6th BUSINESS SUMMIT
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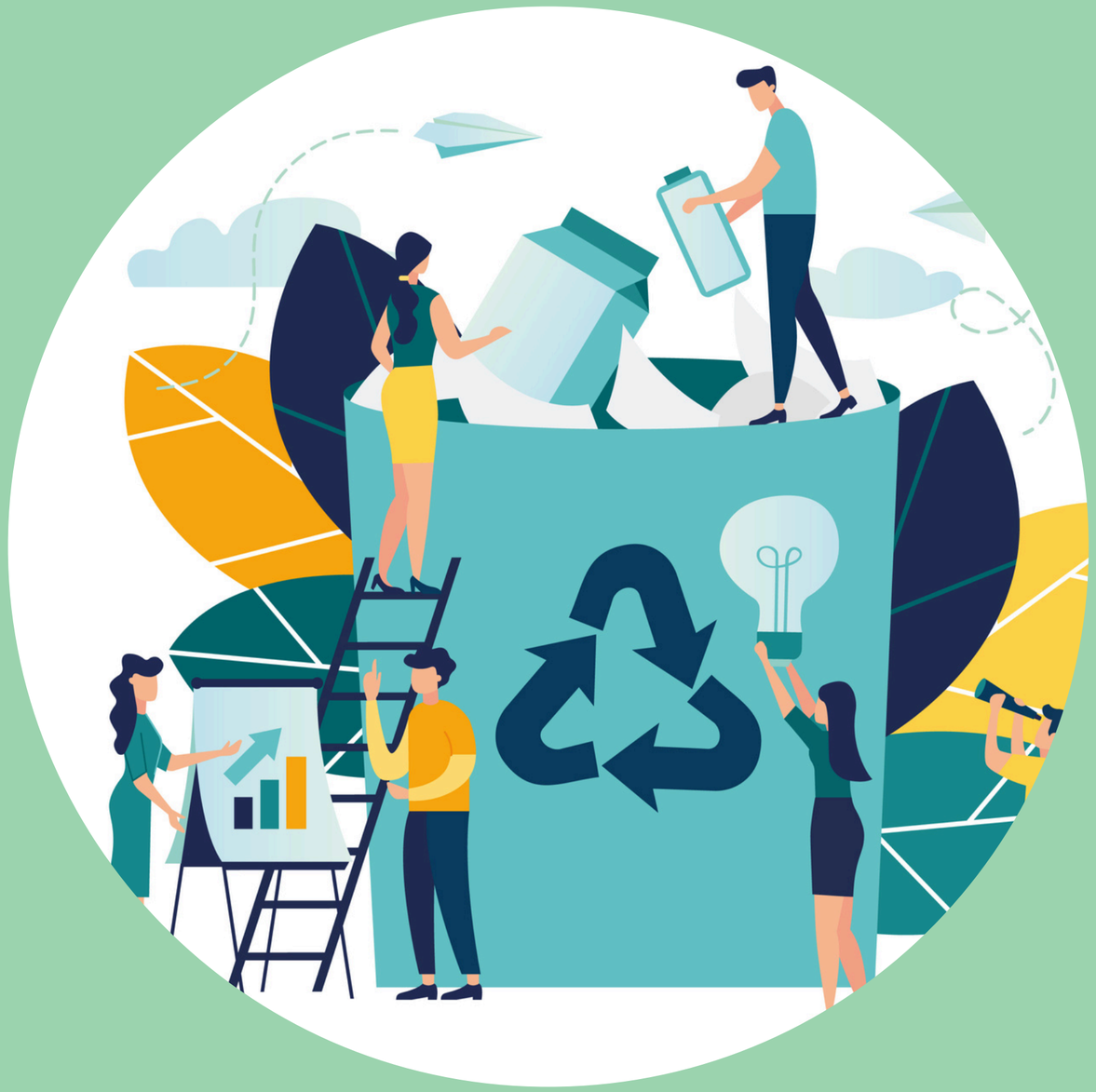
5 KEY TRENDS OF SUSTAINABLE DESIGN



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Each European Union member state should pay **€800** for every tonne of non-recycled plastic waste. This is not merely a suggestion, but a mandatory **charge** established by the EU Council in 2021.

Every year around **10 million pieces of various plastic** waste pollute the ocean, threatening climate stability and biodiversity. And every year European companies pay massive waste fines.

Linear value chains—*'produce, consume, waste'—are not profitable anymore and require transformation into circular models—'produce, consume, put waste into production again'*. It is not an option, but an urgent need for companies that don't want to end up as industry outsiders or simply go broke.

According to the **latest EU policy** updated in order to accelerate the **green transition**, the recycling targets for plastic packaging have been increased by 5% to **55% and 60% by 2025 and 2030**. In the meantime, **twelve EU countries** still have not even reached former goals. For example, only Portugal will have to pay the EU **€200 million** fine for non-recycled plastic packaging next year.

Now that the goals have become even more robust, businesses all over Europe crave new recyclability solutions, ready to invest deeply in research, innovation and process re-engineering. **In this review, we will observe the 5 hottest sustainable design trends of 2024.**

BRIEF HISTORY OF PACKAGING

The first paper cardboard box was invented in **1817**. At that time, packaging was a luxury, used primarily for expensive goods and designed to be reused rather than disposed of. As industrialisation progressed, the advent of cheaper, mass-produced packaging led to an era of disposable convenience-driven solutions that drastically raised packaging waste globally.

Today, packaging is an **ever-increasing source of waste**. The EU total on packaging waste has increased from **66 million tonnes** in 2009 to **83.4 million tonnes** in 2022. Each European generated **188.7 kg** of garbage of this kind in 2021, and this figure is expected to increase to **209 kg** in 2030. In the meantime, in 2022, only 41% of EU plastic packaging was recycled—a modest growth from 38% in 2012.

OK, WHY NOT RECYCLE EVERYTHING THE OLD-FASHIONED WAY?

This could be a key, but for now recycling technologies are not enough to fully satisfy businesses' need for complete, stable, and eco-friendly solutions. There are two types of waste recycling: mechanical and chemical.

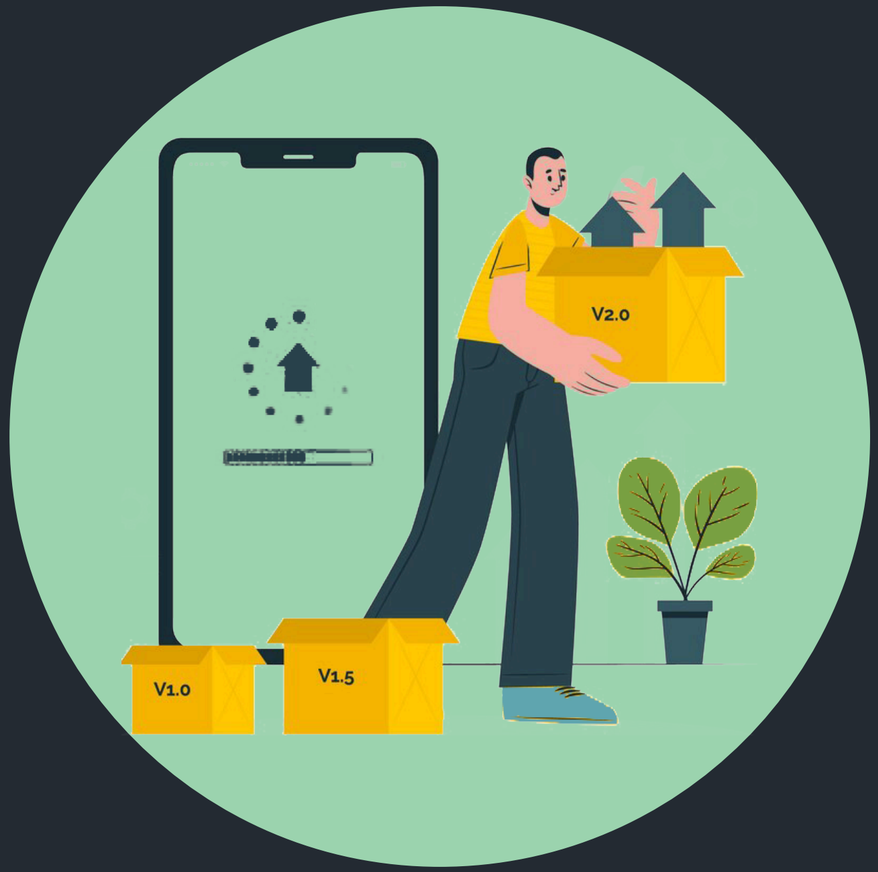
Mechanical recycling is the collection, sorting and melting of waste (plastic packaging, glass or fabric) in order to turn it into recyclable pellets. The process requires painstaking quality control; for example, there are tight restrictions for coloured glass entering the remelting process. The building of such infrastructure demands significant investments and is impossible without the help of citizens and local authorities.

Chemical recycling makes it possible to recycle roughly sorted and contaminated waste, producing polymer raw materials and petrochemical products. But it itself produces GHG or—if eco-friendly solutions are applied—requires expensive equipment.

SO, HOW SUSTAINABLE DESIGN COULD HELP?

Sustainable design is the philosophy that could significantly simplify the waste maintenance processes. It is the idea that the ability to be reused or biodegrade should be built into the very design phase of a product.

Sustainable design is a crucial principle of a **circular economy** that involves sharing, leasing, reusing, repairing, refurbishing and recycling existing products as long as possible. In other words, sustainability extends the lifecycle of the product and minimizes the need for complicated waste management such as collection, sorting or chemical processing.



WHAT ARE THE 2024 MOST PROMISING SUSTAINABLE DESIGN TRENDS?

According to our data, 5 trends are driving the sustainable design agenda today:

Smart data-driven systems.

IoT-based ‘Product as a Service’ solutions granting access to a product instead of selling its ownership. But not only this.

Repurpose and reuse.

Tasty edible packaging, ‘spider silk’ and hydrogen made of old fabric.

Minimalism

Clear and simple ideas: easy-to-recycle mono-material products, packaging on demand and more.

Plant-based solutions and innovation.

Seaweed-based packaging, cactus leather and other eco-friendly inventions.

Modularity and lifecycle extension.

From modular mobile phones to extremely long-live carpeting—everything to reduce waste.

Let's take a closer look at each of these trends.

SMART DATA-DRIVEN SYSTEMS

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The Internet of Things and big data open up huge prospects for sustainable design. The ability to transmit detailed data over any distance provides consumers with a range of services that previously required the purchase of expensive and massive equipment. Now, it is no longer necessary to splurge on the purchase of cheaper hardware that has a short lifecycle and must then be disposed of in some way. It is enough to subscribe to the Product as a Service (PaaS) system, get a company's high-quality equipment delivered and operate it based on a pay-per-use model.

Projects to watch:

Bundle **(Netherlands)** provides laundry and coffee-making services. Customers select their preferences on the website, enabling Bundles to suggest a monthly fee. Once the device is connected to the Internet, the user is ready to go. After the first month, the user receives an overview of how often they used the machine and can have their tariff adjusted accordingly.

Signify **(Netherlands)** offers circular lighting where the capital expense of buying equipment is replaced by monthly payments for performance.

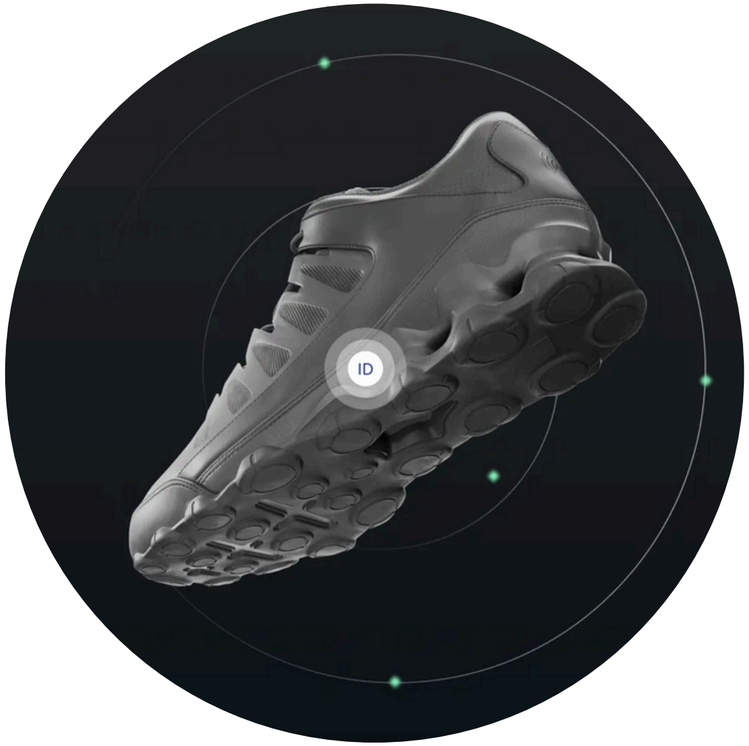
HP Instant Ink **(USA)** utilises high-volume cartridges, pricing based on pages printed, and a direct-to-customer ink refill shipping scheme.

Riversimple (UK). The automobile manufacturer harnesses a hydrogen fuel cell engine, regenerative braking and a super lightweight chassis. Customers pay by the mile rather than own the car.

Another subtrend in data-driven sustainable design is smart packaging, which utilises IT to provide comprehensive data on the product: the origin of the materials used, manufacturing process, freshness status, recycling instructions. Labels on packaging such as QR codes or RFID tags enable both brands and consumers to trace the full lifecycle of a product and ensure its guaranteed recycling. Besides that, they help to personalize a product, which can improve customer loyalty.

Projects to watch:

Eon **(Germany)** allows clothing retailers to connect every item to a Digital ID. It provides customers and sellers with real-time access to data on the full lifecycle of the product from production to sale, customer use, resale and recycle. Microsoft is a partner; Balenciaga and H&M are the clients.



MINIMALISM

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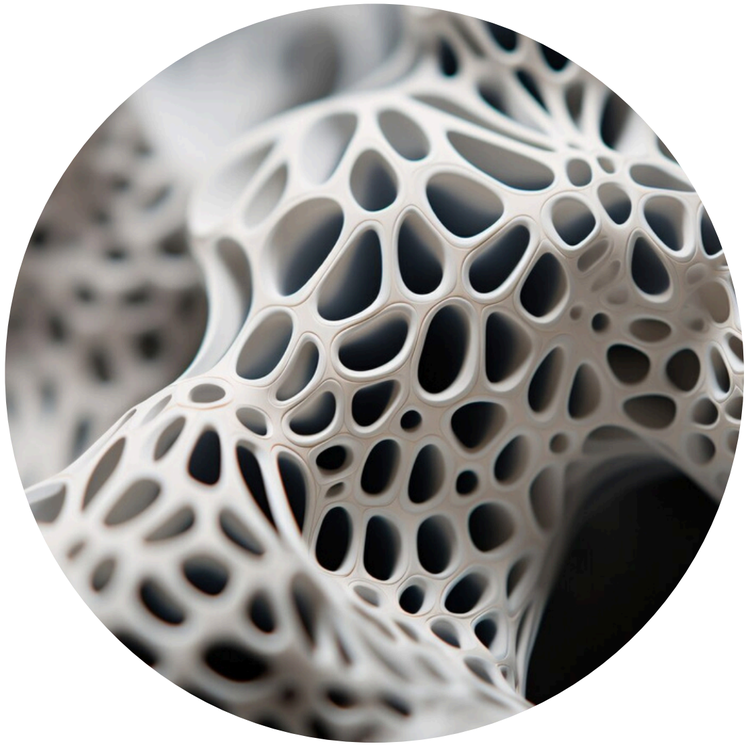
Minimalistic approaches prioritize functionality and simplicity over striking and colourful appearance.

Mono-material packaging refers to design solutions made from a single material type, significantly simplifying recycling processes. This approach contrasts with traditional packaging that often combines different materials, such as plastics, metals, and fibres. ‘Mono-package’ can be easily processed in standard recycling facilities without separating, minimizing the environmental impact of both production and disposal.

Combined solutions, such as 3-in-1 products, reduce waste and resource consumption by connecting with on-the-go consumers who do not want to carry around multiple items.

Simplification of the value chain eliminates non-obligatory packaging production processes such as colour printing or involves a packaging-on-demand system ensuring that materials are only used as needed.



Projects to watch:

Davines (Italy) prioritises the use of only primary packaging to avoid further external packaging and chooses mono-materials that are easily separable for collection and recycling.

Niaga (Netherlands). Medium-life 'bulky' products (MLBPs), like carpets, furniture and mattresses, are difficult to recycle and contain toxic chemicals. Niaga leases 100% recyclable MLBPs developed using a non-toxic adhesive that decouples on demand. Together with the use of mono-material components, the modular design supports easy maintenance.

Jones Road Cosmetics (USA) reduces waste and resource consumption using a monochromatic packaging design.

Zero Waste Patterns. A book about the popular sustainable fashion strategy of using puzzle-like clothing patterns that fit together seamlessly, minimising offcuts.

MODULARITY AND LIFECYCLE EXTENSION

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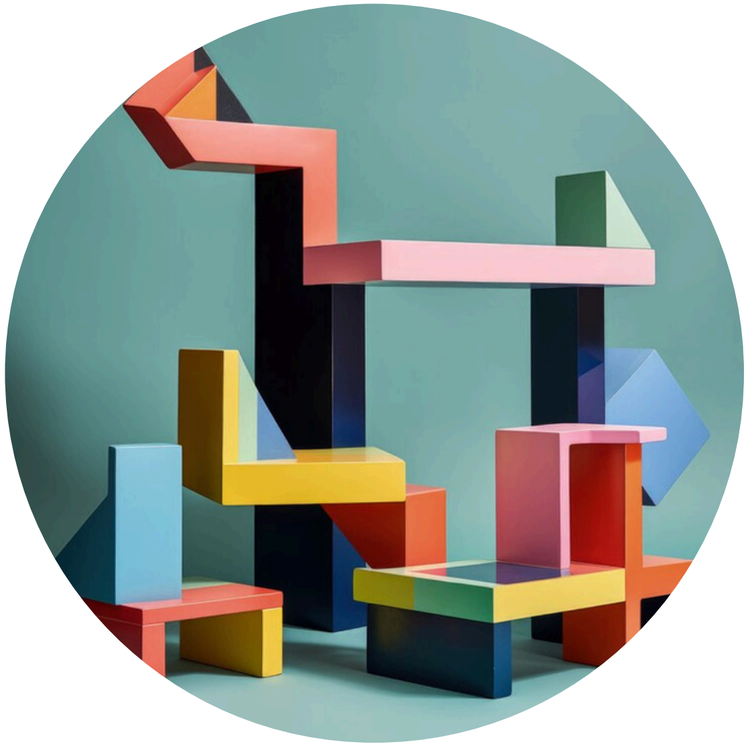
Extending the product lifecycle ensures it remains economically useful through remanufacturing, repairing, upgrading or smart material choices. Three major strategies could be implemented here.

The first one is product **modularity** together with material reliability and ease of maintenance.

The second one is a **closed loop (taken back) strategy** assuming that a product can be 100% recycled into the same product with little or no loss of quality.

The third one is **refills and concentrates usage.** The rise of refill options in well-known supermarkets reflects a surge in popularity. A number of companies are exploring digital solutions that inform consumers when they should reorder or feature exact dilution manuals.



Projects to watch:

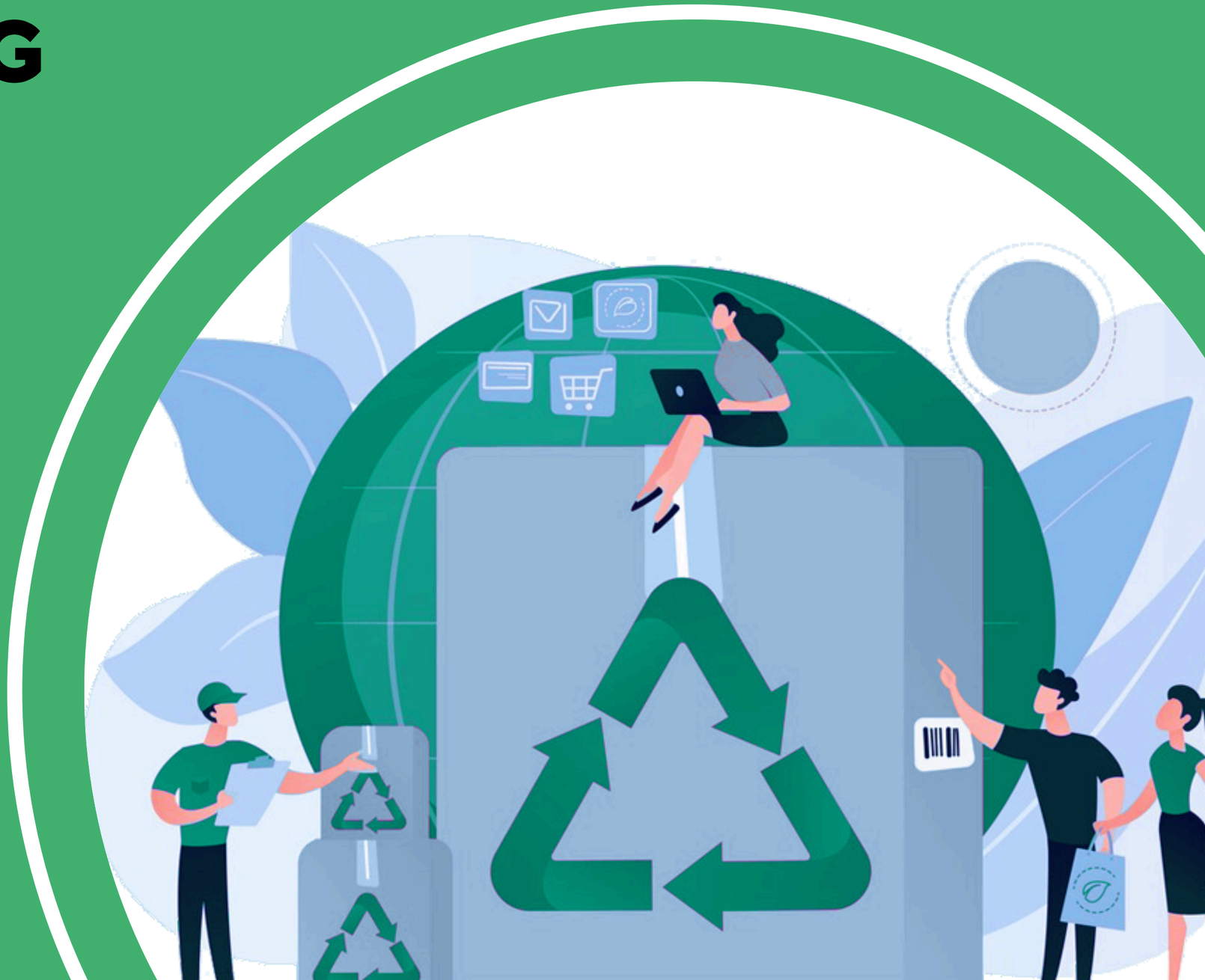
Tarkett **(Belgium)** produces carpet tiles DESSO EcoBase® that are 100% recyclable. They are composed of two main components—yarn and polyolefin-based backing—that can later be taken apart in order to be recycled into quality raw materials for new carpet tiles, over and over again.

Tosca **(USA)** and Returnity **(USA)** provide reusable packaging that can transport products and goods more than once. The packaging is made from solid materials like wood, metal, and plastic enhancing operational efficiency and reducing waste in the logistics sector.

Fairphone **(Netherlands)** is an electronics manufacturer that designs and produces modular smartphones and headphones. From batteries to audio jacks, all modules are available in the company's shop.

Wild **(UK)** provides a lot of refillable and modular beauty products including body washes, deodorants and even lip balms.

REPURPOSING AND REUSE



Perhaps, the most creative area in sustainable design.

Repurposing involves using products or packaging for new purposes, from storing food or planting plants to... food itself.

Reuse focuses on recycling packaging or products into raw materials to create something different, sometimes in unexpected ways—for example, producing hydrogen from waste clothing.

Projects to watch:

Evoware (Indonesia) produces edible glass called Ello Jello cups with plenty of flavours.

P. Louise (UK) popularises edible cosmetics solutions such as lip scrubs and masks.

Re-Fresh Global (Germany) converts textile waste into fibres and bioprocesses them into premium-quality nanocellulose and bioethanol.

Projects to watch:

CHIMIREC (France) repurposes high calorific garage waste like car seat foam as absorbents for energy substitution fuels (ESF).

Researchers of Rensselaer Polytechnic Institute are working on turning polyethylene waste into biodegradable 'spider silk '-like material using Pseudomonas bacteria.

DOK-ING and Humana Nova (Croatia) are testing a pilot plant for processing waste textiles to produce hydrogen.

Davines (Italy) promotes transforming essential oil bottles and hair care products packaging into reed diffusers and food storage containers.

BIODEGRADABLE PLANT-BASED SOLUTIONS

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Compostable plastics are derived from renewable resources, including materials such as cornstarch, mushrooms, seaweed, etc. The environmental impact of this type of packaging depends on proper composting conditions, often available only in industrial composting facilities. However, growing research emphasis on the development of materials that can degrade in a broader range of conditions takes place.

Projects to watch:

Notpla (UK) makes plastic replacements from seaweed—a fast-growing, carbon-sequestering plant—which breaks down anywhere within a few weeks.

NFW (USA) produces plant-based leather called MIRUM®, a premium material made from natural rubber, plant oils and waxes, natural pigments, and minerals.

GreenWrap (India) introduces honeycomb paper, an affordable biodegradable and curbside recyclable alternative to bubble wrap.

Desserto (Mexica) leather is made with nopal (prickly pear) cactus leaves that are grown without chemicals or irrigation on a ranch in Mexico. The leather is used by H&M and Everlane for handbags, footwear and in the automobile industry.

Bpacks (UK) offers biodegradable packaging solutions based on the usage of bark, a byproduct of wood production.

CONCLUSIONS

1. Although every trend in packaging encounters obstacles, such as financial feasibility and consumer approval, the potential they hold for promoting a sustainable future is immense.

2. Moreover, the **revision of European Green Deal** targets has become an additional driver for European companies to make a sustainable value chain transition.

3. The sixth trend, which relates to all of the above, is the convergence of producer and consumer. Companies aiming for success should not just offer a sustainable solution, but also explain to the consumer why it is needed and how it works. Some firms produce recyclability guides and some create entire consumer communities, like **Haeckels**, a British beauty brand that allows customers to watch how its agar eye mask grows. Either way, the future of sustainability lies in transparent and sincere communication—only this approach will help businesses utilise the full potential of technology.

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