

SUSTAINABLE PRINTING AND PACKAGING TRENDS

A white paper based on the webinar presentation and speaker script by Dr. Lode Deprez

This paper distils the webinar into a structured narrative for customers, partners and internal stakeholders interested in lower-carbon packaging, renewable carbon, food-compliant print, and Xeikon's sustainability direction.

Prepared from

Webinar presentation dated March 24, 2026, and accompanying speaker script

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Prepared as a white paper draft; no external verification has been added beyond the supplied materials.

Executive summary

The central argument of the webinar is that the packaging industry should move away from fossil carbon, not away from carbon itself. Carbon will remain essential in polymers, coatings, pharmaceuticals and performance materials, but the source of that carbon must shift toward recycling, bio-based feedstocks and recovered carbon dioxide.

That transition will reshape packaging design. Reuse, standardisation, decoration-free packs and especially labels are presented as practical routes to reduce contamination risk while keeping brand differentiation. In this view, labels become more important because they allow packaging substrates to remain simpler, cleaner and easier to recycle or reuse.

Food packaging compliance remains a critical filter for any printing technology. The presentation makes a clear distinction between composition compliance, which concerns what ingredients may be used, and migration compliance, which concerns whether substances move into food above accepted thresholds. Both are necessary.

Across digital technologies, the webinar argues that image quality is no longer the decisive differentiator. Instead, migration behaviour, deinkability, VOC profile, energy demand, material footprint and operational flexibility matter more. Xeikon positions dry toner and evolving water-based systems as strong fits for the future label task, while also acknowledging trade-offs across the wider technology landscape.

The final part of the webinar shows Xeikon's own sustainability trajectory, including a near 30 percent carbon-footprint reduction since 2019, fleet electrification, recycled PET in toner resin, bio-based humectants in IDERA inks, software changes to reduce installed-base energy use, and practical local recycling measures for toner bottles.

"We do not need less carbon; we need the right carbon in the right cycle."

1. Why the sustainability debate is becoming unavoidable

The presentation opens with a blunt assessment of climate disruption. Flooding, drought, fire, ice loss and more severe storms are not described only as environmental events; they are framed as mounting economic losses, with only part of the damage still covered by insurers. This is important because it shifts sustainability away from a moral side topic and into a material business risk.

The speaker links this risk to the wider economy by citing work that suggests additional warming above today's already elevated baseline could erode global GDP. The message for packaging is straightforward; companies that depend on energy, carbon-based materials and global logistics cannot assume that the cost of inaction will remain external to the business.

A second argument is that emissions are globally distributed. Europe and the United States have reduced part of their historic emissions growth, but this has been offset by strong

increases elsewhere. As a result, selective regional improvements are not enough on their own. The industry therefore needs solutions that can scale across supply chains and geographies.

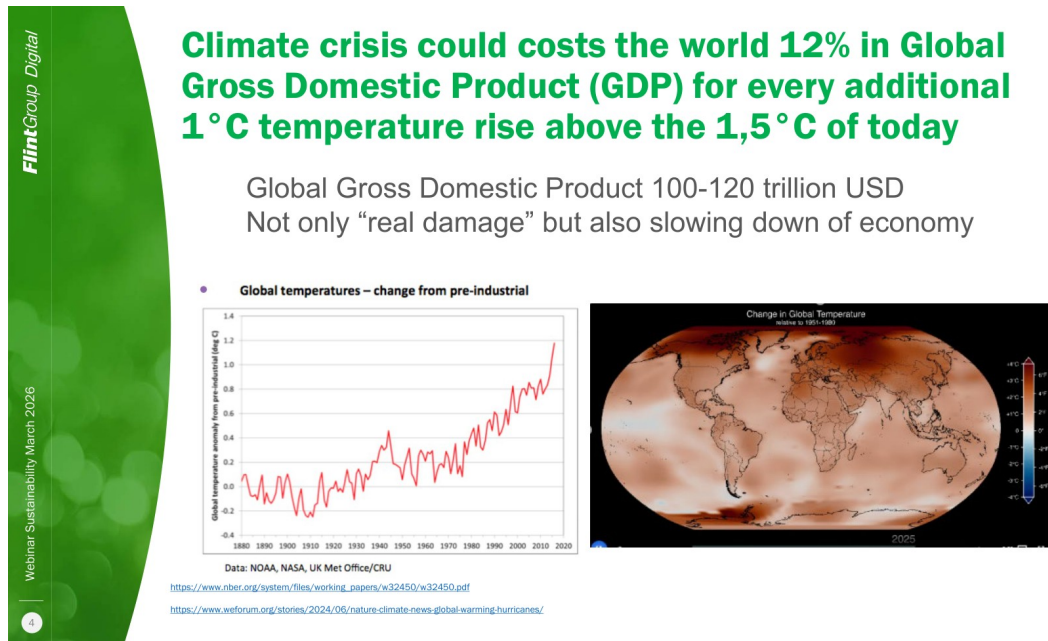


Figure 1. The presentation links rising climate damage to growing business and capital losses.

2. Defossilisation and the rise of renewable carbon

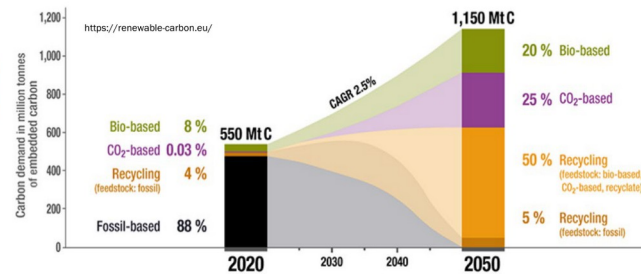
A core concept in the webinar is defossilisation. Rather than using the broad and sometimes misleading term decarbonisation, the paper argues for stopping the extraction of fossil carbon that is later released as atmospheric carbon dioxide. Carbon itself remains indispensable; the real challenge is to feed the carbon cycle differently.

In practical terms, this means substituting fossil feedstocks with recycled carbon, bio-based carbon and carbon recovered from CO₂. The presentation also stresses that total demand for carbon-containing materials is likely to rise rather than fall by 2050. That makes carbon circularity more important, not less.

For packaging, the consequence is that designs will increasingly be judged on how easily their carbon can remain in circulation. Reuse comes first where feasible; when reuse is not possible, recycling must be easy, clean and economically realistic. Decoration, adhesives and complex multilayer structures therefore come under greater scrutiny because they complicate sorting, washing and safe re-entry into the next application.

THE NEED FOR DEFOSSILISATION THE URGENCY TO START FEEDING THE CARBON CYCLE

Carbon Embedded in Chemicals and Derived Materials
updated nova scenario for a global net-zero chemical industry in 2050



**THIS MEANS :
Emphasis on RECYCLING & REUSE**

Figure 2. The webinar frames the long-term shift as a move from fossil carbon toward recycling, bio-based carbon and CO₂-based feedstocks.

3. How packaging design may change

The packaging examples in the presentation point toward a simpler future. Standard bottles, refill models, embossed branding, powder formulations and more uniform materials are all presented as signals of a market that may favour reuse and easier recycling over ever more complex decorated packs.

This is especially relevant in food packaging, where contamination risk matters as much as recyclability. A substrate may be technically recyclable, yet still unsuitable for high-value reuse if residues, inks or migrants compromise food safety. That is why the webinar repeatedly returns to the idea that material simplicity and clean separation will gain commercial importance.

Within that logic, labels take on a larger strategic role. If the pack itself becomes more standardised, much of the differentiation can move to a removable printed layer. Labels can carry branding, product information, security features and variable data while reducing the need to print across the whole pack.

4. Food-compliant packaging; composition versus migration

A distinction the market cannot afford to blur

One of the most useful parts of the webinar is the clear distinction between composition compliance and migration compliance. Composition compliance concerns whether the ingredients in an ink or toner are allowed under the combined demands of governments, industry associations and brand-owner specifications. In the presentation, this is illustrated as

a narrowing funnel; every layer adds exclusions, and only the substances that survive all three levels remain usable.

Migration compliance is a different test. Even when all substances are legally and commercially acceptable on paper, the printed package is still non-compliant if relevant ingredients migrate into food above accepted limits. The presentation emphasises both overall migration limits and specific migration limits, and it notes that printers need reliable formulation data and certified lab testing to assess real structures and designs.

This matters strategically because many suppliers communicate composition compliance as if it were the finish line. The webinar argues that it is only the licence to start the race. The full packaging construction, process conditions and end-use scenario decide whether the finish line is reached.

Composition compliance	Whether ingredients are permitted by regulation, association guidance and brand-owner rules.
Migration compliance	Whether the finished printed structure keeps overall and specific migration below accepted limits in realistic use conditions.
Practical implication	Both are required; compliant ingredients alone do not guarantee a food-compliant pack.

5. Which digital technologies are best suited to the future label task?

The webinar rejects the idea of a single perfect print technology. Instead, it compares technologies against the issues that will matter most in a more sustainability-driven market; migration behaviour, deinkability on paper and plastics, VOC profile, carbon intensity of consumables, flexibility in short-run operations, and energy use during printing.

In this comparison, UV inkjet is treated cautiously for direct food-related applications because its low-viscosity chemistry relies heavily on reactive low-molecular-weight ingredients and tightly controlled curing conditions. Water-based systems are seen as promising, especially on paper, but still constrained on polymeric substrates where drying remains a major technical challenge. Liquid toner can perform well in some areas, but only if solvent handling and imaging-liquid recovery are robust. Dry toner is presented as a particularly balanced option for flexible, compliant and deinkable label production.

The broader point is not that technology choice should follow a simple ranking. It is that buyers and converters need a more complete decision framework than image quality and

speed alone. The safer, lower-footprint and easier-to-recycle package will increasingly win on criteria that used to be secondary.

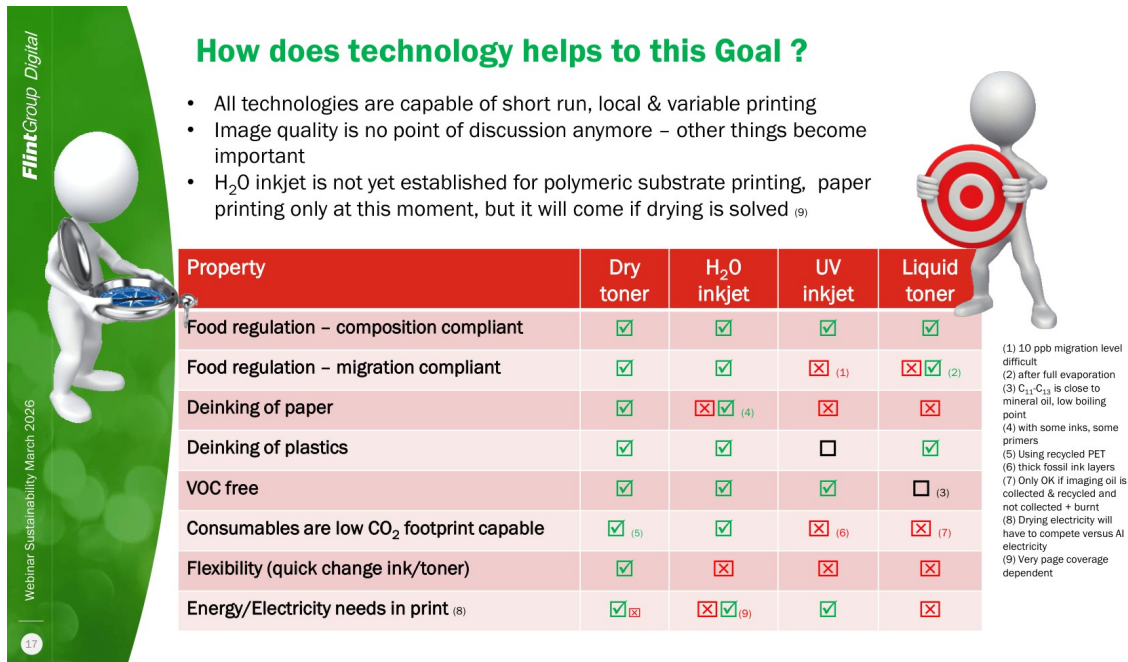


Figure 3. The presentation compares dry toner, water-based inkjet, UV inkjet and liquid toner across compliance, deinkability, VOC profile, footprint, flexibility and energy.

6. Xeikon's sustainability trajectory

The second half of the webinar shifts from industry analysis to evidence of execution. Xeikon presents sustainability not as a recent messaging layer, but as a direction that has already influenced energy sourcing, chemistry choices, logistics, fleet policy, software and end-of-life handling.

The most visible headline is the reduction of Xeikon's reported scope 1, 2 and 3 carbon footprint by close to 30 percent between 2019 and 2024, with 2025 indicated as still in progress but not expected to worsen the trend. This is set against a broader Flint Group target of a 40 percent reduction by 2030 across scopes 1 to 3.

The presentation also points to earlier structural decisions, including a move to 100 percent renewable electricity in Belgium back in 2009, long-standing solvent-free toner production, low-melting toner to reduce print energy, solar installations, reusable transport packaging and operational initiatives to reduce water and waste.



Xeikon Scope 1, 2 and 3 follow up since 2019

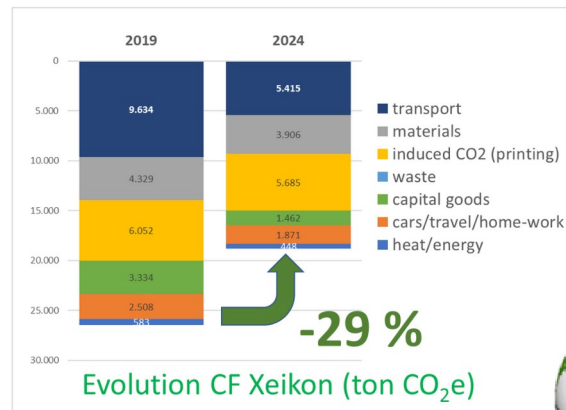


Figure 4. Xeikon reports an approximately 29 percent reduction in scope 1, 2 and 3 carbon footprint from 2019 to 2024.

Material innovation and operational focus

A particularly strong example is the use of collected and cleaned transparent PET bottles as a significant raw-material input for QB toner resin. The webinar describes this as true chemical recycling; PET-derived building blocks are broken down and rebuilt into a resin suitable for toner production. According to the presentation, this avoids roughly 400 tonnes of carbon footprint per year.

For the IDERA platform, the paper highlights water-based inks using 100 percent bio-based humectants, with the X81.XX ink series described as more than 85 percent fossil free. The slide set positions this as evidence that growth and footprint reduction can happen in parallel; ink and toner volumes increased while total CO₂e remained broadly stable over the period shown.

Operationally, the near-term focus is equally pragmatic. Xeikon wants fewer air shipments, better planning between stock, cash and production, lower installed-base energy use through software power states, improved visibility into customers' electricity mix, and practical local recycling of toner bottles instead of long-distance return transport.

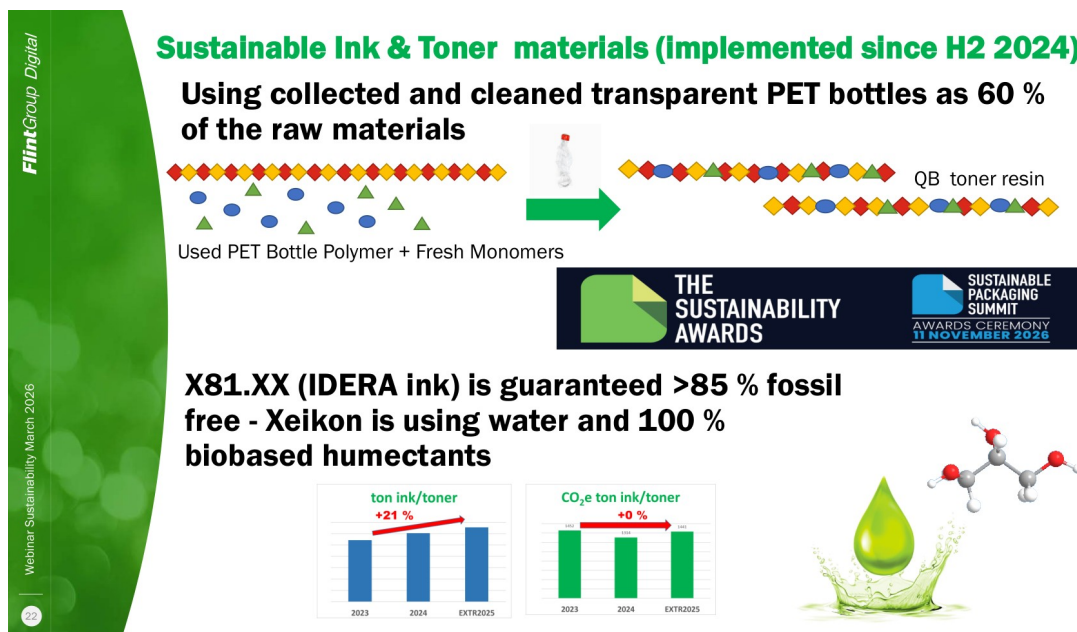


Figure 5. Since H2 2024, the presentation states that recycled PET and bio-based components have become part of Xeikon's toner and ink sustainability story.

7. Strategic implications and final takeaways

First, the packaging sustainability debate is becoming more concrete. The issue is no longer whether companies should care, but where the biggest transition points will appear; carbon source, material simplicity, contamination control, logistics and power use.

Second, food packaging print requires much tighter language and evidence. Composition compliance remains necessary, but migration compliance determines whether a printed application is genuinely fit for food contact scenarios. Suppliers, converters and brand owners need to align around that distinction.

Third, labels are likely to become more strategically important in a lower-carbon packaging system. They allow brand expression and information density without forcing every pack format to become more complex, harder to wash, or harder to recycle.

Finally, the webinar positions Xeikon as a company trying to align technology development with this future rather than react to it later. Whether the market evolves gradually or under sharper regulatory pressure, the themes of defossilisation, reuse, cleaner recycling and energy efficiency are presented as durable rather than temporary.

Further reference mentioned in the presentation

Xeikon sustainability page: xeikon.com/en/lps/sustainability-page

Renewable Carbon Initiative: renewable-carbon.eu

Drafting note: narrative rewrite of the supplied speech text and presentation for PDF publication.