



**KENNISCENTRUM
PAPIER EN KARTON**

PAPER AND BOARD; BIOBASED & CIRCULAR!?

KIVI, 3 OKTBER 2016

ARIE HOOIMEIJER, KCPK

INHOUD

- Trends
- Industrie
- Biobased
- Circulair
- Business modellen
- Conclusies
- Discussie



RECYCLE YOUR OWN PAPER (6724 A4 / DAY)

- Dit is: 30 kg / dag
- PM2 Parenco: 1.100.000 kg / dag

3D Printing



INTERNET OF THINGS

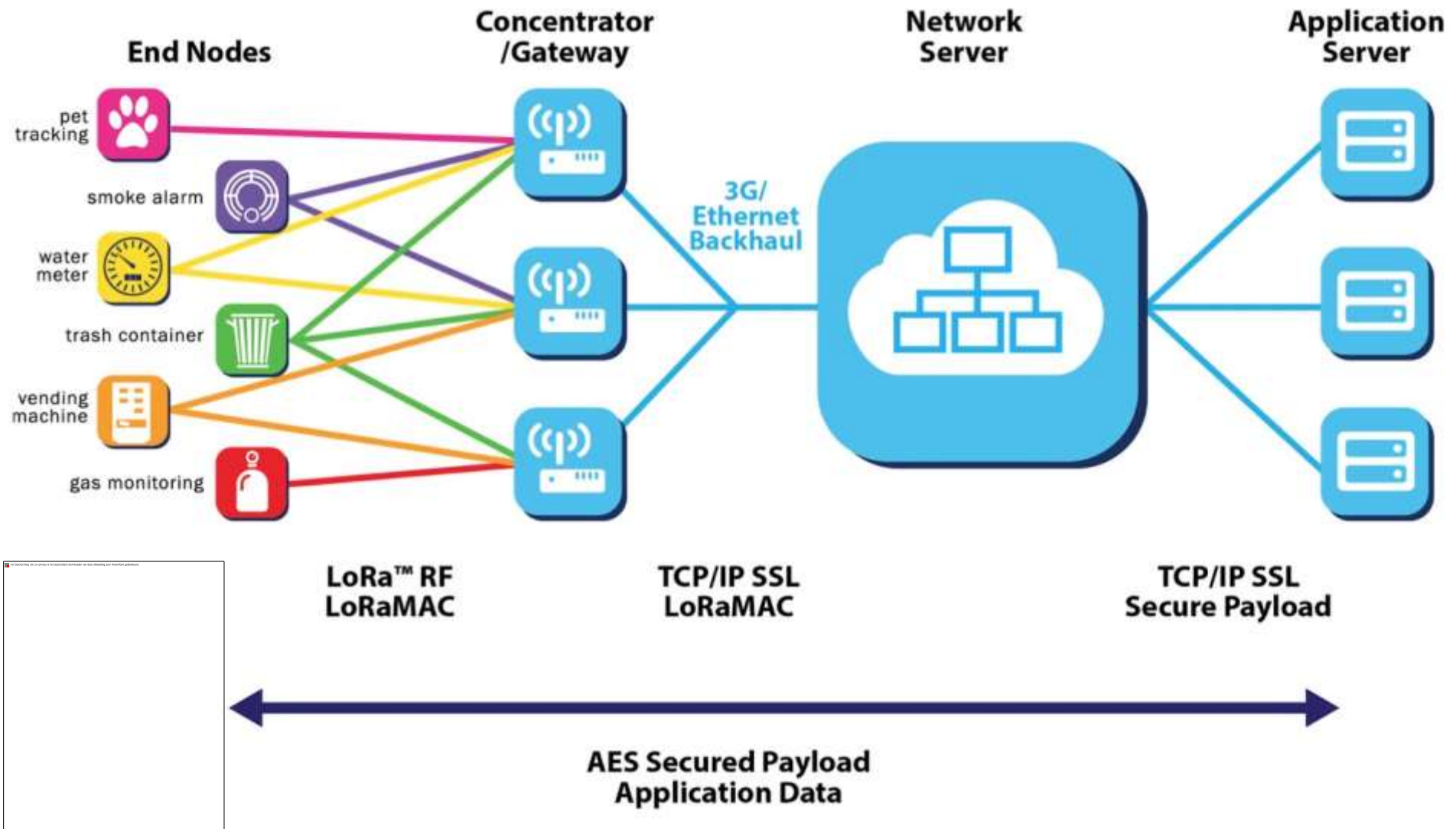
Nu nog:



Straks:



LoRa NETWORK KPN IN 3D MAKERS ZONE



OFF-LINE -> ON-LINE -> OFF-LINE



DIGITAL PRINTING ON A "BOARD" MACHINE

DS Smith Packaging is the first customer to install the 2.8 meter width (110-inch) digital press 30.000m² printing per hour



DRINKABLE BOOK



OVENABLE BOARD



Consumer wants various sizes



Made-to-size/personalized packaging is hot!
Variance in consumer demands/desires is growing
Packaging producers are expected to be increasingly flexible

CONSUMER PRODUCT; ACTIVE PAPER



Testimonials

"The Miracle Paper"
THE WASHINGTON POST

"Ingenious"
THE NEW YORK TIMES

"The best *non-diet* diet tip we've ever heard"

OPRAH MAGAZINE

"We tried it, & it works!"
PREVENTION MAGAZINE



'INTELLIGENT'

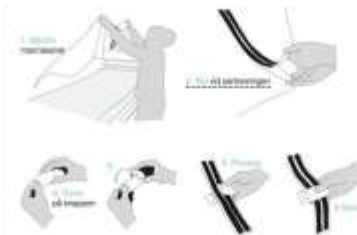
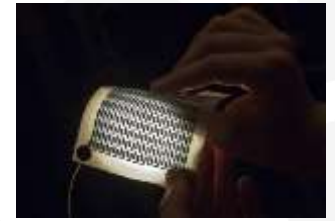
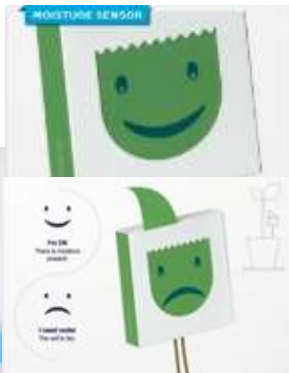
Intelligent packaging senses changes and communicates additional information to the consumer about the quality/state of the packed product



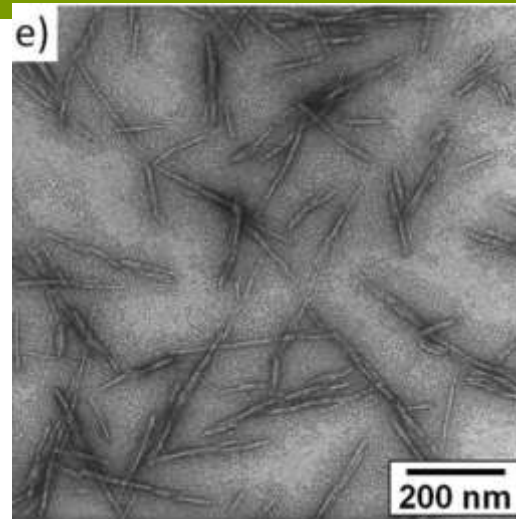
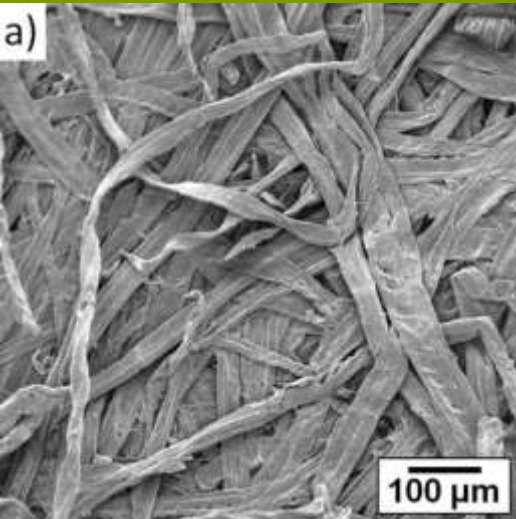
© KoYang

Example:
Beverage packaging that changes colour as time passes to indicate the product is too warm

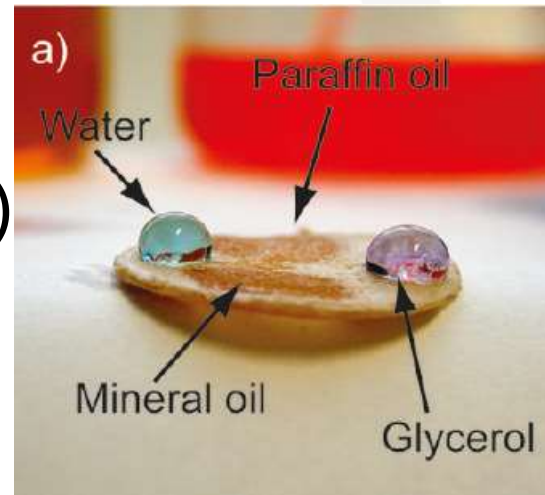
PRINTED INTELLIGENCE / ELECTRONICS



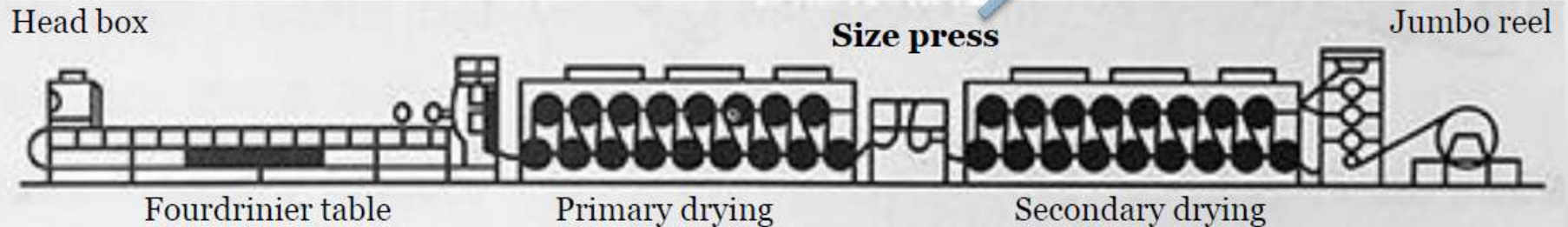
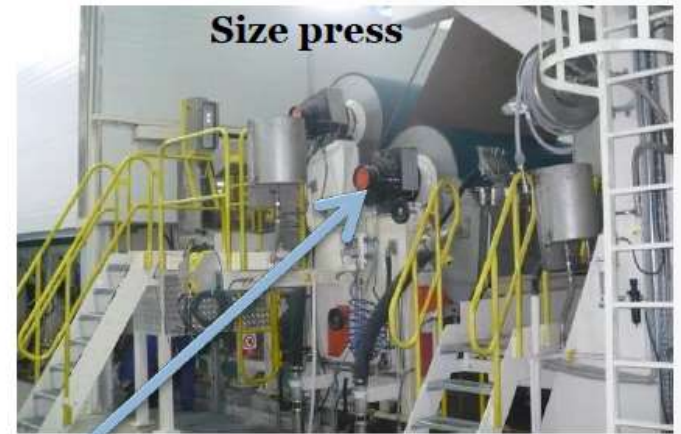
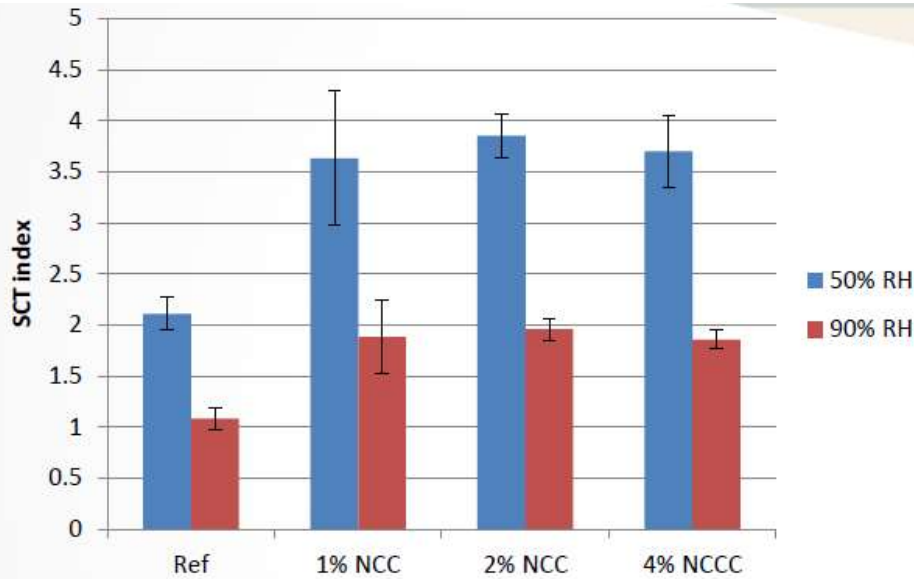
Nano cellulose



- Hydrophobic properties
- Antimicrobial
- Wavelength responsive
- Oil absorbance (lipophilic)
- Electrical conductivity



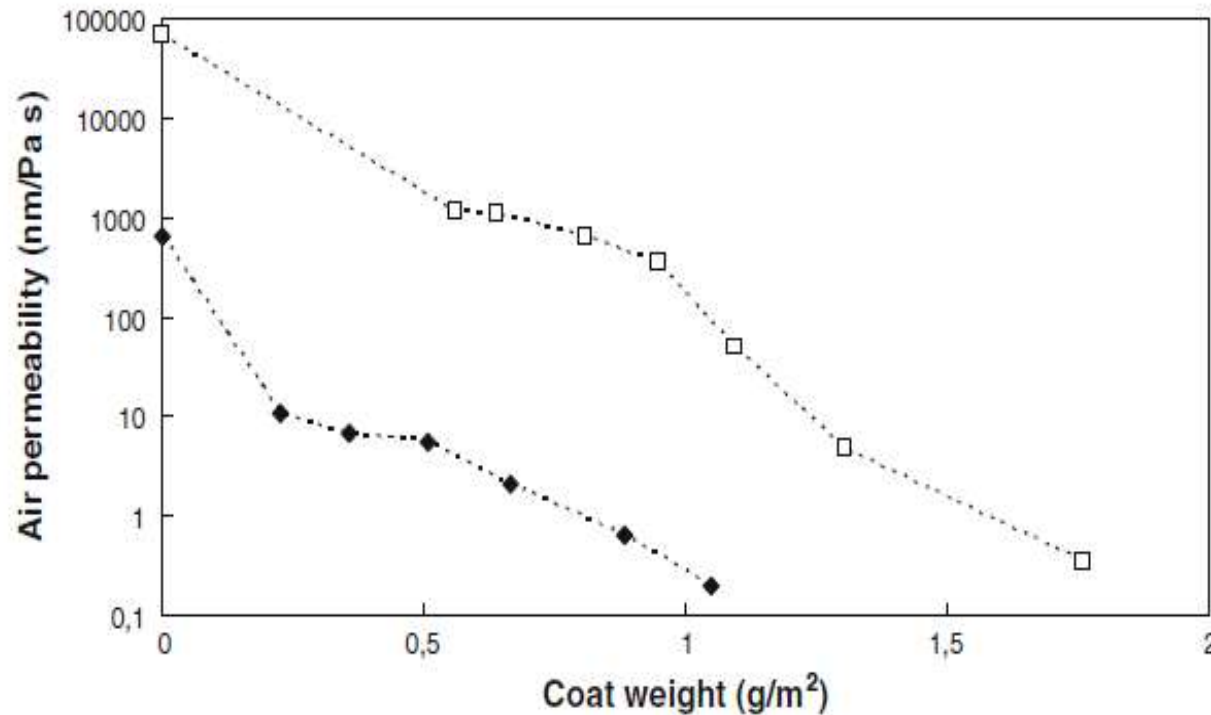
Nanocellulose versterkt zetmeel sizing



Melodea Ltd. proprietary information



NANOCELLULOSE -> BARRIERE OP PAPIER



- Via Nanocellulose kan een zuurstof barrière worden aangebracht.
- Verdere behandeling echter noodzakelijk vanwege de vochtgevoeligheid van de Nanocellulose

NANOCELLULOSE; WAVE LENGTH RESPONSIVE

NCC = Kristallijn
NanoCellulose kan zo
geproduceerd worden dat
het op een instelbare
manier licht breekt ->
Unieke
beveiligingsaspecten



Physical colors

Tetra Rex biobased drankkarton



Maar ook:



The Green Fiber Bottle Project Better World in the Making

KNOCK ON WOOD
A biobased bottle made from sustainably sourced wood fiber.

AS GOOD AS GREEN
Strong, durable material, 100% compliant with the strictest food and beverage regulations.

IN THE NAME OF BEER LOVE
Will contribute to spreading sustainable beer love everywhere in partnership with ecoXpac.

ZERO WASTE
Will be 100% biodegradable and generate 0% waste.

THE EIGHT PARTNERS IN THE CARLSBERG CIRCULAR COMMUNITY



Prevention of food losses



Noodwoningen in karton



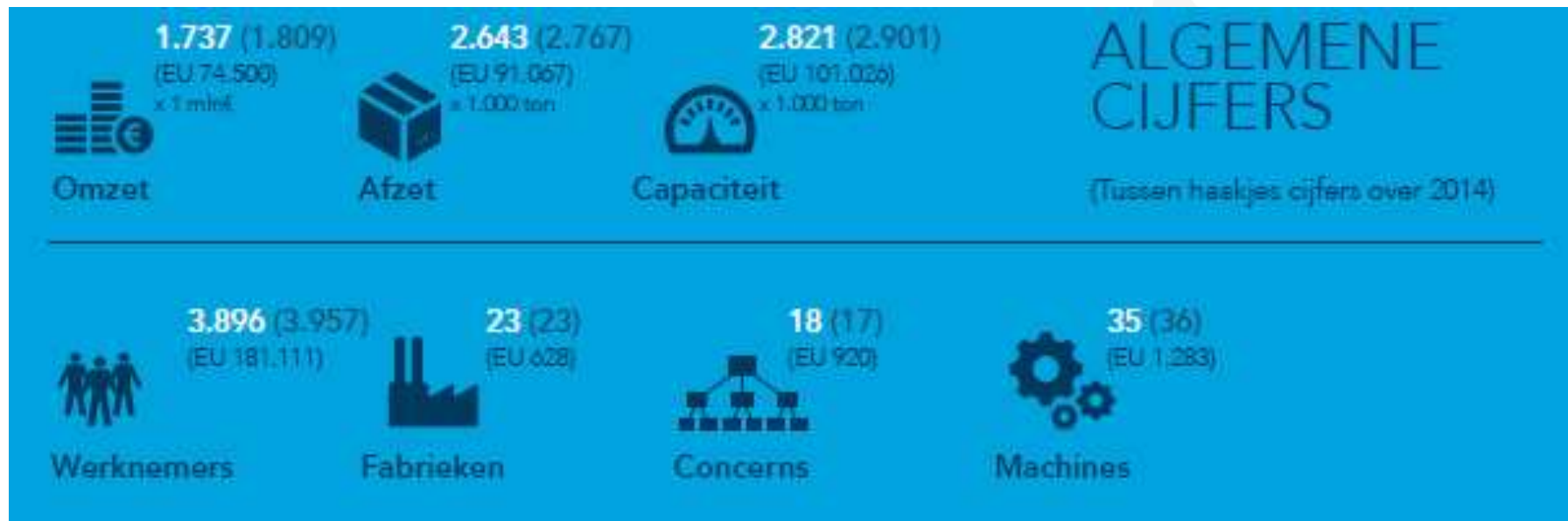
Bibliotheekinrichting van karton



DUTCH PBI AT A GLANCE



PBI THE NETHERLANDS



Bron: VNP Jaarverslag 2015

HISTORISCHE ONTWIKKELING AFZET 2000-2015

AFZET VAN DE NEDERLANDSE PAPIER- EN KARTONINDUSTRIE 2000-2015

(x 1.000 ton)

	Grafisch papier				Verpakkingspapier en -karton				Sanitair papier			
	Afzet	Binnenland	Export		Afzet	Binnenland	Export		Afzet	Binnenland	Export	
2000	1.346	304 23%	1.042 77%		1.854	577 31%	1.277 69%		133	102 77%	31 23%	
2005	1.352	290 21%	1.062 79%		1.994	613 31%	1.381 69%		125	64 51%	61 49%	
2010	967	158 16%	809 84%		1.774	520 29%	1.254 71%		118	48 41%	70 59%	
2011	946	123 13%	823 87%		1.681	474 28%	1.207 72%		121	49 41%	72 59%	
2012	924	94 10%	830 90%		1.713	446 26%	1.267 74%		124	50 40%	74 60%	
2013	925	91 10%	834 90%		1.743	438 25%	1.305 75%		116	45 39%	71 61%	
2014	891	71 8%	820 92%		1.760	455 26%	1.316 74%		116	43 37%	73 63%	
2015	744	64 9%	680 91%		1.786	438 25%	1.348 75%		113	42 37%	71 63%	

GELDERSE INDUSTRIE



GOLDENHOVE PAPIER
PAPER FOR
PERFORMANCE!



Papierfabriek Doetinchem



SCHUTPAPIER!



Arjowiggins
Security

Gezamenlijk de helft van de Nederlandse Industrie

TWEE BERICHTEN UIT DE GRAFICUS

08-2016 Papierfabriek Parenco in Renkum heeft deze week een tweede machine opgestart. De in 2010 stilgezette krantenpapier machine is voor 100 miljoen euro omgebouwd tot een machine voor verpakkingpapier.



04-2016 Schut Papier in Heelsum, naar eigen zeggen de kleinste papierfabriek in Nederland, investeert dit jaar een miljoen euro in uitbreiding van capaciteit



David & Goliath; Beide winstgevend

VISION OF THE DUTCH PBI

“The paper industry is in the **core** of a biomass-based **circular economy**.

We **make the most** out of Biobased **raw materials**,

thereby **reducing energy** consumption and **CO₂** emissions

and **increase** the **added value** and **customer value** of products and services.

Our **people** make the difference”.

CIRCULAR ECONOMY PACKAGE EU

EU Action Plan for the Circular Economy



- Revised EU regulation fertilizers
- Minimum requirement re-used water
- Interface chemicals, products, waste
- Electronic Info system on cross-border waste transfers
- Quality standards for secondary raw material



- MS to promote sustainable sourcing



- Requirement for product reparability
- Coherent product policy framework
- BREFs for CE in industrial sectors
- Facilitate industrial symbiosis
- SME support to substitute hazardous substances and for advanced manufacturing technologies
- EMAS and ETV

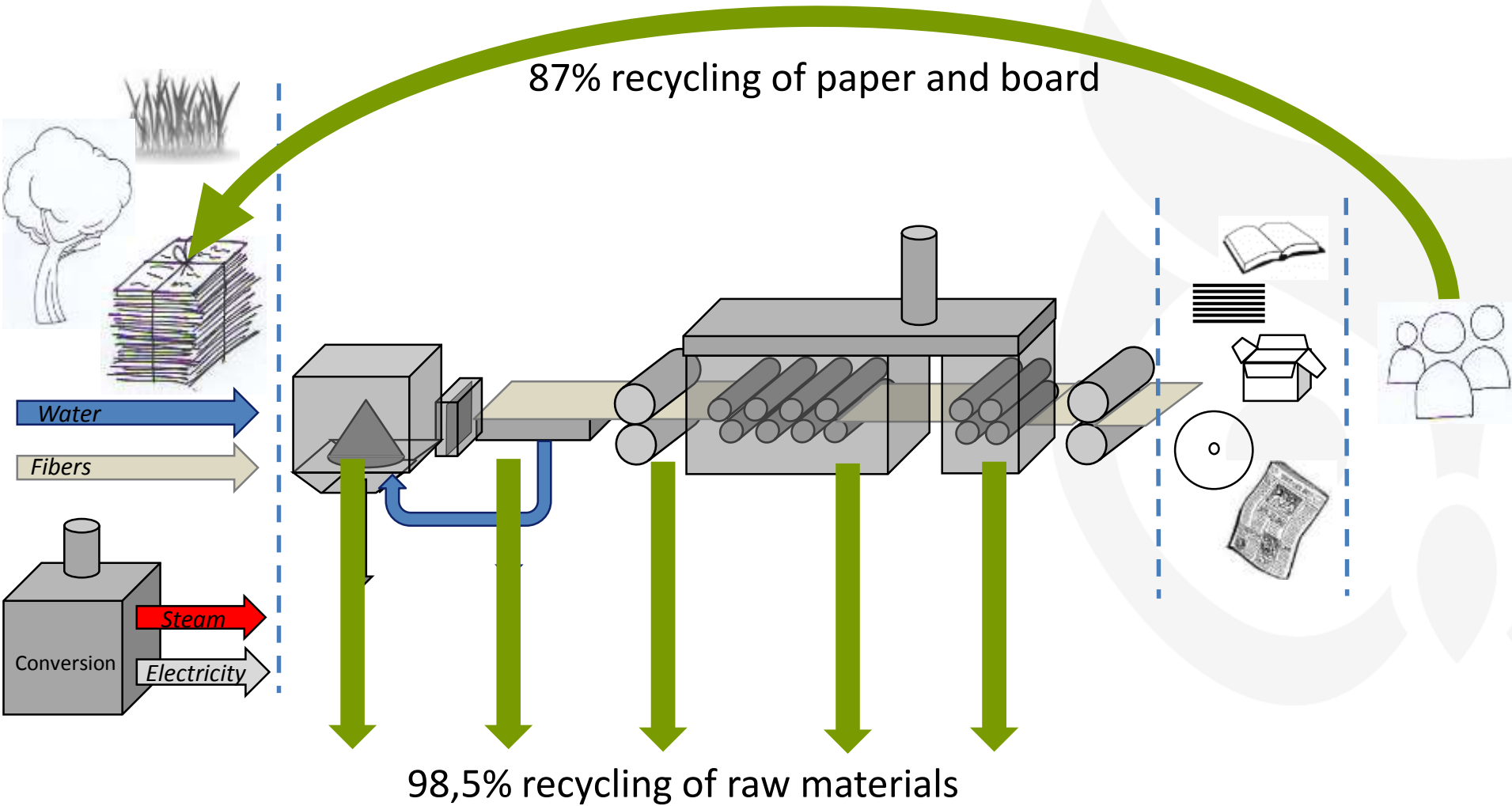


- Legislative package on waste
- MS and COM to avoid overcapacities in waste treatment and improve waste management plans
- Cohesion policy aligned to waste hierarchy



- Encourage reuse activities
- Enforcement of 2-year guarantees
- Action on false green claims
- Eco-design for repair and spare parts
- Repair info requirements
- Better EU Eco-labelling
- Testing for planned obsolescence
- Product Environmental Footprint
- CE in Green Public Procurement

PBI: A CIRCULAR ECONOMY BY TRADITION



A LITTLE HISTORY LESSON



De Schoolmeester, since 1692;
totally energy neutral and totally circular



Typical Dutch: Solid Board



over 100 years circular

DUTCH APPROACH: SOME EXAMPLES



DUTCH APPROACH: ALTERNATIVE FIBERS



SCHUTPAPIERI



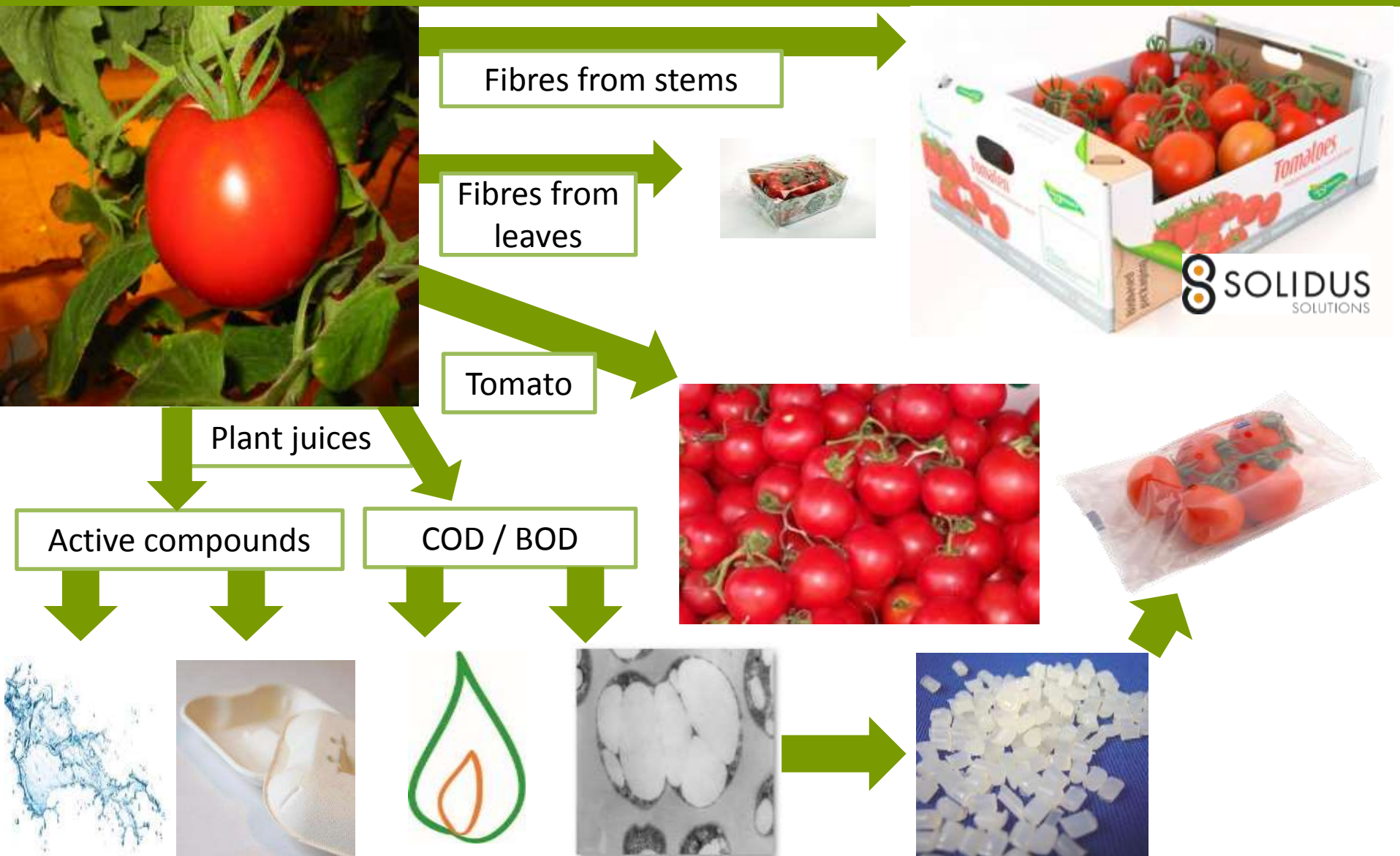
TYPICALLY DUTCH: GREENHOUSES

Every year: 805.000.000 kg tomatoes!

But also: 80.000.000 kg plant waste



FUTURE: TOMATO PLANT PAPER PACKAGING



use the entire barrel of biomass!!

WHICH IS MORE SUCCESSFUL?



Transport packaging



Consumer packaging



CONSUMER PACKAGING!



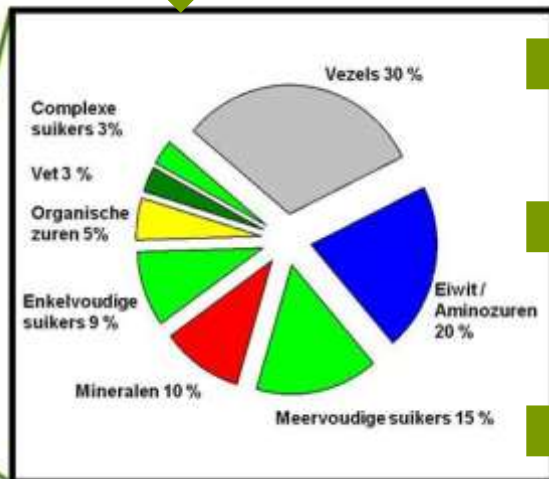
TYPICALLY DUTCH: GRASSLANDS & COWS



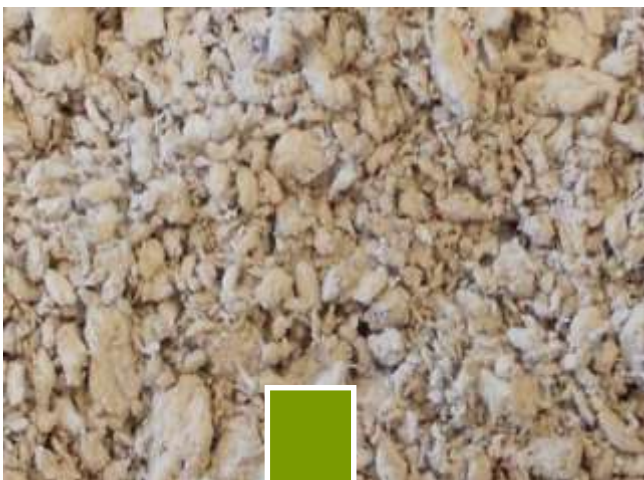
"GRASS IS ALWAYS GREENER ON THE OTHER SIDE"



Vers gras



DUTCH APPROACH: WASTE VALORIZATION



DUTCH APPROACH: INTEGRATED CONCEPTS



+



Business models; C2C paper



Collecting and treating the “waste” but also selling the C2C paper

BUSINESS MODELS: PAPER FOR PAPER



PAPER FOR PAPER

Uw oude papier als gerecycled papier terug

PAPERFORPAPER

Closed loops for offices:

- Collecting archives and office papers
- Giving hygiene products or office papers in return
- Using recovered paper for the hygiene products
- Can be combined with closed loops for coffee cups

BUSINESS MODELS: BIBLES



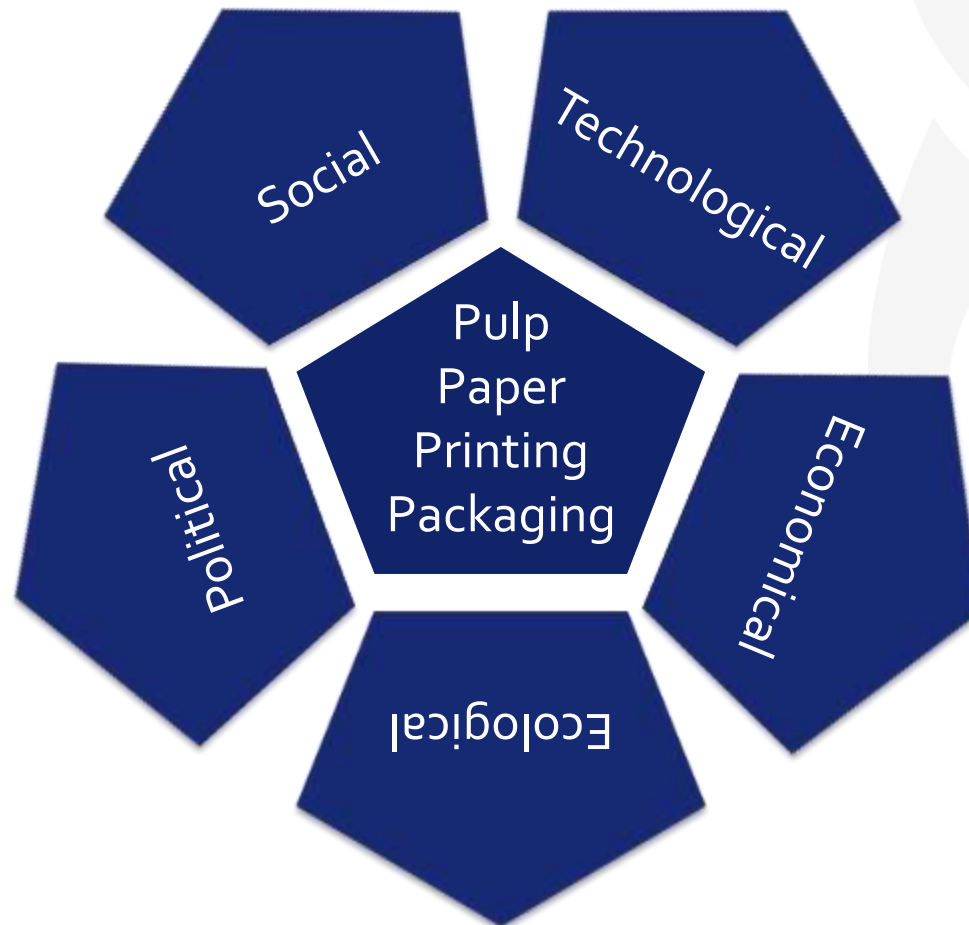
Just in 2013:
100.000X

Paper processed
in France

New paper used
for bibles for less
Privileged people

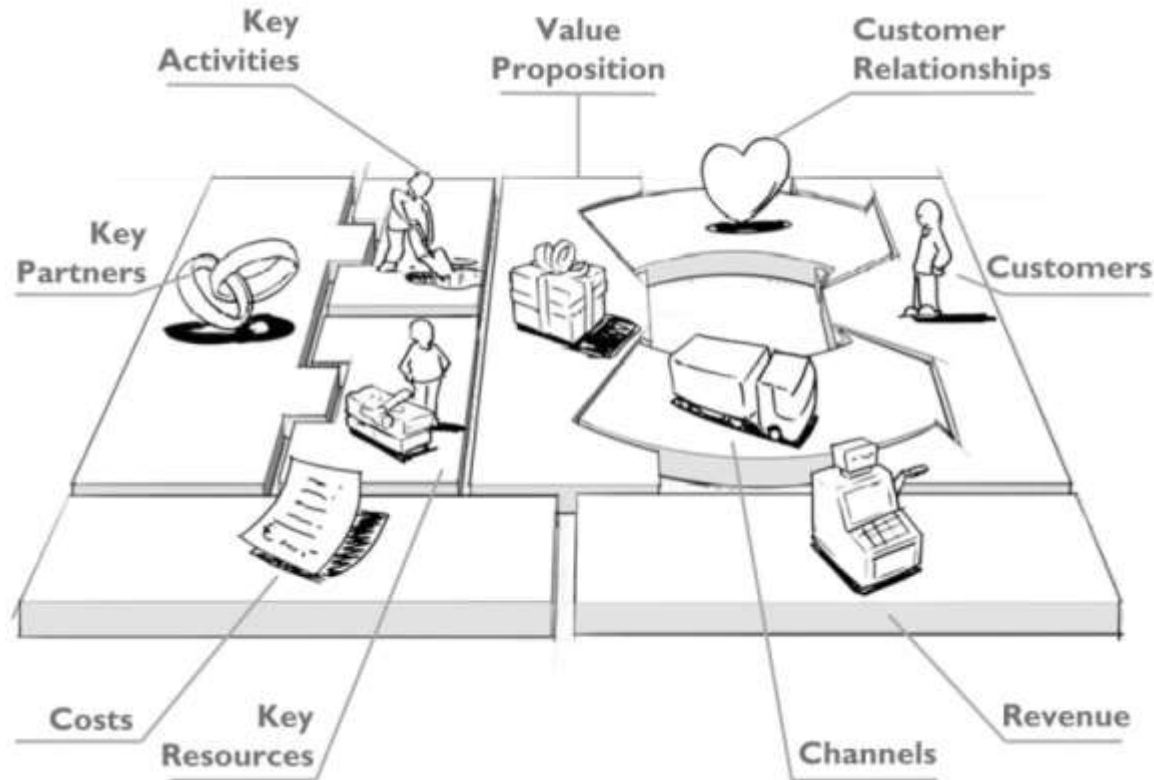
SUCCESSFUL INDUSTRIAL INCORPORATION

depends on several factors:



Technology only part of the success

A feasible and successful business case encompasses more than only technology



SOCIETAL CHALLENGES



Paper made
from limestone

- 100% compostable
- 100% recyclable



If it looks like a duck,
swims like a duck,
and quacks like a duck,
then it's a duck

ECOLOGICAL IMPACT

- » Environmental impacts (LCA)
- » Fate of nanomaterials in paper recycling line
- » Effects of reusing recovered paper in paper production lines
- » Risk assessment and management

The indigenous inhabitants of this land had a wise saying - "Every time you take something from the Earth, you must give something back."



POLITICAL ISSUES AND REGULATIONS

- » Material and energy efficiency goals
- » Food and Health Safety
- » Contamination and mineral oils
- » Labels for bioproducts



compostable
EN13432



INTEGRATED APPROACH IS NECESSARY

- Shift from **costs** towards **opportunities**
- **Branding**, customer bonding and added value
- Assess on **multiple levels** (fibers, active components, plastics)
- Assess on **multiple benefits** (business, society)
- Broader view cause **supplier = customer = supplier**
- Going from “Outside the Box” to “**Beyond the Box**”



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PAPIER EN KARTON**

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