





Food Packaging Design for sustainable development

Marit Kvalvåg Pettersen



Nofima AS Norwegian Food research Insititute

Nofima:

National food research institute, established on January 1, 2008.

Target market: Food industry, aquaculture and fisheries industry

370 employees 595 mill NOK (2017)





Content

Food Waste and Packaging

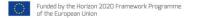
Packaging concepts for sustainability – some examples

Selection of materials and Active packaging – for increased recyclability

Active Packaging – for reduced food waste

Packaging of seafood with A&I – for reduced food waste





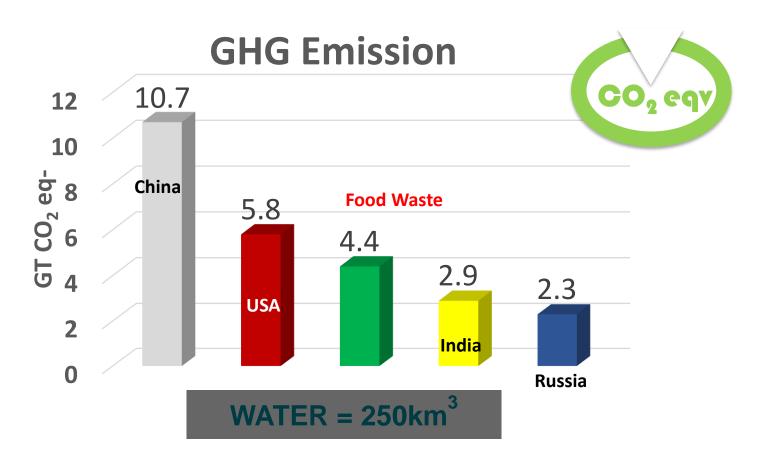
Food waste





Food waste















































RESPONSIBLE CONSUMPTION AND PRODUCTION

Goal 12.3

By 2030 halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses

Facts about food waste in Norway





Food Industry: 17%

Retail stores: 21%

355 000 tonnes

Consumers: 61 %

Copyright © 2015 FotoWeb 7.0

Sources:: ØstfoldResearch /»ForMat Report»

Reasons for food wasted at consumers



- Expired
- ☐ Improper product quality
- ☐ Parts of the product is damages
- ☐ Incorrect/not optimal storage of the product at home or during transportation
- ☐ Too much of the product is left in the packaging
- ☐ The product is damage or lost its quality due to poor packaging

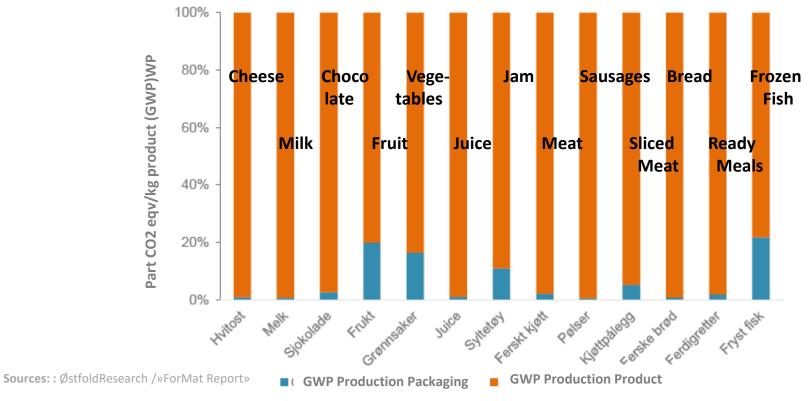




Sources:: ØstfoldResearch /»ForMat Report»

Carbon foot print – Product and Packaging

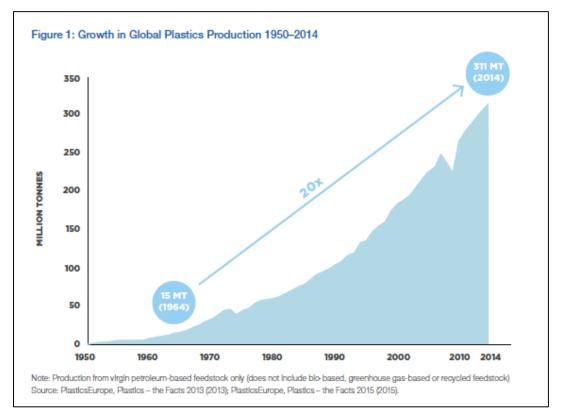




Figur 2-1 Kg CO₂-ekv/kg | Product (production) divided into product and packaging

Plastic – use and challenges





- Increased production
 - 15 mill. tonnes in 1964
 - 311 mill. tonnes in 2014

Estimated to be double within 20 years

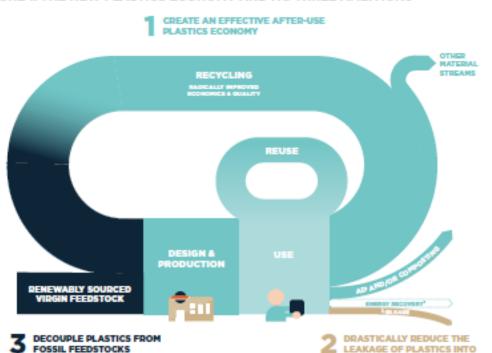


Source: World Economic Forum

Plastic – use and challenges



FIGURE 1: THE NEW PLASTICS ECONOMY AND ITS THREE AMBITIONS



- **1** Effective after-use
- 2 Reduce leakages of plastic to natural systems
- 3 Decouple plastic from fossil feedstock

EGATIVE EXTERNALITIES

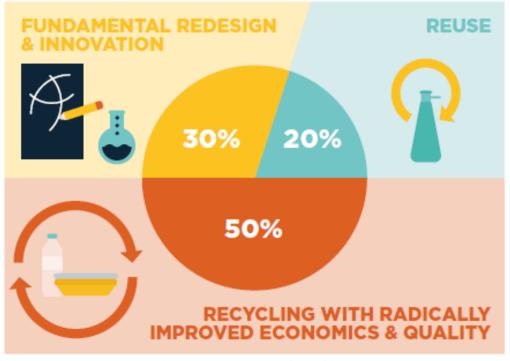
Source: The New Plastics Economy - Rethinking the future of plastics



Packaging for improved sustainability



FIGURE 2: THREE DISTINCT TRANSITIONS STRATEGIES TO ACCELERATE THE SHIFT TOWARDS THE NEW PLASTICS ECONOMY (SHARE OF PLASTIC PACKAGING MARKET BY WEIGHT)





Source: Ellen Macarthur Foundation

Source: New Plastics Economy Initiative analysis (see Appendix for details)

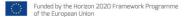


Packaging Concepts for improved sustainability

Selection of materials and Active packaging – for increased recyclability







Facts and Figures

KPN project Funded by NRC, BIA-program

Project period : 2017-2021 Total budget: 2.5 mill. Euros

Project Owner: Norner

Project Manager: Siw B. Fredriksen

R&D:

Norner, Rise-PFI as NTNU Østfoldforskning Nofima



Packaging Concepts for increased sustainability



FuturePack

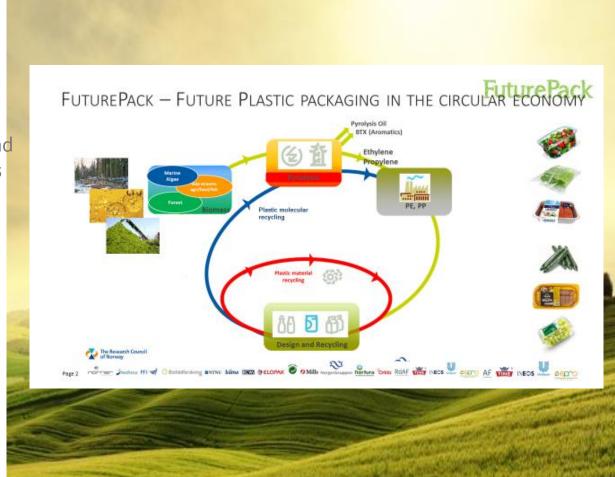
WP 1 : Sustainable materials

WP 2 : Conversion of biomass and plastic waste fast hydropyrolysis technology

WP 3 : Polymer production

WP 4 : Packaging design for recycling

WP 5 : LCSA Sustainability assessment



Packaging Concepts for increased sustainability



WP 4 : Packaging design for recycling

Responsible partner: Nofima WP-leader: Marit Kvalvåg Pettersen

Tasks:

Recycling process

- 2. Use of recycled materials in packaging applications
- 3. Monomaterials as replacement for laminates for food application
- 4. Monomaterials as replacement for laminates in display packaging applications



Selection of materials and Active packaging





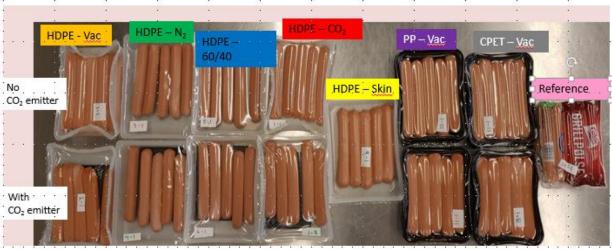
Packaging materials

- Complex structure
- Not appropriate for Recycling

Selection of materials and Active packaging



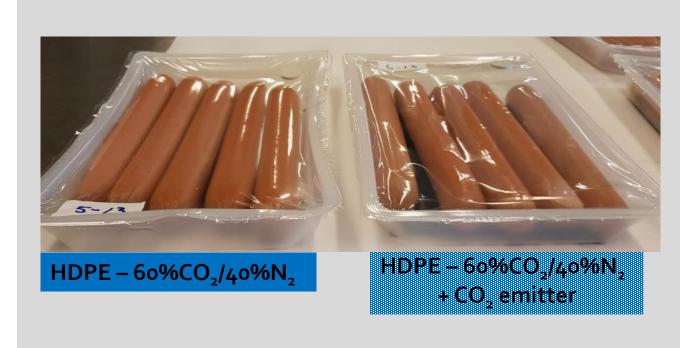






Selection of materials and Active packaging





- Reduced drip loss
 - Monomaterials and vacuum packaging
 - MAP with CO2
- No effect on Odour
- Inhibition of bacterial growth (TVC and LAB) in some of the packaging concepts
- Shelf life comparable to packaging with laminates with complex structure



Packaging Concepts for improved sustainability

Active Packaging – for reduced food waste?





Facts and Figures

IPN project Funded by NRC Bionær

Project period : 2015-2017 Total budget 1.2 mill Euros

Project owner: Bama

Project partners:

Grilstad, Lerøy/Sjømathuset, Lauvsens Gartneri Tommen Gram, RPC, Wipak. Døvigen, BWL Maskin, Lexit, Matvett

R&D

Østfoldforskning Nofima

Project Manager: Marit Kvalvåg Pettersen

Optimal Packaging for Reduced Food Waste





REforReM



🚺 Forskningsrådet

Tomatoes and Active packaging





Tomatoes and Active packaging



- Ethylene content reduced
- No effect on colour and Firmness

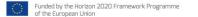




Packaging Concepts for improved sustainability

Packaging of seafood with A&I – for reduced food waste





Facts and Figures

IPN project Funded by NRC, Havbruk2 (Bionær)

Project period : 2016-2019 Total budget: 1.3 mill Euros

Project owner: SalMar

Project Partners
Lycro, NLP, Marel,
Tommen Gram, Multivac
Praxair, Keeplt Tech.

R&D:

Østfoldforskning Nofima

Project Manager: Marit Kvalvåg Pettersen

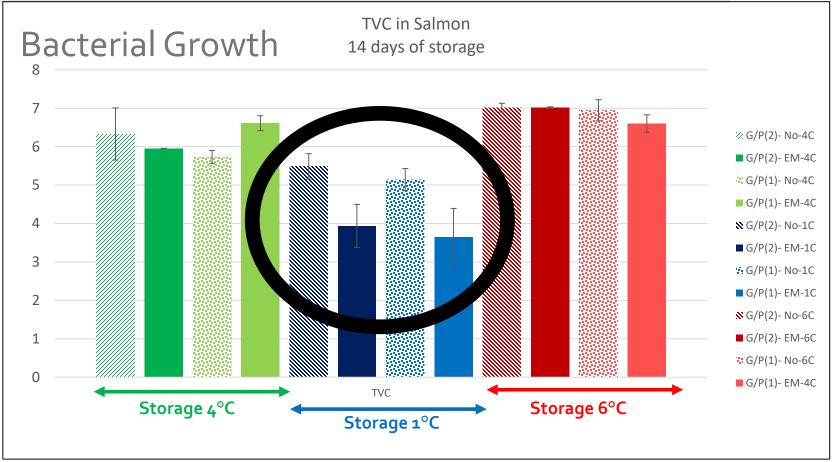




- Mono material
- Gas /product volume ratio
- Temperature
- CO2 emitter
- TimeTemperature Indicator











9 + days

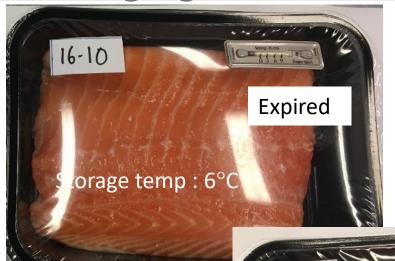
Storage temp: 1°C

Shelf life at 4°C Storage: 15 days after packaging 111 –8 days of storage

12-4

Storage temp: 1°C





3 days Storage temp: 4°C

8-9 days

Shelf life at 4°C Storage: 15 days after packaging TTI — 14 days of storage



Food Packaging Design for sustainable development

Sustainable develo Increased

Reduced



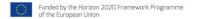






Acknowledgement: Norwegian Research Consul -BIONÆR program / Havbruk for funding the innovations projects REforReM and SeaPack BIA program for funding the Competence Building Project **FuturePack**







Acknowledgement: ActInPak is supported by COST (European Cooperation in Science and Technology).

COST is a funding agency for research and innovation networks. Our actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.

www.cost.eu



