Recyclable material instead of waste: PVC window recycling as part of the circular economy



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PVC windows as a resource

PVC windows are among the most durable building elements in existing buildings. Many date back to the first wave of PVC window installation in the 1960s. Today, the majority of windows installed since the 1960s are reaching the end of their service life - around 50 years on average - and are therefore classified as post-consumer material. This opens up the opportunity to reuse high-quality plastics and returning them to the cycle in order to conserve resources.

Window profile manufacturers have been using recycled materials in new profiles for many years. The industry is also committed to developing closed material cycles, reducing CO_2 emissions in production, and designing sustainable products.

Environmental certifications, life cycle assessments, research, and a wide range of collaborations demonstrate the industry's commitment to creating ecologically and technologically forward-looking solutions.

Recycling as part of European strategies

With the growing demand for sustainable construction methods, window recycling has also gained relevance throughout Europe. For PVC windows, this is already an integral part of the circular economy strategy. European legislators are pursuing the goal of keeping secondary raw materials in the value chain for as long as possible. The recycling of window profiles is particularly important here, as PVC can be recycled multiple times without any loss of quality. That is why no PVC window should go to waste. It does not matter whether it is three windows from a private renovation or 1,000 windows from a large property refurbishment. Windows belong in the closed material cycle and not in thermal recycling. All market participants along the value chain must internalise this and act accordingly. Everyone has the opportunity to dispose of old PVC windows properly in the cycle.

In various European countries, appropriate collection points and recycling systems have been set up to collect disused PVC windows and reintegrate them into the production process for new profiles. In 2024, over 396,000 tonnes of PVC window profiles were recycled across Europe – 295,000 tonnes of recycled material went directly into the production of new profiles (source: VinylPlus 2024).

Germany: Coordination via Rewindo

In Germany, the industry initiative **Rewindo** has played a central role in the collection and recycling of PVC windows, doors, and roller shutters since 2002. Rewindo is supported by leading window profile manufacturers, VinylPlus, and other partners. In addition to logistical tasks in the areas of collection, transport, and recycling, Rewindo

also coordinates communication, quality assurance, and political advocay in the interests of a functioning recycling system.

Around 90% of the German PVC profile market is organized through Rewindo. The operational network comprises:

- a nationwide collection system,
- more than 1,300 waste disposal companies,
- 16 audited recycling partners (four of which are abroad),
- around 100 stationary collection points, including for very small quantities,
- 700 cooperating housing companies,
- around 650 demolition and dismantling companies.

This network enables the flexible collection of old windows regardless of project size or regional location.

In 2024, a total of 130,981 tonnes of PVC were recycled via the Rewindo system in Germany. Of this, 44,109 tonnes were post-consumer waste from window demolition and 86,873 tonnes were pre-consumer materials such as production scrap.

The following practical example is one of the latest projects of the Rewindo initiative in Germany: In the course of a renovation, GEMIBAU Mittelbadische Baugenossenschaft eG replaced 360 old PVC windows with modern, energy-efficient PVC windows with sun protection in three high-rise buildings in Offenburg in 2025. Hilzinger GmbH, a Rewindo Premium Partner, took care of the installation and collection of the old windows. These were transported via the Rewindo system to VEKA Umwelttechnik GmbH, where they were processed into high-quality recyclate.

Technical recycling and economic aspects

The PVC fractions obtained in the recycling process are processed using established methods and reprocessed into window profiles. This is increasingly being done in combination with new design concepts such as multi-chamber profiles with a recycled core, which meet both ecological and functional requirements.

Financially, the responsibility for collection and disposal usually lies with the waste owner – either through direct commissioning or via municipal fees. Many recycling companies offer transparent and customized services that include dismantling, transport, and recycling. In certain cases, remuneration for the windows delivered is also possible, which makes recycling more economically attractive for window manufacturers.

Legal framework and European dynamics

With extended producer responsibility (EPR), the EU is pursuing the goal of making producers responsible for the entire life cycle of their products. While a mandatory take-back system for construction products has already been established in France, Germany has so far relied on voluntary initiatives by industry. These enjoy high recognition in politics, not least because of their proven contribution to resource conservation.

The German Circular Economy Act complies with the requirements of the EU Waste Framework Directive. PVC may not be landfilled, but incineration is still permitted. The planned Fuel Emissions Trading Act (BEHG), which includes a CO_2 tax on thermal recycling, could create stronger economic incentives for higher recycling rates in the future.

Ecological relevance

The ecological significance of PVC recycling has been proven many times over by calculations of greenhouse gas emissions.

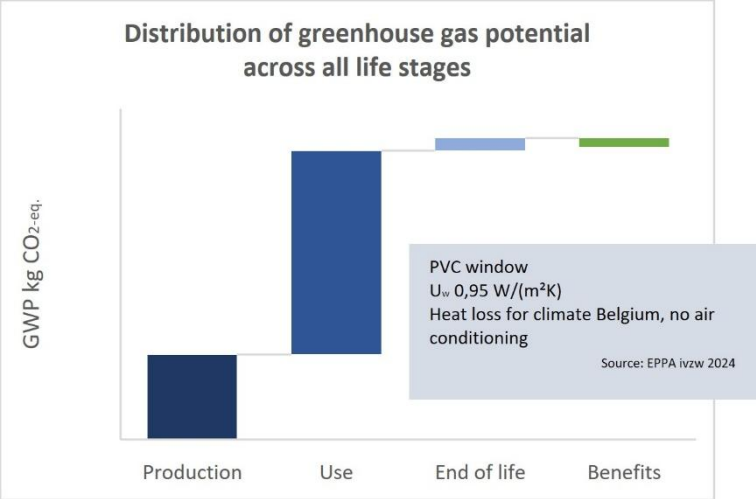


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To determine the CO_2 footprint of a window element, it is not enough to consider only the raw materials used and the manufacturing process, as, rather, a standard-compliant life cycle analysis must also take into account the end-of-life disposal phase. This is because, especially if recycling is not possible due to the material, waste treatment and disposal contribute significantly to greenhouse gas emissions in the life cycle of the window. PVC performs particularly well here due to its low waste generation, as highlighted in a recent fact sheet published by the German Federal Association of Wooden Window Manufacturers (Bundesverband ProHolzfenster e.V.) as can be seen in the figure. And the reuse of PVC from old windows in the production of new windows contributes to a noticeable reduction in the CO_2 footprint. The proportion attributable to the use phase, which must also factor in location-dependent heat loss, air conditioning, and repair and maintenance, likewise significant.

Every kilogram of recycled material used avoids around two kilograms of CO_2 emissions compared to the production of new material (source: EPPA ivzw). In addition, recycling reduces dependence on primary raw materials, thereby promoting raw material security within Germany and the EU and saving landfill volume. The extended retention time of raw materials in the economic cycle strengthens the industry's resilience to global bottlenecks.

A proven system with development potential

Rewindo is a tried-and-tested system that has established itself in German construction and renovation practice. It involves all relevant players – from profile manufacturers and glass and hardware suppliers to waste disposal companies and plant operators. The goal remains to further close the material cycle while combining technical feasibility, ecological responsibility, and economic efficiency.

Participation in the Rewindo system also brings concrete advantages for window manufacturers:

- **Easy disposal**: Depending on the project volume, old windows can be handed over via container services, mobile pick-ups, or stationary collection points.
- **Cost transparency**: Waste owners receive customized offers from recycling partners. In many cases, a refund for the delivered windows is also possible.
- **Visible commitment**: By participating, specialist companies show customers and clients that they are acting responsibly towards the environment.
- **Future-proof**: Recycling will increasingly be required by law in the coming years – with Rewindo, you are prepared.

With the increasing dismantling rate of PVC windows from previous decades, the importance of recycling will continue to grow. With Rewindo, the industry is demonstrating how established systems work in practice and can contribute to the implementation of political and economic sustainability goals.

European practical examples: PVC window recycling in practice



In many European countries, collection and recycling systems have been set up to recover valuable PVC raw materials from dismantled windows. These systems contribute to the implementation of the circular economy in the construction industry. The following provides an overview of exemplary initiatives in various countries.

Germany: Rewindo as an industry solution

Rewindo has been coordinating the recycling of old PVC windows nationwide since 2002. The network comprises more than 1,300 waste disposal companies and over 100 collection points. In 2024, around 131,000 tonnes of PVC were recycled, of which almost 44,000 tonnes were post-consumer material. The initiative is supported by leading profile manufacturers and is considered a reference model for the industry.

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RE:CORE – Closing cycles – creating added value

Schüco has been involved in the Rewindo initiative for over 20 years. In 2022, the company founded the RE:CORE joint venture with REMONDIS to create a closed loop. RE:CORE offers a reliable recycling service for partner companies. The combination of market knowledge and waste disposal expertise creates a sustainable infrastructure.

VEKA: Pioneering work since 1993

VEKA Umwelttechnik GmbH operates the largest PVC window recycling plant in Europe. Windows, doors and roller shutters have been completely recycled there since 1993. In addition to its location in Germany, VEKA also has plants in France and the United Kingdom. The regranulates produced are characterised by their high purity and recyclability and are used in profile production at VEKA AG and its subsidiary GEALAN Fenster-Systeme GmbH.

profine: Closed loop with a European dimension

profine operates its own take-back system in several countries **and processed over 36,000 tonnes of recycled material across the group in 2024**. A modern recycling plant was commissioned at the Pirmasens site **at the beginning of last year**. As a member of the Rewindo partner network**,** profine is **thus** strengthening its commitment to the closed material cycle.

Rehau Window Solutions and Dekura GmbH take responsibility for a circular economy in practice

Dekura has been recycling PVC windows and production residues for over 30 years. The Europe-wide collection system offers containers ranging from 1.1 to 40 cubic metres. At the Höxter plant, this is turned into high-quality regranulate, which saves up to 90 per cent CO_2 compared to primary PVC. As a REHAU subsidiary, Dekura is part of a long-term recycling strategy.

aluplast GmbH bundles its recycling activities in apcycle

apcycle promotes the sustainable handling of dismantled PVC windows, roller shutters and doors. The initiative involves all players along the value chain. aluplast operates the system proactively and is constantly increasing the use of recycled materials. The growing quantities of secondary material demonstrate the success of the concept.

Salamander: Powerhouse for sustainable window solutions with design appeal

Salamander has been committed to recycling for many years and is a founding member of Rewindo. In 2024, 22,000 tonnes of recycled material were processed, with an average of 21 per cent recycled content in the profiles. This is set to rise to over 30 per cent. The award-winning Greta® window loop combines recycling, CO_2 savings and design in one product.

VKG (Netherlands): Industry solution with clear standards

The VKG recycling system has been in place since 1994 and is based on the return of old components by window manufacturers. The materials are sorted by type and recycled to a high standard. The aim is to achieve a closed loop with a recycling rate of over 95%. Cooperation with recycling companies is regulated by contract.

OKNOREC (Poland): Establishment of a national take-back system

EPPA Polska initiated the voluntary OKNOREC system in 2023. It brings together manufacturers, recyclers and waste disposal companies under a common recycling

concept. Collection is carried out by installers and through municipal collection points. The aim is to establish a functioning cycle for PVC windows in Poland.

RECOBUD (Poland): Cooperation between industrial companies

RECOBUD is an industry-led model project for the material recycling of old windows. Participants include Metal-Plast, Saint-Gobain and PreZero. In addition to PVC, glass components are also recycled. The project meets environmental requirements and supports companies in achieving ESG goals.

France: EPR regulation and comprehensive take-back structure

The Loi AGEC itroduced an EPR system for construction products in France. Manufacturers pay an environmental contribution, and recycling and collection are carried out by accredited organisations. The maximum distance to collection points is regulated by law. The system is supported by associations such as UFME and companies such as VEKA Recyclage.

PVC window recycling in Italy: first steps towards a circular economy

The recycling of PVC windows in Italy is still in its infancy. In 2024, 64,000 tonnes of rigid PVC were recycled. Old windows often end up in construction waste, making separate recycling difficult. However, Recovinyl has been tracking and certifying PVC recycling throughout the country since 2006. With the WREP pilot project and increasing political pressure, the potential for structured collection and recycling systems is growing.

Deceuninck: Certified recycling across Europe

Deceuninck operates one of Europe's largest PVC recycling plants in Belgium. RecyClass certification ensures process reliability and material quality. The Go-Bag system allows window components to be collected directly on construction sites, making return easy. The system complements the Deceuninck recycling structure and offers practical solutions for decentralised take-back processes.

Conclusion: Creating structures for more recycling – we need old windows for this

The initiatives described above demonstrate the diversity of functioning collection and recycling systems in Europe. They differ in detail, but they all have a common goal: to keep PVC from old windows in circulation and to produce high-quality recyclates. In this way, they contribute to resource conservation, CO_2 reduction and greater material autonomy in the construction industry. The message to the PVC window industry is clear: "collect old windows, because waste is a new raw material".