED CARPETS
FOR RECYCLING



PERCENTAGE OF SALE

2015
Interface®

2014
DESSO

€940 MILLION

€240 MILLION

€208 MILLION

€187* MILLION

900 TONNES

1342 TONNES

1.5%

3%

*EMEA (includes Middle East and Africa)

GUT can do better when it comes to recycling

In 1990, leading European carpet manufacturers founded the Association of Environmentally Friendly Carpets e.V. (Gemeinschaft umweltfreundlicher Teppichboden, GUT) in Germany. Almost all manufacturers in Europe are member, including Desso and Interface, and other large players like Beaulieu, Anker, Associated Weavers and Vorwerk. The aim of GUT is “to continuously improve all environmental and consumer protection aspects throughout the life cycle of a textile floor covering” (GUT, nd.). GUT has developed a label - it tests environmentally sound production, contaminants, emissions and odour - which is used commonly in the carpet sector. It also looks at recycling of scrap carpet and production waste, but not at recyclability or use of post-consumer recycled material. Yet, while environmental protection is among its key aims, the organisation puts “energy recovery” or “thermal recycling” as central end of life options for carpets, and recycling into new carpets only “if possible”. It should be noted there is no such thing as thermal recycling, as recycling per definition is based on material use, which is not possible after combustion. The use of the term “thermal recycling” is used to conceal the destruction of valuable raw materials during combustion and can also be interpreted as greenwashing.

It is unfortunate that GUT e.V. leaves out key criteria that would stimulate material use of carpet, including reuse and recycling, to a large extent. For instance, recyclability of the carpet, the share of recycled content or take-back service are currently not part of the GUT criteria. Not including such end-of-life criteria sends a signal that incineration of carpet is acceptable. In response to this, members should insist including such criteria in the future and ensure their products are improved accordingly.

Source: GUT website



“As a company, we are committed to managing resources responsibly, developing Cradle to Cradle® capabilities, and supporting the environment and people’s health and wellbeing [...] we believe in the power of collaboration to drive forward circular business models. It is at the heart of our sustainability strategy. ”

Source: Desso, 2016

TARKETT

In December 2014, Tarkett SA acquired Desso from Bencis Capital Partners and minority investors. About 90% of Desso’s sales are integrated into Tarkett’s Europe, Middle East, and Africa segment (Freedonia, 2015). Tarkett was one of the first French companies to join the Ellen MacArthur Foundation’s Circular Economy 100 programme. The Group claims to have implemented an eco-innovation strategy and promotes circular economy throughout its organisation and various brands, which include Desso, Tandus Centiva, Johnsonite and FieldTurf.

Source: Freedonia, 2015

natural grass systems for the sports market. In 2014, the company generated sales of EUR 240 million, with production facilities in Goirle and Waalwijk in the Netherlands and Dendermonde in Belgium (Freedonia, 2015).

Sustainability strategy, brand values and goals

As Desso is part of the Tarkett Group, it operates according to the vision and strategy defined by Tarkett and its four P’s strategy: purpose, people, planet and profits. Tarkett and Desso are committed to shaping their business model for a collaborative circular economy, in which “products are designed with good materials for people and the environment and made to be brought back and recycled in closed loop systems” (Desso, 2016).

Since 2008, Desso has embraced Cradle to Cradle (C2C) principles. The Cradle to Cradle

from being aligned with circular economy principles, since both of them collect, reuse or recycle only tiny shares of post-consumer carpet.

DESSO

Desso is a Dutch flooring company that claims to be one of the main pioneers of the Cradle to Cradle (also C2C) approach. Since 2014, it has been part of the Tarkett Group, the third-largest producer of floor coverings in the world (Freedonia, 2014). Desso produces 80 percent of its broadloom carpet and carpet tiles for hospitality, marine, office, education, aviation, and residential markets; and 20 percent of artificial turf and reinforced

idea aims to promote closed-loop material streams. The certification comes in five levels and should serve as a guarantee for consumers. In order to be certified at a certain level, a product must meet the minimum criteria for that level in all five criteria categories, which are set by the C2C Institute. The main criteria are the non-toxicity of the product and the Cradle to Cradle process. The C2C principles are integrated into the Desso’s vision and its 2020 roadmap.

The Desso vision is “to be the world leader in making environmentally responsible flooring products that deliver outstanding value in design and functionality and thus contribute to people’s health and wellbeing” (Desso, 2017). Desso has set itself ambitious 2020 circular economy goals and aims to become a full Cradle to Cradle company in all its business units (see the box below).

Excerpt from Desso’s Cradle to Cradle® 2020 Roadmap

- All Desso products have to be designed according to Cradle to Cradle design principles
- 100% of the tiles sold should be embedded in Cradle to Cradle loops
- To collect more than 20,500 tonnes per year for recycling
- To use 75% defined recycled material⁷ to produce carpet tiles
- To use 30% of recycled water during production

Source: Desso, 2016

Reported Sustainability achievements

Desso reports to have achieved a number of key milestones. For instance, in its latest extensive sustainability report, the company states that the amount of recycled water has increased from 11 percent in 2008 to 16 percent in 2015 (Desso, 2016). By 2011, Desso states it had switched over to 100 percent green electricity from hydropower (ibid). Desso also reports it reduced its carbon emissions, both indirect and direct, by 54 percent between 2007 and 2015 (ibid). In the field of recycling and recyclability – the core circular topics – achievements are formulated within the C2C framework, and therefore require deeper analysis of the certification criteria and method to be fully understood. For instance, 90 percent of Desso’s carpet tile collection is reported to be C2C certified against the following criteria: material health and reutilisation, energy and carbon management, water stewardship and social fairness (ibid). Moreover, it is reported that 61 percent of all materials are evaluated as recyclable, meaning the materials can be recycled in a non-toxic closed loop, as assessed by C2C, and that, in 2015, 64 percent of all raw materials were “positively defined” (ibid). In the next section, we will take a deeper look at the somewhat opaque C2C certification, in order to analyse the reported achievements and to put them in perspective.



⁷ A material containing recycled content needs to be fully defined in accordance with the Cradle to Cradle® Product Standard (Desso, 2015)

Desso brand values

1. Customer Focus
2. Common Sense
3. Integrity
4. Entrepreneurial Spirit & Ambition
5. Ownership & Empowerment
6. Corporate Social Responsibility & Cradle to Cradle®

Source: Desso homepage

Reality: Little reclamation for recycling and reuse

Desso has developed a take back programme and leasing system to drastically increase collection of post-consumer carpet in Europe. It committed itself to 16,000 tonnes of reclaimed material as of 2013, under the LIFE project, for which it received EU funding, and has set a target of 20,500 tonnes of collected material for recycling in its 2020 Roadmap. However, in 2015, the company only collected 1,342 tonnes of used carpet, a meagre 3 percent of its total carpet sales (Desso, 2016).

In recent years, Desso has made efforts to increase its reclaiming and recycling rates. In 2008, Desso started its Take Back™ programme in 6 European countries (Benelux, France, Germany and the UK) and one year later, developed a separation technique called Refinity®. In 2014, Desso started a leasing scheme for consumers, in which it remains the owner of the carpet, and retains control over maintenance and collection of post-consumer carpet. Despite these efforts, the reclamation rates are still very low and Desso seems to be lagging behind its own target.

The company has recognised that the first hurdle is in the original design of the carpet, as the carpet needs to be taken apart before it can be recycled; therefore, Desso introduced EcoBase® backing. However, the EcoBase® backing is not sold with all its products, and therefore only an unknown share of carpet can be taken back for recycling.

Through Desso’s Refinity programme, post-consumer carpet is taken back (also from competitors provided it doesn’t contain PVC) and the yarn and other fibres are separated from the backing. This creates two main material streams: The yarn, which is sent back

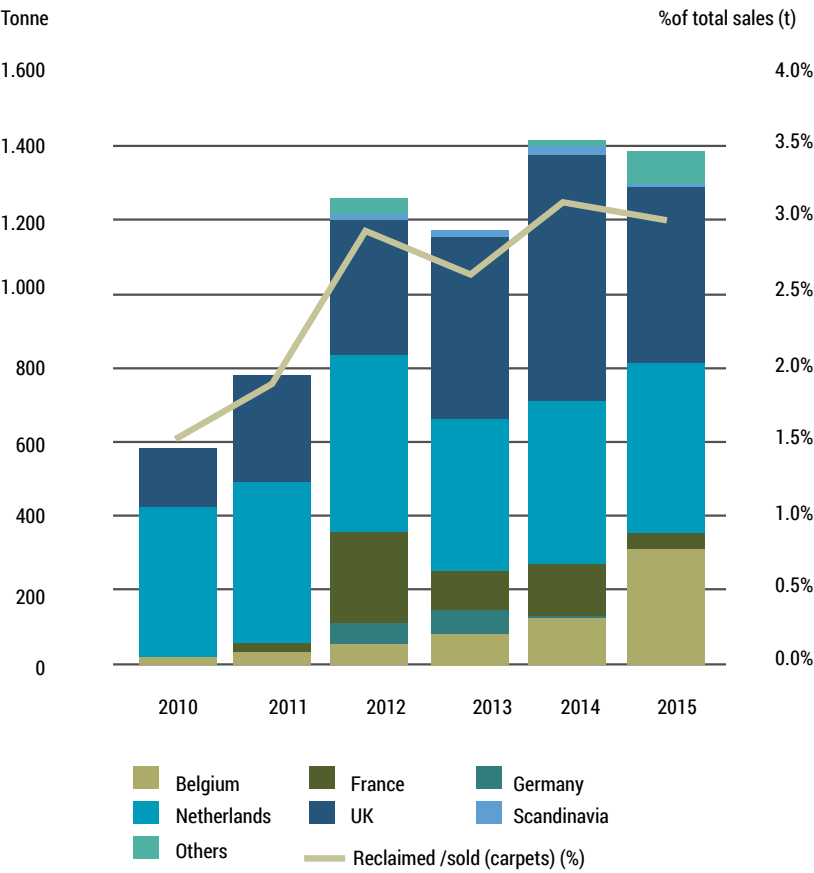
to Desso’s suppliers for recycling, and the bitumen (currently the most common material for carpet backing), which is sold to the road and roofing industry. Bitumen could better be recycled back into carpet backing, and so it seems a waste to down-cycle it to asphalt or roofing material. Since there is no capacity to recycle other types of yarn, only nylon yarn is recycled via Desso’s supplier Aquafil.

While only a small amount of carpet can be remade into new carpet, due to low reclamation, Desso currently claims that over 50 percent of its carpet-tile types are produced with recycled yarn, made from post-consumer yarn waste (Desso 2016). First of all, this is misleading, as it sounds like the post-consumer waste is carpet, while in reality it comes from other sources such as fish nets. Secondly, it’s misleading in that it is not explained what proportion of recycled yarn this 50 percent of their tiles have – it could be that the large majority of this 50 percent only has a small percentage recycled yarn. It would be more transparent to communicate the recycled content of the entire product – rather than just the yarn. Ecostorm approached Desso early this year to find out more about the exact data on recycled content, but Desso refused to provide further information (Ecostorm investigation 2017).

The success of the leasing system still remains to be seen, as Desso only started it in 2014. However, Desso recognised in its 2015 Sustainability report that “our teams are struggling to encourage end users to return the material waste to suppliers like us, rather than send it to landfill or for incineration” (Desso, 2016).

The commitment to collect 16,000 tonnes by 2013 has not been honoured, and the goal of reclaiming 20,500 tonnes by 2020 seems out of reach – to achieve this, Desso’s collection rate would have to increase 15-fold in only three years. The company’s collection rate has been increasing very slowly and it has even gone down between 2014 and 2015 (Figure 1). This goes against Desso’s C2C goal to turn “waste into ‘food’ – as nutrients for either the technical or the biological sphere” (Desso, 2016). It is clear that the most crucial part of a Cradle to Cradle company is to close the loop of its core product, which is far from being reached, with a 3 percent reclamation and even lower recycling rate (due to the down-cycling of most backing).

Carpet reclaimed per country excluding packaging materials (tonnes) and % of reclaimed carpets as a proportion of total carpet sold
Source: Desso 2016



Cradle to Cradle: Unclear scheme with regards to real closed-loop systems

Desso is the first carpet manufacturer in the world to achieve Cradle to Cradle (also C2C) Gold level certification for a carpet tile backing: EcoBase®. This undercoat, made with polyolefin (polyester derivative), is considered to be better than a PVC or bitumen undercoat, because it can be separated from fibres more easily and, hence, the collected fibres are in a better condition for recycling. While Gold might sound like the highest level of certification for products, in reality, there is another level - Platinum. While 90 percent of Desso’s carpet-tile range has Cradle to Cradle certification (EPEA, 2015), only one product collection has Gold certification, and it is unclear what level of Desso’s sales this collection represents. Furthermore, even within each level of certification, there are different ranges, which are not clearly explained. For instance, for “material health,” it is said that the product has been “100% assessed (by weight) using A, B, C ratings,” and no materials have been assessed as “highly problematic”. However, the problem is that within these A, B, C ratings, there is still a wide variation from A (material is ideal for Cradle to Cradle) to C (moderately problematic properties of the material from a Cradle to Cradle perspective).

C2C certification categories

- Material Health
- Material Reutilisation
- Renewable Energy
- Water Stewardship
- Social Fairness

Source: Cradle to Cradle, nd

For Ecobase, which received a Gold standard certification, Desso claims that “all the ingredients have been assessed as either Green [optimal] or Yellow [tolerable] according to the Cradle to Cradle® assessment criteria”. Looking under the surface of C2C certification, this means that the product could either be ideal from a C2C perspective, or that it largely supports C2C objectives, or that it could have moderately problematic properties in terms of quality. Since product design is so crucial to the circular economy, transparency regarding the product’s properties is essential to understanding how carpet can be recycled in a closed-loop system. The transparency and quantification of the C2C certification are currently very unclear and potentially misleading to the consumer.

Finally, to achieve Gold certification, a channel of reuse, collecting and recycling has to exist and be efficient, however, there are no standards for precise volumes and no quantifiable targets. The certification bodies check that the materials are collected and that they never become waste using a formula that combines the percentage of recycled products in the final product with the recyclability rate of a product. To get the Gold certification, the rate must be higher than 65 percent. However, this is a theoretical number based on the company’s ability to recycle carpet rather than an actual number. Therefore, this criterion has no correlation with actual recycling rates, which makes it impossible to evaluate what proportion of the material is reutilised and recycled for Gold-certified products. In a nutshell, C2C certification is questionable in terms of transparency and sustainability.

Why lack of recycling poses a business threat: Vision vs reality

Desso has set itself the target to be a fully Cradle to Cradle® (C2C) company in all its business units by 2020⁸. Is this a realistic and true commitment to circular economy principles or just a form of greenwashing to be labelled as one of the world’s most sustainable flooring companies? A sustainable company, aiming to close the loop and eliminate negative impact on the environment, cannot disregard its core product business being a major contributor to the problem.

Low take-back rates, which lead to low recycling and high incineration and landfill rates of its carpet, constitutes a material or critical issue for Desso, as already recognised by the stakeholder analysis (Desso, 2016). The findings in this report help further analyse the materiality of these issues:

1. It causes a huge negative environmental impact⁹

As Desso collects only 3 percent of the carpet it places on the market, almost all Desso’s carpet end up in incinerators or landfills. These are the least ecological end-of-life options. Incineration emits greenhouse gasses and others toxic particles, while landfilling means that the carpet will stay in the environment almost indefinitely, also leaking toxic substances if it contains them (see chapter 2 for more information).

2. It is caused by Desso’s core product and core business

Desso’s core business is making carpet. Therefore, this is where its core responsibility lies when it comes to sustainability. While Desso has made great progress in reducing the impacts of producing carpet, the end-of-life phase has significant impact that cannot be left untackled.

3. It clashes with Desso’s brand values and Cradle to Cradle vision

Carpet that ends up in landfills and in incinerators clashes with Cradle to Cradle, which is also one of the Desso’s brand values, together with corporate social responsibility. Cradle to Cradle has five categories, among which “material reutilisation” is a key one. The lack of reclamation, and therefore recycling of its carpet, is at odds with material reutilisation. Currently, the focus of material reutilisation according to Cradle to Cradle is in the design¹⁰ – which is a necessary precondition for reutilisation – but it should also include the responsibility of the material after the product has been used. Moreover, transparency and quantification of the C2C system should be improved in order to be clearer about sustainability achievements and gaps, which link to the key value of the certification’s integrity.

4. It makes Desso’s Cradle to Cradle® 2020 Roadmap impossible to reach

Not collecting and recycling more of its own carpet makes it impossible for Desso to reach its Cradle to Cradle® 2020 Roadmap, specifically the goals of “100% of the tiles sold should be embedded in Cradle to Cradle loops” and “to collect more than 20,500 tonnes per year for recycling.”



8. <http://www.desso.co.uk/globalacc-counts/raiffeisen-bank/sustainability/>

9. See more on the environmental effects of landfilling and incineration in chapter 2.

10. Material Reutilization: Designing products made with materials that come from and can safely return to nature or industry. <http://www.c2ccertified.org/get-certified/product-certification>

INTERFACE

Interface, an American company, is the largest manufacturer of modular carpet (also known as carpet tiles) worldwide. It sells around 12 million m2 or 56,000 tonnes of its carpet in Europe, worth \$262 million, about a quarter of the company’s business.

Starting in 1994, under leadership of then-CEO Ray Anderson, Interface established itself as a sustainable brand on the market. Its vision is “to be the first company that, by its deeds, shows the entire industrial world what sustainability is in all its dimensions: People, process, product, place and profits — by 2020 — and in doing so we will become restorative through the power of influence.” “Restorative,” as explained by Ray Anderson, means “to put back more than we take from the earth and to do good for the earth, not just no harm” (Interface blog, 2014).

Sustainability strategy and brand values

Since 1994, Interface has raised its sustainability ambitions with each new programme. Key to the sustainability strategy of Interface is that it is integrated across their entire business (Oringel, 2012, p.185).

Mission Zero is the current sustainability commitment and strategy of Interface. It outlines how the company will have zero negative impact on the environment by 2020. It specifically outlines seven steps, among which is “zero waste,” which aims to “eliminate all forms of waste in every area of the business,” and “closing the loop,” which aims to “redesign processes and products to close the technical loop using recycled and bio-based materials.”

The company’s brand values also reflect the importance of integrating sustainability in all aspects of their business. ‘Commitment’ emphasises that the entire company and each of its employees “has a responsibility to do his or her part to help reduce our environmental footprint.” ‘Stewardship’ means that the company believes that it has “an obligation to be good caretakers of our environment. We consider the impact our business and processes have on our environment and communities.” Also the value, ‘Integrity,’ is linked back to sustainability, indirectly through behaving ethically, as it calls to “seek to provide the highest quality product in the most ethical manner possible.”

Reported Sustainability achievements

Indeed, Interface is perceived to be a sustainability leader in several aspects. It first set ambitious goals for itself in 1994, and has achieved significant progress in many of them since then.

Interface reports that, in 2014, 84 percent of the energy used at manufacturing sites was from renewable sources, and greenhouse gas emissions were reduced by 92 percent compared with 1996. Half of the raw materials used to make products globally came

from recycled or bio-based sources in 2015 (Interface, 2015). Thus, it has made large improvements, and the focus has been on raw material extraction and production processes as, according to Interface, two-thirds of its environmental impact is caused here.

These are important achievements, but an important issue remains open: Does Interface’s carpet move in a closed loop?

Interface claims 50 percent of its products are now made with 100 percent recycled yarn (Ecostorm Investigation, 2017). For 2020, the goal is to extend this to all its products (ibid). But what is the source of this carpet with recycled content? One might assume it is made from post-consumer carpet and that Interface does not let their products go to waste at the end of their lives.

Reality: Reclamation for recycling is the missing link

The reality is that only a tiny share of Interface carpet is made from recycled carpet. On-the-ground investigations (Ecostorm Investigation, 2017) in Germany, France and Belgium revealed that Interface currently only takes back about 1.5 percent of its European sales for recycling; they call this ReEntry®2.0. Since there are hardly any other recycling facilities in Europe that can treat post-consumer carpet for recycling, it can be assumed that presently the other 98.5% of Interface’s carpet almost always ends up on landfills and in incinerators.

At Interface’s recycling and separation facility in Scherpenzeel, the Netherlands, the reclaimed carpet gets separated from the backing. Even at full capacity, only 600,000 m² or 6 percent of Interface’s European sales can be treated at this facility (Ecostorm Investigation, 2017). Only their own carpet is being collected within a radius of 500 to 1000 km from Scherpenzeel. After the carpet is separated, some of the backing (only the vinyl type) is recycled into new backing. The nylon face fibres that are separated are sent off to Aquafil, the major recycler of nylon in Europe. Aquafil’s major nylon recycling facility is based in Slovenia. This means that the carpet fibres have to travel long distances all over Europe, to the Netherlands, then to Aquafil, and after that back to one of the manufacturing sites of Interface (Ecostorm Investigation, 2017).

While Interface reclaims about 1.5 percent of its carpet, it is not clear which percentage of this actually gets recycled. Publicly, Interface claims that “ReEntry 2.0 reclaims all types of carpet (commercial and residential) regardless of face fiber type or backing used,” (InterfaceFLOR, nd). Moreover, “separated vinyl backing is recycled into new vinyl backing using our Cool Blue™ backing technology” (ibid). It is, however, unclear what happens to backing that is not made of vinyl and what proportion of the collected carpet this represents. Moreover, Interface states, “Through a new patent-pending technology, we can cleanly separate the face fiber and backing of nearly any carpet type” (ibid). Investigations and interviews have shown that, with current carpet

Interface’s brand values:

- Service
- Innovation
- Leadership
- Commitment
- Stewardship
- Integrity
- Communication
- Individuality
- Professional growth

Source: Interface webpage

production techniques, separation is difficult due to contamination, mainly because of the adhesives (Ecostorm Investigation, 2017). Therefore, it is unlikely that, from the estimated 1.5 percent of carpet that is reclaimed, all materials are recovered and thus actually recycled.

As a result of the low collection and recycling rates of their carpet, Interface’s products with 100 percent recycled yarn are usually made mainly from either pre-consumer waste (e.g. cut-off carpet pieces from the factory) or from other post-consumer products such as fish nets from the Philippines and Cameroon, as part of the Net-Works™ program. While this latter initiative delivers a great PR story, from an ecological perspective, local recycling and application is the preferred solution, rather than transporting materials over large distances to the European market. Also, while recycling nylon fishing nets is a good option from the circular economy perspective, it begs the question why more nylon is not reclaimed from the carpet Interface should be collecting.

Interface has been praised for an innovative attempt to collect carpet via its leasing programmes. As early as 1994, Interface started the Evergreen programme, where it remained the owner of the carpet and the lessee paid a monthly fee covering installation, maintenance and, when necessary, replacing carpet tiles.

The programme reportedly failed mainly because banks were unwilling to finance the leases. Since then, the company has tried different approaches, working together with carpet dealers and taking over reclamation costs of carpet to make it more attractive to consumers (Kibert, 2008). The rates of collection seem to have gone up since this last improvement, but as reported above, in Europe they are still stuck around meagre 1.5 percent.

Why lack of recycling poses a business threat

Rightfully, the question arises: Can Interface be called a sustainability leader if only tiny shares of its carpet are reclaimed for recycling, while the lion’s share get burned or landfilled? A sustainable company aiming to close the loop and eliminate negative impact on the environment cannot disregard its core business being a major contributor to the waste problem.

This constitutes a material or critical issue for Interface, because:

1. It causes a huge negative environmental impact¹¹

Almost all Interface’s carpet end in incinerators or landfills. These are the least sustainable end-of-life options and a waste of precious resources. Incineration emits greenhouse gasses and others toxic particles, while landfilling means that the carpet will stay in the environment almost indefinitely, also leaking toxic substances (see chapter 2 for more information).

Interface’s Mission Zero: 7 steps

1. Zero Waste
2. Benign Emissions
3. Renewable Energy
4. Closing The Loop
5. Resource-Efficient Transportation
6. Sensitivity Hookup
7. Redesign Commerce

Source: Interface webpage

¹¹See more on the environmental effects of landfilling and incineration in chapter 2.

2. It is caused by Interface’s core product and core business

Interface’s core business is making carpet. Therefore, this is where its core responsibility lies when it comes to sustainability. While Interface has made some progress on reducing the impacts of producing carpet, the end-of-life phase has significant impact that cannot be left untackled.

3. It clashes with Interface’s brand values

Interface’s brand values highlight the importance of integrating sustainability into all aspects of its business and the way the company and its employees communicate and act. Current communication on sustainability does not reveal the fact that most carpet does not move in a closed loop. This is so misleading that it could even be regarded as ‘greenwashing’. Moreover, it also stands at odds with the value of leadership to become a “restorative” business, which Ray Anderson defined as putting “back more than we take from the earth and to do good for the earth, not just no harm” (Interface blog, 2014).

4. It makes Mission Zero’s commitment impossible to reach

Incinerating and landfilling almost all post-consumer carpet makes it impossible for Interface to reach Mission Zero, i.e. to have zero negative impact on the environment by 2020. This is only three years away, so a drastic and swift change is necessary to bring the target back within reach. The Mission’s aspects of ‘closing the loop’ and ‘zero waste’ in particular are completely at odds with the current reality of Interface’s carpet. The aim of ‘closing the loop’ can not only be using recycled or biobased materials, but – by definition – needs to ensure the carpet materials are fed back in a closed loop at the ‘end of life’. Additionally, the aim of ‘Zero Waste’ can not merely reflect the internal business processes, it needs to include the core product’s waste burden on the environment.

b. Interface and Desso need to step up their efforts to close the carpet loop

Interface and Desso have both achieved some progress towards their ambitious sustainability goals. By using 100 percent recycled yarn in half of its products, Interface has tackled the single largest contributor to environmental impact among all the raw materials in a carpet tile. Similarly, Desso has achieved C2C Gold certification for a new range of carpet tiles.

It seems that industry-led competition, rather than consumer demand or policy interventions, has been the engine of change in the carpet sector. However, the image and claims of companies are misleading when it comes to recycling, as only a small proportion of their carpet is recycled at the end of life. The essential problem is that the output of the core business of both Interface’s and Desso’s is polluting the environment. If these two companies want to become true leaders in the circular economy, they urgently need to tackle this issue. Moreover, it is not only a matter of sustainability in itself – it touches the core business and brand values of these two companies and might pose a threat if not tackled adequately.

“If we’re successful, we’ll spend the rest of our days harvesting yesteryear’s carpets and other petrochemically derived products, and recycling them into new materials; and converting sunlight into energy; with zero scrap going to the landfill and zero emissions into the ecosystem. And we’ll be doing well ... very well ... by doing good. That’s the vision”.

Ray Anderson, 1997.

Therefore, Desso and Interface need to step up their game to make their ambitions for a circular economy a reality, and become more transparent about the reality of their business. This is the first step in tackling this sustainability challenge.

Sustainable investment in Interface and Desso: Really a green decision?

As a material issue, low collection and recycling rates combined with unrealistic statements about the closed-loop business model might damage the brands of these self-acclaimed sustainability leaders. Sustainable investors should be able to rely on companies with a bold sustainability vision and high sustainability targets to actually achieve this vision and these targets. However, when companies can’t implement these in their core business, like collection and recycling of old carpet, questions about their complete credibility may arise.

Desso, as part of Tarkett Group, and Interface have been recognised as sustainability leaders not only by the media and with awards, but also by several responsible investment funds. Below is a short list of investors that have selected these companies for their portfolios, specifically because of their sustainability performance. The findings in this report, relating to the current failed performance of Interface and Desso to implement closed-loop and zero-waste systems, should be evaluated.

Sustainable investors in Interface:

- GLS Bank Aktienfonds
- ABN AMRO Multi-Manager Funds Global Sustainable Equities
- DFA US Sustainability Core 1

Sustainable investors in Tarkett, as mother company of Desso:

- LBPAM Responsable Actions Euro
- Sycomore Sélection Responsable



Chapter 5

Conclusions and Recommendations

Structural challenges in moving the carpet industry towards the circular economy are typical of those that every industry is facing. These challenges include insufficient consideration of recyclability in product design, lack of product stewardship in the waste disposal, and a waste management policy which continues to be oriented towards waste incineration rather than recycling.

The movement of the European carpet industry towards more sustainability has been advanced in particular by competition between two leading manufacturers, Interface and Desso. However, research has revealed that both companies only take back and recycle around 3 percent of the carpet they put on the market. The entire sector is still far from achieving the large-scale, closed loop recycling of carpet. In Germany, most carpet still ends up being incinerated. Despite sustainability initiatives, companies, like Interface and Desso, need to increase carpet reuse and close the recycling loop. Only then can the unnecessary waste of valuable resources be stopped, allowing these companies to live up to their claims of environmental responsibility.

Technological solutions exist, as shown by the current albeit small percentage of carpet recycled back into carpet. At the same time, the recyclability of carpet that is put on the market, and collection and recycling infrastructures both need to be improved. This transition will not happen overnight, but it needs to start today. Because of the long product life span of carpet, up to 20 years, decisions made today will affect the reuse and recycling of carpet for years to come. If not tackled, the carpet industry will lock itself into years of unsustainable products and fail to take its share of responsibility to protect the environment.

The transition to a circular economy in the carpet industry requires action on the part of carpet producers, retailers, policy makers, and consumers.

Recommendations for Producers

Integrate reuse and recyclability in product design

The goal for producers should be to produce carpet out of recycled materials, which are at the same time suitable for reuse and recycling at the product's end of life. To simplify recycling processes, the individual carpet layers should be easily separable from one another. Also, it is important to avoid complicated combinations of materials and mixtures, to ensure that the carpet's recyclability is not compromised. As a matter of principle, carpet should not contain hazardous components and chemicals.

Take responsibility for products: more reuse and recycling, no incinerating and landfilling increased reuse and recycling rates

Carpet manufacturers need to take responsibility for the environmentally-friendly design and disposal of their products. The reuse and recycling rates in the entire sector need to be dramatically increased. In particular, companies that have high sustainability targets, like Interface and Desso, should reclaim and recycle increased amounts of carpet, as only then can they live up to their role as frontrunners of the circular economy in the carpet sector. Carpet disposal cannot be swept under the rug anymore and manufacturers should turn past weaknesses into future strengths.

Key characteristics of a circular carpet

- Tiles rather than broadloom so that individual tiles can be replaced if necessary
- Made from materials that are recyclable (see the full overview in table p. 22-23)
- No mixed materials within each layer of the carpet, i.e. mono material per layer
- Use of an adhesive that enables easy separation of carpet layers after use
- Ideally 'backstamped' - i.e. the materials used are indicated on the back of the carpet
- Installed without glue
- Avoiding materials that are dangerous to people's health or the environment

Comprehensive and user-friendly reclamation system

Carpet manufacturers should offer so-called "take back"-systems, reclaiming carpet after the end of its product lifespan. It's important to actively inform consumers in an accessible way about possibilities to return carpet after use. Despite tentative attempts by some manufacturers at reclamation, many consumers are completely unaware of such options. Therefore, public awareness efforts to promote reclamation is essential. Consumers should be offered the opportunity to be able to give back used carpet when buying new carpet. Manufacturers and retailers can cooperate to establish this. Take-back systems should be offered comprehensively, not only to business customers, but also to individual consumers. Incentives, such as instance rebates on new carpet when returning used carpet, could considerably increase the amount of reclaimed carpet. In addition to manufacturers and retailers collecting carpet directly, local municipalities



Photo: Les Stone



should also be included in this effort. They are legally required to collect bulky waste, which includes carpet. At collection points, carpet should be separated from other bulky waste and put into separate containers to protect it from dust, rain and other contaminants. In this way, reuse or high-quality recycling can be guaranteed.

Investing in Recycling Capacities

Recycling carpet depends on the availability of existing facilities and recycling techniques. Interface and Desso each only maintain a single facility in Europe where carpet is transformed with face fibers being separated from carpet backing and backing recycled. Other companies should follow the model of Interface and Desso and build up capacities at their facilities to reclaim carpet for recycling. Another possibility would be a coalition of several manufacturers, or of the entire sector with the goal of building and maintaining recycling facilities. Finally, companies specialising in material recycling could be contracted for the recycling process as well. Even though Interface and Desso already maintain facilities for carpet recycling, the amounts they process are meagre compared to the quantities they sell. Therefore, their recycling capacities need to be scaled up.

Clear labelling of product materials

Many different materials are currently used in manufacturing carpet, which means that it is hard to track what materials have been used in carpet. This makes recycling unnecessarily difficult. The answer is simple: Printing information on the carpet backing about the manufacturer and materials makes recycling significantly easier.

Recommendations for Policy-Makers

Principle of product stewardship: Product stewardship, also called extended producer responsibility (EPR), is at the center of German waste policies. The fundamental idea behind product stewardship is that waste prevention and recycling are best achieved if the producer has responsibility over the waste its product creates. Accordingly, manufacturers have to design their products so that, during production and use, the creation of waste is minimised and environmentally friendly end-of-life options are possible. For carpet to become fit for reuse and recycling, the introduction of product stewardship in the carpet industry is urgently required. Currently, almost all carpet in German gets incinerated.

The legal basis for product stewardship in waste management is the circular economy law. It includes standards for the development of durable products, the use of recycled materials, and the reclamation and environmental disposal after use. The ban on certain materials, labelling requirements, and take-back obligations for manufacturers and retailers support these goals. Product stewardship has so far been introduced for used packaging, cars, electric and electronic devices, batteries and oil.

In California, an extended producer responsibility system for carpet already exists and – despite flaws in the design of this particular EPR and the industry’s effort to undermine it – the recycling rates of carpet are around 10 percent, roughly 3 times as high as in Europe.

Bulky waste regulation: A regulation with binding targets for reuse and recycling of bulky waste would be necessary to ensure materials embedded in bulky waste move in closed loops. The introduction of a bulky waste regulation would create incentives for carpet to be collected separately and recycled in the future. Policy-makers are called upon to propose and adopt such a regulation.

Requirements for manufacturers, retailers and municipalities to separately collect carpet waste: Another way to increase the amount of carpet that gets collected and recycled would be to require manufacturers, retailers and municipalities to scale up and maintain a comprehensive, separate collection system for carpets, accessible for consumers and businesses.

Incineration tax: Overcapacities in waste incineration combined with low prices leads to the incineration of recyclable materials and products such as carpet. This is completely at odds with circular economy principles. For this reason, the price of incineration must rise by introducing a tax. The tax would have to be paid by the incinerators per tonne of incinerated material, making recycling models economically viable.

Recommendations for Retailers

Demand product information: Retailers should demand clear and exact information



from producers about the products’ recyclability, the share of recycled content and use of chemicals. Only then can retailers purchase sustainable products at wholesale, comprehensively inform consumers about environmentally-friendly and resource-efficient products, and undertake the appropriate sorting measures when reclaiming carpet.

Offer sustainable products: Retailers should offer consumers and business partners sustainable carpets, which contain recycled materials, can be reused, and are recyclable at the end of their useful lives.

Inform consumers: Companies should pro-actively inform consumers about sustainable carpet and reclamation possibilities for used products. This should include personal advice about sustainable options, as well as written materials such as flyers, posters, shelf labels and information on websites.

Carpet reclamation and services (reuse and repair): As service providers and interface between manufacturers and consumers, carpet retailers can play a particularly important role in reclamation. When buying a new carpet, it is important that consumers can give back used carpet at the point of sale. To increase the amount collected, individual retailers could offer a rebate on new carpet if used carpet is returned. Especially when delivering new carpet, a take-back service for existing used carpet should be offered. Such a service could be a good instrument for long-term customer loyalty. Additionally, services such as maintenance, cleaning and repair, should be introduced. Consumer tips should be offered, for instance, on how carpet can be installed without excess use of glue.

Recommendations for Consumers

Consumers should demand information about the sustainability of carpet products. They have the right to find out to which extent the carpet:

- is recyclable
- has a share of recycled materials
- contains chemical materials
- is non-toxic
- can be taken back by the retailer without issue

To make the circular economy in the carpet sector a reality, manufacturers in particular should assume responsibility, especially with the design of the products they place on the market. Since there has been little improvement in the reclamation and recycling rates of carpet in Germany for many years, policy makers must create pressure by enacting mandatory regulations for reuse and recycling. At the same time, consumers should consider the environmental aspects of carpet when purchasing them and demand take-back-possibilities from manufacturers and retailers.



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