SAVING THE WORLD FROM PLASTICS
- A POTENTIAL GAME CHANGER

2/23/2018
Markku Hämäläinen, CEO, Kotkamills
Markku Hämäläinen, CEO

- Kotkamills’ CEO since 2015
- PhD
- 30 years’ experience in production, product development and management
- International experience from UK, France and Germany
- Shareholder
Need for a Change

How to slow the growth of plastics production?

\[ y = x^2 \]
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Material not reused!

Material not recycled and disposed into landfills – Not sustainable!

Microplastics enter food chain through water ways and food crops – Not sustainable!
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Long biodegradation times

SOME SUCH TIME SPANS ARE GIVEN BELOW

The time required for biodegradation of different materials is different. Here is the time that is takes for some products to dissolve:

- Banana peel – A week
- Cotton cloth – 1 to 5 months
- Paper - 2 to 5 months
- Wool - 1 to 5 years
- Nylon - 30 to 40 years
- Thin plastic – 10 to 20 years
- Thick plastic – 500 years
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Litter disintegrates slowly in the sea

How long it takes for a litter item to disintegrate in the sea?

- **Newspaper**: 6 weeks
- **Plastic Bag**: 35 years
- **Plastic Mattress**: 50 years
- **Aluminium Can**: 100 years
- **Plastic Bottle**: 400 years

Non-plastic coated Barrier Board

Note: To disintegrate means in practise that microplastics are being formed.

2/23/2018 © Kotkamills
Municipal waste treatment in EU

Source: Eurostat (March 2016) Municipal waste treatment, EU-27, (kg per capita)
Facts of plastics waste

- Plastics alone account for more than 25% (by volume) of municipal waste generated. Plastic’s low density and slowness to decompose makes them a visible pollutant of public concern.

- 80% of post-consumer plastic waste is sent to landfill – degrading land masses and causing water pollution.

- 8% is incinerated – causing unwanted emission.

- 7% is recycled.

- The situation is so acute in some countries of Europe of Japan that today few sites left that can be used for landfill. Gate fees are increasing rapidly.
Disposal cups have been in the headlines all over the world. Something amazing is happening around the country: cities and towns are starting to ban Styrofoam.

Throwaway polystyrene coffee cups, soup bowls, plates, and trays have gotten the boot. So have those foamy clamshell-style cartons fast food comes in. Even packing peanuts are going the way of the dodo. Here’s a list of cities that have completely or partially banned Styrofoam, compiled by Groundswell:

- New York City (and several other cities in New York)
- Takoma Park, MD
- Seattle, Washington
- Washington DC
- Miami (Beach, FL)
- Freeport, Maine
- Portland, Maine
- Nantucket (City & County), Massachusetts
- Minneapolis, Minnesota
- Portland, Oregon (and several other Oregon cities)
- Los Angeles County and San Francisco, California (and many other cities and counties in CA)

And more are in the works. It’s as if a big Styrofoam domino has started to fall, taking all the other dominoes down with it.

Viewpoint: The waste mountain of coffee cups

Every day hundreds of thousands of Britons put their coffee cup into a recycling bin. They’re wrong - those cups aren’t recyclable, and the UK at a stop.

The horse that saved his café

France Just Banned Plastic Cups and Cutlery

France is thought to be the first country in the world to introduce a ban on disposable cups, plates, knives, and forks in a bid to cut waste. The city of Bordeaux is the first to go, with other cities expected to follow suit. The move comes as part of a broader push to reduce plastic waste and protect the environment.

Related story: Milk wars: Does cheese really matter in your coffee?

Takeaway coffee cups piling up in landfill as Australia’s caffeine habit soars

Australia’s ever-growing caffeine habit could be doing more damage than we think, with environmentalists warning disposable coffee cups are fast on their way to becoming a major pollution hazard.

Related story: Global coffee shortage could close cafes.

Cafe Bans disposable takeaway coffee cups

Cafés in New Zealand and Australia are banning disposable coffee cups, telling customers they can either bring their own or drink out of old crockery from second-hand shops.

New Zealand’s Eden Cafe stopped selling takeaway cups on Monday.

The small university cafe was handing out up to 1,000 cups every week.

All takeaway cups have been replaced by second hand tea cups and mugs.

The majority of customers drank their coffee within 50 metres of the cafe.

A cafe is ditching their disposable takeaway cups in favour of second hand mugs and tea cups.

The Eden Cafe on New Zealand’s South Island began their ban on disposable cups on Monday after staff realised they were handing out up to 1,000 cups every week.

About 90 percent of customers drink their cafe within 50 metres of the cafe, which sits on Otago Polytechnic’s campus in Dunedin, Polytechnic functions and catering executive chef Mark Lane told Daily Mail Australia.
Need for a Change
Case: Disposable paper/coffee cup

5-10% plastics

58 Billion paper cups end up in Landfills every year in US

90-95% paper

A plastic coated paper cup takes more than 20 years to decompose

Source: Inez Torre/CNN
Need for a Change
How to ensure recycling of fast food packages?

Fast food consumption in selected countries

China has exploded in fast food consumption

Consumption of food and beverages sold in food service outlets by the countries under review, 2006-2016 ('000 tonnes) (Source: Pira 2012)
The Ellen MacArthur Foundation announced at the World Economic Forum in Davos that the list of leading brands, retailers, and packaging companies working towards using 100% reusable, recyclable or compostable packaging by 2025 or earlier has grown to 11 – Amcor, Ecover, evian, L’Oréal, Mars, M&S, PepsiCo, The Coca-Cola Company, Unilever, Walmart, and Werner & Mertz – together representing more than 6 million tonnes of plastic packaging per year.
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Brand owners calls for change!

McDonald’s Just Made a Stunning Announcement That Will Completely Change the Future of Fast Food
In the United States alone, McDonald’s sells more than 1 billion pounds of beef and more than 500 million cups of coffee each year.

By Peter Economy, @bizwriter

McDonald’s to Use Completely Renewable, Recycled Packaging by 2025
interestingengineering.com - Fast food giant McDonald’s announced that it would make 100 percent of its guest packaging from renewable or recycled materials as well as recycling 100 percent of its guest packaging by 2025.

Nestlé, Unilever vow to explore alternatives to plastic packaging
Published September 26, 2017 10:34:24 PM
By NICOLE-ANNE C. LAGRIMAS, GMA News
Need for a Change

UK House of Commons strong view on disposable packaging and coffee cups!

“We received evidence highlighting that consumers mistakenly think disposable coffee cups are widely recycled. A Report from 2011 found that 8 in 10 consumers believed disposable cups were being recycled”.

“-but less than 1 in 400, just 0.25%, are recycled”

House of Commons, Environmental Audit Committee
Disposable Packaging: Coffee Cups
Second Report of Session 2017–19
Source: https://conversation.which.co.uk/food-drink/recycling-disposable-coffee-cups-starbucks/
Need for a Change
UK House of Commons strong view on disposable packaging and coffee cups!

“It is unacceptable that coffee sellers are perpetuating customer confusion through their use of recycling labels and emphasis on the recyclability of coffee cups, despite the shockingly low recycling rate. Coffee shops with in-store recycling schemes should place a ‘recyclable in stores only’ label on their coffee cups. Those without in-store recycling should print their cups with a ‘not widely recycled’ label. We believe this greater consistency will enable the public to make more informed choices about their use and disposal of packaging that cannot be recycled in most public recycling bins.”

Need for a Change
Confusing "environmentally friendly products" message!

For example to biograde, Polylactic Acid (PLA), often marketed as an environmental friendly compound, requires

- Oxygen
- >45 °C temperature for a long time, which is not the case in nature
- More organic substrate than PLA in the mixture

In many industrial composting site (for example in Helsinki) the composting time is limited to a couple of weeks and after screening all the PLA end up as landfill

And if feed into a paper/board recycling system, PLA is extremely difficult to separate from the fibre
A Game Change
What does it take?

“The secret of change is to focus all of your energy, not on fighting the old, but on building the new”

– Socrates, 470–399 BC
A Game Change
What does it take?

With new coating technology and new water-based repulpable dispersion coating materials it is possible to produce fully recyclable and biodegradable Barrier Boards for

- Paper cups
- Fast food boxes
- Frozen food
- Ice cream cups and packages
- Animal food
- Dry powder products
A Game Change
Brand owners postconsumer waste hierarchy

1. Recycling

2. Energy recovery
   - No/very low fossil concentration in the broke

3. Composting

4. Landfilling

CARBON FOOTPRINT!
Research from Mintel found that environmental sentiment is particularly strong among 20-24-year-olds with half (51%) saying they would be happy to pay more for cups that are made with 100% paper or are compostable.

The hassle factor of carrying around reusable coffee cups could limit the popularity of schemes that reward people for doing so.

A more effective solution would be to make things easier for consumers by making cups more easily recyclable.

Recycling a disposable paperboard coffee cup

TRADITIONAL CUPSTOCK WITH PE-COATING

SEPARATELY COLLECTED AND SORTED. REQUIRES OWN COLLECTION SYSTEM.

CUPS ARE SHREDDED, PE LAYER IS SEPARATED FROM THE FIBRES AND TRANSFORMED INTO PULP.

A CUP MADE FROM KOTKAMILLS’ ISLA BARRIER CUPSTOCK WITH DISPERSION COATING

RECYCLED WITH NORMAL PAPER AND BOARD WASTE. DOES NOT REQUIRE OWN COLLECTION SYSTEM.

PAPER WASTE AND CUPS ARE SHREDDED INTO PIECES AND TRANSFORMED INTO PULP.

A big difference in the economical value of the fibre!
## Compostability standards

<table>
<thead>
<tr>
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<th><strong>Industrial Composting: BS EN 13432</strong></th>
<th><strong>Home Composting: Vinçotte Certification Programme</strong></th>
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<tbody>
<tr>
<td><strong>Biodegradation</strong></td>
<td>Test performed at 58 °C +/- 2 °C, carbon dioxide at least 90 % compared with control within 6 months (approx 182 days)</td>
<td>Test performed at ambient temperature (20 - 30 °C), carbon dioxide at least 90 % compared with control within 365 days</td>
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<tr>
<td><strong>Disintegration</strong></td>
<td>Test performed at whatever temperatures are achieved in vessels, each at least 140 litre capacity. At maximum of 12 weeks (approx 84 days), no more than 10 % of original dry weight of test material &gt; 2 mm.</td>
<td>Test performed at 20 - 30°C in vessels each at least 140 litre capacity. At maximum of 26 weeks (182 days), no more than 10 % of original dry weight of test material &gt; 2 mm.</td>
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**Current certification and logos**

- AFOR / Din Certco
- Vinçotte
Plastics amount can be reduced in Liquid Packaging Board

- Prohibited materials (>5%) in Carton waste: Aluminium foil (other than in the carton), pins, staples, rubber bands, polystyrene, metal cans, glass, textiles and all types of plastic etc.

- LPB waste containing <5 % plastics has a lower handling fee (500 €/t vs. 70 €/t)

- A realistic opportunity already today:
  - At the moment LPB contains 14+28 g/m2 PE-coating = 15% of total weight
  - With plastics free dispersion coating the amount of PE can be reduced to 14 g/m2

=> 5% of total weight is plastics !
=> 0,7 Mt reduction in Plastics usage

http://www.resourceassociation.com/recycling-quality-specifications
In our opinion, the world needs a more sustainable and ecological packaging. Our innovative next-generation packaging board solutions are easily recyclable, compostable, totally repulpable and renewable.
No accumulating landfill

Kotkamills’ AEGLE barrier boards disintegrate and do not accumulate in landfills.

**BARRIER** is > 90% biodegrading in industrial composting (BS EN 13432)
(Test result 99,5%)

With new coating technology and coating materials, tougher standards can be applied.

HOME COMPOSTABILITY IS A REALISTIC TARGET, TESTS ARE BEING CARRIED OUT PRESENTLY
A new recycling tool to be tested first in the Kotka town area:

A Fluting carton box first to deliver the new cups to the coffee shop, and then the used cups from the coffee shop to a recycled fibre user.

Our unique barrier board is made by using water-based dispersion barriers. It is repulpable, recyclable, reusable – just as it is.

The strong fibers are valuable raw material. They can be reused up to 7 times after their first use.

Unlike traditional barrier board, which requires a costly process for removing the PE, Kotkamills barrier board is recyclable even with normal paper waste and does not leave plastic waste.
No micro-plastics in AEGLE Barrier Boards

A practical dilemma:

- Within all the various environmental friendly products, how can one market a new real-life environmentally friendly Paperboard?
Sources of barrier polymers

Recyclable barrier coatings can be produced out of

**Oil based polymers**

- Preferred by those who like all bio material to be used for food
- Can also fulfill biodegradability standards

**Bio based polymers**

- Preferred by those who want to avoid any oil based raw materials
- Can also fulfill biodegradability standards
Kotkamills board machine in general

- The first new board machine ever that is fully designed for on-line production of barrier grades
- 3-layer baseboard with own special integrated CTMP
- Grammage range 180 – 550 g/m²
- Web width 5400 mm
- Top speed 800 m/min
- Production capacity 400,000 t/a
Unique barrier coating set-up totalling 7 barriers / layers on-line

Coating Technologies

- Film coating unit
- Two curtain coaters, two layers simultaneously by each coater
- Blade coating

Different functions for each layer

Good coverage by full contour coating
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<tr>
<th>Investment</th>
<th>Machine length 230 m</th>
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<tr>
<td>170 MEUR</td>
<td>Web length 530 m</td>
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<td></td>
<td>Over 900 km of board/day</td>
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<td>Enabling fibre cycle</td>
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<td>Up to 7 times</td>
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<td>Capacity</td>
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<td>&lt;5km</td>
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CHALLENGE THE PRESENT,
BE THE GAME CHANGER