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# Digital Inkjet Press VariJET106

The best of two worlds!
Technology contribution to sustainability
Extended Gamut Printing – successful path

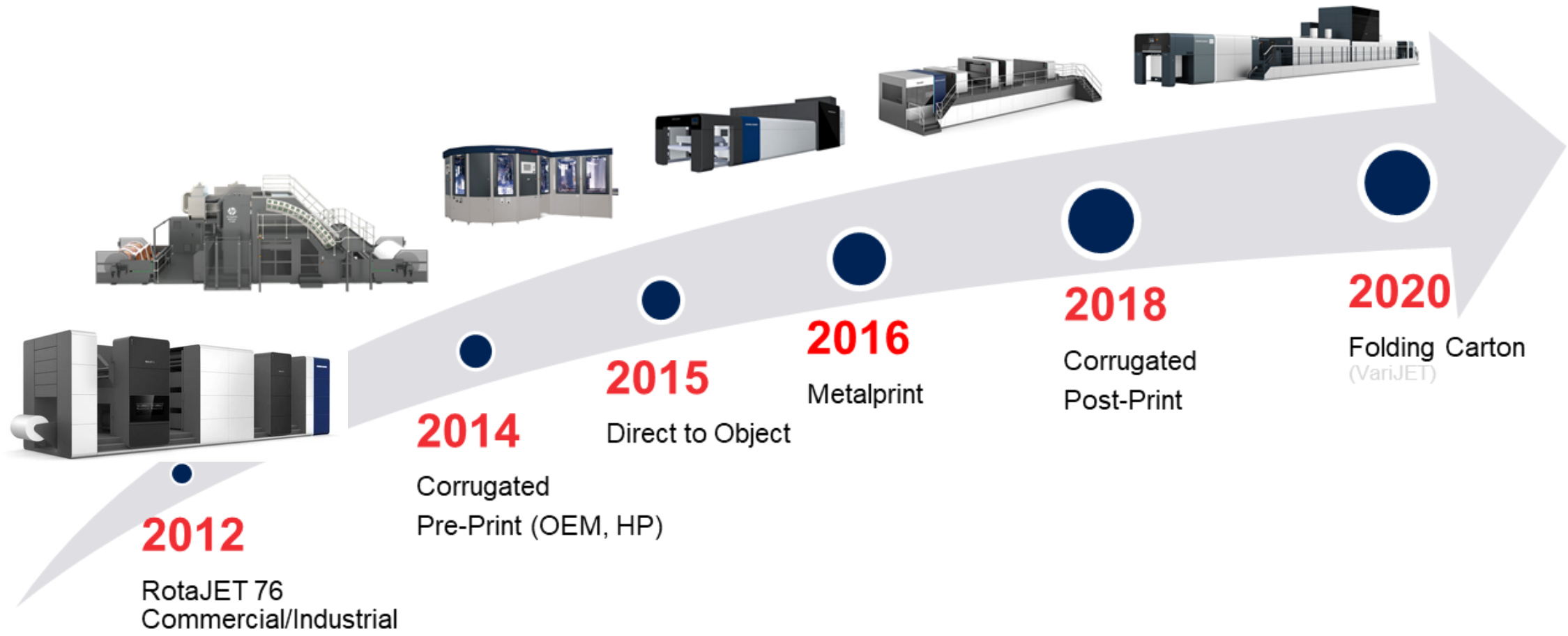
Maik Laubin,

Director Digital Printing Solutions, Koenig & Bauer Sheetfed

we're on it.

# Industrial Digital Printing

## Road to future success



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# VariJET technical information (1)

The machine

# VariJET 106

## Digital printing system with water-based inkjet technology

**Fuji Dimatix Samba printheads**
with variable droplet size for consistent ink application with a resolution of 1,200 x 1,200 dpi

**Digital inkjet printing unit**
For printing an extended colour gamut with up to 7 colours for a wide range of spot colours

**Coating unit with chamber blade system** for efficient inline finishing with UV or water-based coatings and minimum makeready times

**Pre-treatment flexo unit**
For the application of a primer for optimum ink acceptance on the board and for highest print quality

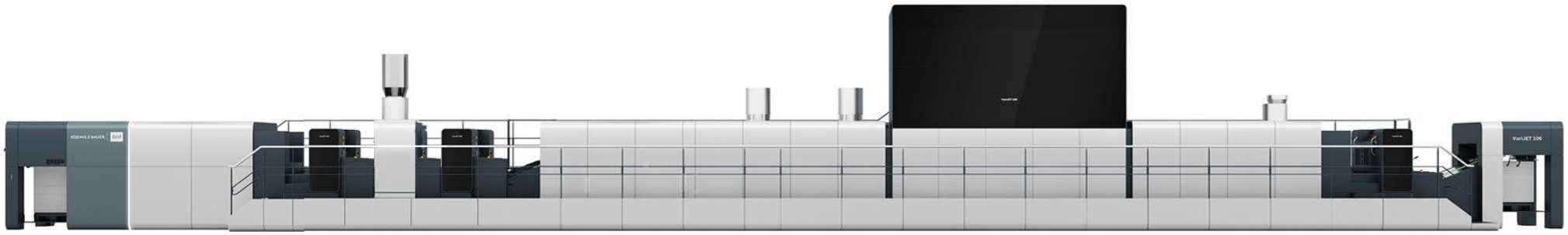
**Koenig & Bauer VariDry dryers**
for optimum drying results - whether water-based, UV or hybrid

**Sheet transport by a stainless steel suction belt** provides maximum register accuracy thanks to the precisely defined and constant distance between the print heads and the substrate

**DriveTronic feeder**
for highest precision and maximum operating comfort

# VariJET 106 – configurations

## Double Coater



# Koenig & Bauer Durst VariJET 106

Max. machine speed:
5,500 sh/h = 70 m/min

Board specification:
0,2 to 0,8 mm

Max. sheet size: 1,060 x 750 mm
Min. sheet size: 750 x 500 mm

7 color water based inkjet technology (CMYK+OVG) for Primary Food applications

1200 dpi 3pl inkjet heads

Digital printing and proven modular Rapida technology

Offset print quality

Efficient production of ultra-short to medium runs

Food compliance

Highly automated, industrial solution with outstanding economics for customers with volumes over 300k sheets per month

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# VariJET technical information (2)

Waterbased Inkjet

# Design Decisions VariJET106

Waterbased Inkjet

Waterbased  ink on water basis (ca. 85% $H_2O$)

Why waterbased?

- No legal concerns in food environment.
- Relatively low ink price compared to UV inks.

Why Inkjet for VariJET 106?

- Scalable in machine width and speed
- Tonerbased technologies reaching speed and width limitations earlier.

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# What does this mean for VariJET 106?

# VariJET 106 Facts

1

**VariJET 106**

# VariJET 106 Facts

7

**Separation (Print Bars)**

# VariJET 106 Facts

24

**Printheads per Print Bar**

# VariJET 106 Facts

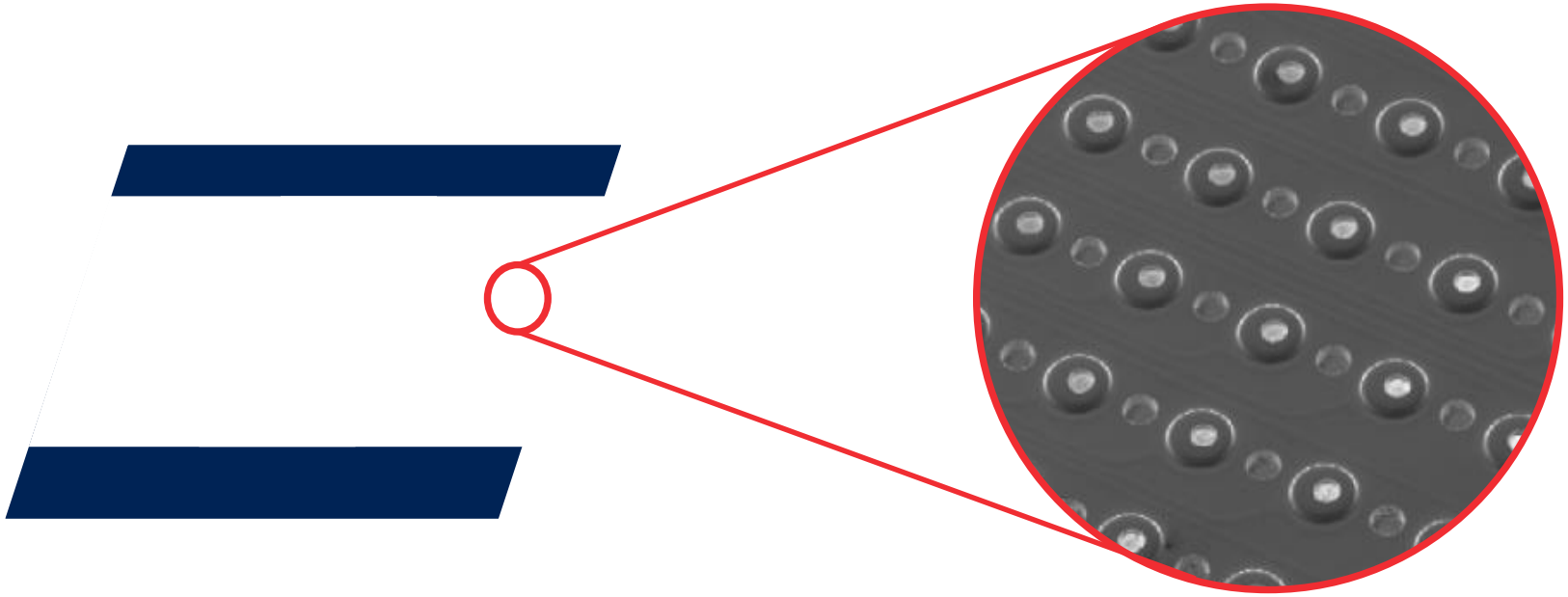
168

**Printhead Per Machine**

# VariJET 106 Facts

2048

**Nozzles Per Printhead**



# VariJET 106 Facts

49.024

**Nozzles for printing a B1 sheet with 7 colors.**

# VariJET 106 Facts

2.702.110.236

**Droplets per second for printing a 7 color image at 5500 sph**

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# The Power of 2.7 bn. Droplets per Second

# Strenghts of Inkjet to Print Quality

- No issues by „keeping negative elements open“.
- All freedoms with positioning of artwork elements (no ghosting etc.)
- Unlimited number of spot colors on a sheet possible.
- Excellent Color consistency within a print run or from print run to print run.

# Extended Color Gamut Printing (ECG)

## Replacing Spot Colors with CMYKOVG Equivalents

- Example: 1 Job
  - 9 Versions
    =
  - 9 spots + CMYK

- This specific production setup is fairly sophisticated in an offset environment.

- Job ganging supports on demand approach in packaging.

# Extended Color Gamut Printing (ECG)

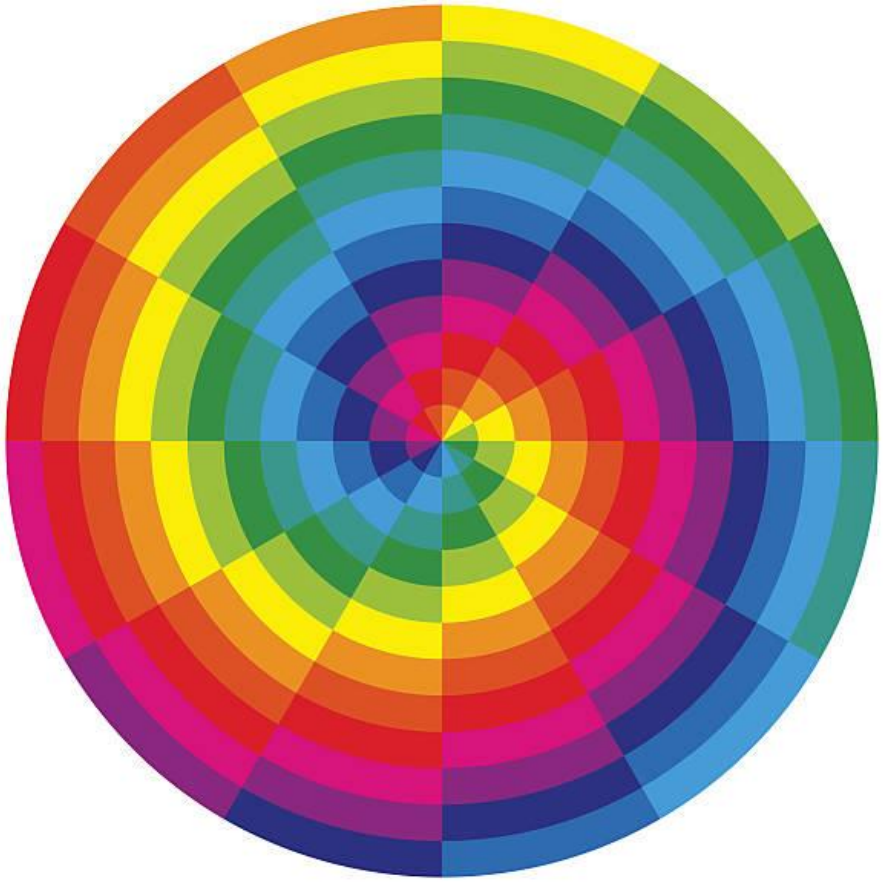
“Boost” Images with Extended Color Gamut (ECG)

# Gamut Size for CMYK Setup

By using a CMYK setup more than
**~90% of Pantone + Solid Coated v2**
colors can be reproduced with a
**$\Delta E_{2000} \leq 3,0$*.**

| **# of Pantone + Solid Coated v2 Colors in Gamut** | Standard [Varijet] [CMYK] CF67 Lack maxK TAC 180% | Standard [Varijet] [CMYK] CF68 Lack maxK TAC 250% | ISOcoatedv2_300% |
|---|---|---|---|
| **$\Delta E_{2000} \leq 2,0$** | 87% | 83% | 62% |
| **$\Delta E_{2000} \leq 3,0$** | 92% | 88% | 69% |

*Figures for „ISOcoatedV2 300%“ taken from ESKO Color Pilot v.18.0.1
Substrate: Iggesund Invercote G 300 gsm
Glossy Varnish Actega G9/680



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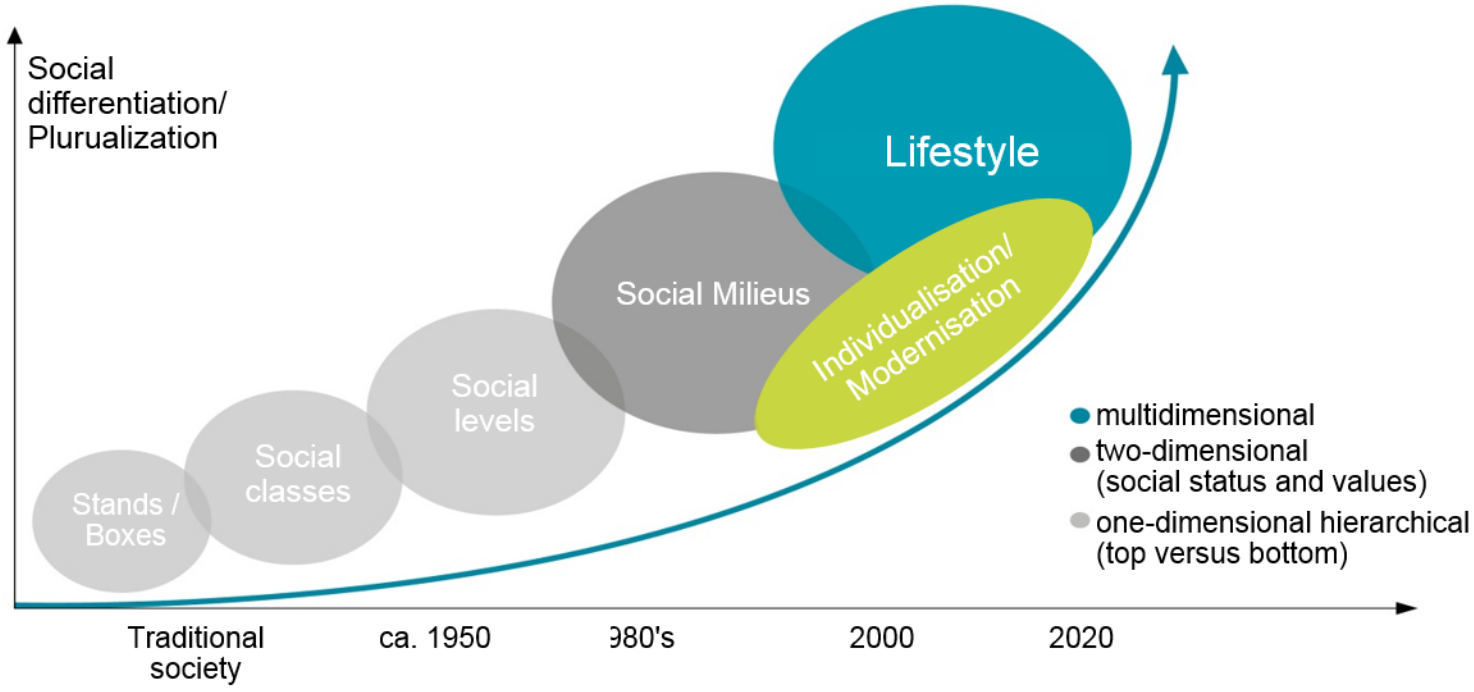
# VariJET106 – changes everywhere

Environment our customers making decisions

# Changes

## from traditional lifestyle to individual and multidimensional lifestyle

**Change in society: Individual lifestyles instead of social classes and milieus**
From status, class, level and milieu to the lifestyles of the 21st century

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# Demand for digital printing in packaging is growing

## Packaging trends

- SKU proliferation
- Need for velocity
- Regionalization
- Product lifecycle management
- Regulatory environment

## Impact on production

- Number of jobs per day ↑
- Average run length ↓
- Planning complexity ↑
- Turnaround time ↓
- Circular economy and food-safety ↑

## Digital benefits

- Profit (lower costs for short runs) ↑
- Optimize production (liberation effect) ↑
- Working capital ↓
- Waste / obsolescence ↓
- Water-based inks for future proofing ✓

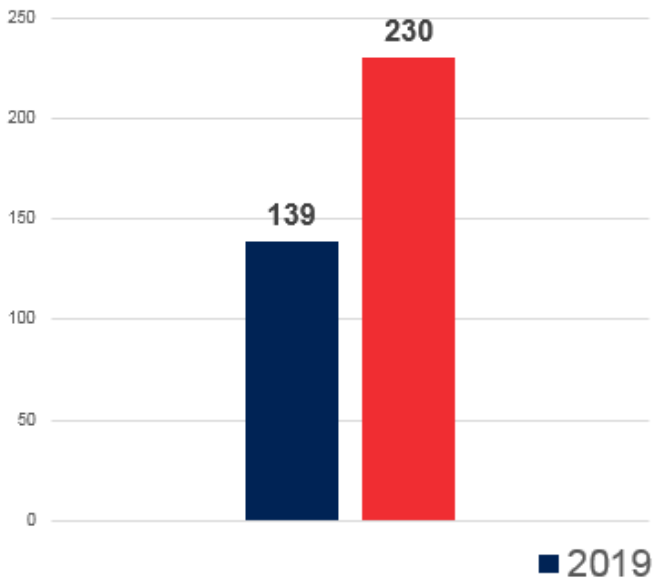
# VariJET will fly - Packaging Market (Facts)

Smithers Pira – The Future of Digital vs. Offset Printing untill 2022

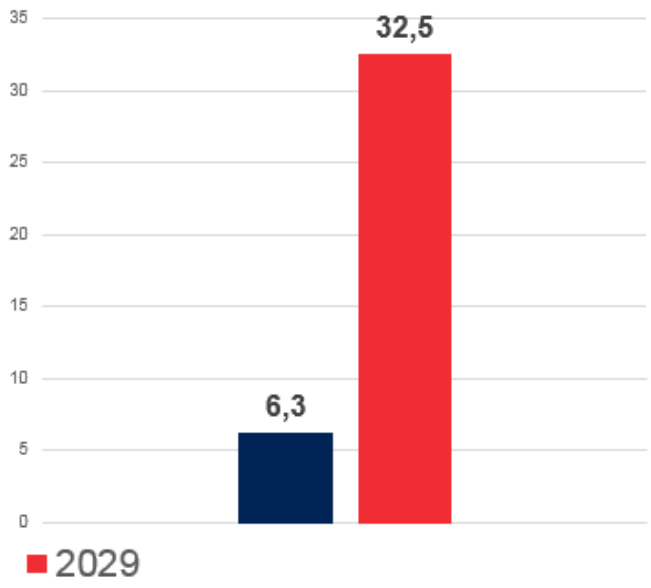
## Digital Print: Forecast

Smither‘s research 08/2019

**Digital Printing (bn USD)**



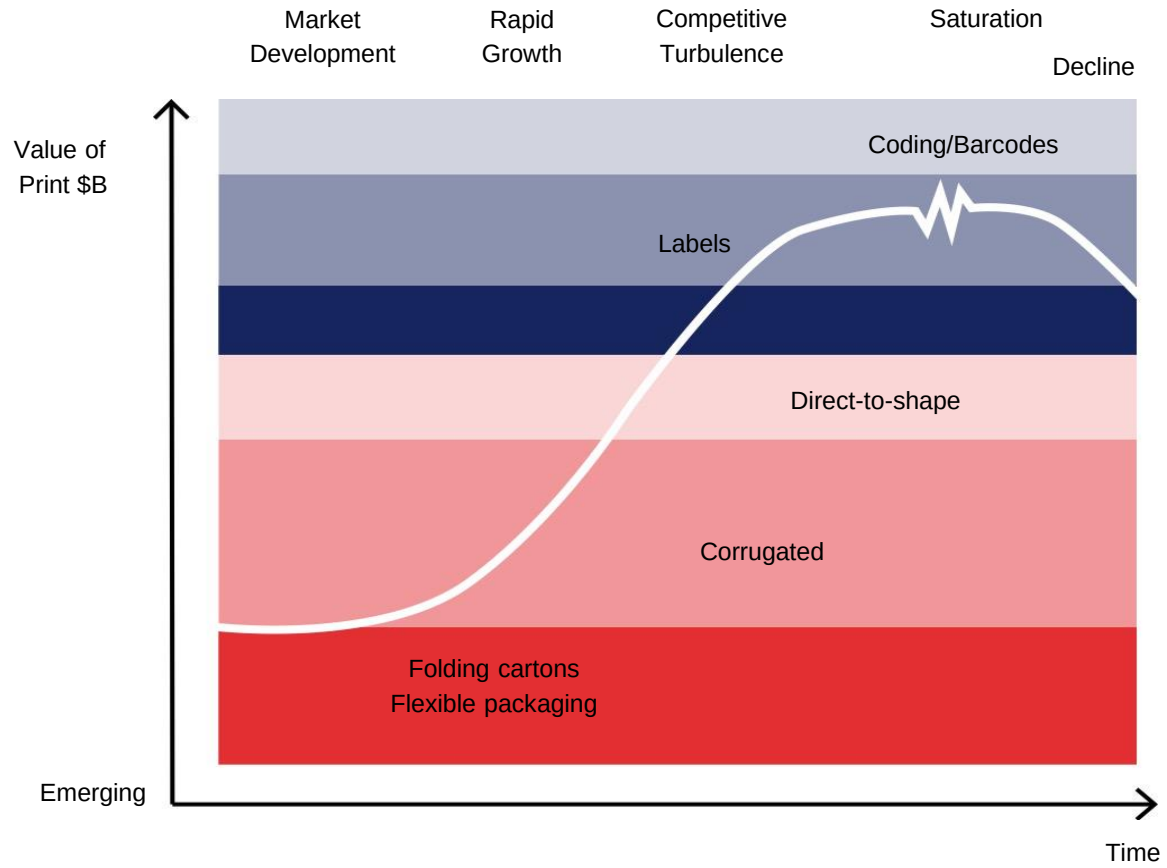

**Digital Packaging Print (bn USD)**




- Constant growth over long period
- Goes in hand with stronger product diversification and declining runlength / SKU
- Faster turnaround times required
- End users demanding synchronized production to inventory and version management

# Packaging market - Opportunity

## Digital folding carton market still in the very beginning of the life cycle




**Digital Packaging Application Landscape**

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# Brands

what you maybe realise

# Brands


- Demographic trends (urbanization, increase in global population, single households, fast-changing situation)
- Smaller target groups with more individual needs
- More and more labelling regulations
- Changes in the retail trade (expansion of supermarket chains, more own brands)
- Changes in packaging design
- Ever shorter go-to-market intervals (more flexible supply chains, shorter times for reaction to changes in demand)
- Increased popularity of online shopping

***„Anyone who wants to work with us should definitely buy a digital press, or they will find it an uphill struggle in the future“.***

Paul France, Principal Engineer for Printing and Decoration
Procter & Gamble

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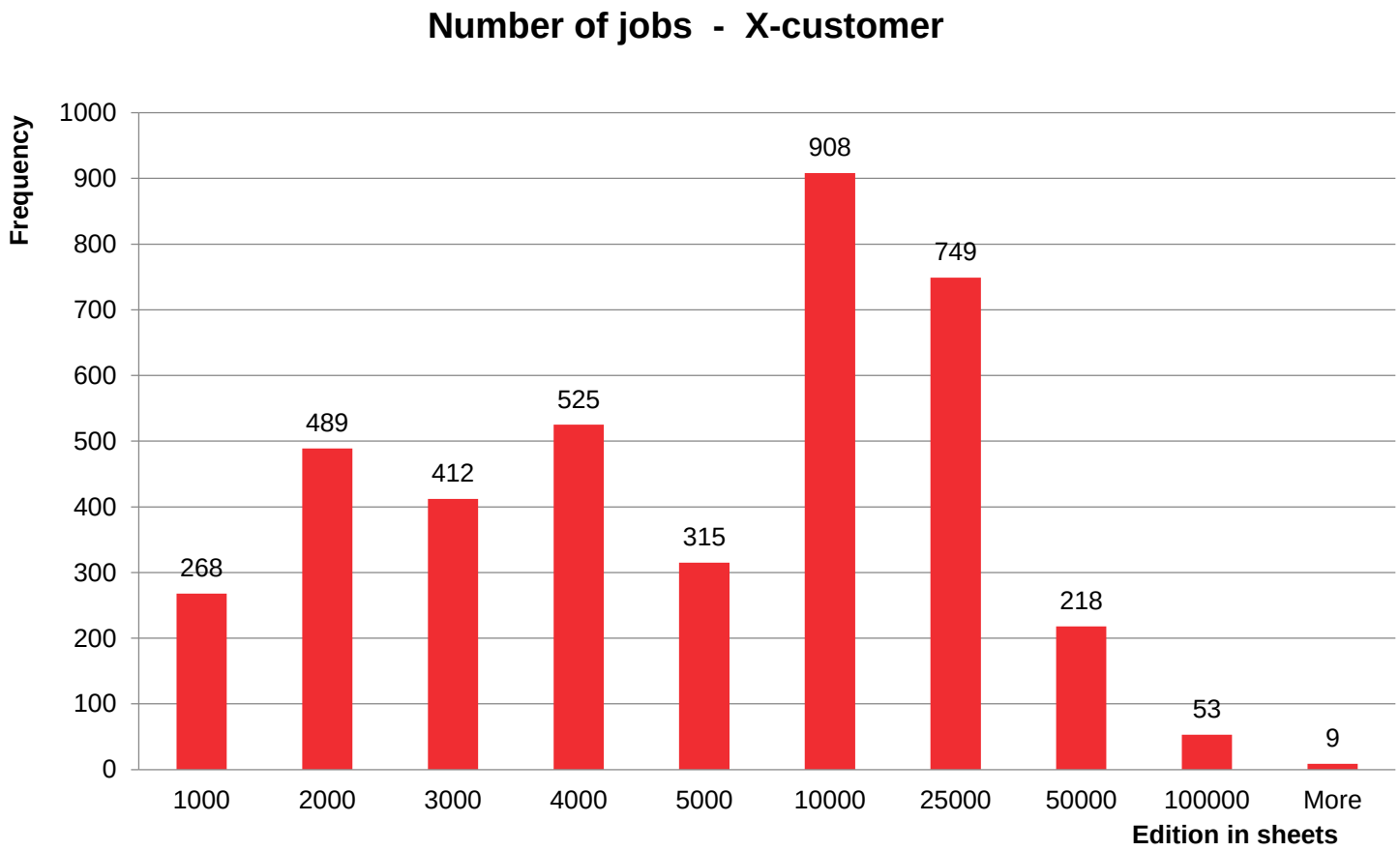
# VariJET 106 – Business Case (1)

# Customer analysis

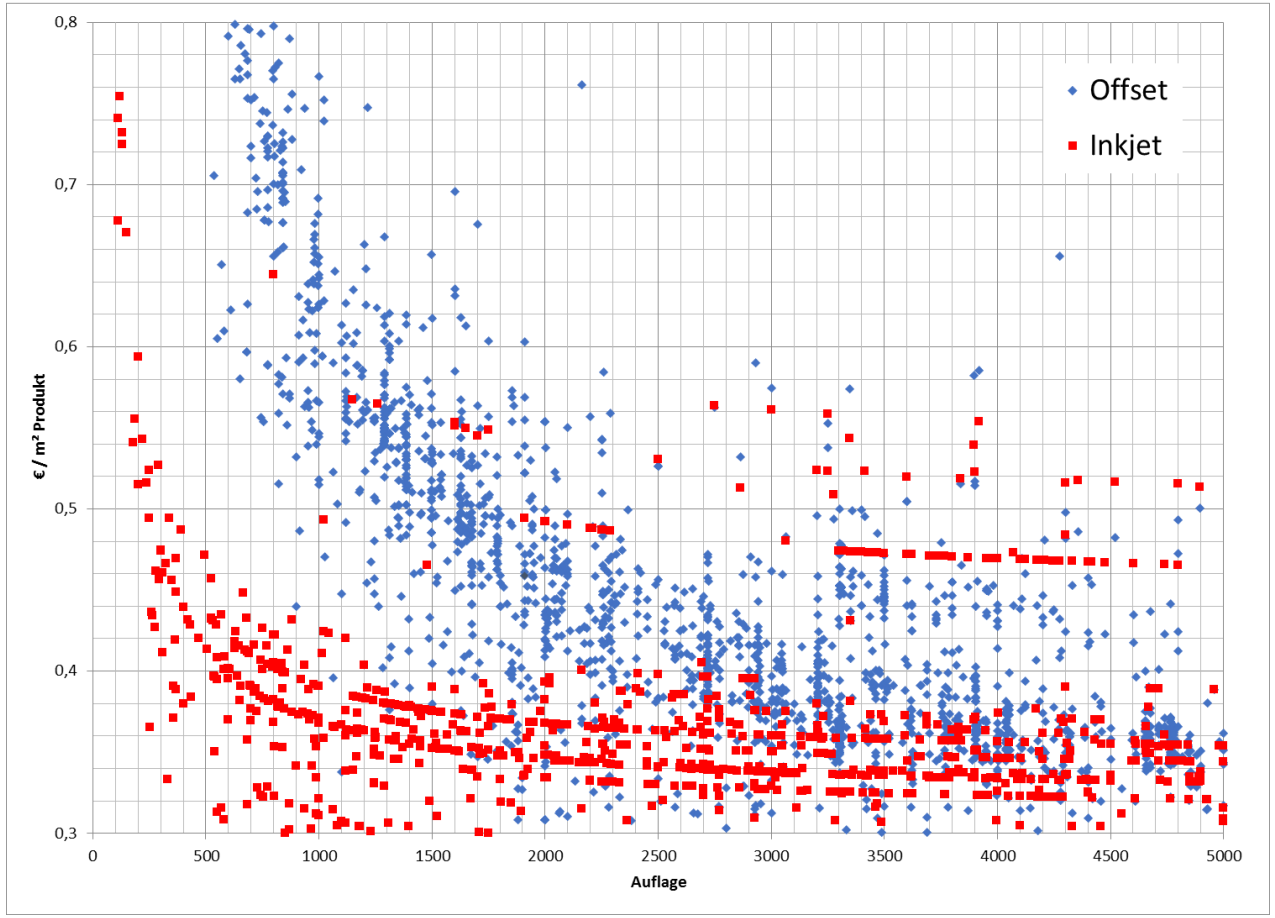
## X-Customer | Jobs without Gold, Silver, White



# Data base cost analysis Inkjet

**Important:**

- comparing cost Inkjet / Offset  is not  only pending on run length
- Each point in the graphic represents the production cost of one single job  at one existing company
- Additional variable data are format size, reduction on waste, substrate cost, ink coverage, usage time



# Positioning VariJET 106

## Rapida 106 and VariJET 106 – the real complementary folding carton printing solution

0 500 1.000 5.000 1.000.000
Bogen pro Job

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# VariJET106 – Business Case (2)

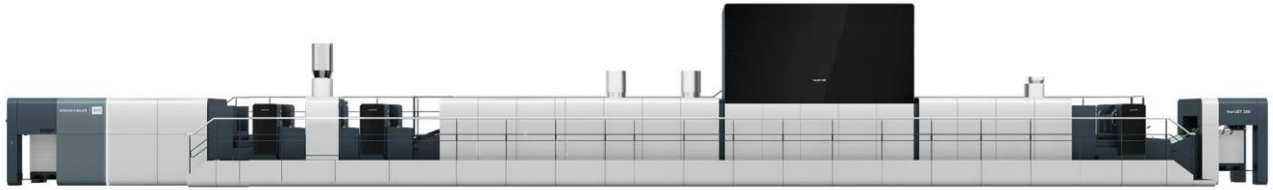
Customer Insights

# VariJET 106 – Customer case study

No 1

## Customer at a glance

- 30 Mio sheets per year
- Short runs → 25 to 30 % < 3,000 sheets
- Production in 3 main market segments



### Cosmetics

- Different language versions

### Industry

- Mixed production

### Pharma

- Many and small print runs

# VariJET 106 – Customer case study

## Cosmetics

**Todays challenges**

- Customer production requires a variety of printed products in many different languages. Most of them are short runs from 50 to 1,200 sheets
- This means loss of time due to frequent job changes and a high amount of waste - sometimes more waste than good sheets

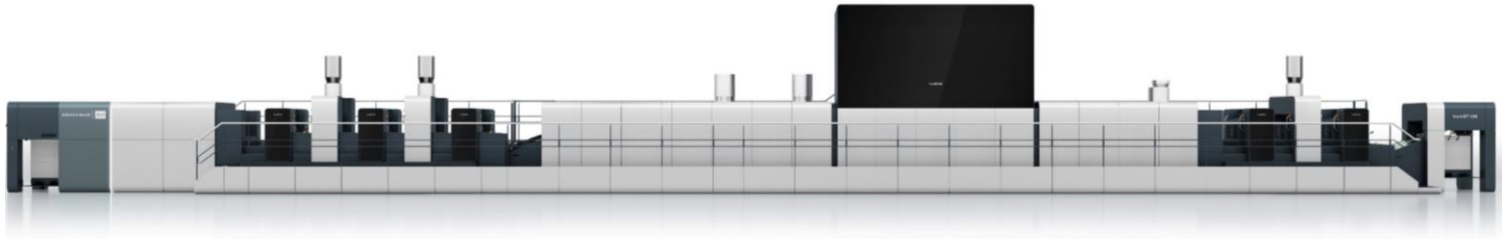
**Future with VariJET 106**

- **Reduction of set-up waste by more than 90 %**
- Because of reduced set up time twice the number of jobs can be produced per day
- More free capacities for larger print runs on the offset presses

**Cost reduction of each individual print job through optimum assignment of the corresponding printing machine (Liberation Effect)**

# VariJET 106 – Customer case study

No 2



| Offset |
| --- |
| **Offset** |
| • About 30 hours production time<br>• About 10.000 sheets waste<br>• About 200 plates used |

| Digital |
| --- |
| **Digital** |
| • About 4 hours production time<br>• 80 sheets waste<br>• Zero plates |

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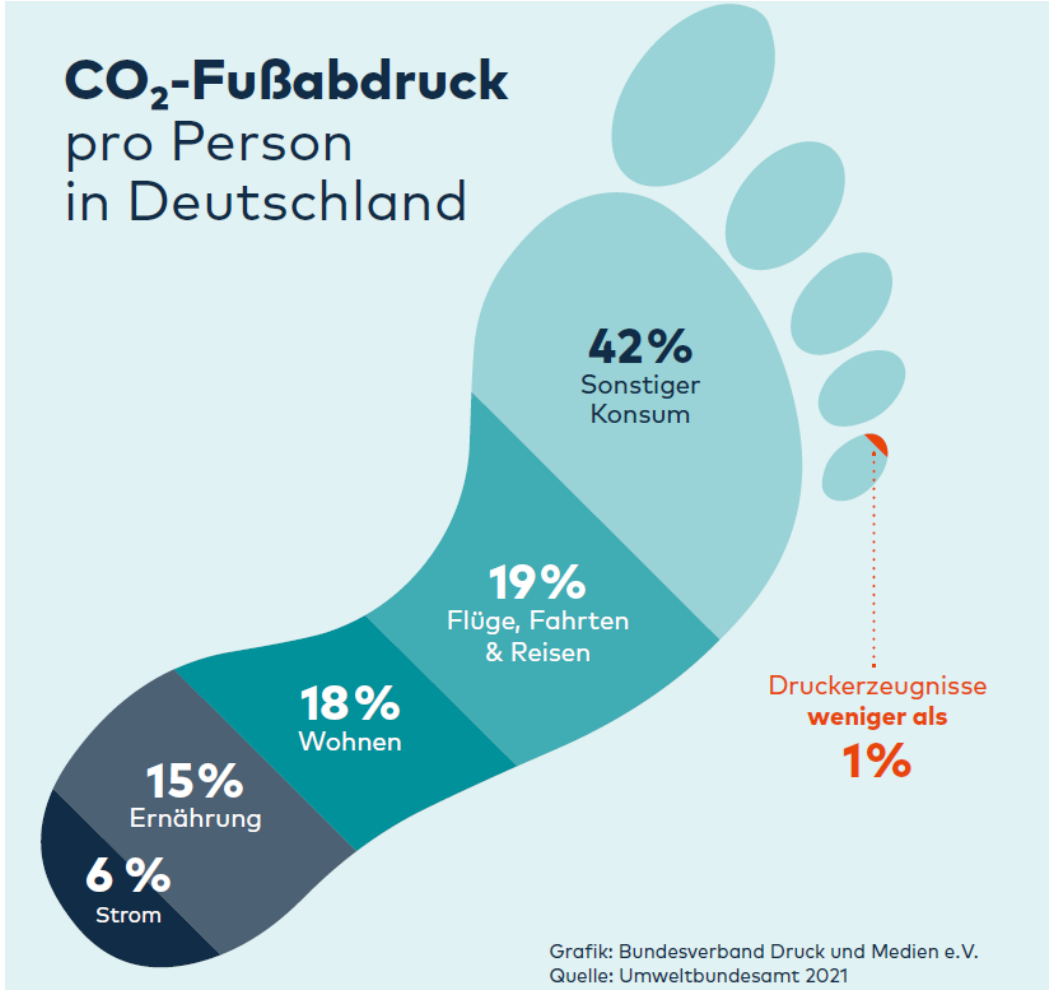
# Koenig & Bauer focusing on Environmental Sustainability

# Carbon Footprint per Person in Germany




- 42% - other consumption
- 19% - travelling - flights, commute, trips
- 18% - living
- 15% - food
- 6% - power
- Less than 1% printed matters

# Agenda 2030 - Sustainable Development Goals of UN

& Green Deal of EU

# Sustainability in the Printing Industry

## Contribution of Koenig & Bauer to Sustainable Development Goal 12


Responsible substrate sourcing

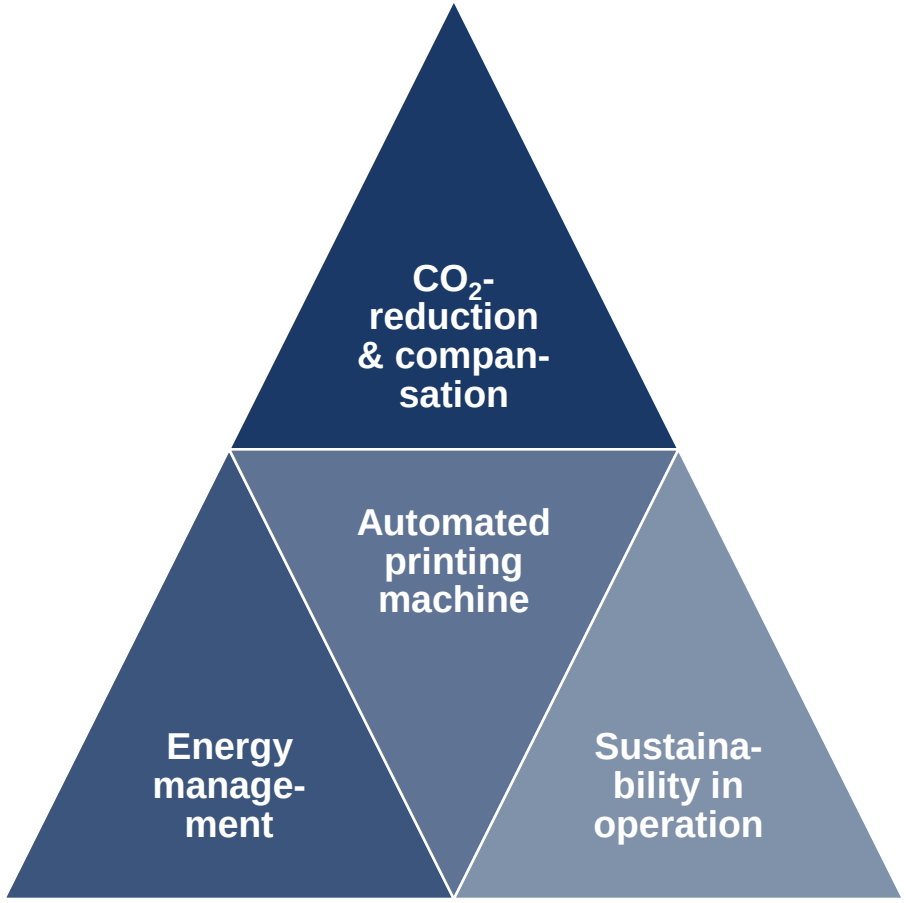
Optimization of waste-generating production processes

Sustainability in the printing industry

Use of fewer & more environmentally friendly printing consumables

Overall energy efficiency

# Sustainability – the Building Blocks



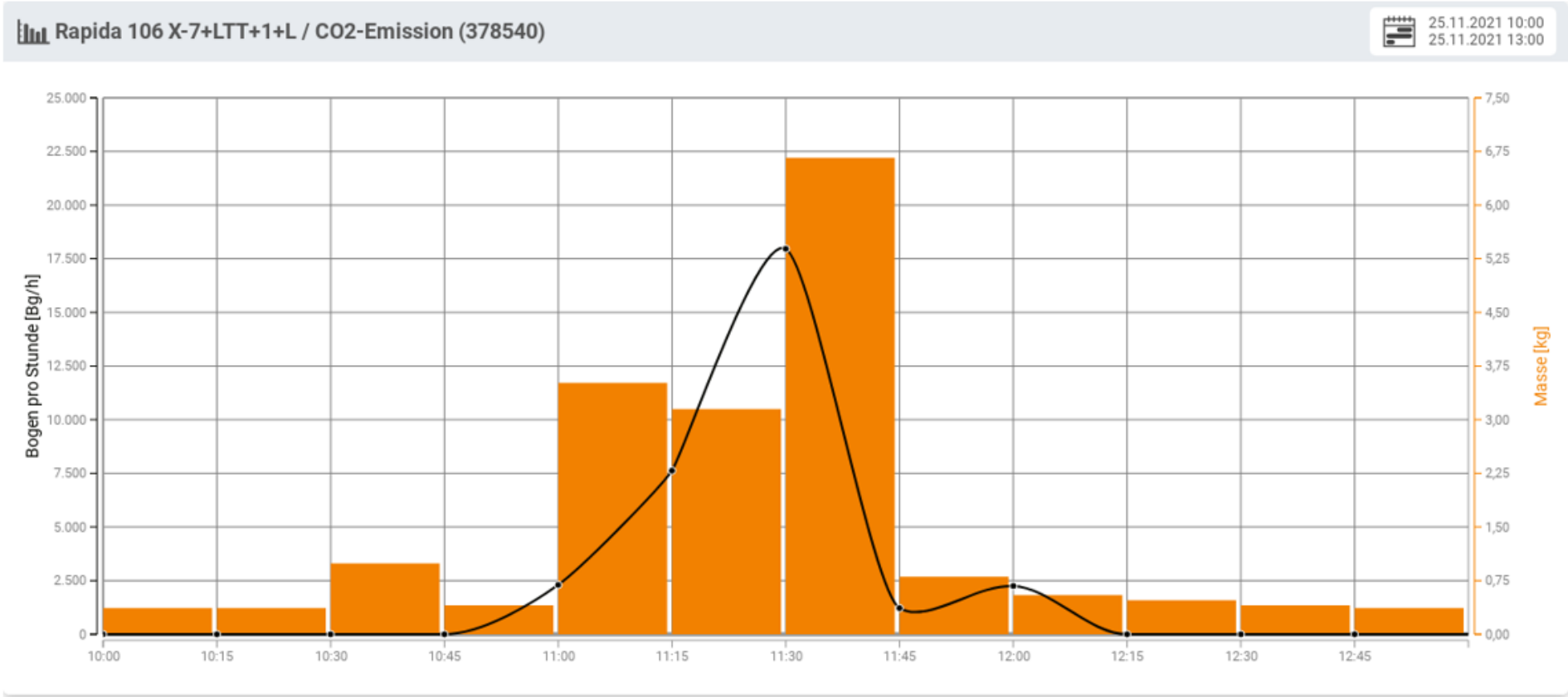
# Energy Management - Energy Consumption Recording

## VisuEnergy X – based on EnergyView meters


| | Typ | Element | Gewählter Zeitraum |
|---|---|---|---|
| | Σ | 378540 Leistungsaufnahme gesamt (P) [kW] | Ø 21,5 kW |
| | | 378540 - UV Trockner (P) [kW] | - |
| | | 378540 - UV-LED (P) [kW] | - |
| | | 378540 - Luftschrank QualiTronic (P) [kW] | Ø 2,2 kW |
| | | 378540 - IRTL Trockner (P) [kW] | Ø 18,6 kW |
| | | 378540 - Hauptschaltschrank (P) [kW] | Ø 9,7 kW |
| | | Bg/h [Bg/h] | Ø 2.542 Bg/h |

# Energy Management – $CO_2$ Emission

## VisuEnergy X



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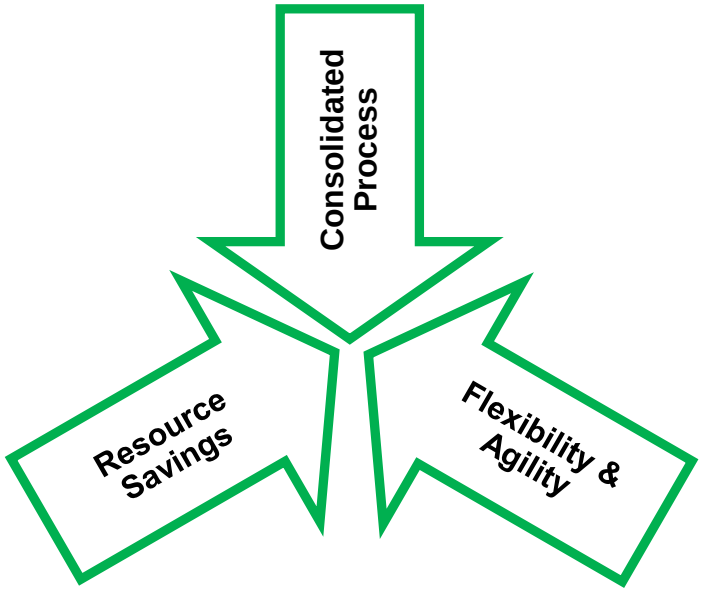
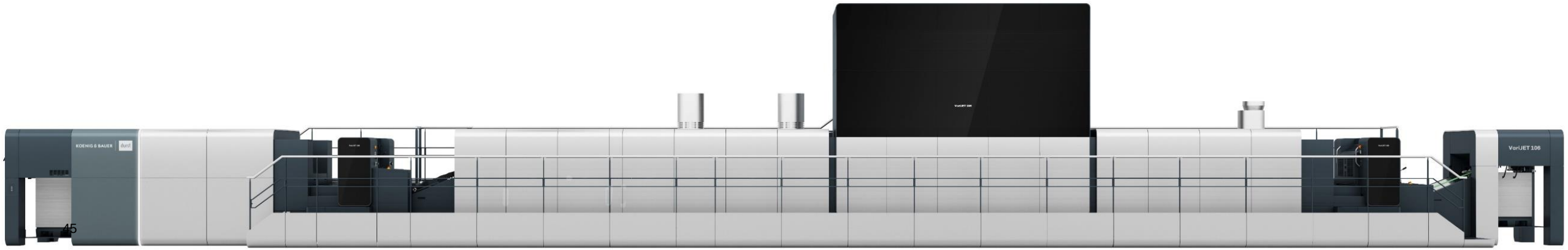
# VariJET106 – Environment

Case study

# VariJET 106

- Waterbased inks and liquids
- H1 certification
- “Swiss Ordinance” classified
- Manufactured in accordance with GPM rules



# VariDry$^{BLUE}$ IR/hot-air


- Koenig & Bauer VariDry$^{BLUE}$ IR/hot-air dryers for **ultimate drying quality and energy efficiency**
- Energy savings and lower $CO_2$ emissions thanks to efficient energy use
- **Reduced heating energy input** through recirculation of the hot, but still only partially saturated air from the dryer modules in the first sections of the delivery
- **Reduced waste air volume** as less fresh room air must be drawn in for drying
- **Reduced power consumption** for cooling and room air conditioning
- **Reduced specific energy consumption per sheet**

## IR/hot-air dryers – Room air drawn into heater modules

1. 10 hot-air knives
2. 7 infrared lamps

## VariDry$^{BLUE}$ – Recirculated air

3. 5 additional hot-air knives

# Print Production – Case Study

| | |
|---|---|
| **Number of shifts** | 2 |
| **Average run length/ job*** | 3.500 sheets |
| **Number of jobs p.a.** | 3.900 |
| **Annual output** | 14 mio sheets |


* Average: 5,5 c + varnish, 300 gsm

# Annual Savings on Resources

| | Savings | Conversion to $CO_2$ reduction |
|---|---|---|
| **Make ready waste p.a.** | **167 t** | **54 t** |
| **Aluminium printing plates** | **14 t** | **125 t** |
| **Consumables, processes, etc.** | | **> 5 t** |

* Washing processes, inks, blankets, chemicals, etc.

# Benefits – Cost Savings

## Production data (01.08.2022 – 31.07.2023)

| Offset | | Digital | |
|---|---|---|---|
| Number of Jobs (per year) | 2,465 | Number of Jobs (per year) | 2,465 |
| Volume (sheets per year) | 6,548,069 | Volume (sheets per year) | 6,548,069 |
| | | | |
| Plate costs | 159,929 € | Plate costs | 0 € |
| Waste costs | 63,970 € | Waste costs | 2,459 € |
| Ink costs | 28,159 € | Ink costs | 158,189 € |
| Blanket costs | 32,000 € | Blanket costs | 0 € |
| Energy costs | Ref point | Energy cost | - 15,000 € |
| Inventory costs | 370,000 € | Inventory costs | 220,000 € |
| **TOTAL COSTS** | **654,059 €** | **TOTAL COSTS** | **365,648 €** |

**1 Cost savings for one year : 288,411 €**

**Comments :**

- Digital production will **reduce waste costs by 255,900 €**
- Production “on demand” with VariJET 106 allows to **reduce inventory costs by 150,000 €**

# Benefits – $CO_2$ Footprint

## Production data (01.08.2022 – 31.07.2023)

| Offset | | Digital | |
|---|---|---|---|
| Number of Jobs (per year) | 2,465 | Number of Jobs (per year) | 2,465 |
| Volume (sheets per year) | 6,548,069 | Volume (sheets per year) | 6,548,069 |
| CO2 footprint | 96 (B) | CO2 footprint | 76 (A) |

**2 Reduction of $CO_2$ footprint per year : 290 tons**

# VariJET106

## Rapida 106 and VariJET 106 – the real complementary folding carton printing solution

0 500 1.000 5.000 1.000.000
Bogen pro Job