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White Paper

Sustainability in Label Printing

Prepared for: Epson

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May 2021

Contents

0. Executive summary

This white paper will explore the different label printing available to brands and the relative sustainability impacts of each process to help label users select the best processes and technologies for both their bottom line and the planet. We assessed several alternative label printing options available to brands. These include outsourcing to a commercial printer, printing in house using a thermal transfer process or printing in house using new colour inkjet technology:

Definitions of label printing types	
Commercially printed label	Commercially printed label defined as printed by a for profit printer on commercial printing presses (analogue and digital) and transported to point of application.
Thermal transfer printed label	Thermal transfer printed label defined as printed for use on blank base stock using one or more thermal transfer colours at point of application.
Commercial plus thermal transfer printed label	Commercial plus thermal transfer printed label defined as commercially printed base label as above with variable data applied by a thermal transfer printer at point of application.
Inhouse colour inkjet printed label	Inhouse colour inkjet printed label defined as printed for use on blank base stock using desktop colour inkjet printers at point of application.

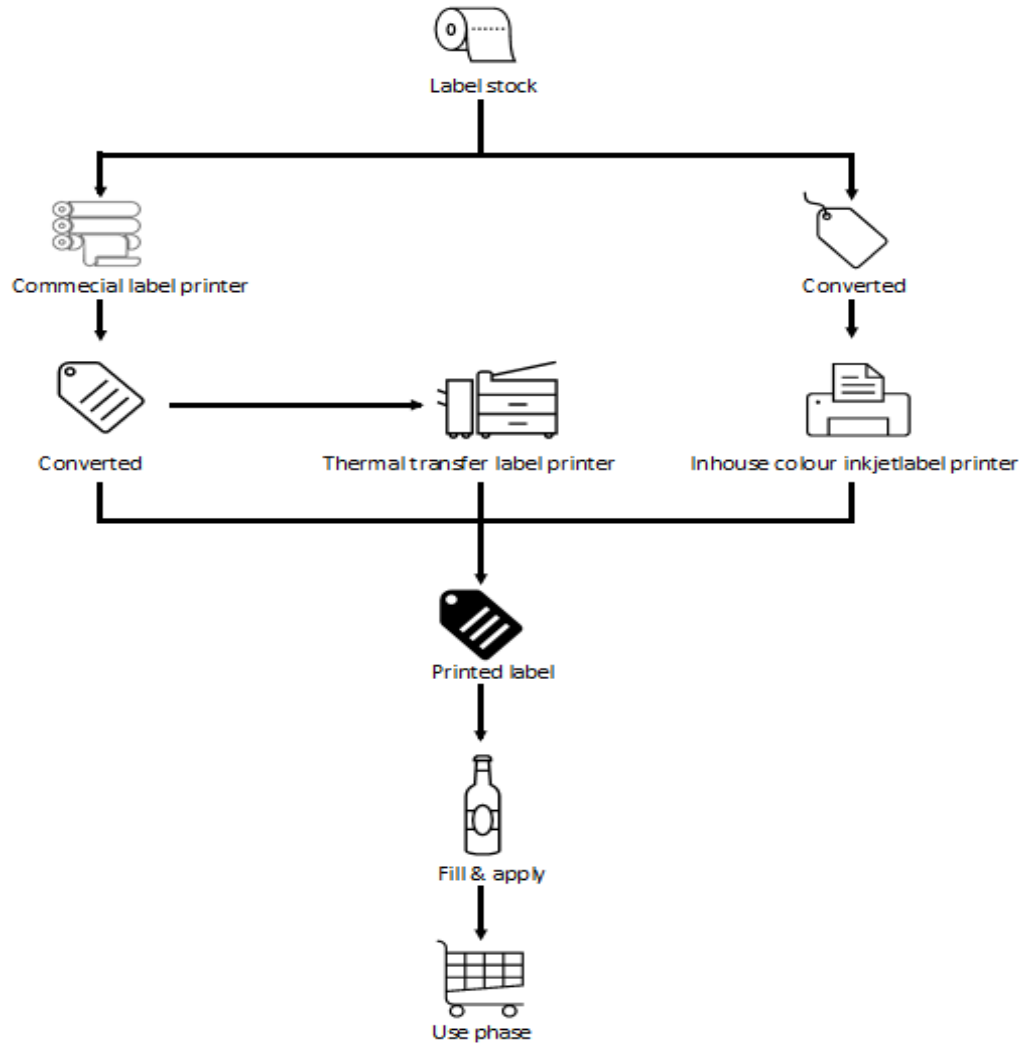*Figure E.1 Definitions of label printing types*

Figure E.1 Printing process map

While still a very small part of the label printing market, in-house inkjet label printing is particularly well suited to:

✓ Brands that have relatively low label orders p. year (Brands that have relatively low label orders per year in the range 100,000 to 1 million, with larger volumes possibly requiring multiple printers.)
✓ Brands that have requirements for high degrees of variable data and personalisation
✓ Brands that value speed of fulfilment
✓ Brands that are subject to stringent and evolving regulatory environments

In addition to achieving their business objectives, brands and their end customers are also working hard to find sustainable packaging solutions and lower their carbon footprint. While many brands prioritise packaging as a key focus area for improving sustainability, label printing can be overlooked and yet selecting the right label printing process for your business could achieve significant savings in energy and waste.

Smithers undertook research to compare and evaluate the sustainability impact of different print process options and how they can be utilised by brands to help achieve their sustainability goals. In order to assess it, we surveyed brands using a range of commercial, thermal transfer and inhouse colour inkjet printing processes and analysed the sustainability impact from label stock to application across 5 key categories: energy, waste, consumables, storage & transportation, release liner. This white paper summarises the findings of this research.

	Commercially printed label	Thermal transfer printed label	Commercial plus thermal transfer printed label	Inhouse colour inkjet printed label
Energy	🔴	🟡	🔴	🟢
Waste	🔴	🟢	🟡	🟢
Consumables	🟡	🔴	🔴	🟢
Storage & transportation	🟡	🟡	🟡	🟡
Release liner	🔴	🔴	🔴	🔴

Legend: negative 🔴   neutral 🟡   positive 🟢

Figure E.3 Sustainability impact overview of label printing types

Using inkjet to print labels inhouse could have significant commercial and operational benefits but also demonstrable environmental benefits including energy, waste, and consumables, which are indispensable for companies to meet UN sustainable development goals:

- SDG 7 Affordable and Clean Energy
  Inkjet is a far less energy intensive process and can use just 1% of that energy for the same area printed.
- SDG 8 Decent Work and Economic Growth
  Inkjet printing can provide cost efficiencies and margin improvements for label users.
- SDG 9 Industry Innovation and Infrastructure

Innovative inkjet technology can reduce waste of label materials and stock obsolescence.
- SDG12 Responsible Consumption and Production
  There are significant reduction waste materials (e.g. ribbons) during inkjet printing vs thermal transfer printing.

1. Label printing market and trends

The label printing market is undergoing significant change as brands and printers look to leverage new digital technologies to respond to growing consumer demand for personalisation and just in time delivery. As a result the digital label printing market is growing rapidly at the expense of analogue printing processes. Brands are increasingly aware of the benefits of an inhouse label printing solution for improving speed, flexibility and quality while decreasing waste, obsolence and delays.

The label market is evolving to favour quicker turn around times and shorter runs. Changes in consumer demand patterns due to the growing number of smaller households boosts the number of products needing labels, while the growth in e-commerce boosts demand for transit (and return) labels. Increasing regulatory pressure has led to growth in some regions. This has accelerated the move to shorter production runs as brands respond to personalisation and customisation trends that have placed greater emphasis on the flexibility of printer and converter operations and on the presses themselves. Therefore, label printers are introducing new production systems that allow them to print labels more efficiently and cost-effectively within a highly competitive market, while end-users are looking for shorter lead times and better customer service from their suppliers.

Global label market by print process (million sqm)

- Analogue
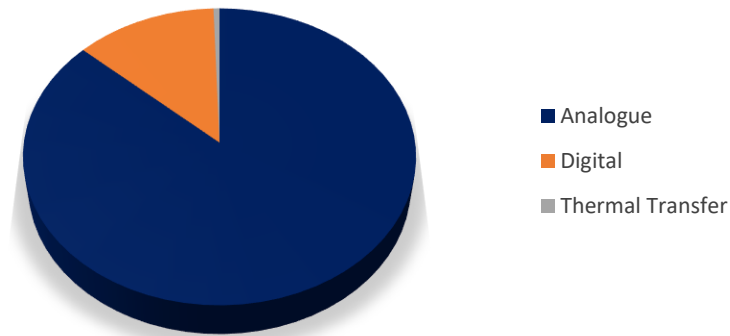- Digital
- Thermal Transfer

Figure 1.1 Global label market by print process (million sqm)

Current market and future forecast performance

The global market for label printing has been growing steadily from 2014 to 2019, at rates of 4.8% in value and of 5.2% in volume (A4 prints). In 2019 the market is worth $41.02 billion on volumes of 1.21 trillion A4 prints or equivalent, nearly a 4% increase on the 2018 value of $39.46 billion, and up 5.5% on 2018 volumes of 1.15 trillion A4 prints or equivalent. The market will continue to increase up to 2024, at an annual average rate of 4.0% in value to $49.90 billion, and by 5.5% in volume to 1.59 trillion A4 prints or equivalent.

The label industry has been relatively resilient during the Covid-19 pandemic, and although there was a general overall decline in label production throughout the crisis, many sectors including food, beverage and pharmaceutical saw some growth, particularly in the early months.

What are the key drivers and trends?
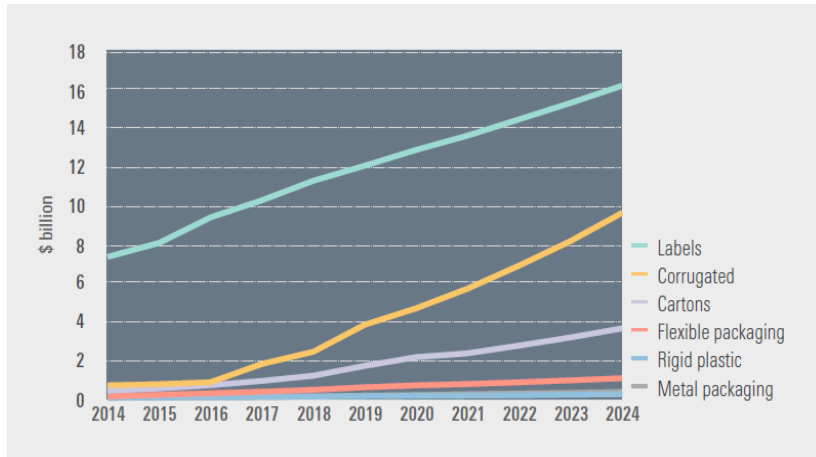
Figure 1.2 Global digital package and label printing market by application, 2014–24 ($ billion, constant 2018 prices and exchange rates)
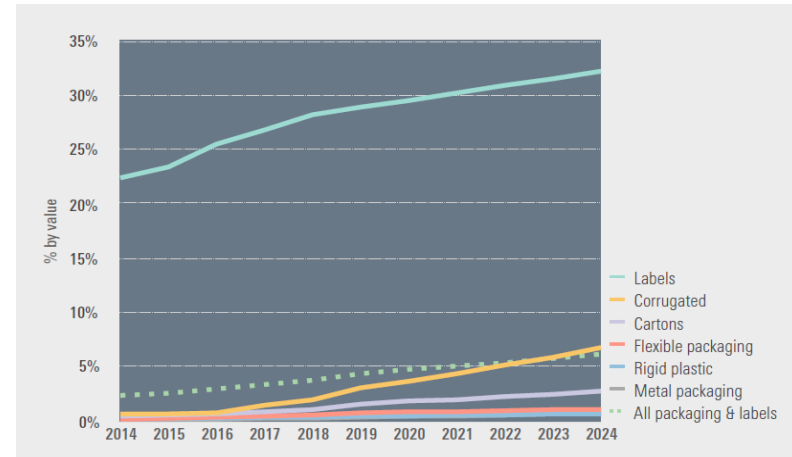

Figure 1.3 Penetration of digital print in all printed packaging and label output, 2014–24 (% by value)

Many end-use applications for printed labels are moving to shorter print runs and end-users are looking for greater levels of customisation, which is driving a growth in the use of digital printing.

Digital printing is now very much mainstream in label printing, gaining market share at the expense of analogue processes in the industry. Both label converters and brand owners are increasingly recognising its value. Initial drivers of digital print centred on cutting costs for short runs but as competition drove down costs against other processes, factors such as improved operability, faster response, versioning and variable data capabilities are now all key to rising demand. Digital developments are making it easier to respond to tightening sustainability regulations, growing counterfeit issues and shifting consumer preferences.

Although the choice of digital technology is principally determined by the aesthetic and functional requirements of the label end-product, there is no one-size-fits-all for converters. However, there are areas in which many printers/converters are seeing long term returns on investment in digital printing equipment, depending on application.

Market drivers for adoption of digital print for packaging

Digitalisation. All print industry stakeholders are responding to the opportunities and challenges of an increasingly digital age. Consumers want their packaging to be interactive and comprehensive in terms of information, which is now possible more than ever through digital tools such as QR codes, virtual/augmented reality, real time video rendering, etc. Brand owners can and want to establish a better connection with consumers through interactive packaging. Digital printing can also help brand owners differentiate (allowing real time customisation of individual products) from their competitors and deliver complete digital marketing campaigns. Lastly, further benefits can be achieved through digitalisation of print, including flexibility, agility/speed and possibility to print on-demand.

> *"On average, they'll (run lengths) probably go lower, for part of our strategy is offer more choice for both our customers"*
>
> **Food Brand**

Cost advantages for short runs. Digital printing eliminates prepress and make-ready costs, specifically applicable for shorter runs in the case of marketing campaigns that offer products with personalised packaging.

> *"We'd like to adjust them to our immediate needs. Which would imply lower order sizes, in general. And as we further widen our product range and number, that will split run numbers"*
>
> **Personal Care Brand**

Supply chain disruption. The current supply chain is under pressure as there are too many stages and players, which translates into higher costs and time. Digital print enables new models in terms of packaging features such as personalisation, numbering/coding of the pack (very useful for pharma) and versioning for variety/region/language. The new supply chain must meet the need for e-commerce as print on-demand is pressuring lead times and stock holding (for example same-day delivery). However, disruption in the supply chain will also provide industry players with opportunities to differentiate, innovate and gain market share.

Environmental benefits derived from reduced set-up waste, printing exact quantities on demand and elimination of minimum order quantities, reduced energy consumption and lower consumables waste

Industry players from paper manufacturers, print technology manufacturers, finishing equipment suppliers, converters, etc. have started communicating to facilitate the transition from analogue to digital. Some brand owners even adopt digital print for packaging capabilities in-house and are increasingly trying to solve the challenges of digital printing. This can be seen as a very positive attitude of brand owners towards digital printing.

2. On Demand Colour Inkjet

End users of labels are faced with a choice of how to balance cost, efficiency, and sustainability in their label printing. Depending on the number of labels required and the degree of variable data required brands are increasingly likely to consider bringing at least some element of label printing in house so that they can respond to requirements 'just in time' and fulfil orders quickly and accurately. There are several ways to approach this:
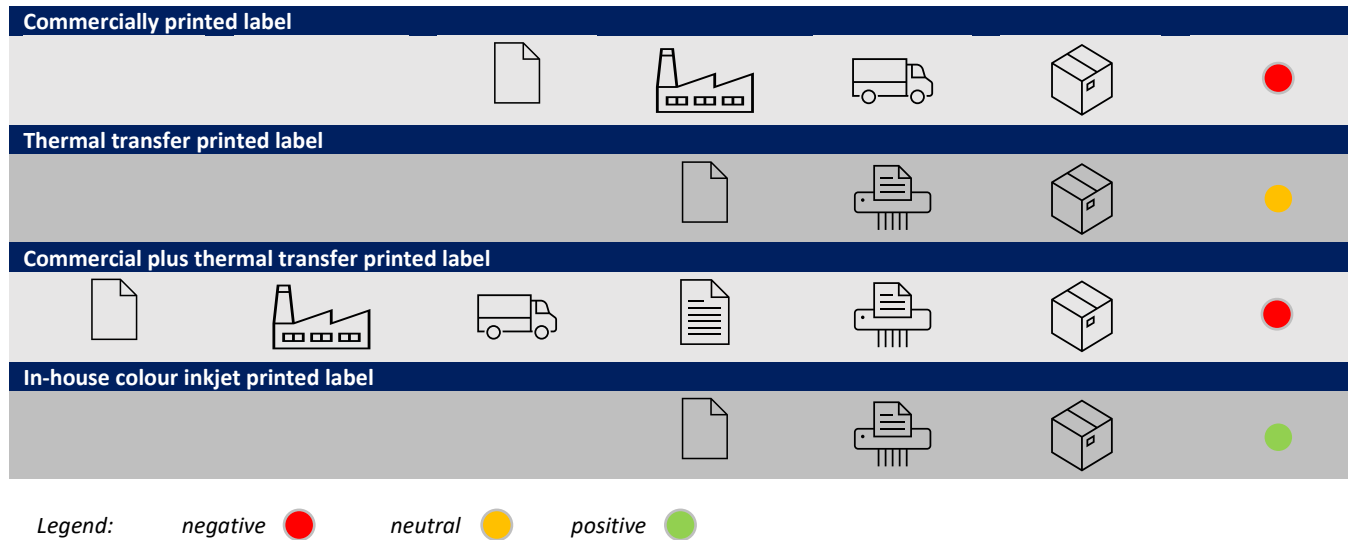
Figure 2.1 Sustainability impact of label printing types

Print-on-demand

The print-on-demand philosophy is a form of digital printing in which elements such as text, graphics and images may be changed from one printed piece to the next without stopping or slowing down the printing process and using information from a database or external file.

Print-on-demand satisfies two basic human macro trends for instant gratification and personalization: 'I want it unique, and I want it now!' This concept even goes beyond hard-copy printing as exemplified by the rapid evolution of e-books, smart devices and instant messaging. To this end,

technology has evolved to enable new processes that can assemble digitized data and print hard copy immediately. With these digital technologies comes an ability to print variable information that is no longer bound by a traditional fixed data printing plate used for multiple duplication.

On demand colour printing vs thermal transfer printing

On demand colour printing

Colour printing makes messages more memorable. On demand colour printing can easily provide high-quality, customized colour labels, tickets, and tags in-house, as and when you need them. From manufacturing and retail to pharmaceutical, healthcare and ticketing, there is on demand colour printing that can make a real difference by giving you the flexibility to print the labels.

Figure 2.2 On demand colour printer

Thermal transfer printing

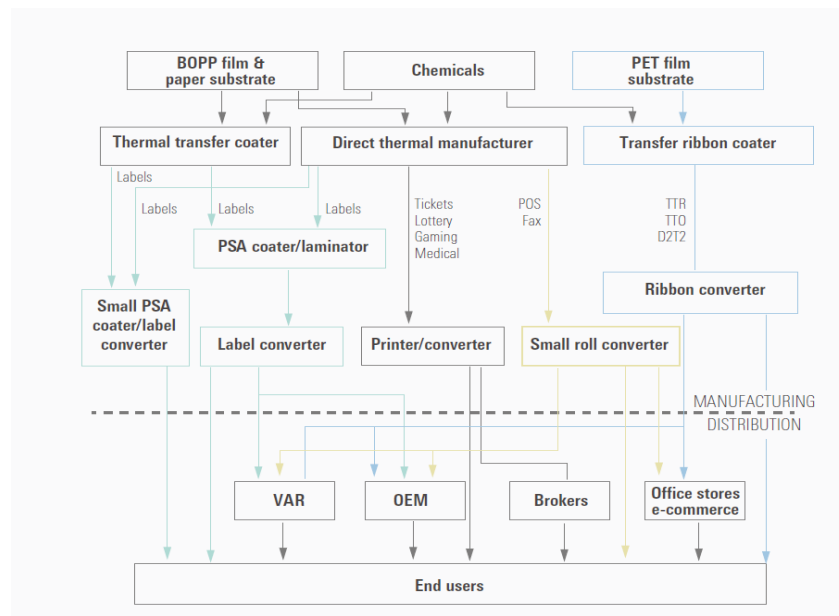*Figure 2.3 Supply chain for thermal media (TT, DT, and Ribbons)*

Since its inception in the 1960s, thermal transfer printing has become a popular form of late stage customization for label printing as it is reliable, fast and cost effective. However, thermal transfer printing can only provide a very limited colour range and generates significant additional waste as the ribbon must be disposed of after use.

What drives the adoption of on demand colour printing?

On demand colour label printers eliminate the traditional problems of thermal overprinting. No more delays, disruption, waste or inconvenience. No more pre-printed label inventory, production downtime, lost orders, or late shipments. It improved visual identification, efficiency, and flexibility.

Eliminate label waste

In a survey conducted for Epson, 'The Convergence of Sustainability and Productivity in Labels', 69% of respondents said that they only use 50% of the labels they order and the rest is disposed of. Avoiding wastage of pre-printed label stock makes economic and environmental sense. On demand colour labelling makes it possible to achieve zero waste of labels due to last-minute design changes.

Drastically reduce label inventory

Storage of label rolls takes valuable warehouse space. On demand colour labelling produces a range of high-quality labels at the same speed as some incumbent thermal monochrome printers. It can help eliminate the storage costs associated with pre-printing by producing short-run, customised labels on-demand.

Improve efficiency

On demand colour labelling eliminates wasted searching for and changing to the correct pre-printed labels. For instance, using colour labels within logistics and warehouse environments, can increase picking rates and improve efficiency.

Add flexibility

Label users can easily print high-quality, customised colour labels, tickets, and tags in-house, as and when they need them. On demand printed labels improve the flexibility and respond quickly to product and process changes.

3. Sustainability trends

The drive for environmental sustainability has had a considerable impact on industrial packaging right across all major industry verticals, from food and drink to beauty, personal care and health. This has been fuelled by the long-term, rising environmental awareness among consumers who are placing greater emphasis on product sustainability credentials such as recyclability and carbon neutrality. Today, sustainability is at the top of the agenda for product campaigns, and manufacturers, retailers, regulators, and experts are working collaboratively to decrease the use of environmentally harmful materials and to make packaging more easily recyclable.

Increasingly consumer products companies are recognising the sustainability impact of their packaging and focusing on finding ways to reduce the environmental impact of their product packaging. However, surveys with the market show that many companies have yet to consider the potential sustainability impact of change to their label printing process and evidence is growing that this impact could be significant. According to the interviews, sustainability is the least considered criteria when deciding how to print labels. These companies pay more attention to factors that can be directly assessed such as cost, speed, reliability, and quality. This is not because sustainability isnt important to them, rather this is because label printing is seen as having low sustainability impact overall.

Ranking of criteria by interviewees
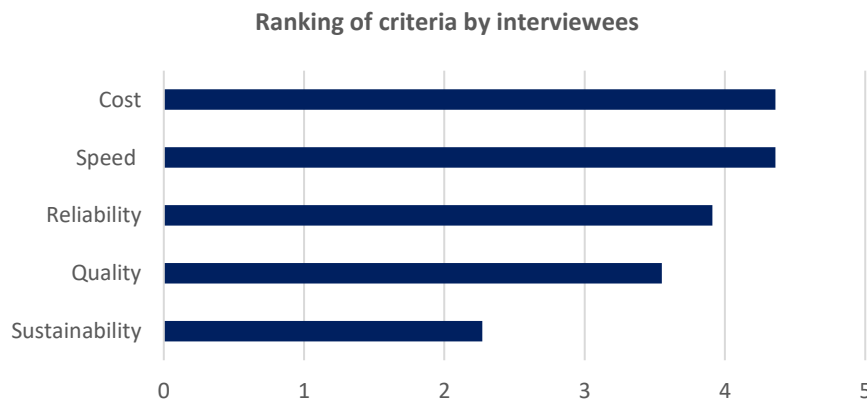
Note: average ranking 1-5 with 1 being least important 5 being most important.

Figure 3.1 Ranking of criteria by interviewees

Sustainability was no consideration because labelling is just a minor part of the entire package (5% vs 95%). We put more emphasis on making our packaging material sustainable, rather than putting focus on sustainability in label production.

Owner, Director,

Spanish Food Brand

Proportion of printer used by interviewees

- Commercial label printer
- Commercial plus thermal transfer label printer
- Thermal transfer label printer
- Inhouse colour inkjet label printer
- Inhouse laser printer
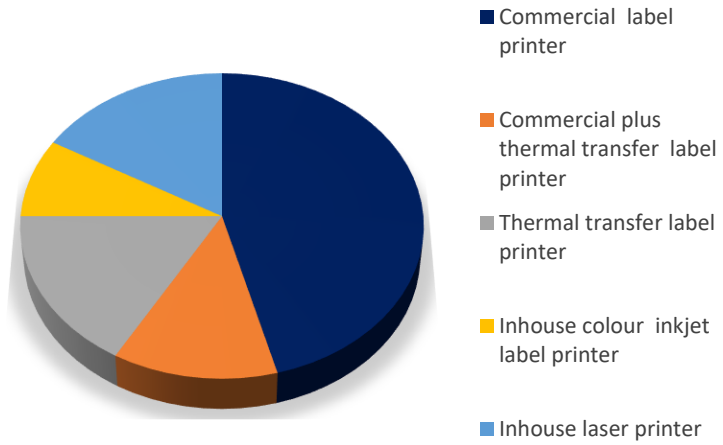
Figure 3.2 Proportion of printer used by interviewees

Ranking of printer in term of sustainability
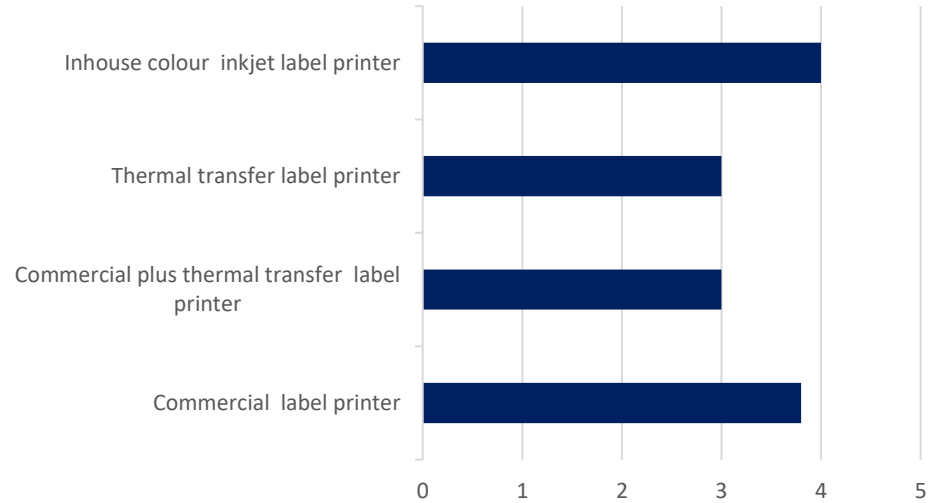
Note: average ranking 1-5 with 1 being lowest impact 5 being highest impact.

Figure 3.3 Ranking of printer in terms of sustainability by interviewees

However, research by Smithers has shown that changing label printing types can create significant sustainability benefits in 3 key areas: energy saving, waste reduction and consumables reduction. The usage saving are shown below. The data are estimated based on Smithers's survey and analysis.

Figure 3.4 Energy use (p. 1000 sqm of labels)

Figure 3.5 Obsolescence scrap (p. 1000 sqm of labels)

Figure 3.6 Ink use (p. 1000 sqm of labels)

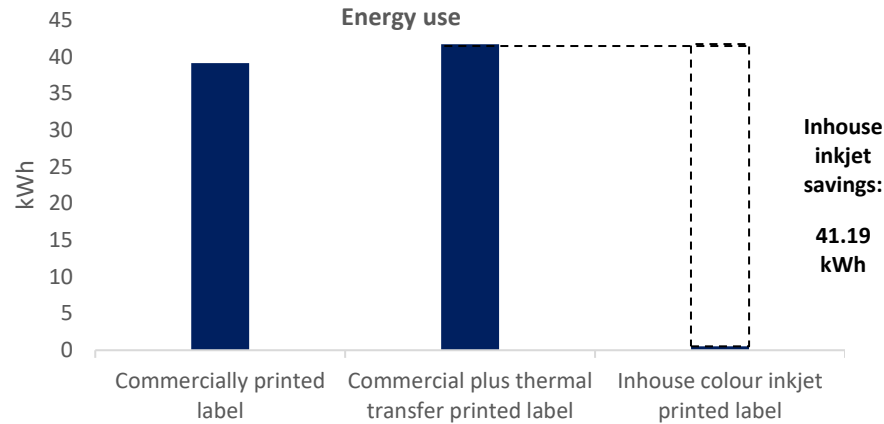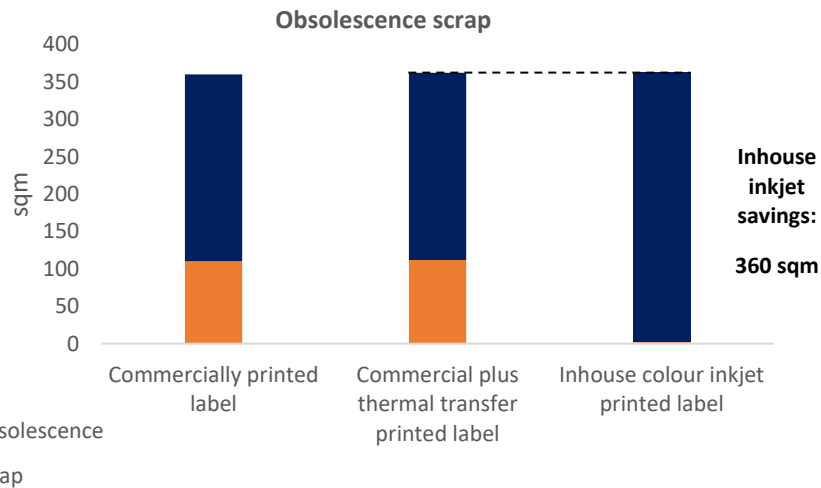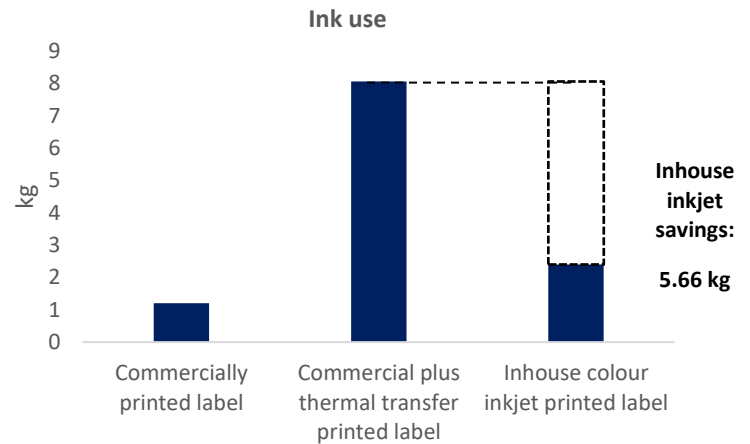| Issue	Impact	Assumptions	Commercially printed label	Thermal transfer printed label	Commercial plus thermal transfer printed label	In-house colour inkjet printed label
Energy	High	Inkjet is a significantly less energy intensive process versus commercial printing (especially UV flexo) and marginally less energy intensive than thermal transfer	🔴	🟢	🔴	🟢
Waste	High	Commercial print has scrap rates of up to 11% in set up, make ready and print errors. Up to 25% of labels ordered from commercial print can be rendered obsolete by regulatory, product and market changes	🔴	🟡	🟡	🟢
Ink /consumables	High	Thermal Transfer ribbon usage generates significant waste that cannot currently be recycled	🟢	🔴	🔴	🟢
Storage & Transportation	Low	While inkjet can create some advantage in cost & efficiency for the user in eliminating storage & transportation, both steps remain necessary elsewhere in the supply chain	🟡	🟡	🟡	🟡
Release Liner	Medium	Liners account for the majority of the 60% of waste material generated across the label industry during manufacturing and converting. Much of this waste is produced during product labelling and one of the industry's key challenges is to manage this waste as effectively as possible, particularly as release liners have traditionally been unrecyclable because of their silicone coatings	🔴	🔴	🔴	🔴

Legend: negative 🔴   neutral 🟡   positive 🟢

Figure 3.7 Sustainability impact in 5 key areas

Energy

Commercial print processes are relatively energy intensive with a traditional flexo label printer using around 39 kWh p. 1000 square meters of labels printed. If that label has variable data printed using thermal transfer the combined energy use is 41 kWh p. 1000 square meters. Inkjet is a far less energy intensive process and can use just 1% of that energy for the same square meters. If the total addressable market for on demand labels made the switch this could save enough energy for: over 9 million miles in an electric vehicle or lighting 95,960 homes for a year.

Figure 3.8 Energy saving conversion diagram based on total market switching to inkjet

p. 1000 sqm of labels	Commercially printed label	Thermal transfer printed label	Commercial plus thermal transfer printed label	Inhouse colour inkjet printed label	In-house colour inkjet savings	In-house colour inkjet savings for total market (kWh)
Energy use (kWh)	39.14	2.59	41.72	0.53	41.19	28,698,407
Sustainability impact	🔴	🟢	🔴	🟢	-	-

Legend: negative 🔴   neutral 🟡   positive 🟢

Figure 3.9 Energy use description table

Waste

According to interviews with industry representatives and analysis based on interviews with end users, Smithers estimates that up to 11% of label materials are wasted from label stock to final application. This can be as a result of start up and make ready or simply the result of print errors. Both of these can be eliminated by switching to on demand colour inkjet.

Furthermore, stock obsolescence is a major driver of waste labels. Due to product changes, inventory management issues, regulatory requirements and other considerations brands can be a position of having to dispose of up to half of all their good labels each year. Our survey showed that label specifiers are getting better at reducing waste and optimising their process to utilise more of the label stock. However, the problem has not been eliminated and in highly regulatory areas like chemical distribution label obsolescence is a necessary outcome of frequent legislative changes beyond the user's control.

Switching to full colour on demand inkjet label printing eliminates this issue as labels can be printed as they are needed, and users can respond to changes in product, market and regulatory conditions instantaneously. This could save amount of label materials from being wasted, which would save the user money and eliminate labels from going into the waste stream.

> *"With the higher waste ratios we generally see with digital, it's a factor, yes. And runs don't always come out as they're supposed to, with the right mix of versions, say, which is another factor with it"*
>
> **Commercial Label Printer**

Waste label materials in commercial printed label → **180 million** sqm
label materials saving per year by using inkjet: → **25,264** football pitches
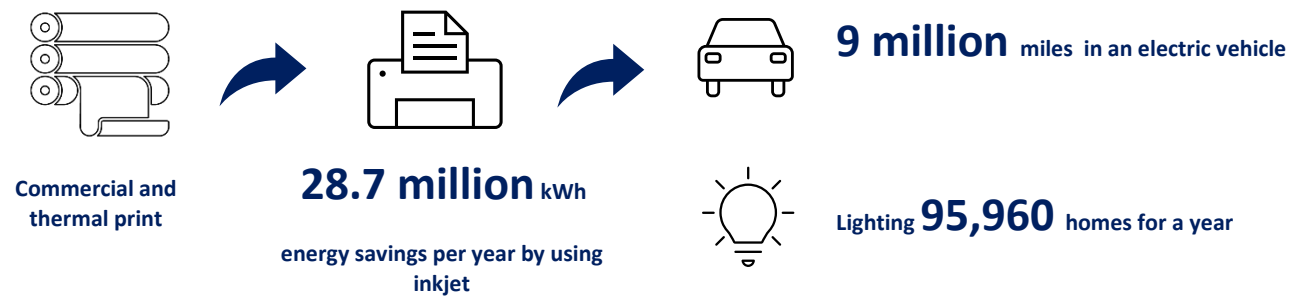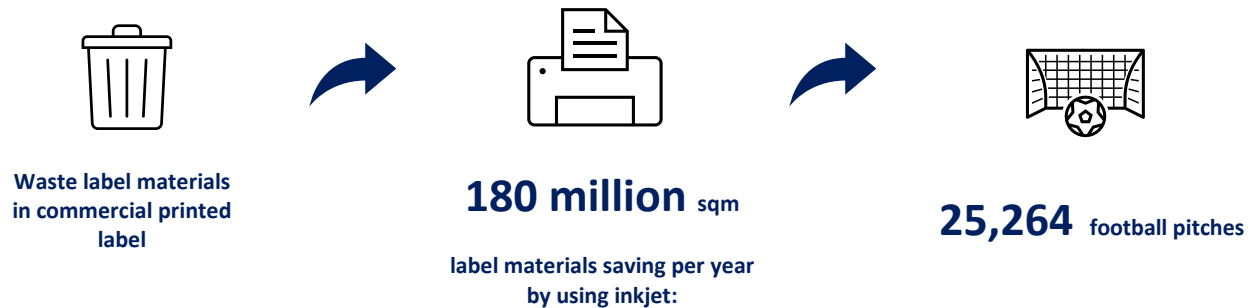
Figure 3.10 Label materials saving conversion diagram based on total market switching to inkjet

p. 1000 sqm of labels	Commercially printed label	Thermal transfer printed label	Commercial plus thermal transfer printed label	In-house colour inkjet printed label	In-house colour inkjet savings for total market (sqm) vs commercial	In-house colour inkjet savings for total market (sqm)
Scrap	11%	0.2%	11.2%	0.2%	10.8%	33,572,646
Obsolescence	25 %	>1%	10%	>1%	25%	146,815,105
Total	-	-	-	-	-	180,387,751
Sustainability impact	🔴	🟢	🟡	🟢	-	-

Legend: negative 🔴 neutral 🟡 positive 🟢

Figure 3.11 Waste description table

Ink and Consumables

" Thermal transfer ribbons can be disposed of in a landfill like most other trash, but with 85% of label industry waste being sent to landfills each year, DNP recommends recycling instead.
Organizations like Convergen Energy and Pellet America convert non-recyclables like substrates and TTR into fuel pellets that can be used as alternative energy. Many paper, printing, converting, and label companies and DNP partners utilize these services. "

DNP

One of the key sustainability challenges in thermal transfer printing is ribbon usage. For every square meter of label printed, an equivalent square meter of ribbon is also used regardless of the ink coverage. This can only be used once and cannot easily recycled. DNP, one to the world's largest manufacturers of thermal transfer ribbons, recommends energy recovery by burning as an alternative to landfill. If the thermal transfer process is used to generate 2 or more colours then 2 more ribbons will need to be used further adding to the amount of ribbon used.

The disposal of the ribbon is not often considered as part of brands overall sustainability footprint. However, if all current thermal transfer printing for labels were to switch to inkjet the savings could be significant.

109 million sqm of ribbons saving per year by using inkjet

15,333 football pitches

619 tonnes of ink saving per year by using inkjet

41 buses
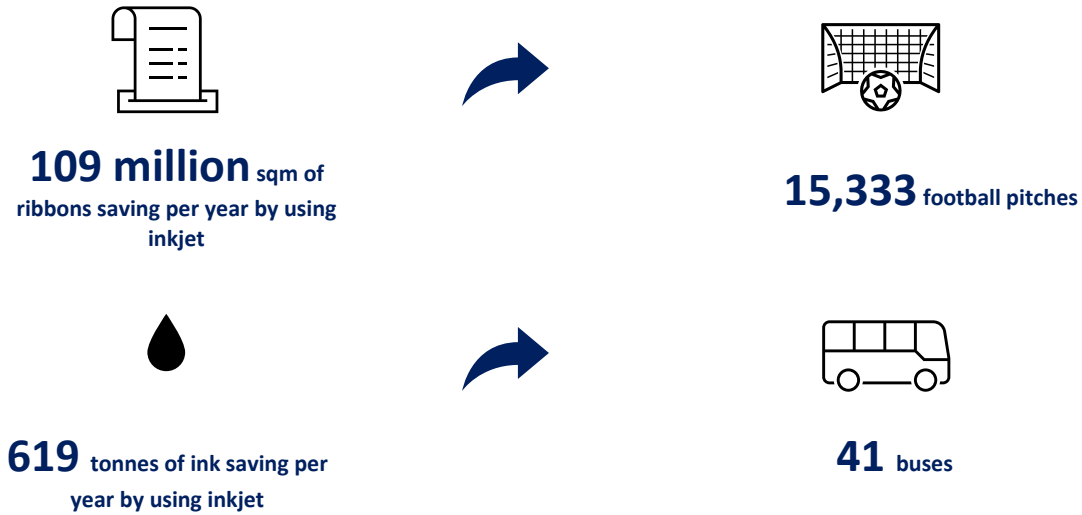
Figure 3.12 Ribbon and ink saving conversion diagram based on total market switching to inkjet

p. 1000 sqm of labels	Commercially printed label	Thermal transfer printed label	Commercial plus thermal transfer printed label	In-house colour inkjet printed label	In-house colour inkjet savings	In-house colour inkjet savings for total market
Ink and ribbon use (kg)	1.2	6.9	8.06	2.4	5.66	619,628.5
Ribbon use (sqm)	-	1000	1000	-	1000	109,475,000
Sustainability impact	🟢	🔴	🔴	🟢	-	-

Legend: negative 🔴   neutral 🟡   positive 🟢

Figure 3.13 Consumables description table

In most regions, inkjet cartridges can be collected from users through existing collection program so that they can be recycled and reused.
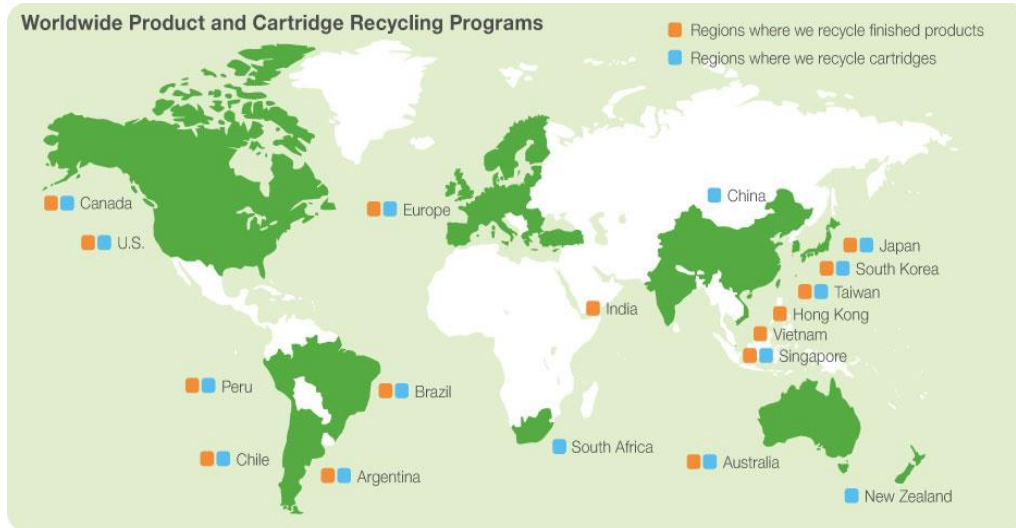
Figure 3.14 Worldwide product and cartridge recycling programs (source Epson)

"Epson has had active recycling programs for many years; our corporate, manufacturing, distribution, and repair sites maintain ISO 14001 Environmental certifications. The goal of this program is to be a good community partner, providing products and services in an environmentally friendly manner.   We strive to close the loop so that products can be reused as much as possible and not be sent to landfills…"

Kevin Carmichael,

Manager, Environmental & Quality Systems

Figure 3.15 Cartridges collected (cumulative through fiscal year)

Storage & Transportation

For some label users, storage and transportation are further challenges to manage that create costs and inefficiencies. For example storing large inventories of labels across a wide range of SKU's requires valuable warehousing space and creates additional complexities to manage. Indeed there are examples of users who are printing labels that couldn't be found in the warehouse, only for them to turn up on the next stock check, no longer usable.

Similarly, shipping large order volumes of labels can be time consuming and inefficient, slowing down production and dispatches to customers while labels are sourced and delivered. On demand labels can be an effective way of eliminating this issue and improving speed and responsiveness.
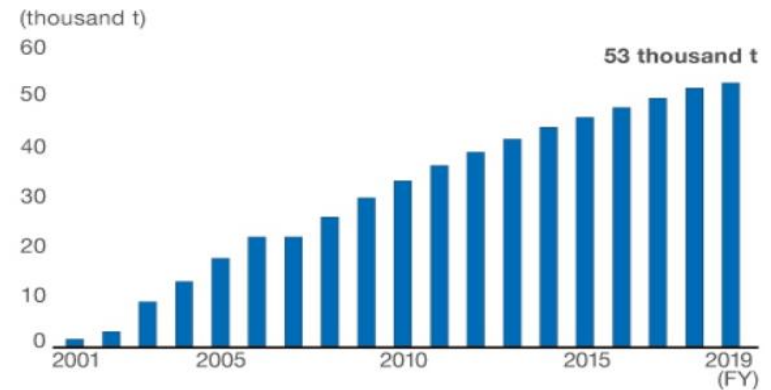
However, for the purpose of this white paper our evaluation was that while there are real cost and efficiency benefits in storage and transportation for on demand labels, there is no clear sustainability differentiator. If we consider the value chain from label stock to label application, the same label may be stored and transported in different ways and at different times and different points in the supply chain depending on the configuration in question but the savings in warehouse square footage or miles travelled are not materially different, they only alter where in the supply chain they take place and who's carbon footprint is directly affected.

> "We have one entire house, our "Label-house" where all labels are stored. The house is roughly 30x30m and one person is full-time responsible for managing it. The house is always kept cold without heater, if it gets too hot then the label glue starts liquifying. This is more applicable for long-term stored labels. "
>
> **Procurement Manager**
>
> *Specialty chemical company*
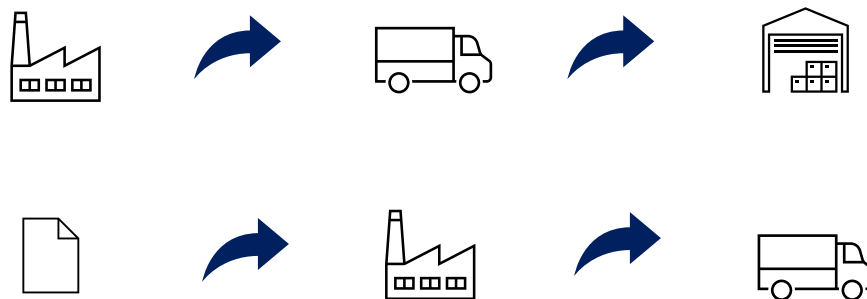
Figure 3.16 Storage and transportation process

The same label may be stored and transported in different ways and at different times and different points in the supply chain depending on the configuration in question but the savings in warehouse square footage or miles travelled are not materially different, they only alter where in the supply chain they take place and who's carbon footprint is directly effected. **The key advantage of on demand labels is the flexibility not the transportation saving.**

Release liner

Release liner is used as carrier for labels on industrial and consumer goods, and fulfils a crucial role in the manufacture, conversion and application of self-adhesive products. Liners account for the majority of the 60% of waste material generated across the label industry during manufacturing and converting. Much of this waste is produced during product labelling and one of the industry's key challenges is to manage this waste as effectively as possible, particularly as release liners have traditionally been unrecyclable because of their silicone coatings. To remedy this, several innovative solutions that reduce the environmental footprint of liners in label printing have emerged.

> "Liner waste is currently an inevitable by-product of the labelling process, but it does not have to be managed using unsustainable practices that generate large volumes of landfill, or waste that goes to incineration. The options to source and recycle responsibly do exist and are becoming more widespread as brands seek more sustainable offerings. "
>
> **Avery Dennison**

The sustainability of liners depends on three main factors: sourcing responsibly, reducing the amount of material used, and establishing recycling that performs properly under real world circumstances - and so avoids waste going to landfill.

Sourcing responsibly: liner materials should be derived from the supply chain where every stage is certified. Paper certification includes the well-known Forest Stewardship Council® (FSC®) and PEFC schemes. Other options, such as label facestocks made from grape or sugar cane waste can also form part of a responsible sourcing mix.

Reducing material consumption: glassine liner use can be reduced to a certain extent. However, the liner is critical to the application and conversion process. There is a finely tuned existing market where all conversion and application machines are set to existing standards. Another way to reduce liner material usage is to move from glassine paper to PET. Due to their lower thickness and weight, PET liners enable longer label reels, with more labels on a roll. Such reels allow reduction of CO2 emissions in transport and enable longer converting and application runs that further reduce startup and changeover waste, both at the converter and brand owner sites.

Recycling: releases liner cycling offers the potential for the reduction of costs associated with the management of secondary release liner materials, compared to alternative disposal methods. It also provides a potential answer to present and/or prospective legal or market requirements in the context of government or corporate environmental sustainability programmers. There are already recycling solutions for PET liner and glassine liner.

4.0 Case studies

Case study 1 – food and beverage

A C7500G label printer from Epson gives Danish wholesaler Greens Engros the opportunity to create customised labels within minutes, saving resources and giving greater flexibility for product design.

Greens Engros is a Danish catering business and turnkey supplier of food products to industrial kitchens and restaurants throughout the country. Greens Engros sends packets and products filled with chopped vegetables, meat products and, of course, freshly squeezed juice to its many customers every day. Its product labels used to be preordered from an external supplier, but when a change in the law led to a new form of product declaration, the production process had to be rethought. They had to throw away their old labels, which was a waste of money and resources. For this reason, Green Engros purchased their own label printer from Epson which prints the exact number of labels they need. Having the printer means that Greens Engros no longer has to keep a stock of labels.

Figure 4.1 Colorworks C7500G

"It gives us a fantastic degree of flexibility. We can design a graphic and print it onto a label within five minutes. It's so easy to use – we can create a personalised birthday graphic on the morning of an employee's birthday, print off a label and stick it on their juice when we all have breakfast together"

Karim Sekkal

Brand Manager

Investment in on demand colour label printer has given the business more than just the means to avoid writing off unusable labels, it also opened up new business opportunities. Greens Engros's customers can order unique labels, such as when Lars Løkke's running club ordered specially labelled juices with the club logo on, with the exact number they needed, to the benefit of Greens Engros and the customer. This is also helpful at Christmas, for example, when special festive labels are printed for juice bottles, or for trade fairs and conferences, when companies can order special products for their stands.

Case study 2 – pharmaceutical

> *"We are glad that we decided on Epson."*
>
> **Patrick Eisermann**
>
> *Managing Director*

Natural GmbH (Roots) is a start-up whose goal is to provide customers a wide range of spices from environment friendly cultivation.

Most of the products are sold online, Roots has developed a detailed, eye-catching logo that is applied to every label on the high-quality containers. In addition to the regulated information, it can be designed individually. Patrick Eisermann, managing director of the company says: "The label and the packaging are advertising signs for our goods to the customer. And we have a premium claim to the quality of our products, which is also applies to the labels."

The labels used to be produced by an outsource print service provider. While the quality was reasonable, there were also noticeable drawbacks. Their herb products are hand-picked products in different weights, which must be recorded in labels. They always had to order a certain minimum quantity of labels otherwise the order would not make sense for the print service provider. However, it caused a lot of label waste. Also, the transport routes from the print shop to the roots generated unnecessary CO2. In addition to the quality of the labels and a high degree of flexibility in their production, a good durability of the labels is also important. some roots spices stay in the kitchens for months and are exposed to the humid, fatty atmosphere all the time.

Epson Colorworks C6000 offered Roots a perfect solution. "We were really surprised when we first saw the on-demand labels," said Eisermann. "The print quality is extremely high, which is so important to our design."

Figure 4.2 The labels are durable even in a damp, oily kitchen atmosphere.

Figure 4.3 The Epson Colorworks C6000 for root, more flexible and cheaper solution

In addition to the high quality and durability, Roots also got benefit from the flexibility. There is no longer any costly and environmentally harmful overproduction. Thanks to the Epson Colorworks printer, even last-minute changes to the text or the information on a herb are immediately considered. Eisermann explained: "we have already generated some additional orders as a result which would not have been possible at all with an external service provider. " The most important is that Epson Colorworks C6000 is not only more flexible for Roots, but also more affordable. "We are very happy that we have chosen this solution," concluded Eisermann.

Case study 3 – chemicals

Bristol-based Ureka Global Ltd provide adhesives, sealants and bonding solutions and services to manufacturing, construction and other businesses in the creation of components, structures, safe environments, and innovative products.

"Our game is adhesives and we like to primarily focus on offering our own labels", says Alex Nunn, Managing Director, Ureka. "Whether we're buying unlabelled products or decanting them from larger volumes, the labelling of our own brand is really important to us. The capability to do our own in-house label printing, and not be governed by manufacturer's stipulations is a key added value for us. We're also pushing contract packaging, so the ability to private label for customers is also another USP, and when dealing with low numbers of labels it's important that the quality of the label is just right."

Ureka's in-house label printer was providing them with a series of issues that they were keen to remedy. "The media wasn't right, the ink was expensive and it wasn't drying properly, but the biggest issue was the lack of support from the company we were dealing with", continued Nunn.

Ureka met with label solutions specialist, AM labels, at the PPMA trade show, who took them to the Epson stand to see the latest line-up of 8-inch label printers, including the Colorworks CW6500. AM labels followed up with a demo of the printers at Ureka's offices.

Nunn Continued: "We needed an 8-inch colour label printer that provided good quality labels. It became clear when AM labels provided the Epson demo, that we'd been mis-recommended our original printer that we had purchased. We tried different types of label stock on the Epson Colorworks CW6500 printer, including polypropylene labels, which we went for in the end, and the quality of printed label was significantly better when compared with the incumbent printer. Not to mention, the ink dried properly and didn't come off in your hands.

Figure 4.4 Colorworks CWCW-6500

 "This all happened a week or two before the lockdown, which helped us meet our revenue targets as we could develop and add labels in-house to the PPE (personal protective equipment) and hand sanitiser that, through sheer demand, we began selling over the period. Having the Colorworks label printer, ready in-house, gave us the flexibility to develop labels for our own branded products, as well provide short-run label requests for our customers.

"The Colorworks has been running pretty much full-time since we got it. We use it so much that we are considering buying a second one!"

Alex Nunn

Managing Director

"We've been really pleased with the Epson Colorworks label printer so far. The ink cartridges are significantly larger than on the incumbent label printers, meaning the cost of the ink is significantly less, and it performs well with the BarTender label software we're using, so the changeover to the new Colorworks printer was easy. It performs quickly and we've had no issues, and the label stock changing and the way it feeds into the head is very intuitive and hassle-free. The Colorworks has been running pretty much full-time since we got it. We use it so much that we are considering buying a second one!

Case study 4 – retail

AKI is a DIY distribution company in Portugal and Spain. They offer products and solutions for DIY, repair, maintenance and improvement of houses and gardens. Anyone who has visited an AKI store will have seen the vast amount of information that the stores provide in their signage, not only on the shelf, but also to provide training and information, which is highly valued by customers.

This labelling was previously generated by a central service, that printed large volumes of labels to meet the requirements of the 57 stores. But that 'centralised service' required multiple stages and dedicated staff: printing in large formats, cutting to size, checking each label manually, then stuffing into envelopes and dispatching.

After detecting some inefficiencies in current processes for printing in AKI stores throughout Spain, the Visual Merchandising department of the DIY and home improvement brand went to work on a project to give the stores more autonomy. The aim was to increase efficiency, reduce costs and allow stores to be self-sufficient to meet ongoing and regularly changing needs for in-store signage.

Their first aim with the printing system was to reduce the manual work of cutting and adapting materials. Epson's Colorworks high-speed roll label printer was the obvious choice. With automatic cutting, it offered exactly what AKI was looking for. As the shelf labels were all one size, the difference was simply a choice of two widths. Colorworks made it possible for printing of the labels to be automated and for each store to have full control of the process. Now, an AKI employee simply goes to the Colorworks printer, selects the type of label they need from those offered by central services, prints it and places it in the right location immediately.

> *"The advantage for the store is that it has full control of the process, without relying on central services. Now, when a member of staff has a specific need, they go to the printer, print a label and stick it on."*
>
> **Juan José García Grande**
>
> *Head of Visual Merchandising*

For AKI Spain, the use of Epson's Colorworks in each of its stores has brought multiple advantages. The reduction in cost is substantial, and the process more efficient, drastically reducing the amount of waste generated from unused labels. The stores print only what they need, when they need it. Also, with a sticky label containing the information of the employee who assisted them with their purchase, the customer can easily contact their sales person.

Figure 4.5 Create merchandising materials and signage with Colorworks

Case study 5 – warehouse

Renault-Boom is the European distribution centre for the Benelux region. The warehouse measures 17,000 m2 and there is more than 33,000 different products in stock. Their supplies come form France and they deliver to 330 delivery points every day.

Renault have developed a solution to meet the challenges they faced. They have delivered a new print solution with full colour, high speed and high-definition printing. The labels are of top quality and the layout is easily adaptable using the software that they have created.

Quality is extremely important, by adding icons and a barcode to their delivery notes they were able to increase this overall quality. Renault wanted to optimise and modernize their system and decided to work with Epson. The operator will print the delivery notes by firstly creating a database. The software then analyses this database and, depending on the fields, they can choose to print certain logos or colours in such a way to catch the eye, meaning there are far fewer errors. Colorworks C7500 makes it possible. After printing, all labels are scanned to ensure that everything is printed correctly, which gives them the creativity and the flexibility to grow further.

The printer has been integrated as part of an overall labelling solution to help the company better manage the distribution of over 33,000 products at the warehouse. Working with Epson's Colorworks was another positive experience and they are already looking forward to the next project!

"We are already looking forward to the next project!"

Benny Moons

Coordinator & APW Pilot, CDE P&A

Case study 6 – hospitality

For over 10 years, events specialist key4events has offered a comprehensive range of services to event managers within the scientific sector. Events include seminars, conferences, trade fairs, and more. As one of the many services offered during the event life cycle, key4events works to make the arrival of attendees at seminars, trade fairs and conferences smoother and quicker.

Until now, the solution used for producing visitor passes involved large laser printers hooked up to computers, and required a lot of space, restricting the design of reception areas. Furthermore, the cost of transporting this equipment and buying consumables was high.

Figure 4.6 Trade fair entrance with several Colorworks C3500 terminals

Key4events organise an average of 150 conferences per year all over Europe, they needed a universal solution that would be easy to transport and simple to use for printing visitor passes, forms and labels of different sizes on glossy coated paper. Compact, light, fast and user-friendly, Epson's Colorworks C3500 was the ideal solution for printing visitor passes in real time, independently and at a low cost. An interactive terminal incorporates the Colorworks C3500 printer and a tablet. Data is centralised so that it can be used on demand for looking up the attendee's record, updating it in real time, reprinting visitor passes, and so on. The Colorworks C3500 inkjet printer is a reliable product with highly resistant pigment inks that dry fast to prevent any risk of dripping during real-time use, meaning that passes can be kept for a very long time.

Furthermore, unlike with laser printers, 'just-in-time' printing is very useful for preventing long queues from developing at the entrance to a conference. The

average number of visitor passes printed at a single conference can be up to 1000. In terms of investment, the use of separate pigment ink cartridges, which can be changed as they run out, reduces the cost of printing thanks to a low cost per label. This is a winning formula compared to the previous laser solution.

"We wanted to acquire a selfprinting solution for creating visitor passes and documents at science conferences. With 150 conferences per year all over Europe, we needed an intuitive solution that would be easy to transport and reliable."

Bruno Ricciardi

Founder and chairman

5.0 Conclusions

Labels are a business critical consideration for brands in a wide range of sectors. Selecting the right label printing process can provide significant commercial advantages in terms of speed to market, flexibility, and quality all of which can positively improve the customer experience and drive sales. As a result, more and more brands are switching to inhouse inkjet label printing solutions

While brands are aware of the growing need to consider sustainability in their wider packaging choices, many have yet to assess the impact of their label printing. Our research shows that selecting the right label printing process can make a significant contribution to a brands sustainability goals as well as achieving the business objectives above.

Selecting the right label process can significantly reduce the overall energy consumption, minimize waste through reduced scrap and obsolescence and reduce consumable use, in particular ribbon from thermal transfer but also ink. Optimising supply chains and future innovations in release liners as well as the growing adoption of recycling of ink cartridges can further enhance the sustainability benefits of switching to inhouse inkjet.
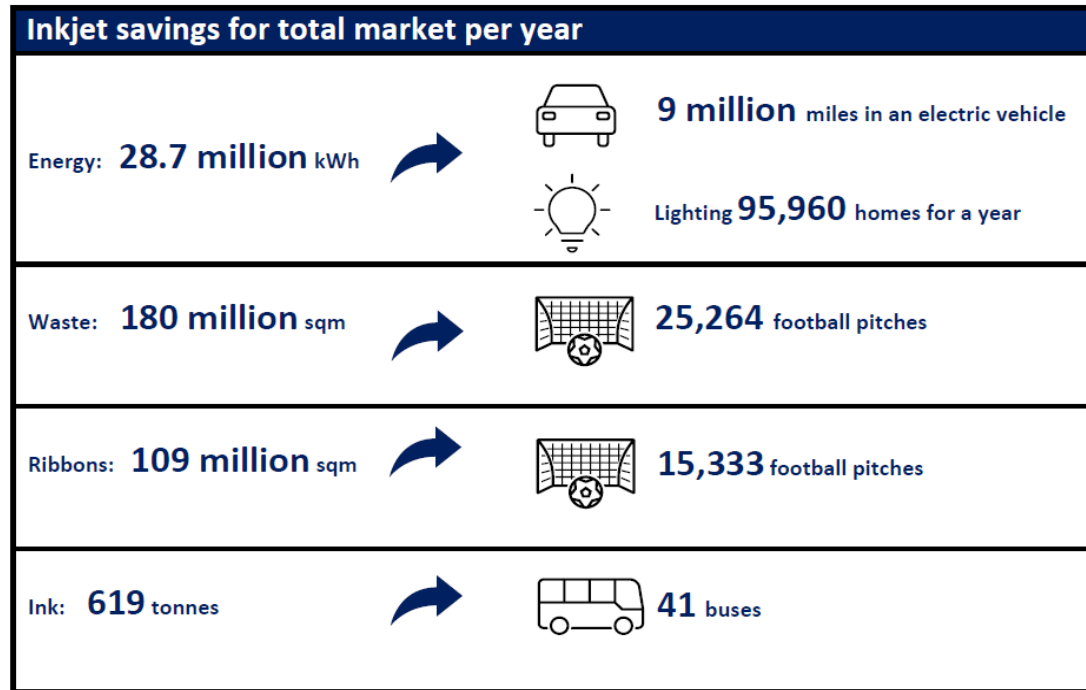

Inkjet savings for total market per year

Energy:	28.7 million kWh	→	9 million miles in an electric vehicle
			Lighting 95,960 homes for a year
Waste:	180 million sqm	→	25,264 football pitches
Ribbons:	109 million sqm	→	15,333 football pitches
Ink:	619 tonnes	→	41 buses

Figure 5.1 Inkjet print resources saving overview

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