

The Implications of a Changing Raw Material Outlook and its Effects on Containerboard Production, Products and Manufacturing in the Future

ICCA/WCO GLOBAL SUMMIT

22-25 May, 2011

Outi Juntti, Pöyry Management Consulting

ICCA/WCO GLOBAL SUMMIT 2011

PRESENTATION CONTENTS

- **Containerboard trends and outlook**
- **Global Fiber Challenges**
- **Containerboard Technology Development**
- **Nanotechnologies**
- **Conclusions**

PÖYRY INTRODUCTION

GLOBAL EXPERTS IN CONSULTING AND ENGINEERING

- Pöyry is a global consulting and engineering company dedicated to balanced sustainability and responsible business
- 7 000 experts in about 50 countries
- Project experience in over 100 countries
- 15 000 projects annually

- Net sales in 2010 EUR 682 million
- Listed on the NASDAQ OMX Helsinki



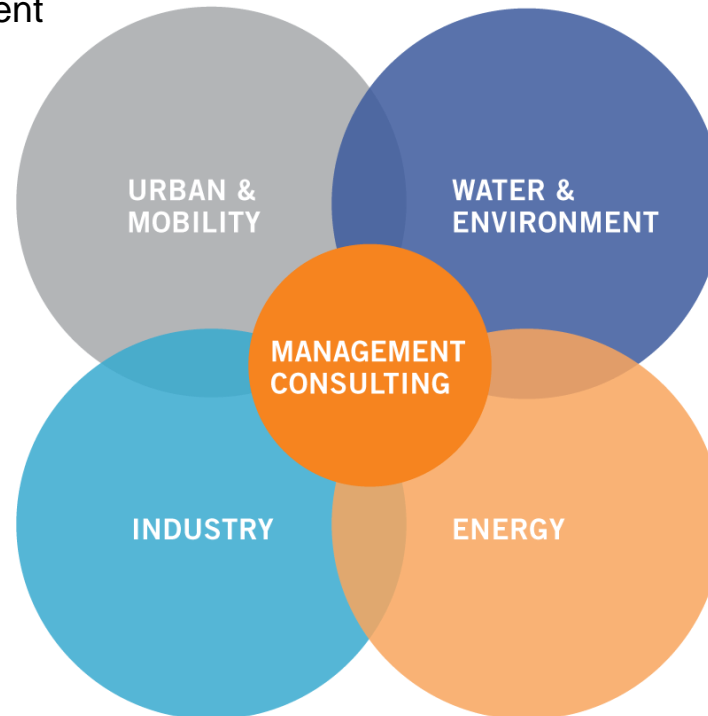
WIDE RANGE OF DEEP EXPERTISE

URBAN & MOBILITY

- Urban planning
- Real estate development
- Transport planning
- Rail infrastructure
- Road infrastructure
- Construction management
- Building design

WATER & ENVIRONMENT

- Water
- Wastewater
- Waste
- Environment



INDUSTRY

- Pulp and paper
- Chemicals
- Minerals processing

ENERGY

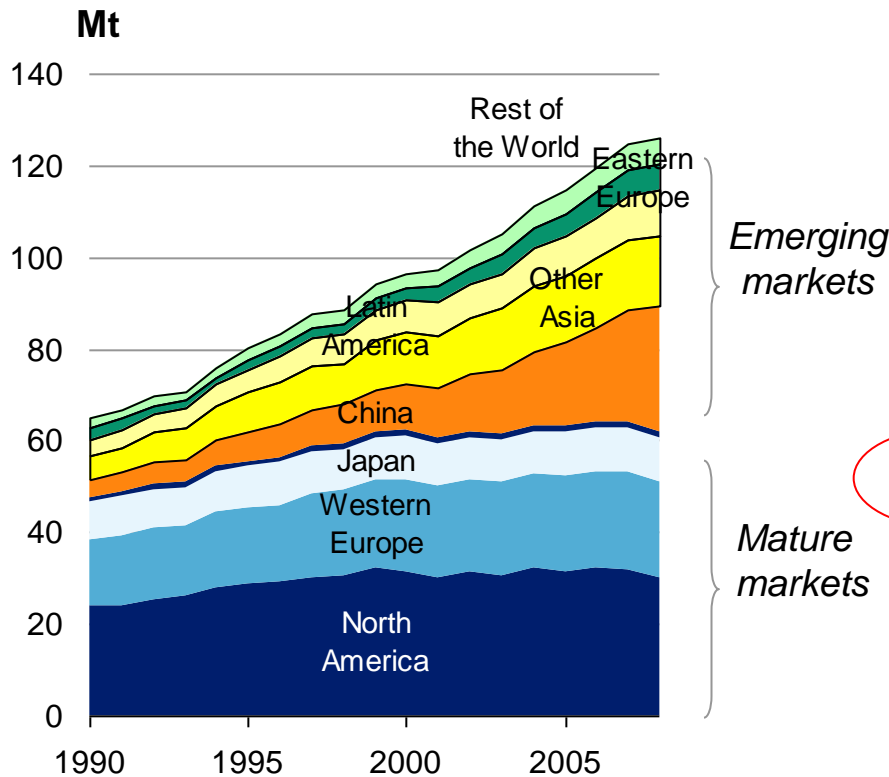
- Hydropower
- Thermal power
- Bio-renewables
- Oil and gas
- Nuclear energy
- Transmission and distribution

CONTAINERBOARD TRENDS AND OUTLOOK

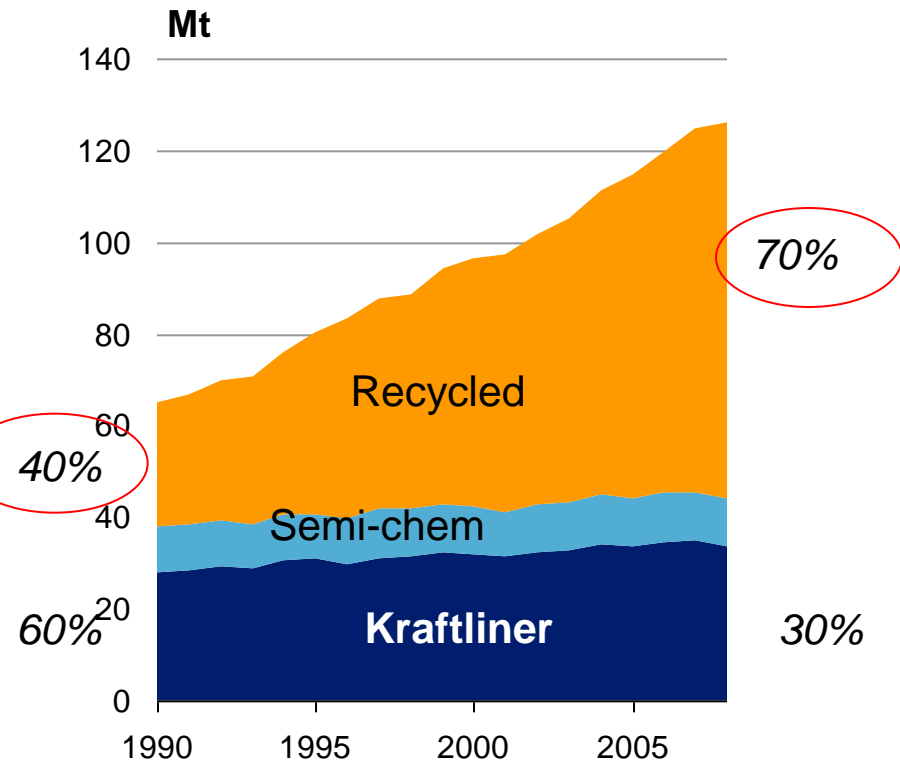
Market Development and Characteristics

DEVELOPMENT OF GLOBAL CONTAINERBOARD MARKETS

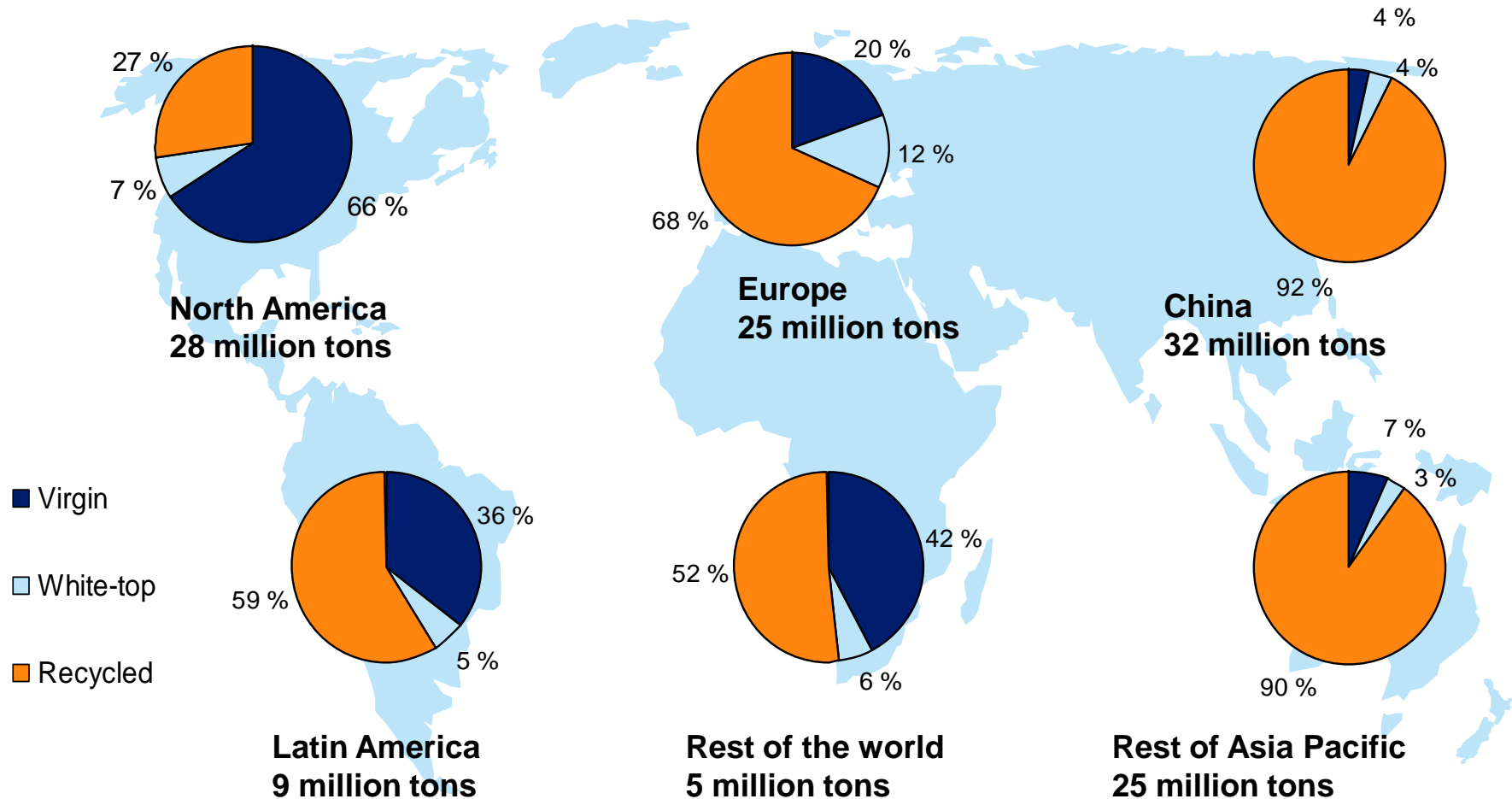
BY REGION



BY GRADE



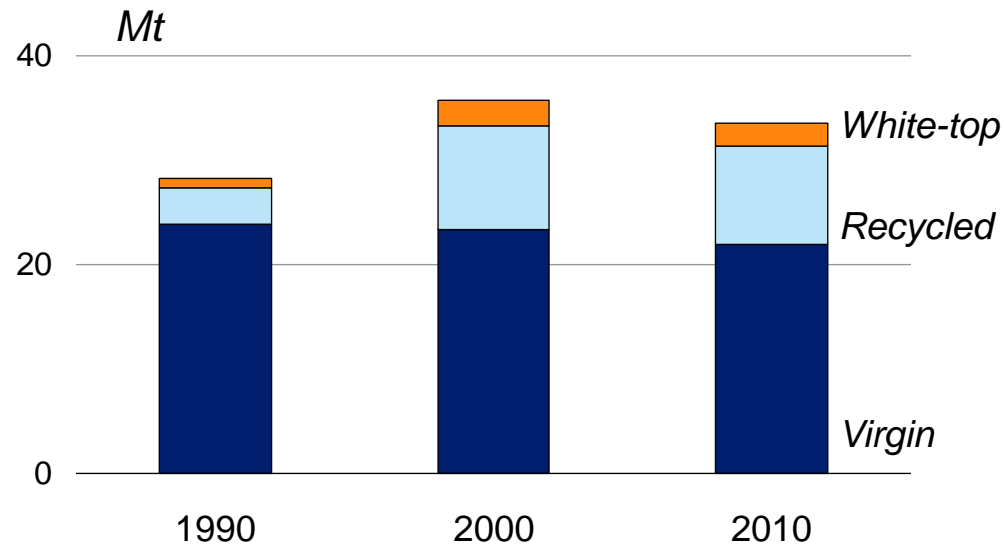
CONTAINERBOARD MARKETS BY REGION IN 2009



MARKET AND INDUSTRY CHARACTERISTICS – NORTH AMERICA

- **Dominance of traditional products**
 - Virgin fibre based still close to 70% of the market
 - High basis weights
- **Crusial role in the global markets/ industry**
 - Kraftliner exports to Asia and Europe
 - Fibre source for the Chinese
- **Role of corrugated**
 - Higher share of transportation packaging
 - Lower share of white-top

Capacity development



MARKET AND INDUSTRY CHARACTERISTICS – EUROPE

- **Rapid industry development since mid 1990's**

- New recovered fibre based machines, shut down of old capacity
- Development in corrugating technology

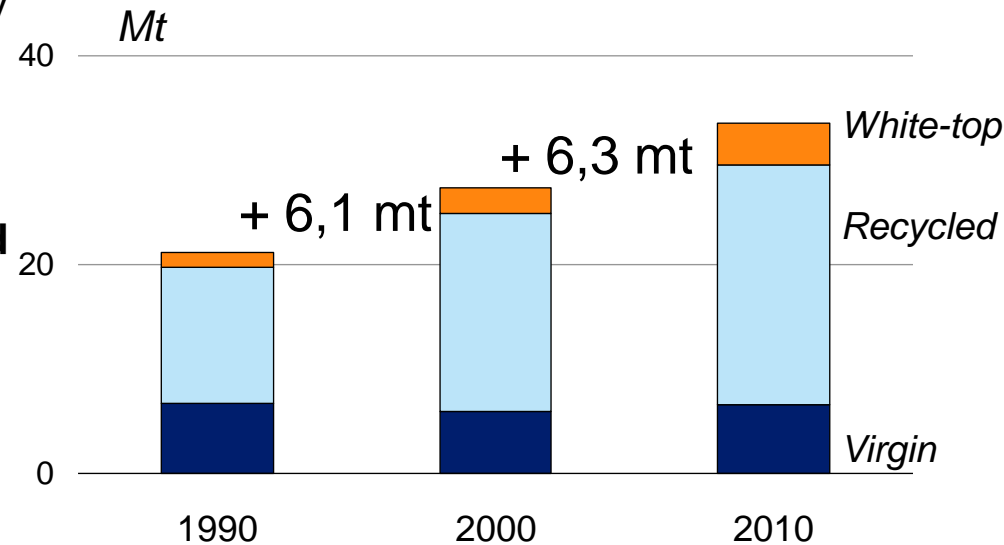
- **Clear trend towards higher quality and consumer packaging**

- White-top and coated products,
- Micro-flutes, light-weighting and multi-wall structures

- **Environmental and sustainability awareness**

- Packaging reduction
- Recycability

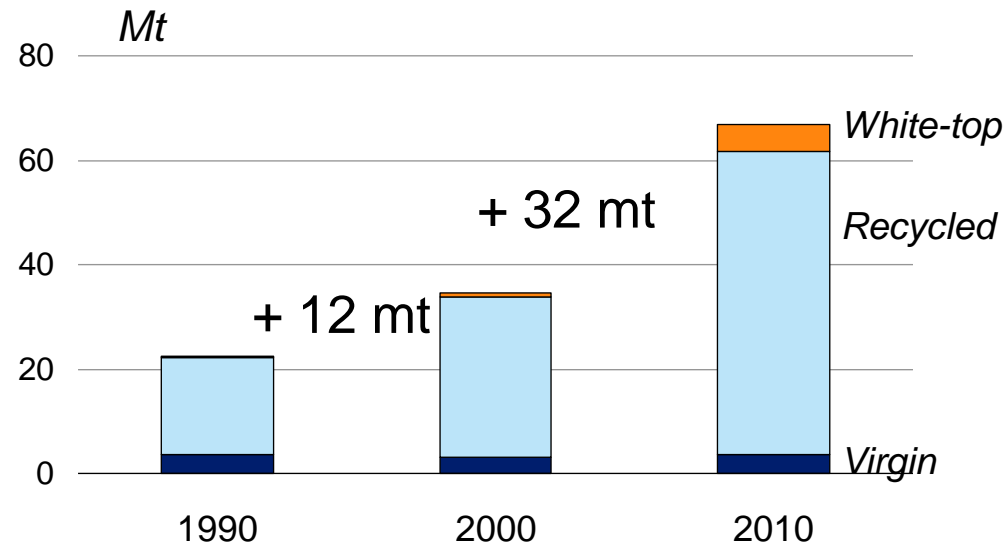
Capacity development



MARKET AND INDUSTRY CHARACTERISTICS – ASIA

- **Massive industry boom**
 - 200 new machines built since 2000
- **Fibre is the key industry challenge**
 - Impact on global trade flows
- **Product development driven by export industry**
 - Large share of transport packaging
 - Light-weighting and higher quality packaging in development phase
- **Domestic consumption expected to pick-up**

Capacity development



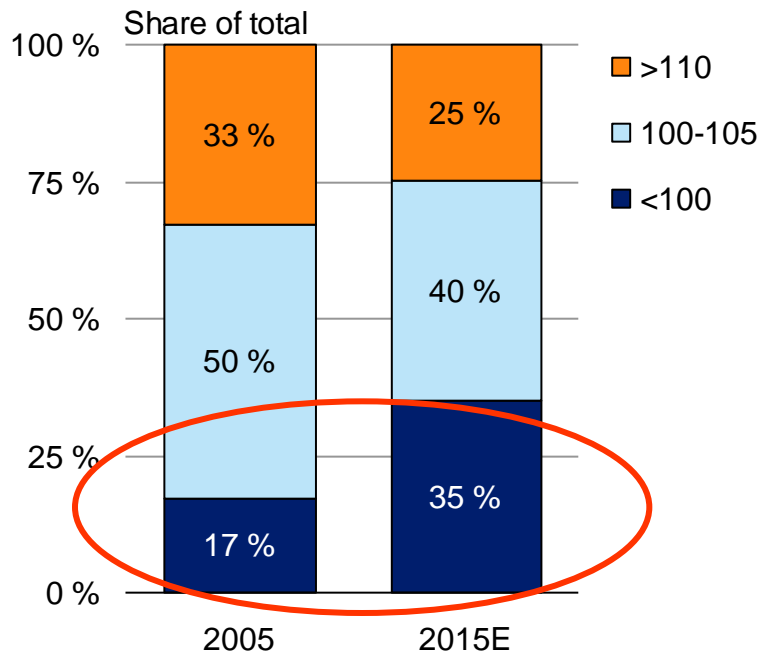
CONTAINERBOARD TRENDS AND OUTLOOK

Trends and Outlook

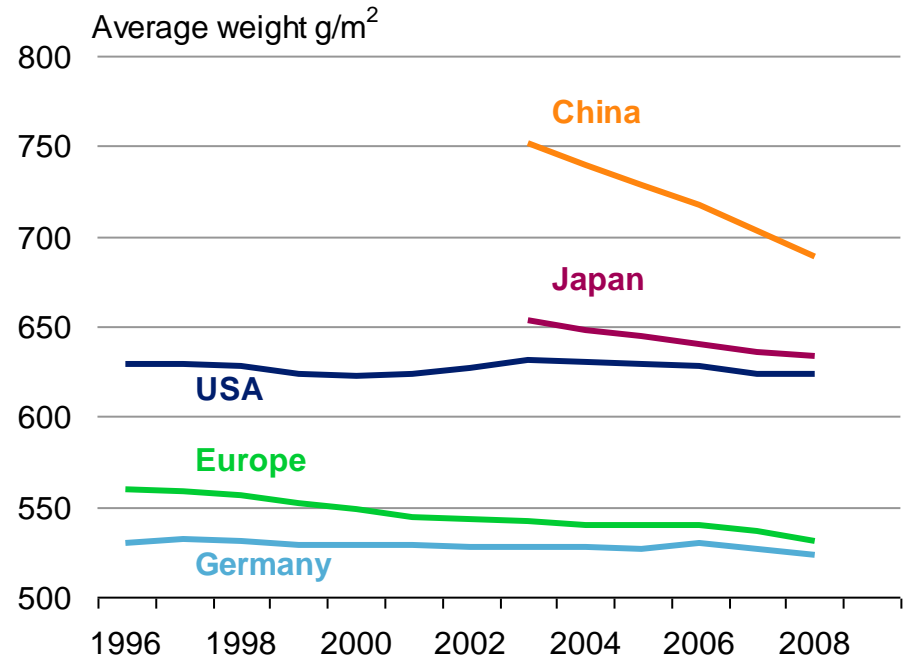
KEY TRENDS – LIGHT-WEIGHTING

Containerboard & Corrugated

Estimated RCF-fluting grammage breakdown in EU25

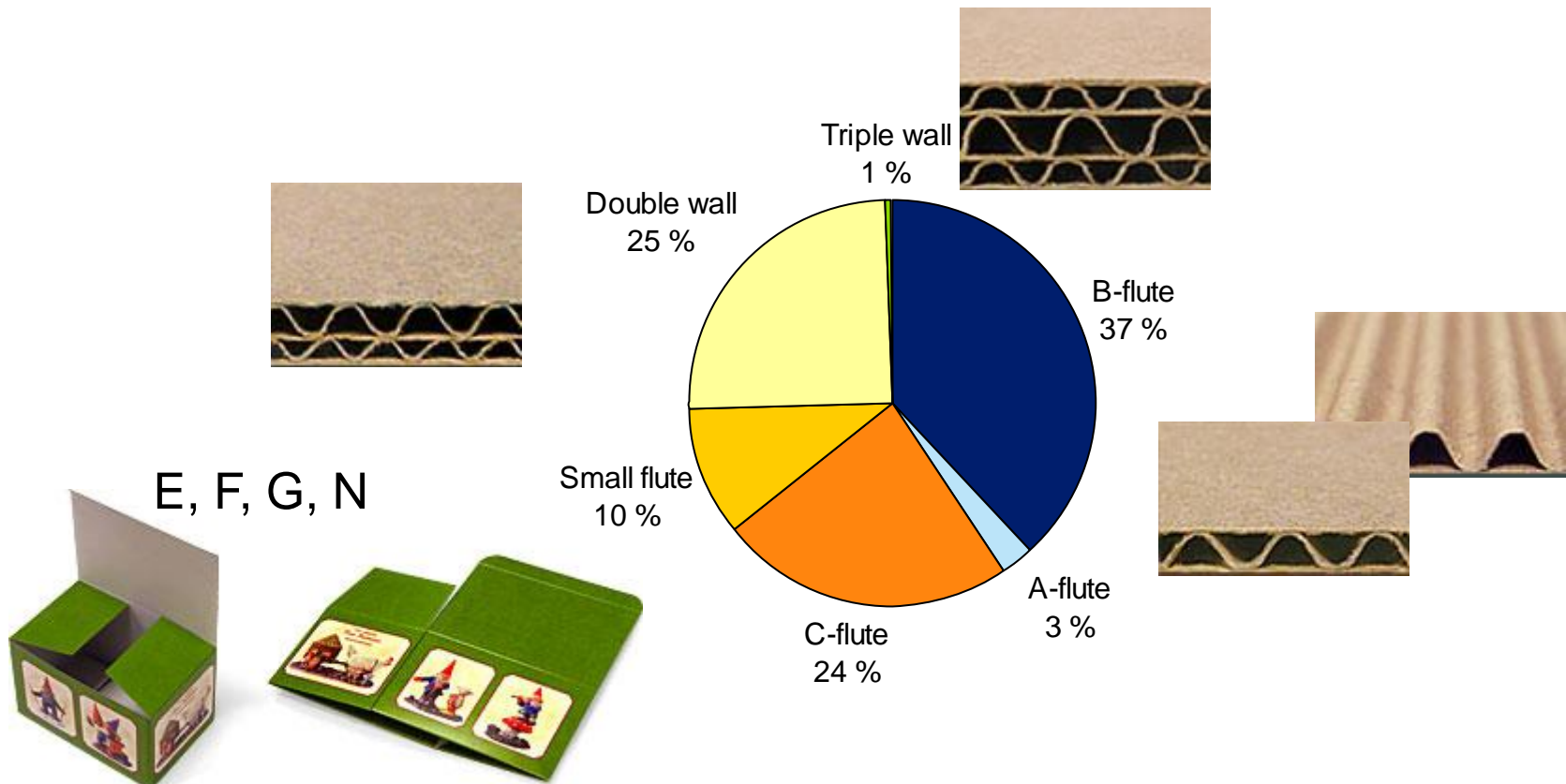


Corrugated board basis weight



KEY TRENDS – SMALL FLUTE AND MULTIWALL

Tightly linked to light-weighting. Single-wall still dominating structure, but the other constructions grow faster.

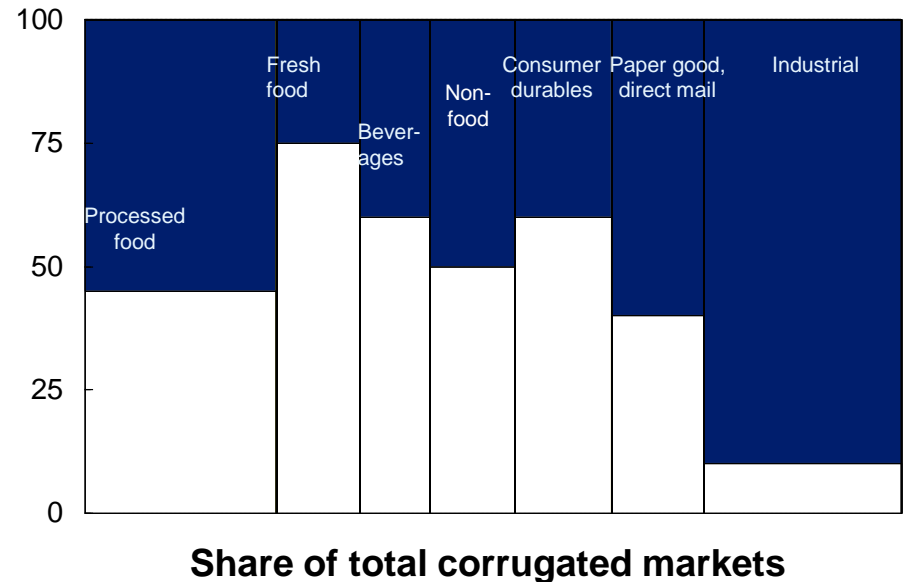


KEY TRENDS – WHITE-TOP, HIGH-QUALITY PRINTING, SHELF-READY PACKAGING

Shelf-ready packaging provides new opportunities for corrugated and has brought it closer to the consumers. Required high-quality printing has increased used of white-top linerboards.



White-top Liners by End Use



MARKET OUTLOOK UNTIL 2020

- **Healthy growth prospects globally**

- Demand in Asia and other emerging markets still growing
- New packaging solutions provide opportunities in mature markets

- **Prevailing product trends will continue**

- Increasing demand on white-top grades
- Increasing demand on recycled based grades
- Increasing demand on light-weight grades

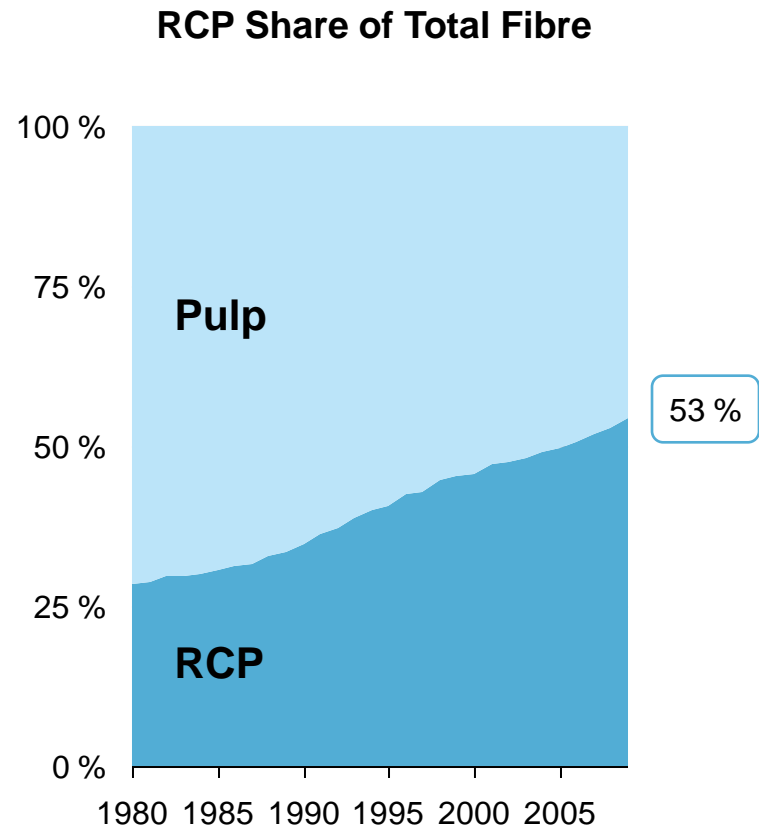
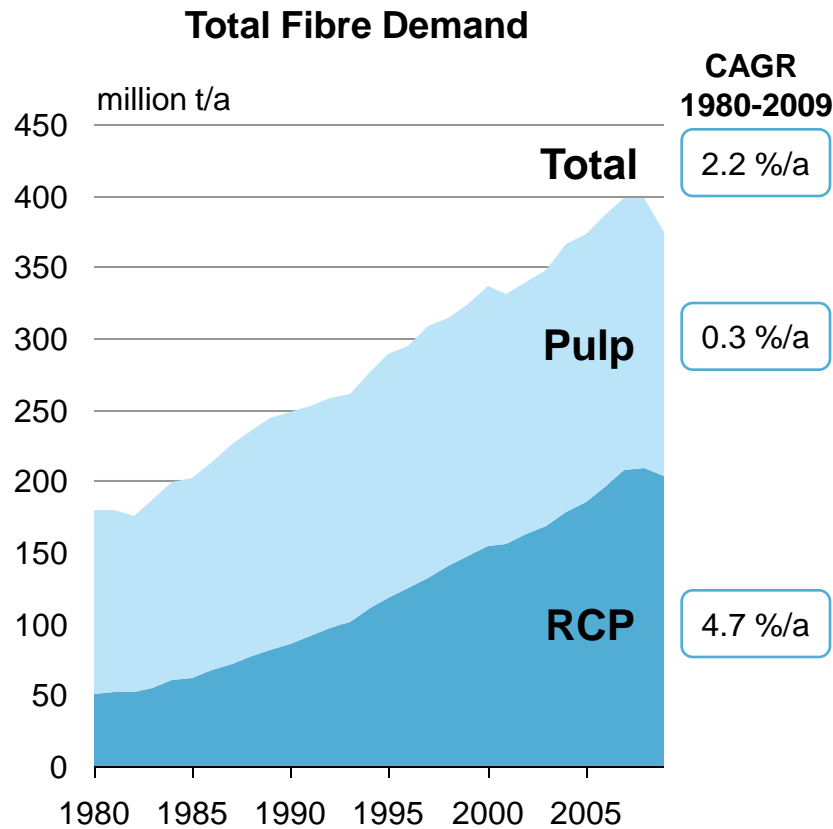


- ***Good growth prospects; CAGR 3 %/a***

- ***Increasing quality requirements***

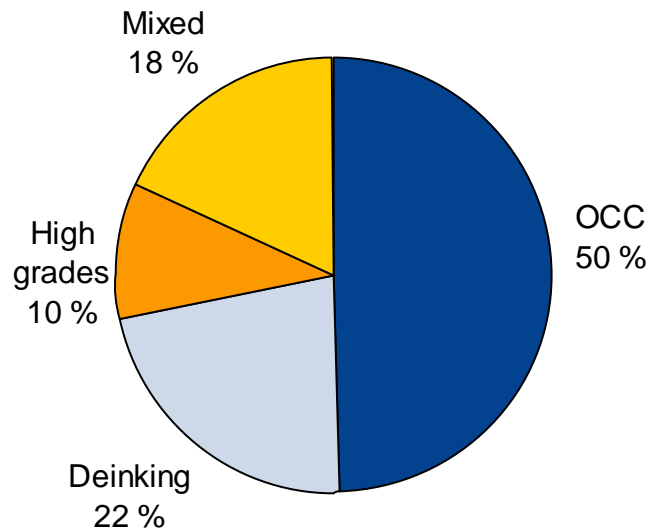
FIBRE CHALLENGES

DEVELOPMENT OF GLOBAL FIBRE MARKETS

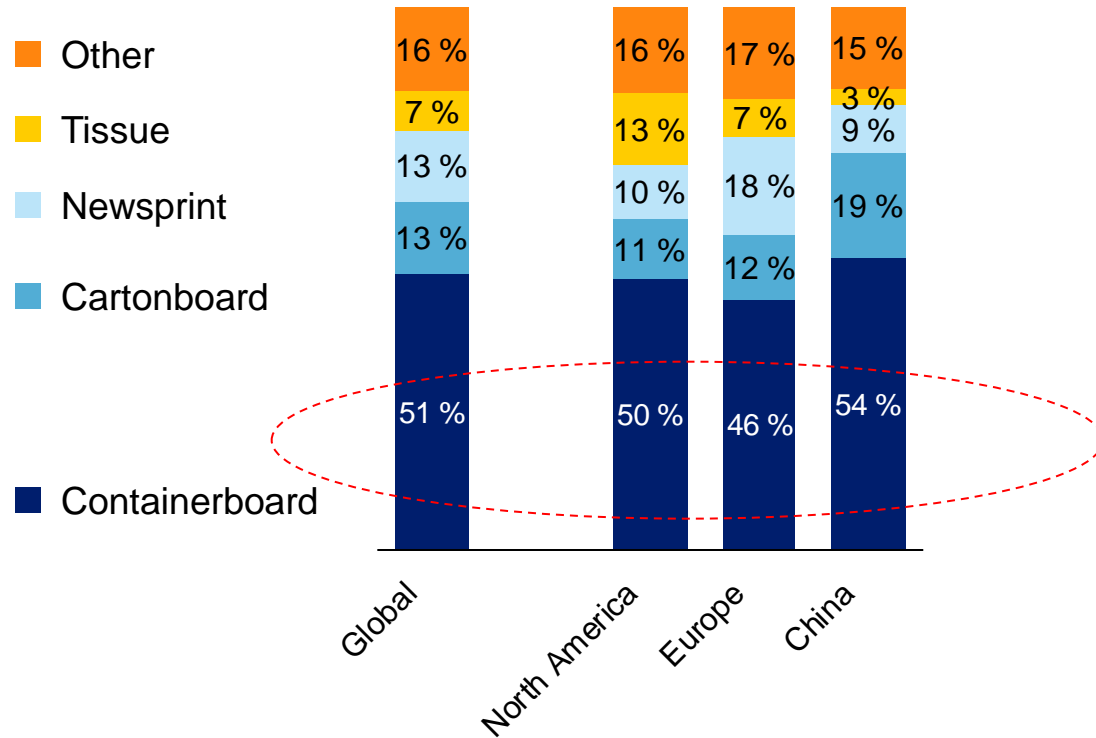


RCP USE IN PAPERMAKING

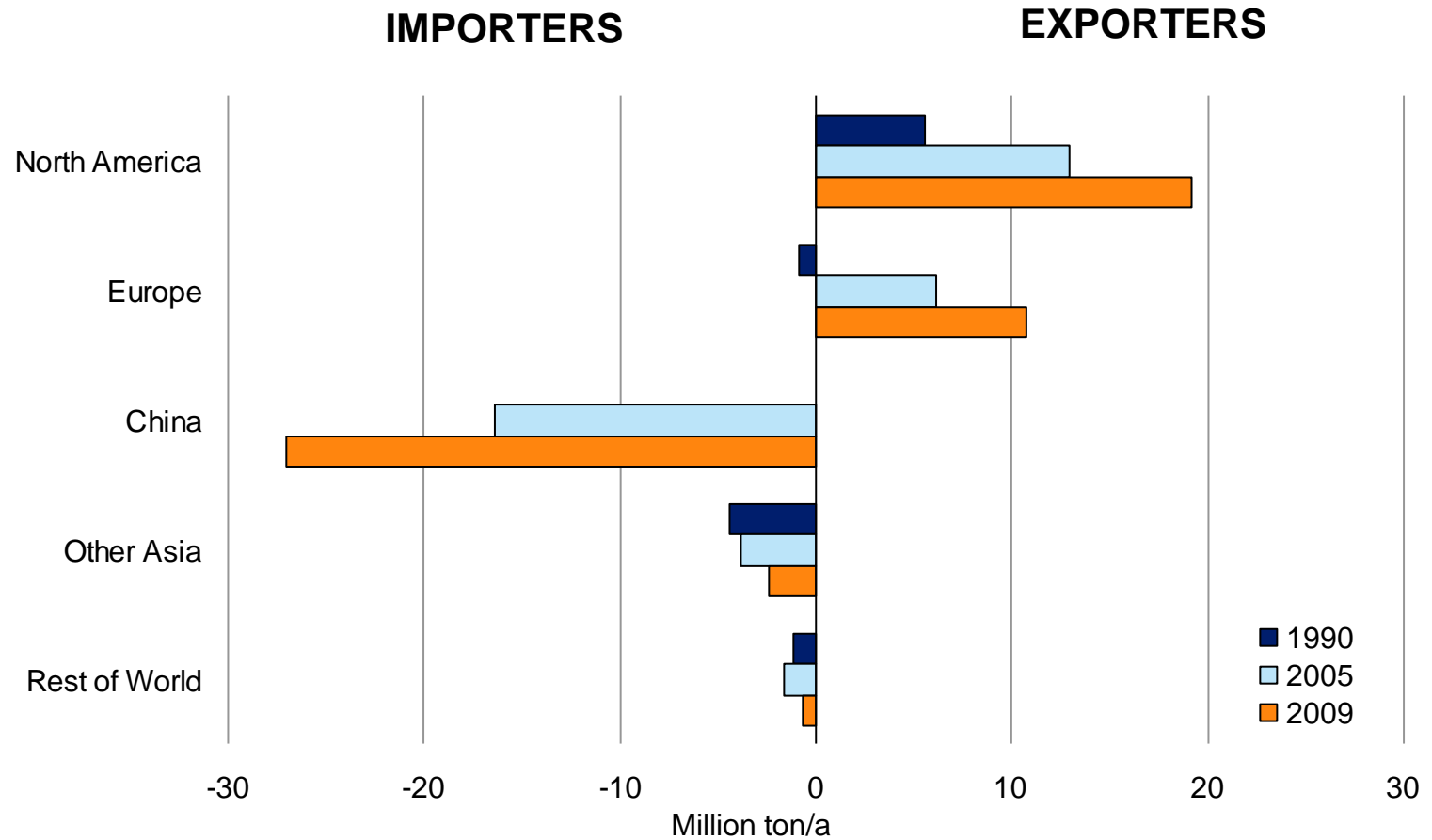
Consumption of RCP Grades



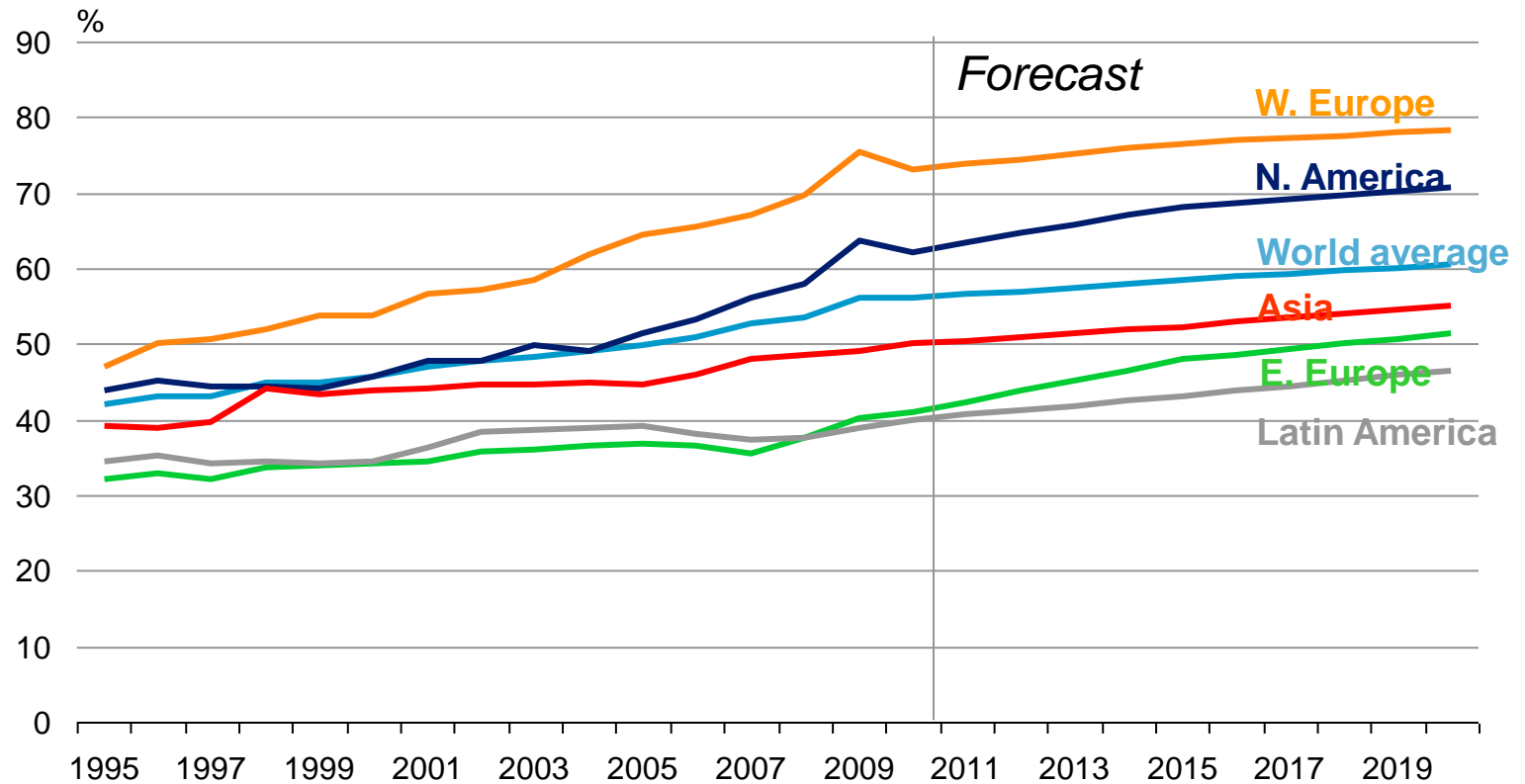
RCP Consumption by Paper Grades



DEVELOPMENT OF GLOBAL RCP TRADE FLOWS



COLLECTION RATE BY MAIN REGION 1995-2020



IMPLICATIONS ON CONTAINERBOARD INDUSTRY

Better products from lower quality raw material

- ***Increasing collection rates impact on both production process and technology as well as on production efficiency and economics***

- Lower yield, more fibre needed
- More fines lower strength, more chemicals needed
- Quality fluctuations, focus on stock preparation

- ***Increasing global competition affect on local availability***

- Price pressure
- Volatility
- Larger sourcing areas
- Middlemen



NEXT GENERATION CONTAINERBOARD MILL – MEETING THE NEEDS AND EXPECTATIONS

CONTAINERBOARD PRODUCT DEVELOPMENT IN EUROPE -LINERBOARD

UNBLEACHED

- Trend from testliner 2 to testliner 3
- Typical basis weights: 90 g/m² onwards
- Increasing share of mixed paper
- Kraftliner substitutes

WHITE-TOPS

- Trend towards better print quality
- 1-2 layer coating
- Cartonboard liners



CONTAINERBOARD PRODUCT DEVELOPMENT IN EUROPE -MEDIUM

LIGHT-WEIGHT RECYCLED

- From light weight (below 100 g/m²) to ultra light-weight down to 65 g/m²
- Furnish up to 100% mixed paper (EU 1.02)



SEMI-CHEMICAL SUBSTITUTES

- Diminishing share of virgin fibre based production - >Semi-chemical substitutes for eg. Frozen food
- Furnish: pre-consumer (kraftliner) clippings

DEVELOPMENT OF CONTAINERBOARD MACHINE CONCEPTS IN EUROPE

Start-up Year	1980	1990	2000	2010
Technical concept	<ul style="list-style-type: none"> W-type HB 2 Foudriniers Conv 3 nip press 	<ul style="list-style-type: none"> Converflo Bel Baie (horizontal double wire) Extended nip 	<ul style="list-style-type: none"> Dilution control HB Gap former Shoe press 	<ul style="list-style-type: none"> Hydraulic HB two ply High speed gap former Double shoe press
Dimensions				
<ul style="list-style-type: none"> Trim Design speed Capacity 	<ul style="list-style-type: none"> 4 900mm 450 m/min 75 000 t/a 	<ul style="list-style-type: none"> 7 460 mm 1000 m/min 230 000 t/a 	<ul style="list-style-type: none"> 7 600 mm 1 500 m/min 350 000 t/a 	<ul style="list-style-type: none"> 10 100 mm 1 900 m/min 650 000 t/a
Typical basis weight	130-150 g/m ²	110-120 g/m ²	90- g/m ²	65 - g/m ²

CURRENT STATE- OF- THE-ART CONCEPT

STOCK PREPARATION

- Fractionation
→ Better yield, lower contaminants

HB & FORMING

- Hydraulic HB and Gap Former
→ Formation, runnability

PRESS SECTION

- Two Shoe presses
→ Dry content, productivity

SIZE PRESS

- Film sizer
→ Higher speed, better control

RECENT PROJECTS AND FUTURE OUTLOOK

A FEW RECENT PROJECTS GLOBALLY



PROPAPIER
Germany 2010

SAICA
UK 2012



VISY
Australia 2009



PROPAPIER, EISENHÜTTENSTADT PM2, GERMANY

Largest RCP based machine in the world – 650 000 t/a

DIMENSIONS

- Testliner and fluting in the grammage 70-130 g/m²
- 100 % recycled fiber
- Trim width after winder 10 000 mm
- Design speed 1 900 m/min

CONCEPT

- Dilution HB (OptiFlo)
- High Speed Gap Former (OptiFormer)
- Double Shoe Press (OptiPress)
- Film Sizer (OptiSizer)



On July 23, 2010 PM2 produced 2,099 tonnes of corrugating medium and testliner 3 at an average basis weight of 109 g/m². Machine efficiency reached 99.2 %.

SAICA PARTINGTON PM11, UK

A greenfield mill of 425 000 t/a with a CHP

DIMENSIONS

- Testliner and fluting in the grammage 75-125 g/m²
- Raw material: Recovered fibre
- Trim width after winder 7 500 mm
- Design speed 1 700 m/min, operating speed 1600 m/min

CONCEPT

- Dilution HB (OptiFlo)
- High Speed Gap Former (OptiFormer)
- Trinip with shoe
- Film Sizer (OptiSizer)
- Lower energy and water consumption



Start-up scheduled beginning of 2012.

VISY, TUMUT PM10, AUSTRALIA - KRAFTLINER

Most recently started kraftliner machine – started in the end of a year 2009.

DIMENSIONS

- Unbleached and white surface kraftliner; 150-400 g/m²
- Raw material: virgin (plantation softwood) and recovered fiber
- Trim width 7 490 mm
- Design speed 1 200 m/min

CONCEPT

- Hydraulic HB
- 3 Fourdriniers
- 2 shoe presses



WHAT CAN WE EXPECT FROM THE FUTURE

- **DIMENSIONS**

- **Width:**

- Four corrugator roll machine a maximum;

- **Speed:**

- Size press and fiber quality are limiting going forward from 1600 m/min onwards

- **CONCEPTS - NO MAJOR CHANGES**

- Gap former

- Shoe press

- Film sizer

WHAT CAN WE EXPECT FROM THE FUTURE (CONT.)

- **PRODUCTS**

- ***Light-weighting will grow, BUT***

- New machines eaching the limits around 60 g/m²
 - Limited capabilities of the existing machines

- ***Better printability***

- White-top
 - Coating, 1-2 layers

- ***Fibre furnish:***

- Deterioration of fibre quality; focus on stock preparation
 - Flexibility
 - Sizing helps but strenght properties can not be compensated
 - Need for kraft

NEW TECHNOLOGIES

NANOTECHNOLOGY

R&D IN FOREST CLUSTER RELATED TO NANOTECHNOLOGY

Main drivers

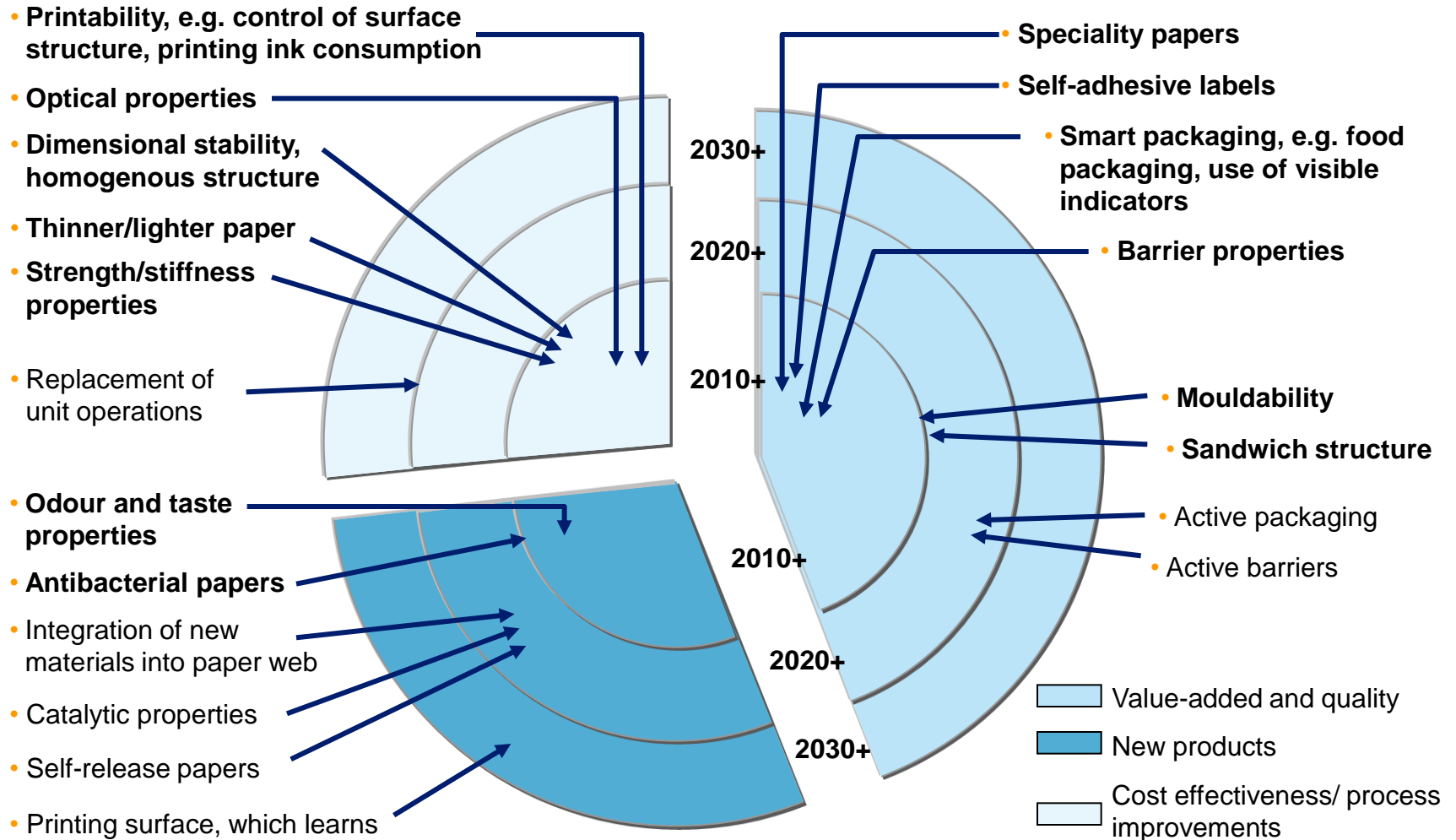
- Cost effectiveness
- Improved product quality, i.e. value-added products
- Completely new products including different by-products



Application areas

- Pulp/fibre
- Chemicals
- Pulping and paper machine technology
- Paper, packaging and tissue
- Wood processing and products
- Specialties

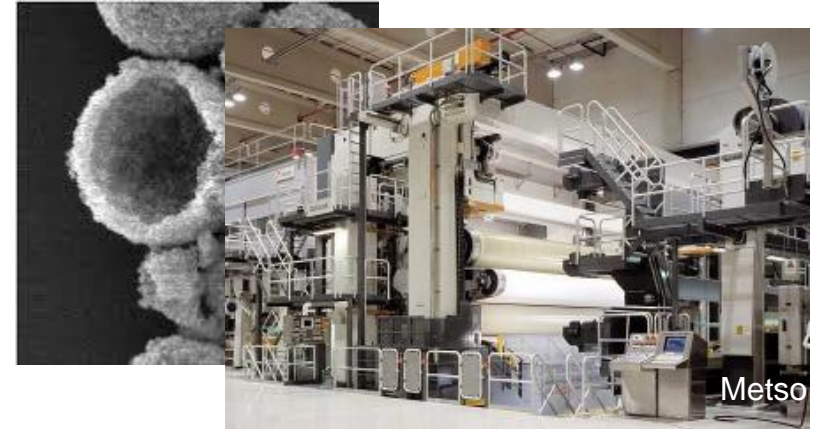
TIMELINE FOR NANO-ENHANCED FIBER BASED PRODUCTS



NANOTECHNOLOGY – A FEW EXAMPLES OF APPLICATIONS

- **Papermaking machinery**

- Reinforced composites
- Nano-structured surfaces
- Nano-sensors



- **Pulp and paper**

- Nano-fibres to form extraordinary properties
- Nano-sensors for enhanced recycling
- Functional paper coating
- Smart paper



- **Packaging**

- Active packaging
- Security applications



CONCLUSIONS

INDUSTRY OPPORTUNITIES AND CHALLENGES

- **Healthy growth opportunities**
 - Industrial production and retail development on emerging markets
 - New packaging solutions in mature markets
- **Fibre challenges vs. quality requirements**
 - Increasing recovery rates and lowering RCP quality
 - Increasing containerboard quality requirements -> need for kraft
- **Focus on margin improvement**
 - Capacity and capex optimisation
 - Efficiency throughout the value chain
 - Other costs: energy, fixed
- **Sustainability – a Key Success Factor Against Plastics**

Thank You !



PÖYRY

Engineering balanced sustainability™

CONTACT:

NAME: OUTI JUNTTI

TITLE: PRINCIPAL

MAIL: OUTI.JUNTTI@POYRY.COM

PHONE: +358 10 33 22994