# Driving the circular economy

Printing Innovations & Market trends

Niels van Groenendaal

Friday 8 November 2024

WINDMÖLLER & HÖLSCHER

# W&H is the Only Full-system Provider Worldwide – from Film to Finished Sack

# W&H as your sustainable partner: Our promise of Greenovation – Environment, Social, Governance


Source: http://webarchiv.bundestag.de/archive/2008/0506/wissen/analysen/2004/2004_04_06.pdf

**ENVIRONMENT**

- Environmental Protection
- Strategies for Climate protection
- Use of renewable energies
- Reduction of emissions
- Careful use of raw materials and energy

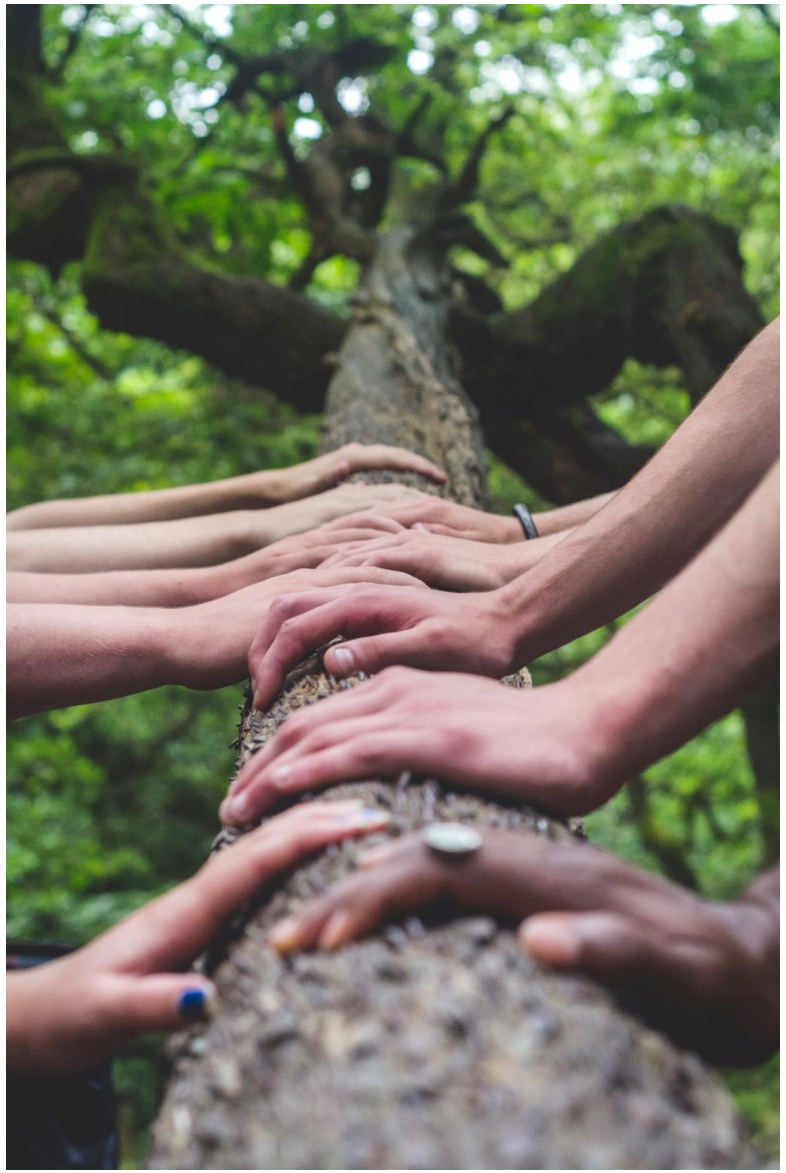
**SOCIAL**

- Occupational safety
- Health protection
- Compliance with labor rights
- Fair working conditions
- Prohibition of child labor
- No forced labor
- Compliance with ESG criteria for service providers and suppliers

**GOVERNANCE**

- Ethical corporate governance
- Compliance
- Prevention of corruption
- Independent supervisory board
- Risk management

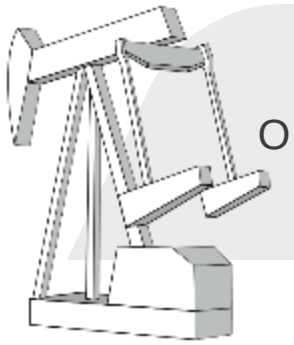
GREENOVATION



# 78 %

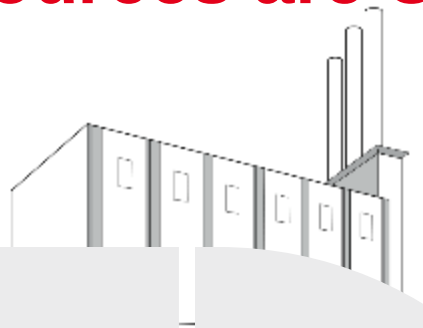
of global consumers feel that evironmental sustainability is important, they like the idea of being sustainable, and want to live more sustainable lives.

# The Goal: A Circular Economy in Which Resources are Used for as Long as Possible



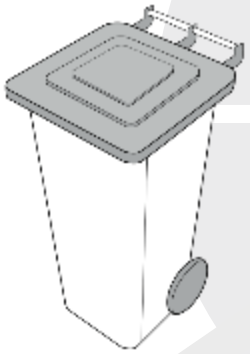
Oil industry

Chemical Recycling



Chemical Industry

Extrusion



Mechanical Recycling

Waste Management

Waste landfills and incineration

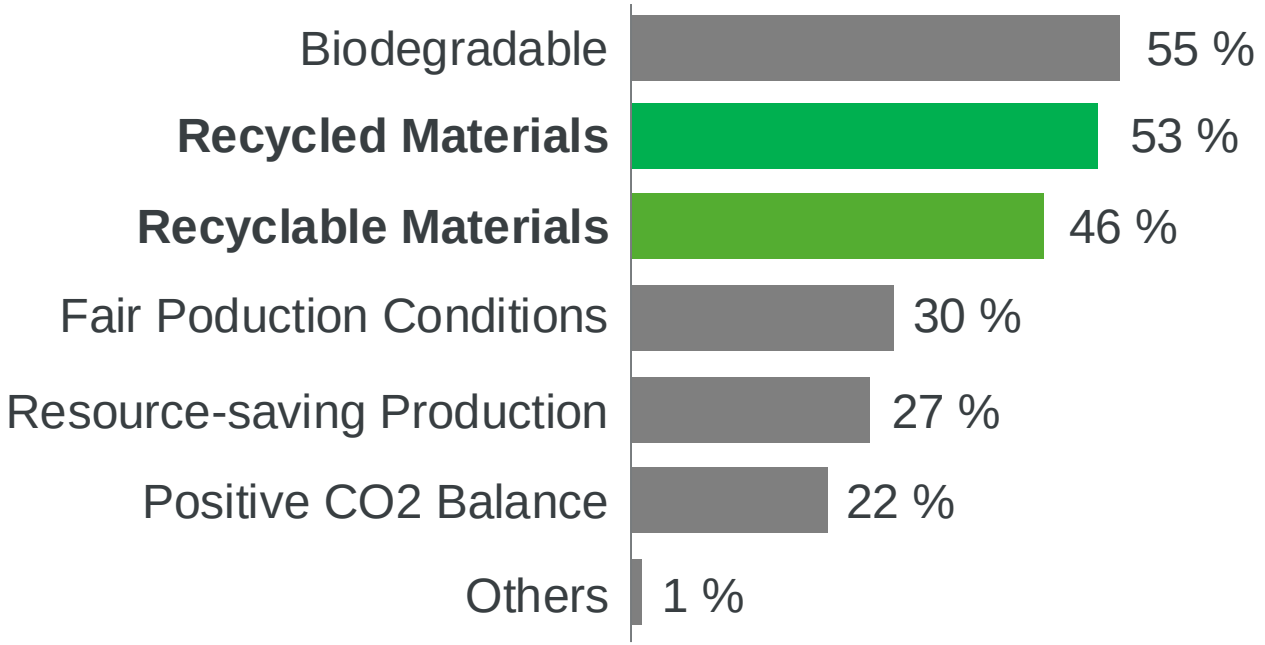
Communities

Customers

Flexible Packaging

# Substrates are strongly associated with sustainability in the minds of consumers.

## Consumer perception: »What is sustainable?«





*Simon Kucher & Partners - Global Sustainability Study 2021*
*Percentage of respondents per category*

# Sustainable substrates – Three different approaches

Mono-materials
MDO-PE

Post-consumer
recycled materials


Paper-based
packaging

# Sustainable substrates – Three different approaches

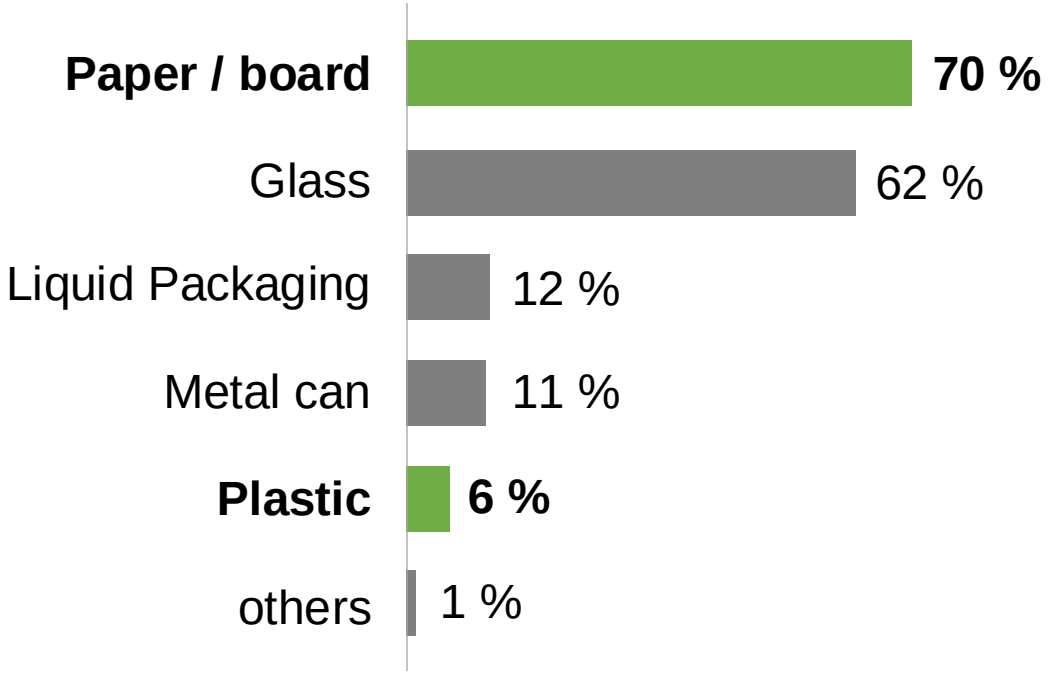

## Paper-based packaging

- Renewable raw material with good recycling infrastructure
- Influence on packaging processing

*Simon Kucher & Partners - Global Sustainability Study 2021*
*Percentage of respondents per category*

# Paper is the first choice when it comes to consumer perception

## Which materials are particularly sustainable?




*Simon, Kucher & Partners - Global Sustainability Study 2021*
*Percentage of respondents per category*

## Examples of Paper Based Packaging


Confectionary


Powder


Potatos

Multipack Fruit


Diaper Bag


Dry Noodles

# Challanges in paper packaging

## » PACKAGING PROPERTIES

Realize the product properties required for the packaging

- **Barriers**
- **Sealing**

*Source: Huber*

## » EFFICIENT PRODUCTION

Efficient Packaging Production and Filling of goods

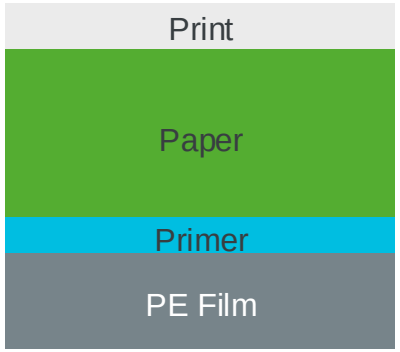
- **Wrinkles**
- **Surface Damage**

*Source: Rovema*

## » RECYCLABILITY

Maintain good recycling properties

- **Other Ingredients**
- **Efficient Use of Material**



# Ready for Paper production


- Diaper packaging made out of Paper
- Bag machine Garant EXTRA 5-FS
- Printed on W&H MIRAFLEX´´
- Waterbased inks

# Sustainable substrates – Three different approaches

Mono-materials
MDO-PE

Post-consumer
recycled materials


Paper-based
packaging

# Sustainable substrates – Three different approaches

## Post-consumer recycled materials

- Legislation as a driver for increased PCR use in Europe
- Sustainability goals of the brand owner as a driver

# Brand owners and legislators are driving the change

## Policy goals lead to more packaging legislation


UK Plastic Packaging Tax: Special taxation of plastic packaging with less than 30% recycled content

## Brand Owners commit to sustainability


Nestlé: “reduce our use of virgin plastics in packaging by one third by 2025”

Pepsico: “ By 2030: Cut virgin plastic from non-renewable sources by 50%”

# Different types of Post Consumer Recyclate

## Virgin resin

First use of resin

From well known resin suppliers

## PIR

Pre-consumer recyclate

From film production scrap

## PCR *(B2B)*

Post-consumer recyclate commercial

From commercial collection

## PCR *(B2C)*

Post-consumer recyclate houshold

From household waste

# Challenges in PCR Production



## EXTRUSION

- ✔ High levels of impurities, Filtration (frequent screen changes)
- ✔ Input material with varying composition
- ✔ Ensure consistent quality and consistent efficient production

## PRINTING

- ✔ Process stability despite fluctuating material quality (e.g. varying repeat tolerances during printing)
- ✔ Higher risk of creases and web breaks/shift
- ✔ Consistent Print Inspection

# Ready for PCR Production


- 50%-Post consumer recycled material
- 40 µm LDPE
- Extruded on W&H OPTIMEX´´
- Printed on W&H NOVOFLEX´´

# Sustainable substrates – Three different approaches


## Mono-materials
## MDO-PE

- Mono-material structures for better recyclability
- Large investments in equipment are being made

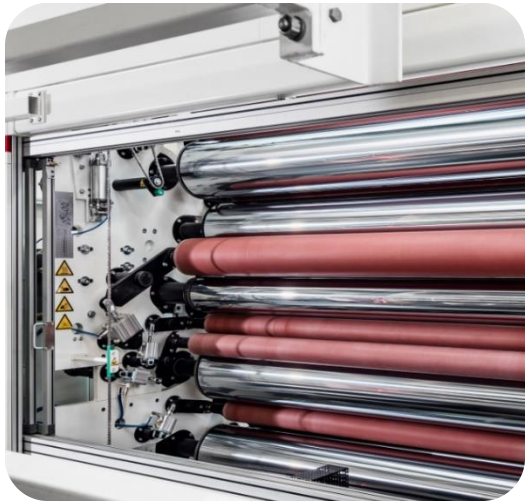
# From Multimaterial to Monomaterial Packaging Structures

MDO-PE / PE pouch designed for:

✔ Recyclability

PET / Alu / PE pouches:

× Not recyclable



MDO-PE with EVOH designed for:

✔ Recyclability

✔ Cost efficiency + high productivity

✔ Oxygen barrier

✔ Energy efficient production

The past

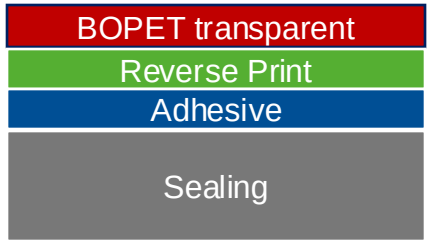
2019

2023

# From Multimaterial to Monomaterial Packaging Structures

## Multimaterial

### Typical Structure



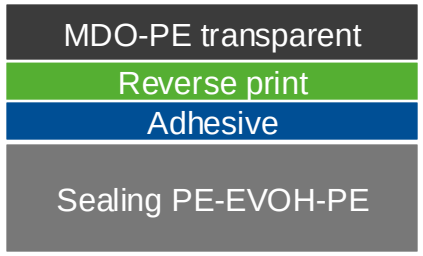

### Recyclability

Recyclability:

Replacement of PET with MDO-PE

## Monomaterial

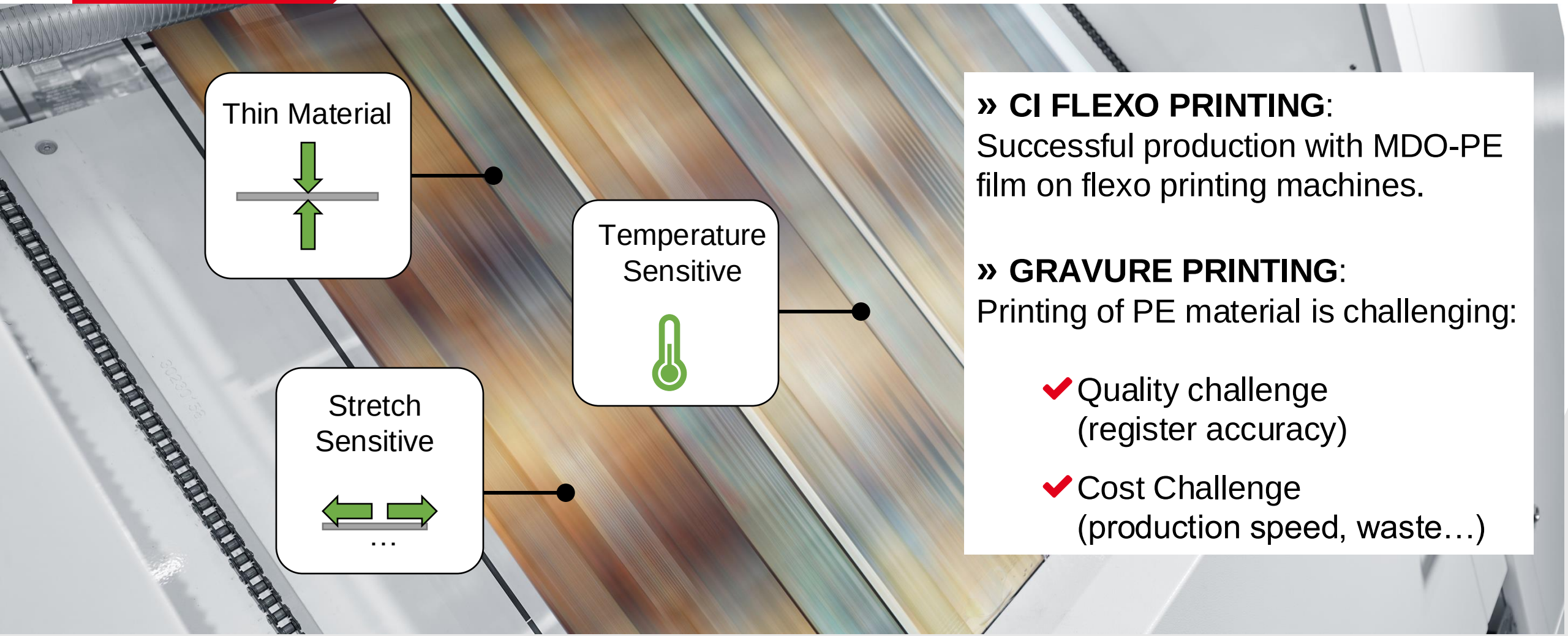
### Typical Structure




### Recyclability

Recyclability:

# Mono materials - challanges




**» CI FLEXO PRINTING**:
Successful production with MDO-PE film on flexo printing machines.

**» GRAVURE PRINTING**:
Printing of PE material is challenging:

- ✔ Quality challenge (register accuracy)
- ✔ Cost Challenge (production speed, waste…)

# Ready for MDO production


- 25 µm MDO-PE
- Sealing film with EVOH
- Extruded on VAREX´´ with inline MDO
- Printed on W&H HELIOSTAR´´


And there is more…

# Conclusion

- Demands from endusers, brandowners and legisators are becoming more strict
- There is value to be unlocked in tapping into the sustainable market
- However, different substrates come with their own challenges and use cases
- By opening up the dialogue together we can find future proof solutions.

# Thank you for your kind attention!

# Questions?