

# Recycling of Graphic Paper Products – Challenges and Trends

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International Association of the Deinking Industry  
(INGEDE)

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Graz, Austria



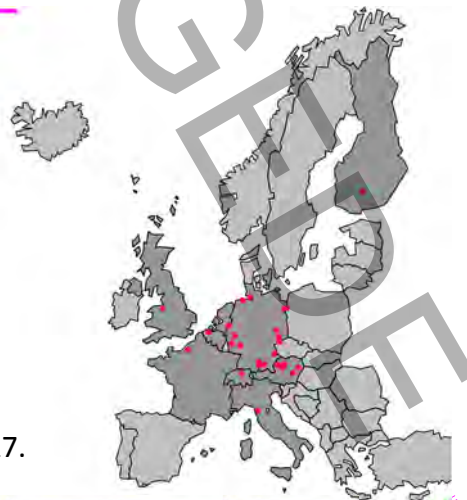
## INGEDE

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INGEDE is the organisation of European deinking mills.

INGEDE was founded 1989 by 12 companies.

Currently **26 paper** mills are members of INGEDE, who utilised about **7,0 million tons** of Paper for Recycling (PFR) in 2017.



Graphic Papers

Special Writing

Special Packaging

Tissue

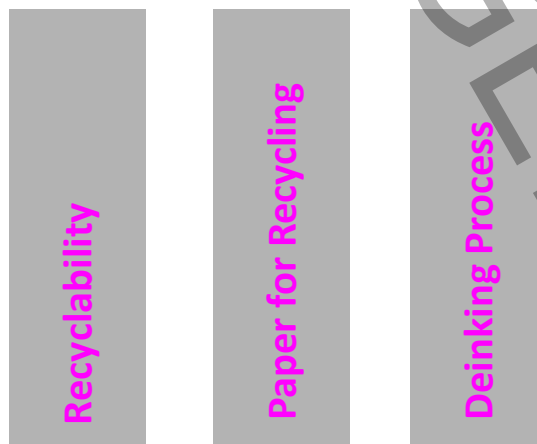


## Activities of INGEDE

Research	Funding INGEDE research projects Monitoring 3rd party funded projects Developing INGEDE Test Methods
Representation of interests	Communication, standardisation, technical committees of the value chain, conferences, ecolabels, statistics
Member activities	Exchange of experience (working groups, annual symposium, project meetings), networking

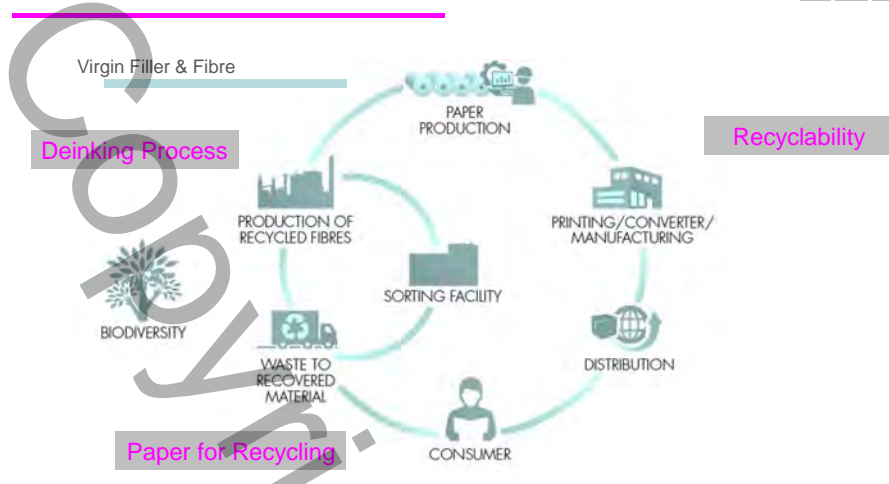


## INGEDE's Thematic Pillars



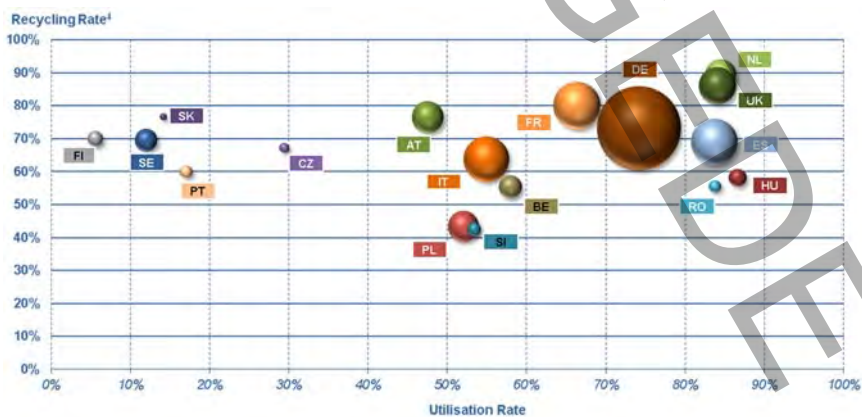
# INGEDE Thematic Pillars within the Paper Value Chain

Recyclability  
Paper for Recycling  
Deinking Process



# The importance of paper recycling in European Countries

Recyclability  
Paper for Recycling  
Deinking Process



Bubble size is proportional to the Utilisation of Paper for Recycling – Source: CEPI



## INGEDE Thematic Pillars – General Trends



### Recyclability

- Higher diversity of printing technologies
- New converting technologies and materials

### Paper for Recycling

- Declining share of graphic products in PfR collection
- Increasing share of board in deinking grades
- Declining availability of deinking grades

### Deinking Process

- Increasing load of non-paper components
- Increasing ash content in PfR
- Decreasing brightness potential
- Increasing problems with “Stickies”



## Recyclability assessment



- The European Paper Recycling Council issues scorecards
  - Deinkability
  - Removability of adhesive applications



- Ecolabels for printed matter are based on these scorecards

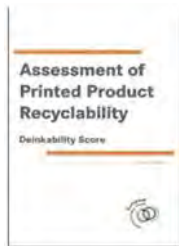


# News from the European Paper Recycling Council (EPRC) – 2017/2018

- **New European Declaration on Paper Recycling** issued in May 2017
- Monitoring Report 2016: **Paper Recycling Chain on track, but 2020 target will be difficult to reach**
- Revision of **Deinking Scorecard** by addition of an annex finalised
- Revision of **Removal Scorecard** with respect to hotmelt adhesive applications is settled technically
- Revision of **Recyclability Guideline** document initiated



## Deinkability assessment



Objectives	Evaluated Parameters
High Reflection	Luminosity Y of Deinked Pulp
High Optical Cleanliness	Dirt Area A* of Deinked Pulp
No Color Shade	a* Value of Deinked Pulp
High Ink Removal	Ink Elimination IE
No Discoloration of White Water	Filtrate Darkening ΔY

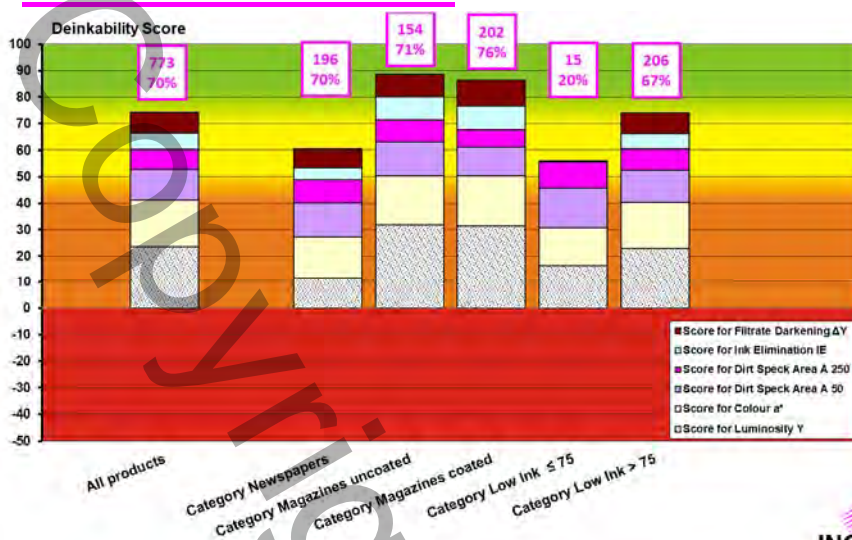
Quality Parameters  
Process Parameters



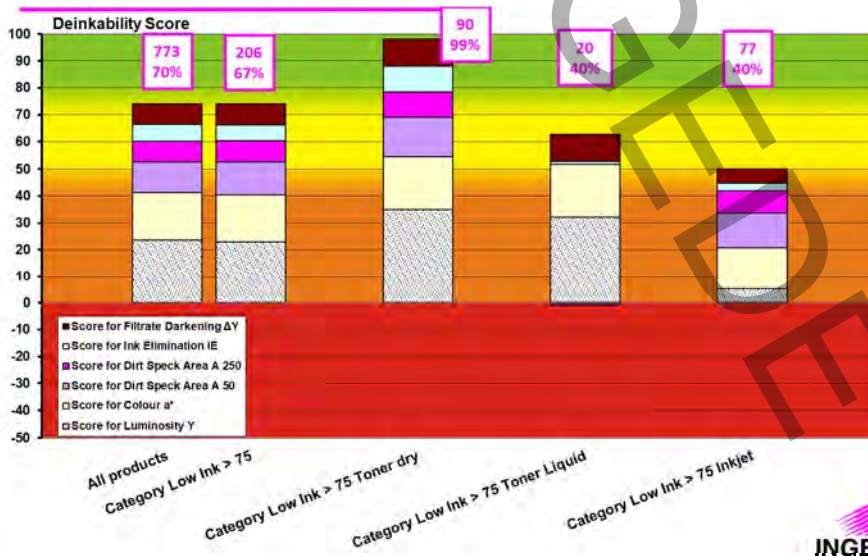
Score	Evaluation of deinkability
71 to 100 Points	Good
51 to 70 Points	Fair
0 to 50 Points	Tolerable
negative (failed to meet at least one threshold)	Not suitable for deinking (may be recyclable without deinking)



## Deinkability of printed products – all printing methods

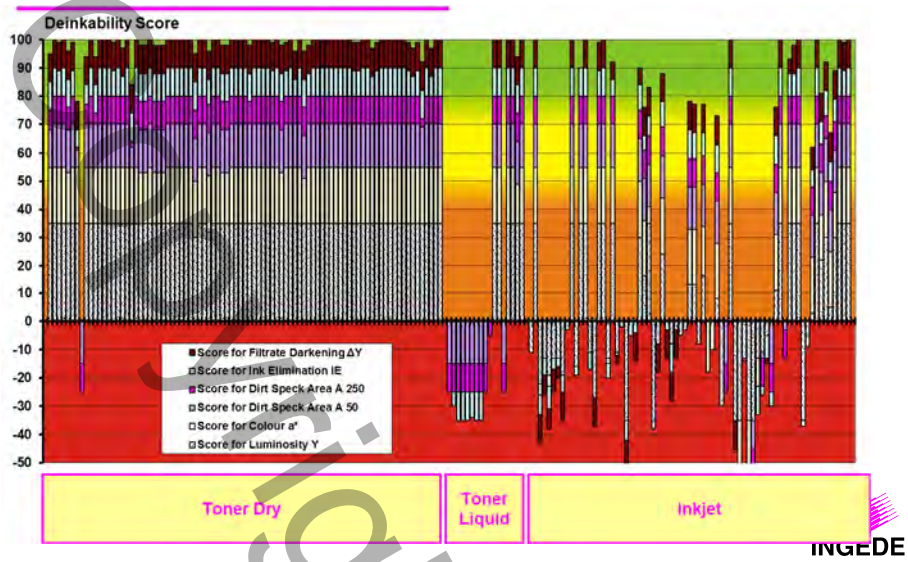


## Deinkability of printed products (low ink > 75) – impact of printing methods

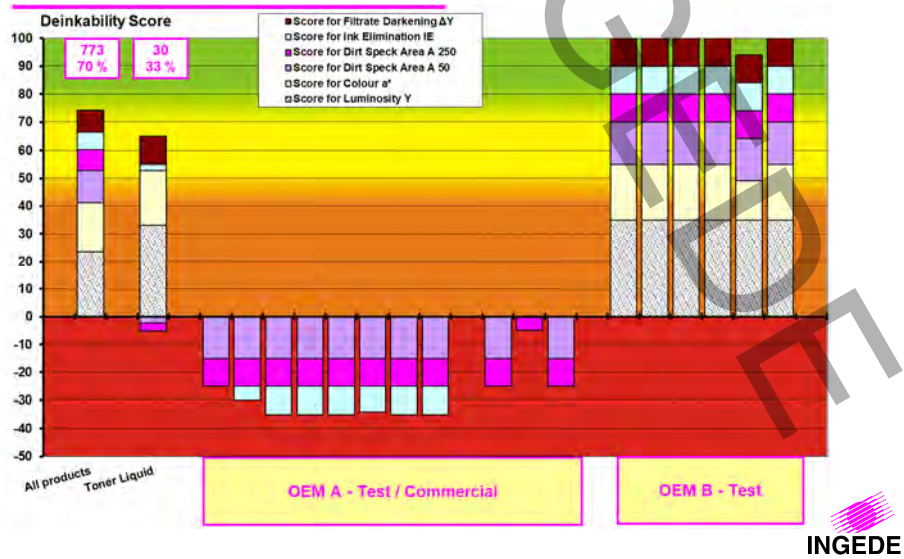




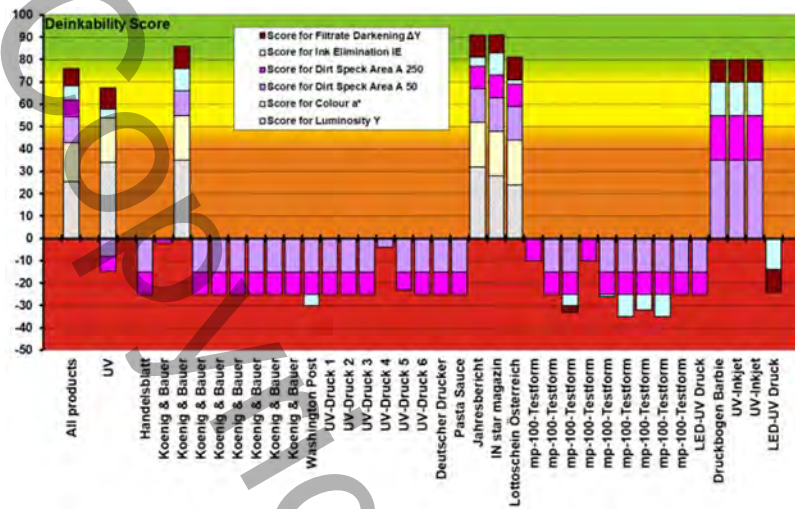
## Deinkability of printed products (low ink > 75) – impact of printing methods



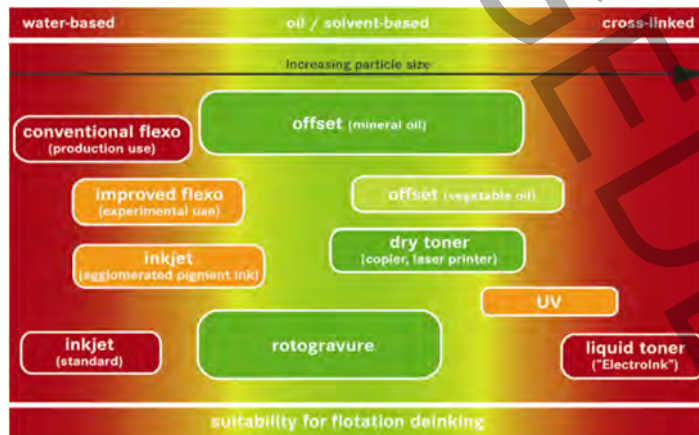
## Deinkability of liquid toner prints – different vendors



## Deinkability test results of UV cured prints



## Deinkability of printed products – impact of printing methods



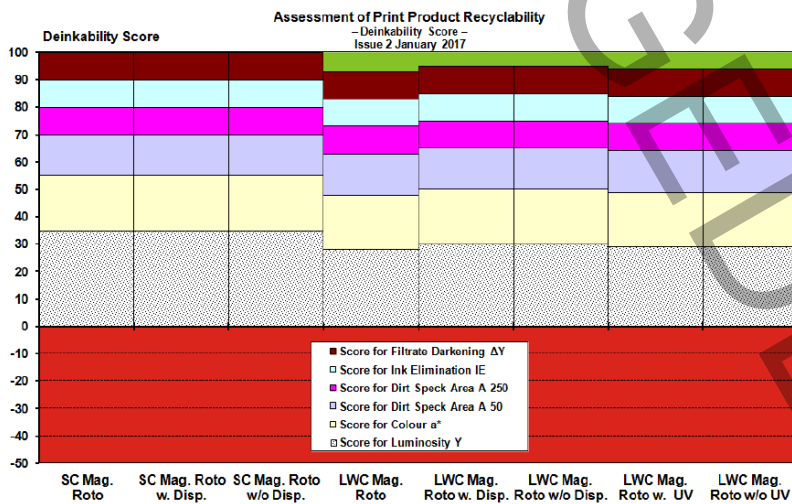


## INGEDE Project 153 17 Deinkability Survey 2017

- **Scope**  
Survey on deinkability of different print product mixtures relevant to 1.11.00 (sorted graphic paper for deinking)
- **Boundary Conditions**  
No tests of single print products but tests of print product categories with 3–13 different samples
- **Test Method**  
Deinkability test according to INGEDE Method 11 (new version of January 2018)
- **Assessment**  
Assessment of deinkability score according to EPRC (version of January 2017)



## INGEDE Project 15317 – Rotogravure Magazine Mixtures



## Recyclability of Printed Products – Current results of Major Topics



- Results from Deinkability Assessment
  - Most printed products are sufficiently deinkable – standard offset, rotogravure, dry toner
  - Digital printing methods
    - Pigment based inkjet – mostly low brightness, sometimes ok
    - Dye based inkjet – mostly low brightness and often (green) colour shade
    - Liquid toner – market leader insufficiently deinkable due to dirt specks
  - UV cured systems – mostly problematic due to dirt specks
- Market Developments and Trends
  - Mixtures of printing products from household collection are sufficient deinkable, problems reported with printing house collection
  - Digital printing and especially UV cured printing are gaining market share
    - Low Deinkability will arise when certain thresholds are exceeded
  - Monitoring the development of “mineral oil optimised” ink

→ Development of Recyclable Printing Methods inevitable

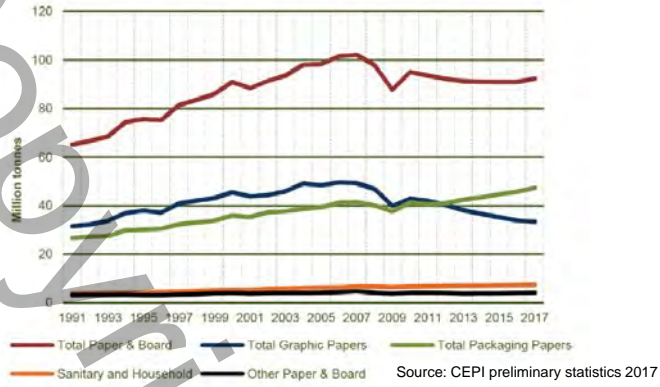


## Do you want to print on such papers?



## Production Development in Europe

Production of paper and board in CEPI countries



## Two main groups of Paper for Recycling

Mixed and packaging



Graphic

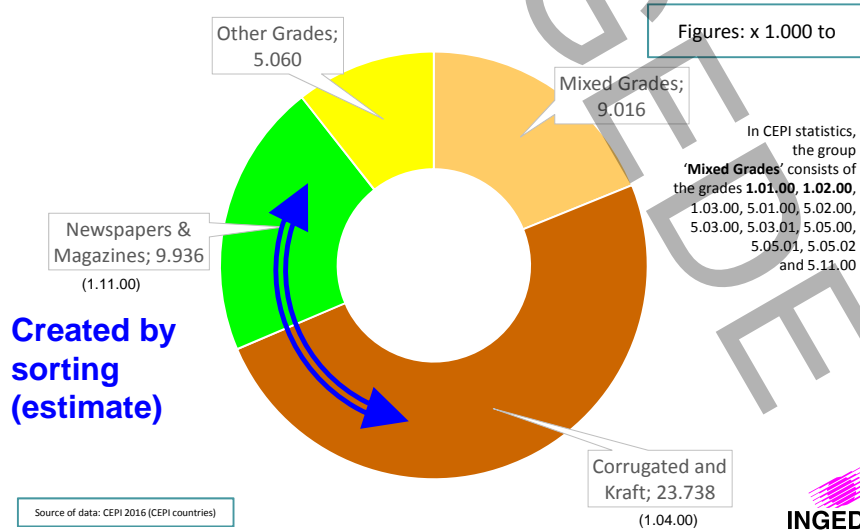


## Main sources of paper for recycling

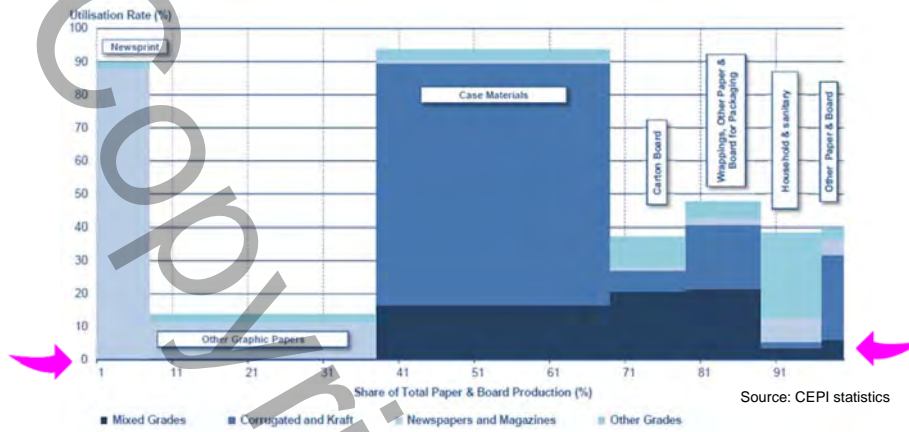
Source	Quality	Remarks
Households	Mostly mixed (graphic and packaging), sometimes selective	Mixed requires sorting or is sold as mixed
Retailers, other trade	Mostly packaging	
Offices	Mostly graphic	
Printing and converting industry	Either graphic or packaging	



## Collection of PfR in Europe

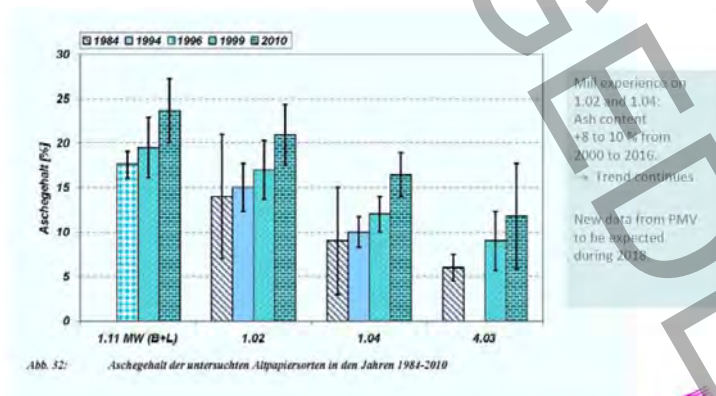


## Utilisation of Paper for Recycling in Europe



'Mixed Grades' consists of the grades 1.01.00, 1.02.00, 1.03.00, 5.01.00, 5.02.00, 5.03.00, 5.03.01, 5.05.00, 5.05.01, 5.05.02 and 5.11.00 (CEPI countries)

## Quality development of PFR grades – Ash content



Source: IGF Project 15406, PMV Darmstadt, November 2010



## Quality development of PFR grades – Mill experience (IGF 15408)



- Most **strength parameters** in grades 1.02 and 1.04 **dropped** by 5–10 % from 1999 to 2010
  - Compensation in production by raw material mix, starch, dry strength agents and/or grammage
- **COD increased** by 10–20 %
  - Adding starch is obviously the dominant compensation
- **Bending stiffness decreased** by 10–15 % in 16 years
  - Compensation in board production by addition of virgin fibres (mechanical pulp or CTMP), lower coating weights (more expensive pigments), lower press loading, higher grammage



## Paper for Recycling – Current Major Topics



- Production/Consumption of graphic papers declining
  - Availability of graphic grades paper for recycling (e.g. 1.11.00)
    - Supply is generally short
    - Volumes have sometimes to be shipped over long distances
    - Some mills have to increase input of virgin fibres
    - Increased production of white top layer packaging grades with PFR requires additional share of graphic papers from the graphic loop
    - White grades used for white top liners do not return to the graphic loop
- Increased and improved collection → IMPACTPaperRec
- Increase sorting of mixed grades
- More efficient sorting



## Project Outcomes



- Handbook with Good and Best Practices for paper collection including a selection tree
- Informative brochures and posters
- E-learning modules for the target groups
- Video clips on youtube.com



- **All material available at [www.impactpaperec.eu](http://www.impactpaperec.eu)**



## INGEDE Partners – working closer together



- Paper & board recycling has a long history in circular economy
  - Work and project funding of INGEDE members has contributed significantly to a 72 % world leading recycling rate in Europe
  - Fast developments in paper products composition and printing technologies lead to:
    - Increased need of project funding in the area of
      - Recyclability of printed products
      - PfR Collection and Sorting
      - Deinking process and automation
    - Need of closer cooperation of all partners in the paper chain
- New INGEDE Partner program started



## INGEDE Partnership program

INGEDE invites companies in the paper recycling value to participate in the new partnership program to ...

- support and develop paper recycling and deinking
- contribute to technical discussions within INGEDE
- provide financial contribution for project funding

INGEDE offers partnership in three levels:



→ More details from the INGEDE office



## INGEDE Partners

INGEDE Silver Partner



INGEDE Bronze Partner



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**International Association of the Deinking Industry**



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