

Round table:

# Sustainable management of packaging waste

Kick off webinar 27.08.2020

# Ecodesign of plastic packaging & EPR cornerstones



# Extended Producer Responsibility



*"**Extended Producer Responsibility** is an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product **responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal of the product.**"*

Thomas Lindhqvist. Reports to the Swedish Ministry of the Environment.

# How much do producers pay today?



<b>Lindhqvist</b> <b>100%</b>	<b>60%</b> In residual waste - for incineration
	<b>40%</b> Collected - for "recycling"



The intention of the EPR is that producers take 100% responsibility. How much do producers pay today? Let's look at the example from Sweden: In case of the household plastic packaging, collected through bring system organized and operated by the PRO (*Producers responsibility organization*), producers only pay for 40% of the collected waste. The bill for remaining 60% household plastic packaging, which is appointed for incineration, is taken by the municipalities. The Swedish system is currently under development initiated by the regulations adopted in 2018.

# How much do producers pay today?



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U			
<b>Producer fees (eur/ton)</b>																								
	material	AT	BE	CY	CZ	DE	EE	EL	ES	FR	HU	IE	LV	LT	NL	NO	PL	SI	SE	SK				
municipal waste	glass	87	31	29	74	100	102	11	197	14	19	9	85	79	56	0.014	18	7		100				
	plastics	630	426	106	206	1263	409	66	472	346	38	89	159	177	553	141	5	195	334	110				
	paper and board	90	22	47	96	250	105	53	68	163	19	23	33	38	22	34	3	17	182	92				
	multilayer composite	610	618	123	208	765	0	57	323		38	94	0	141	380	0.003		74		103				
	metals	275	43	58	74	743	255	15	102	78	38	81	68	54	20	0.011	19	125	244	114				
	wood	18	618		46		41	10	21		19	11	16	44	20		3	32		87				
industrial waste	glass				12.54																			
	plastics	110.00		37.96	24.31															2.84				
	paper and board	30.00		43.31	43.39															0.95				
	multilayer composite	100.00			24.31																			
	metals	62.50			20.85																			
	wood	6.00		12.42	13.19															11.62				
original unit	eur/kg	eur/kg	eur/t	eur/t	eur/t	eur/kg	eur/t	eur/kg	cents/kg		eur/kg	eur/t	eur/kg	eur/t	eur/kg	NOK/kg	eur/kg	eur/t	SEK/kg	eur/t				
		1000.00							10.00							0.10				0.09				
price level indices (EU28=100)	111	110.6	89.1	69.5	107.3	77.4	82.2	91.5	109.4	62.2	113.3	70.5	64.6	112.6	149.2	58.9	82.1	122.8	100					
eurozone	1	1	1	0	1	1	1	1	1	0	1	1	1	1	0	0	1	0						
mean exchange rate				25.647						318.9					9.5975	4.2525		10.2482						
<b>Producer fees in Slovak purchasing power parity (eur/ton)</b>																								
	material	AT	BE	CY	CZ	DE	EE	EL	ES	FR	HU	IE	LV	LT	NL	NO	PL	SI	SE	SK				
municipal waste	glass	78	28	33	107	93	132	13	215	13	31	8	121	122	50	0.009	31	8	0	100				
	plastics	568	385	119	297	1177	528	80	516	317	61	79	226	274	491	95	8	238	272	110				
	paper and board	81	20	53	139	233	136	64	74	149	31	20	47	59	20	23	6	20	148	92				
	multilayer composite	550	559	138	300	713	0	69	353	0	61	83	0	218	337	0.002	0	90	0	103				
	<b>Summary</b>	Blad1	AT	BE	CY	CZ	DE	EE	EL	ES	FR	HU	IE	LV	LT	MT	NL	NO	PL	SI	SE	SK	UK	+

There is significant difference in the financial contributions of the producers across Europe. The fee depends on the EPR framework (*monopoly or competitive level playing field*), type of the collection system (*curbside or bring*) as well as the administrative capacities of the public bodies responsible for controlling and monitoring of the market. The comparison of the fees has been elaborated by the Slovak Institute of Environment and is available here:

# What for and how much will producers pay?

# Extended Producer Responsibility

An introduction to key concepts and requirements of EU law

Reloop Webinar, 27<sup>th</sup> August 2020

**Joe Papineschi**  
**Director**  
**Eunomia Research & Consulting**

# Contents

- 1. Introduction to Eunomia**
- 2. Aims of the session**
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- 4. EPR basics**
- 5. Cost coverage**
- 6. 'Necessary cost'**
- 7. Collection and distribution of funds**
- 8. Conclusions**

# About Eunomia



A policy, strategy and implementation consultancy, we are led by our purpose of helping to transform our clients' environmental and economic outcomes for the better



We are market experts in systemic change in material and energy resource efficiency, working at the highest level of professional competence to meet our clients' needs



Our work is global in scope with 100+ circular economy and sustainability specialists working on projects on six continents from bases in the UK, Brussels, Athens, New York and Auckland





# Eunomia Sectors and Selected Clients

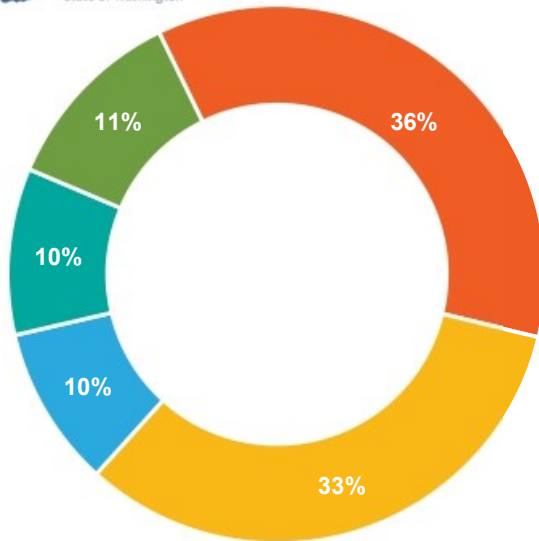
## National, Regional, Government



## Supranational Government



## Non-Governmental Organisations



## Local Government



## Private Sector





## Study to Support Preparation of the Commission's Guidance for Extended Producer Responsibility Schemes

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Final Report

Dr Dominic Hogg, Dr Chris Sherrington, Joe  
Papineschi, Mark Hilton, Alex Massie, Peter Jones

27<sup>th</sup> April 2020



## Study to Support Preparation of the Commission's Guidance for Extended Producer Responsibility Schemes

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Recommendations for Guidance

Dr Dominic Hogg, Dr Chris Sherrington, Joe  
Papineschi, Mark Hilton, Alex Massie, Peter Jones

27<sup>th</sup> April 2020

# Aims of this Presentation

- **Provide an introduction to EPR**
  - What is it?
  - What is its purpose?
  - What are the key concepts?
- **Discuss the specific requirements of:**
  - **Waste Framework Directive**
    - Revised 2018
  - **Packaging and packaging Waste Directive**
    - Revised 2018
  - **Single Use Plastics Directive**
    - Adopted 2019
  - **EU Circular Economy Action Plan 2.0**
    - Published 2020

# EPR

**Producers are  
responsible for  
the cost of  
managing their  
products once  
they become  
waste**

# EPR – Drivers for Change

## New Waste Framework Directive

- New targets for MSW
  - up from 50% in 2020 using any of four methods, to:
    - 55% by 2025;
    - 60% by 2030;
    - 65% by 2035
- New measurement method for measuring recycling targets
- Requirement for fee modulation under EPR and full cost recovery for packaging

## Single Use Plastic Directive

- Tethering of caps for plastic beverage containers
- Recycled content:
  - 25% recycled content for all single-use PET beverage bottles by 2025
  - 30% recycled content for all single-use beverage bottles by 2030
- Separate collection of single-use plastic beverage containers:
  - 77% by 2025;
  - 90% by 2029
- EPR costs extended to behaviour change & litter clean-up

## EU Directive on Packaging and Packaging Waste

- New targets for plastic (and other) packaging
- Plastics: up from 22.5% (pre-amendment in 2018) to 50% (2025); 55% (2030)
- New measurement method as per WFD
- Requirement for fee modulation as per WFD

## Increased Attention on Plastic Pollution

- Growing public concern regarding plastic pollution and its impacts
- National and local governments responding with DRS, EPR and packaging requirements

## Brand Commitments

- Growing awareness of a threat to brand reputation
- Increasing numbers of brands looking to meet or exceed statutory requirements
  - Commitments on recycled content
  - Commitments to achieve recycling targets
  - Commitments to sustainable packaging design
- Potential leadership role in countries that are not yet looking to make statutory changes

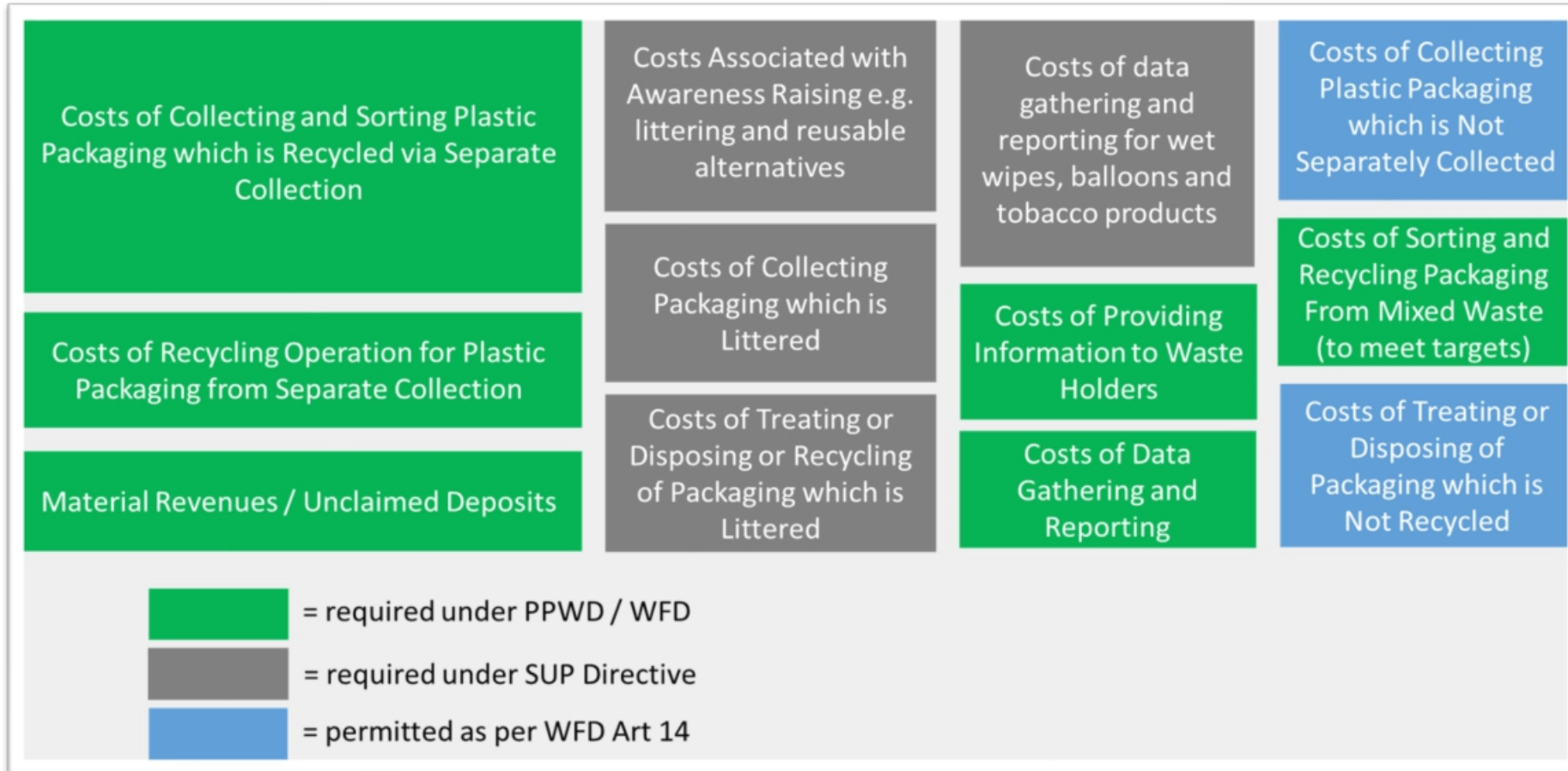
# Key Concepts

- **Purpose**
  - To create incentives to prevent waste, promote eco-design and support achievement of recycling goals
- **Cost coverage (full cost recovery)**
  - Producers cover end of life cost of products placed on market
  - Internalising externalities of end of life management
  - Key questions around scope of cost coverage
- **Collective versus individual responsibility**
  - In many cases (e.g. packaging), collective schemes will be established through Producer Responsibility Organisations (PROs) to discharge responsibility on behalf of producers
- **Eco-modulation of fees**
  - Fees paid are 'modulated' to incentivise eco-design
  - Producers placing products on the market that do not meet eco-design objectives make a disproportionate contribution to the overall cost-coverage 'pot'

# EPR Rationale: Why EPR?

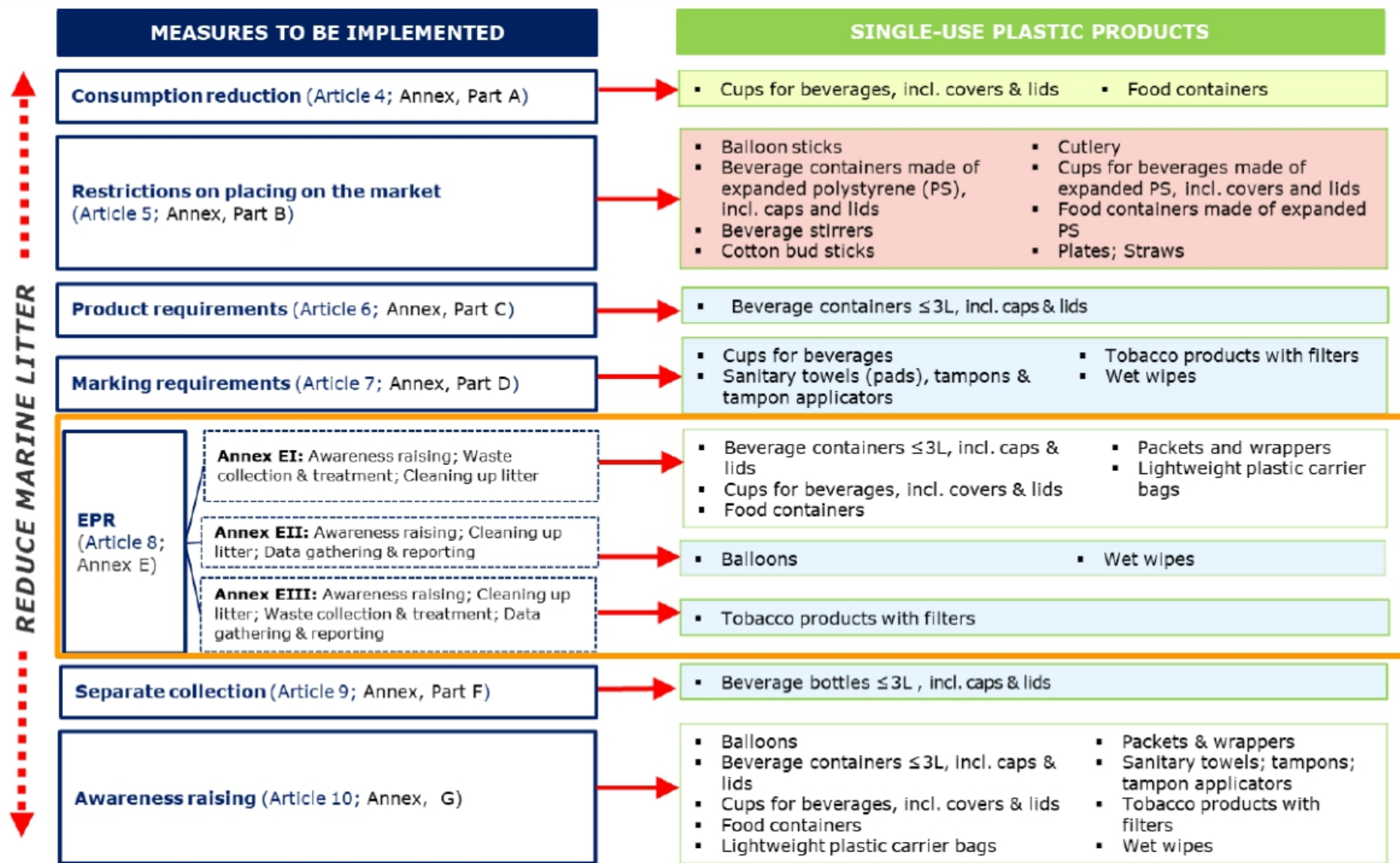
- **Placing costs on producers gives them an incentive to reduce those costs by:**
  - Eliminating unnecessary packaging
  - Ensuring packaging is readily recyclable
  - Funding recycling activities and infrastructure
  - Using recycled material
- **Will support Member States (MS) to meet targets:**
  - Packaging waste recycling targets (2025, 2030)
  - Municipal waste recycling targets (2025, 2030, 2035)
  - Collection targets for beverage bottles (2025, 2029)
- **Note: deposit systems (DRS) are a form of EPR implementation, not a separate instrument**
  - But clearly do interact with other EPR approaches

# Plastics: Cost Coverage Under EU Directives



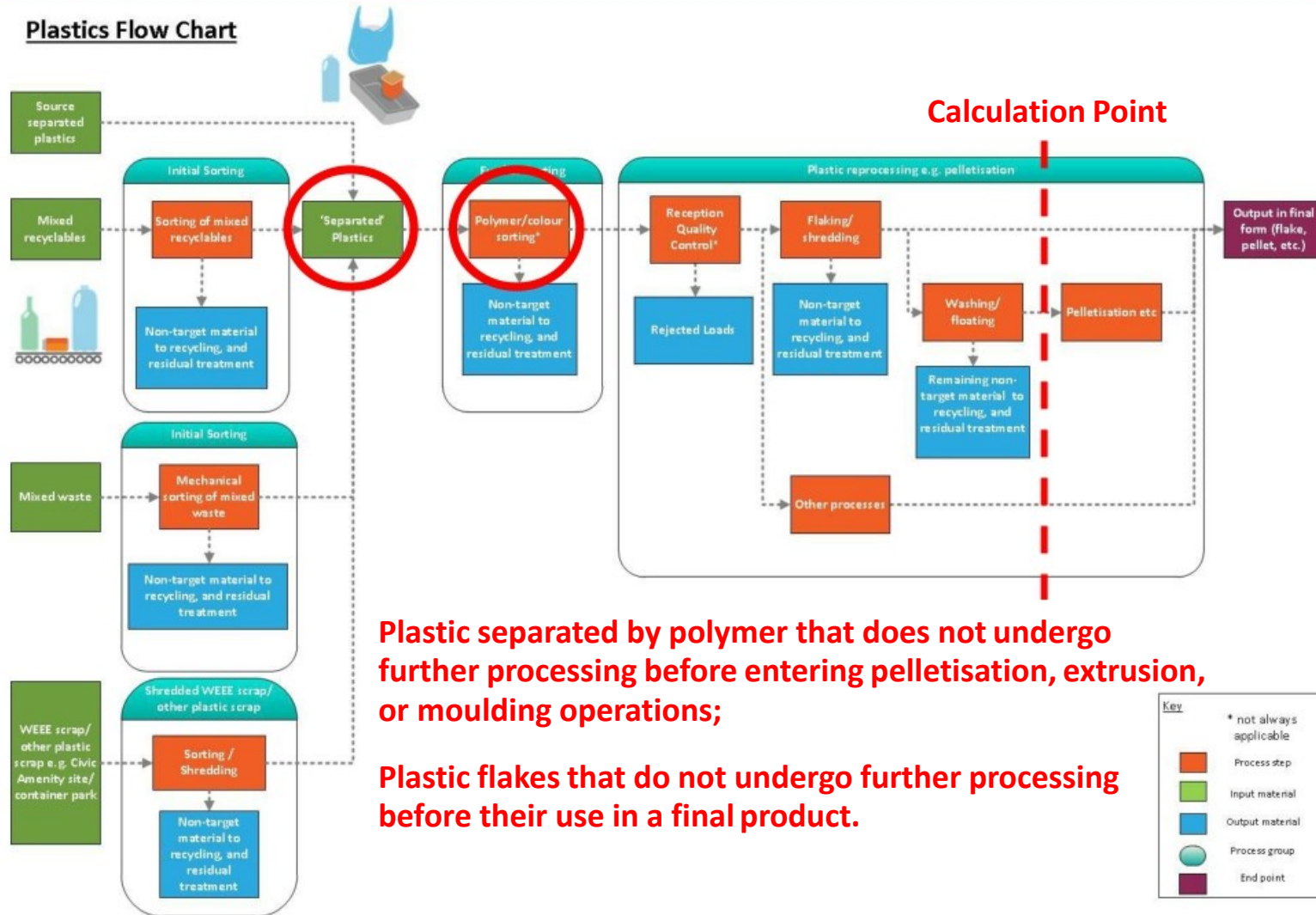


# Single Use Plastics Directive Scope

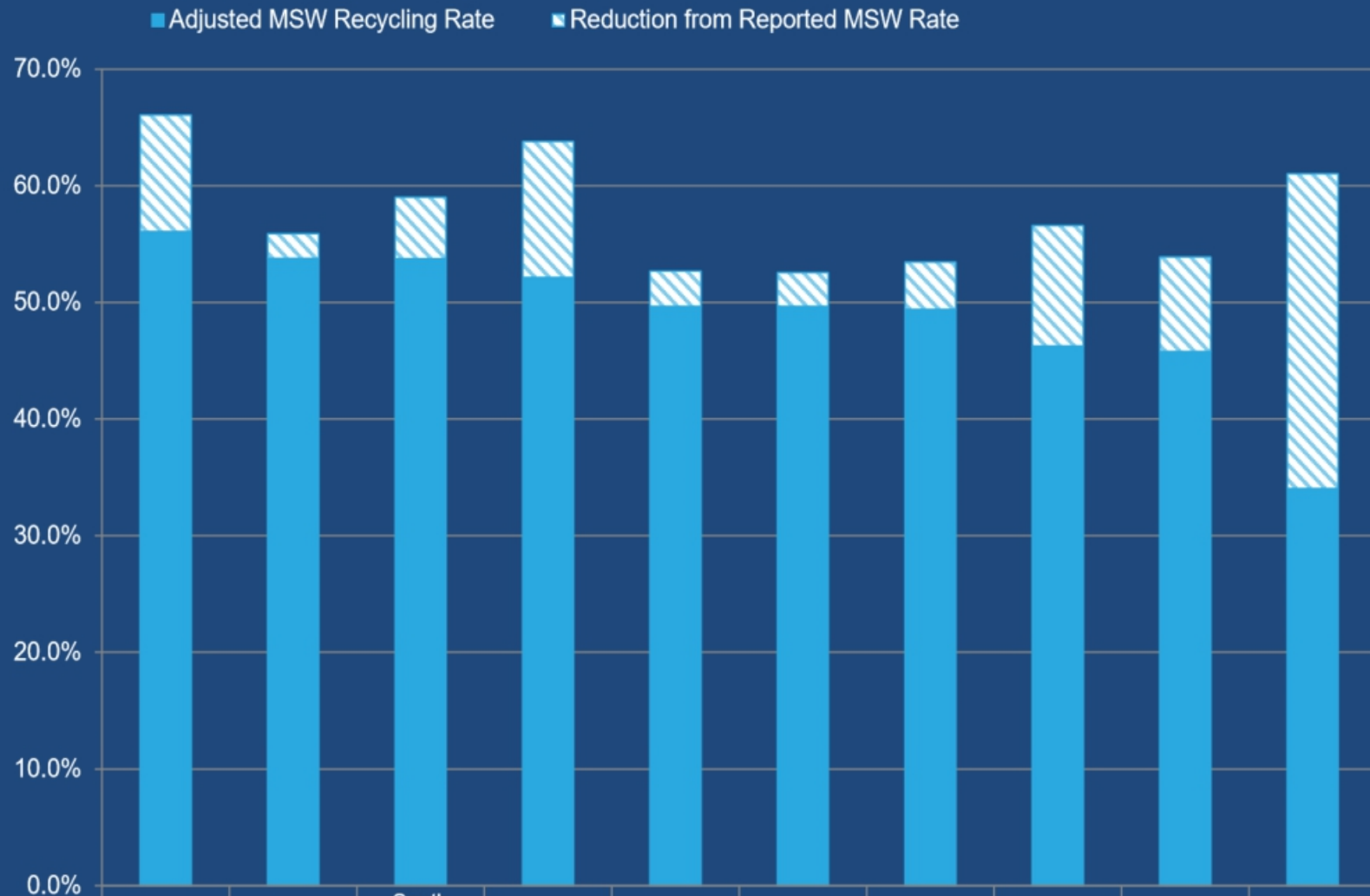


# New EU Measurement Method for Recycling

Plastics Flow Chart



## Top 10 - Adjusted Recycling Rate and Reduction from Reported Rate - MSW



	Germany	Austria	South Korea	Wales	Switzerland	Italy	Belgium	Netherlands	Slovenia	Singapore
Reduction from Reported MSW Rate	10.0%	2.1%	5.3%	11.6%	3.0%	2.9%	4.1%	10.3%	8.1%	27.0%
Adjusted MSW Recycling Rate	56.1%	53.8%	53.7%	52.2%	49.7%	49.7%	49.4%	46.3%	45.8%	34.0%

# EPR Fee Modulation: French Bonus/Malus System

## On-pack sorting instructions



BONUS  
8%  
BONUS



## Weight reduction



BONUS  
8%  
BONUS

## Volume reduction



BONUS  
8%  
BONUS

## Mono-material packaging



BONUS  
8%  
BONUS

## Recycling disruptors



Malus  
50%

## Non-recoverable packaging



Malus  
100%

# EU Guidelines: Focus on Recyclability

- **Design for Recycling (DfR) guidelines at the level of:**
  - **Specific *format* (e.g. bottle);**
  - **Made of a specific *material* (e.g. PET); and**
  - **In some cases by *colour***

Plastics Recyclers Europe Summary Design Guidance for PE transparent flexible film

	YES	CONDITIONAL	NO
	Full compatibility – materials that passed the testing protocols with no negative impact OR materials that have not been tested (yet), but are known to be acceptable in PE recycling	Limited compatibility – materials that passed the testing protocols if certain conditions are met OR materials that have not been tested (yet), but pose a low risk of interfering with PE recycling	Low compatibility – materials that failed the testing protocols OR materials that have not been tested (yet), but pose a high risk of interfering with PE recycling
Material	PE-LD; PE-LLD; PE-HD	multilayer PP/PE	any other polymer
Colours	unpigmented; transparent	light or translucent colours	dark colours
Barrier	barrier in the polymer matrix	barrier layer EVOH (in polyolefinic combination film); metalized layers	barrier layer PVC; PA, PVDC; any other barrier layer foaming agents used as expandant chemical

# Design for Recyclability

	<p>materials that passed the testing protocols with no negative impact</p> <p>OR</p> <p>materials that have not been tested (yet), but are known to be acceptable in PE recycling</p>	<p>materials that passed the testing protocols if certain conditions are met</p> <p>OR</p> <p>materials that have not been tested (yet), but pose a low risk of interfering with PE recycling</p>	<p>materials that failed the testing protocols</p> <p>OR</p> <p>materials that have not been tested (yet), but pose a high risk of interfering with PE recycling</p>
<b>Material</b>	PE-LD; PE-LLD; PE-HD	multilayer PP/PE	any other polymer
<b>Colours</b>	unpigmented; transparent	light or translucent colours	dark colours
<b>Barrier</b>	barrier in the polymer matrix	barrier layer EVOH (in polyolefinic combination film); metalized layers	barrier layer PVC; PA, PVDC; any other barrier layer foaming agents used as expandant chemical agents; aluminium
<b>Additives</b>			additives concentration $\geq 0.97 \text{ g/cm}^3$
<b>Closure</b>	same material as body	PE on PP body; PP on PE	any other

# Fee Modulation - Packaging

- **Based on Design for Recycling guidelines:**
  - **YES** for *all* relevant aspects: eligible for bonus
  - **YES** in some aspects but **CONDITIONAL** in *any* aspect: will face the standard fee; and
  - **NO** in any individual aspect: subject to a malus
- **Or based on the recycling rate actually achieved**
  - **For material and packaging format or sub-format, e.g.**
    - PET bottles (maybe clear, coloured, opaque)
    - HDPE bottles (maybe natural, coloured/opaque)
    - Flexible plastic packaging (maybe mono-polymer, multi-polymer, multi-material)
- **Or a combination of both**
  - **Likely to move in this direction over time**

# Cost Coverage: Waste Framework Directive

- **Article 8a(4)(a):**
  - *“costs of separate collection of waste and its subsequent transport and treatment, including treatment necessary to meet the Union waste management targets...”*
- **These *must* include the specific targets set in the Directives and *may* include other relevant targets and objectives (8a(1)(b))**
  - Meeting wider targets (e.g. the WFD municipal waste targets) may require specific packaging stream targets to be exceeded



# Concept of Net Costs

- **Producers must meet the net costs**
  - These are the operational and support costs, minus the value of the recycling that is collected
- **Municipalities may be given responsibility for sorting / selling the material they collect**
  - Or, producers could take responsibility for this
- **Net cost recovery means collectors and sorters (e.g. municipalities) should be less affected by fluctuations in material markets**

# What Costs Do Producers Meet? (1)

- In some MS, many costs currently met by local or national governments will become the responsibility of producers
  - In some countries, additional funding from producers will be € € € € €
- Producers will be responsible for net operational costs of packaging recycling services, including (but not limited to):
  - Direct vehicle, staff & container costs (capital and running costs) e.g.
    - Door-to-door collections;
    - Communal collections; and
    - Recycling centres or container park facilities;
  - Maintenance costs for vehicles and containers
  - Depot and transfer stations costs
  - Sorting and processing costs
  - Costs of transporting waste to sorting and final treatment
  - Corporate overheads (e.g. IT, HR, financial services) associated with waste management
  - The costs of marketing and selling reused items or recycled materials

# What Costs Do Producers Meet? (2)

- **In addition, cost coverage should include necessary supporting activities, including (but not limited to):**
  - **Performance incentives to encourage:**
    - Waste prevention and reuse
    - A high recycling rate and
    - High recycling quality
  - **Costs of providing information to citizens and other waste holders on managing their waste appropriately**
  - **Enforcement costs – i.e. the costs of systems to ensure that producers, waste management organisations, businesses and citizens follow the rules**
  - **Efficiency reviews to ensure that services are run at the lowest cost necessary to achieve the objectives and targets**
  - **Data gathering, recording, analysis and reporting costs**
  - **Costs of Producer Responsibility Organisations (PROs)**
- **In addition, EPR schemes *may* cover other costs**
  - **Member States have broad powers under Article 14(1) of WFD (polluter-pays principle)**
  - **This could cover litter, residual waste, marine pollution impacts etc.**

# What Makes Costs 'Necessary'?

- **Producers must fund adequate services across the whole Member State**
  - Can't just meet the targets by focusing on the areas where it is cheapest to collect waste
- **The system must be capable of driving required outcomes:**
  - Collection/sorting system design
  - Communications
- **But only the necessary costs....**
  - Waste management system must have potential to be efficient...
  - ... and be implemented in a way that is cost effective
- **If municipalities or the state collect material on behalf of producers, they will need to demonstrate cost effectiveness**
  - Through competition/market testing and/or
  - Through modelling and benchmarking

# Minimum or Standardised Service Models?

## Multi-stream with separate food

 or  Residual waste  
(up to a maximum  
equivalent of  
120 litres weekly)

Minimum of 120 litres collected weekly

 Plastics, metals  
and cartons

 Glass and card\*

 Paper

 Food

 Plastics, metals,  
cartons, glass,  
card, paper  
and food

## Two-stream (fibres separate) with separate food


 or  Residual waste  
(up to a maximum  
equivalent of  
120 litres weekly)


Minimum equivalent of 120 litres weekly

 Plastics, metals,  
cartons and glass

 or  Paper and card

 Food

 Plastics, metals,  
cartons, glass,  
card and paper

 Food

## Co-mingled with separate food

 or  Residual waste  
(up to a maximum  
equivalent of  
120 litres weekly)

Minimum equivalent of 120 litres weekly

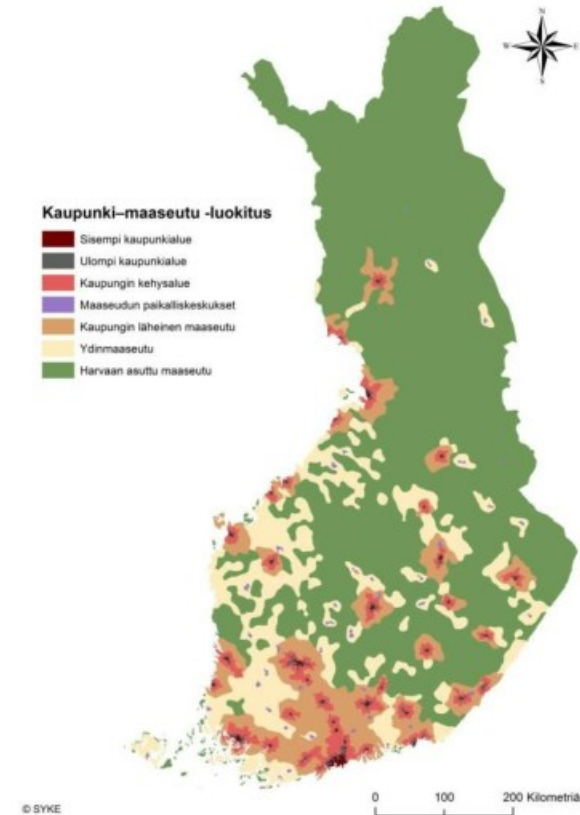
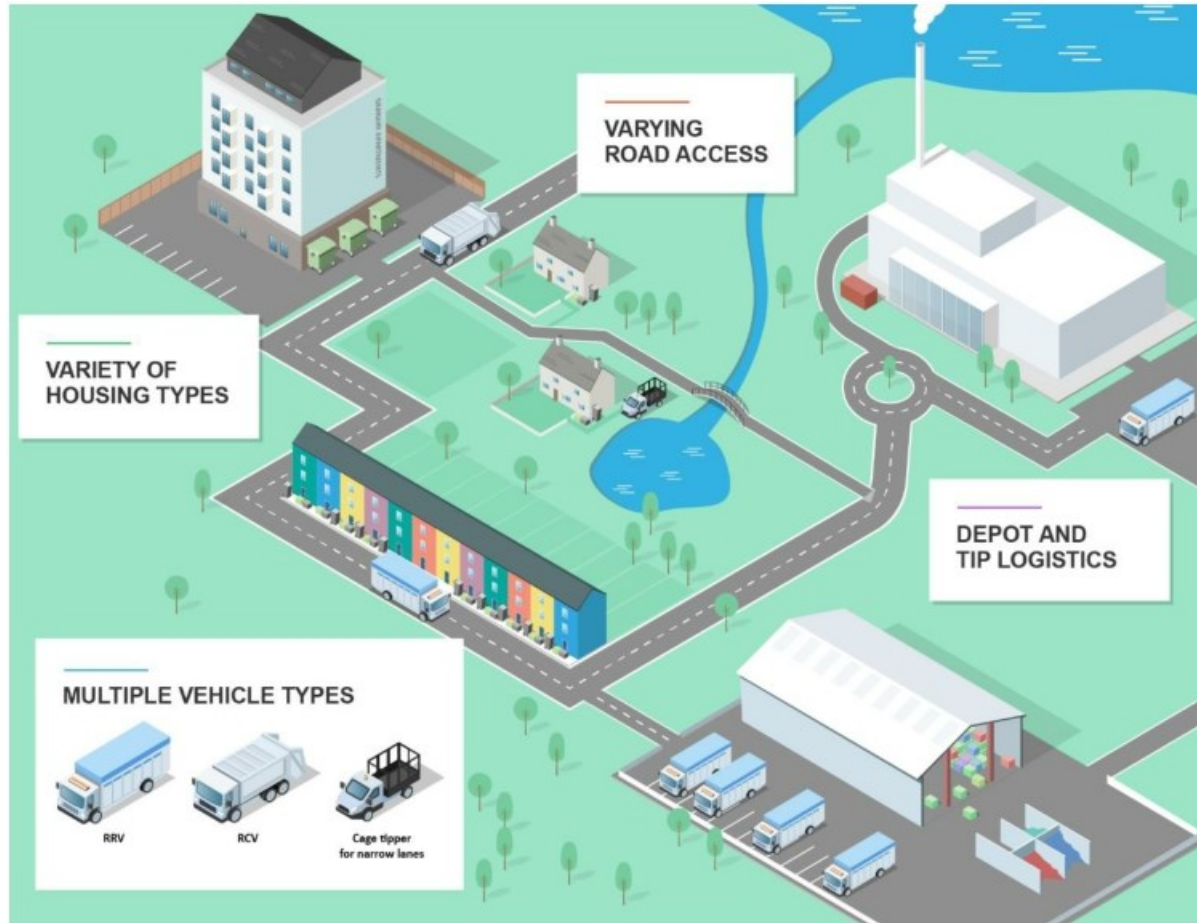
 or  Plastics, metals,  
cartons, glass,  
paper and card\*\*

 Food

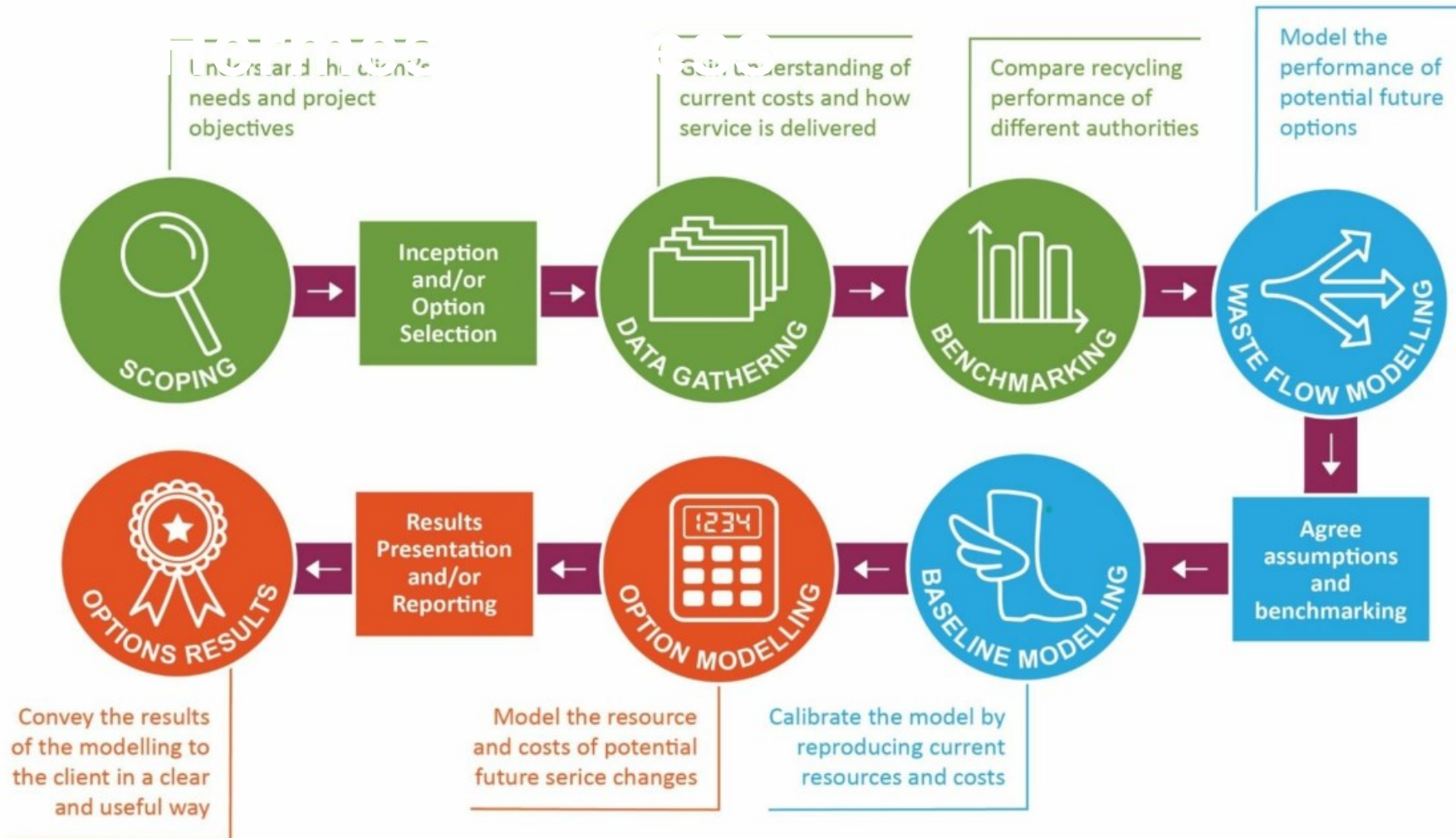
 Plastics, metals,  
cartons, glass,  
card and paper

 Food

# Collection Resource Requirements



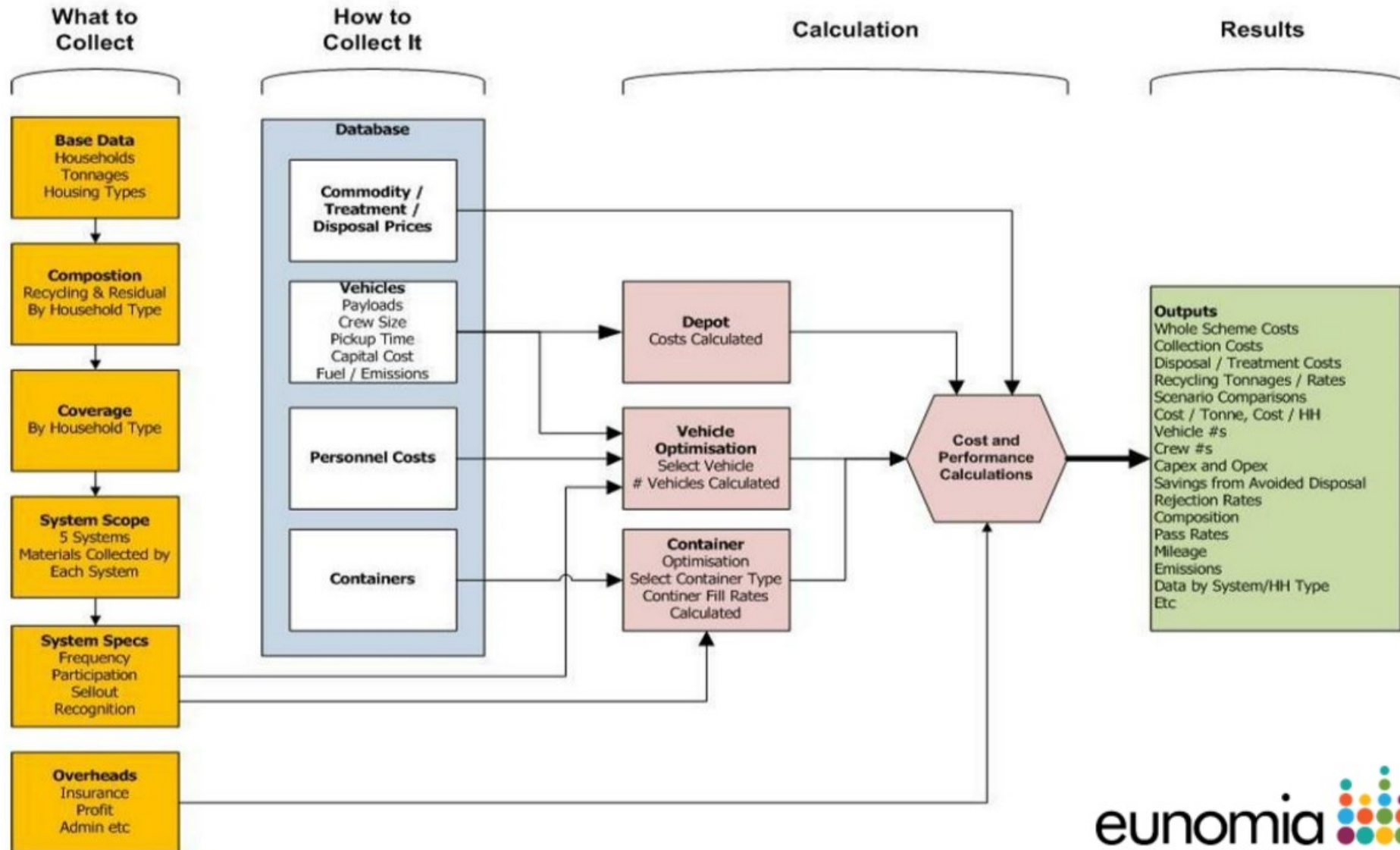
- **More sophistication likely to be required in designing services and demonstrating efficiency**



**Key**

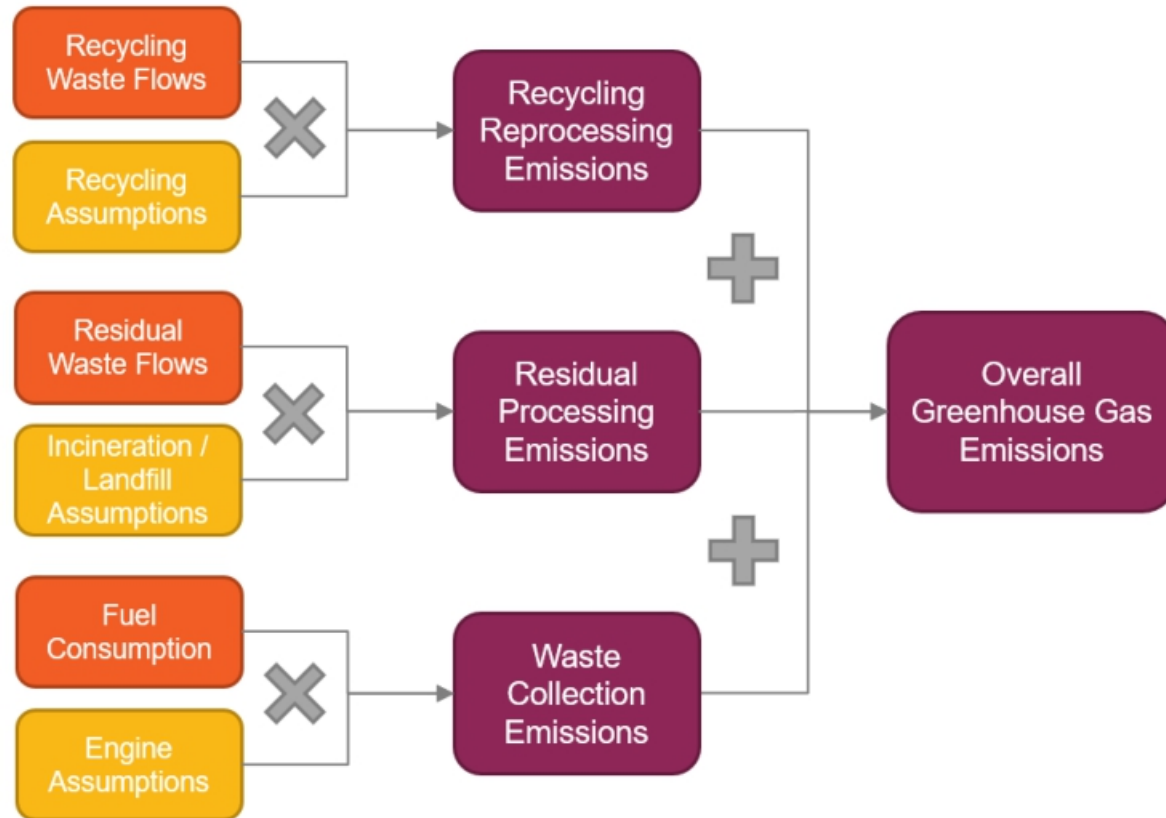
- Meetings/Reports
- Stages/Tasks
- Model Preparation
- Collection Options Appraisal
- Results Reporting/Presentation

# Eunomia Hermes Model: Detail





# Consideration of Carbon Emissions



- Increasingly important for governments and producers
- Can be used to justify different approaches
  - e.g. derogations from strict application of separate collection



# Collection and Distribution of Funds

- **Member States can decide:**
  - **How to ensure cost coverage by producers:**
    - Collect money through PROs
    - Collect money through levies or taxes
    - Allow direct responsibility by producers
  - **But must modulate and limit to 'necessary costs'**
  - **How to distribute EPR money to waste management organisations (e.g. municipalities)**
    - Could be based on modelled costs
    - Could be based on actual measured costs
    - Could be based on producers contracting directly

with

municipalities

- **Could be through supporting the price of recycled**

# Circular Economy Action Plan 2.0

- **Published** in March 2020
- **Wide range of additional targets & measures**
  - **Potentially radical focus on product policy**
  - **Halving municipal waste by 2030**
    - **Reducing food waste**
  - **New targets to reduce packaging waste**
  - **“Mandatory essential requirements” for all packaging placed on the market**
    - **All packaging placed on the EU market to be reusable or recyclable in an economically viable way by 2030**
  - **Mandatory use of recycled content**
- **EPR to be introduced for textiles**

# Conclusions

- **EPR is perhaps the most important instrument in EU for ‘making packaging circular’**
- **Legislation & guidelines seek appropriate balance between producers & collectors/recyclers:**
  - **Collectors/recycler should expect:**
    - High degree of cost coverage of high-performing systems
    - Transparency on funding
    - Increased recyclability of the waste stream
    - Investment in infrastructure
  - **Producers should expect:**
    - An efficient collection and sorting system
    - High performance and high quality material for recycling
    - A high degree of transparency on costs



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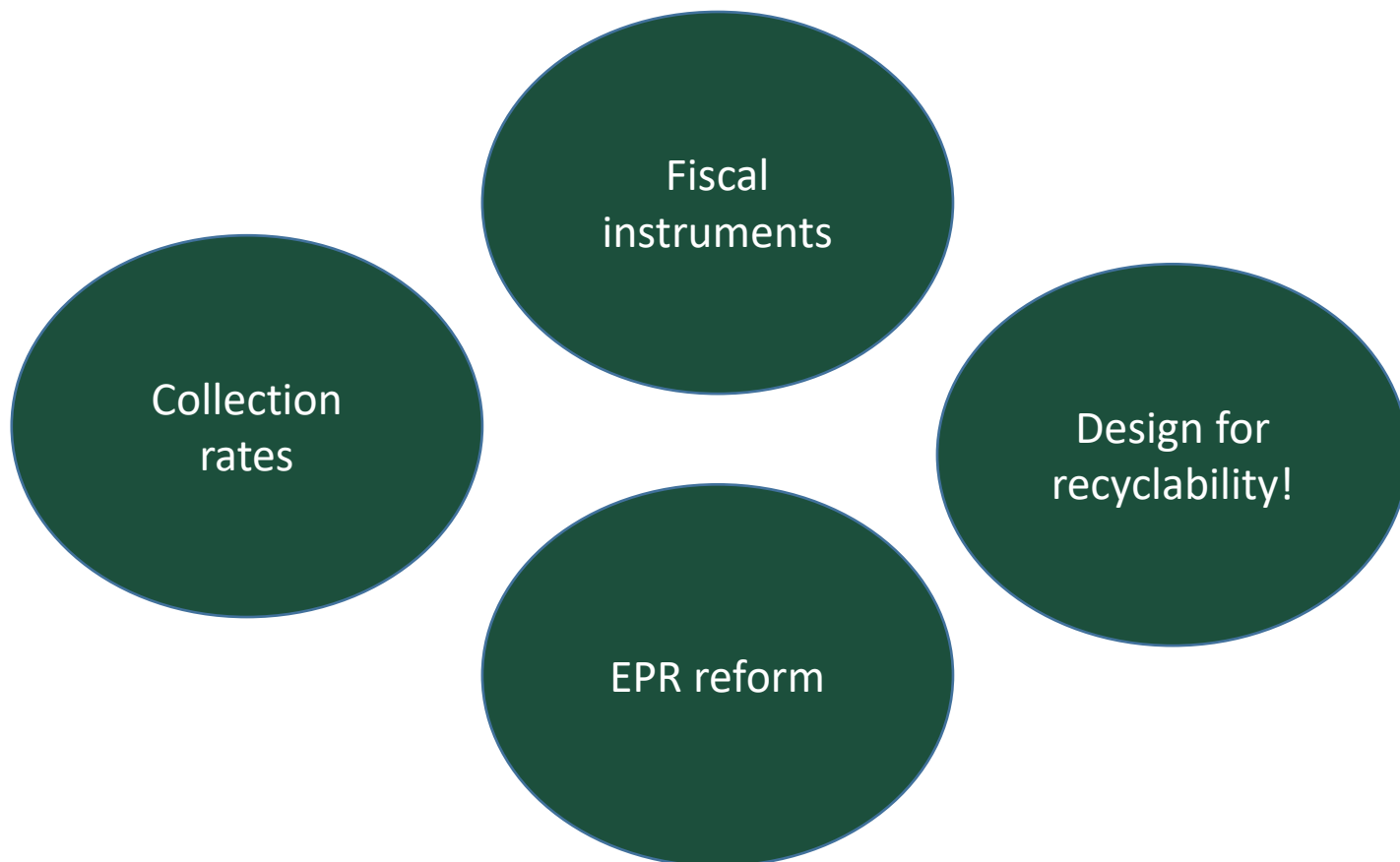


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# Ecodesign - introduction



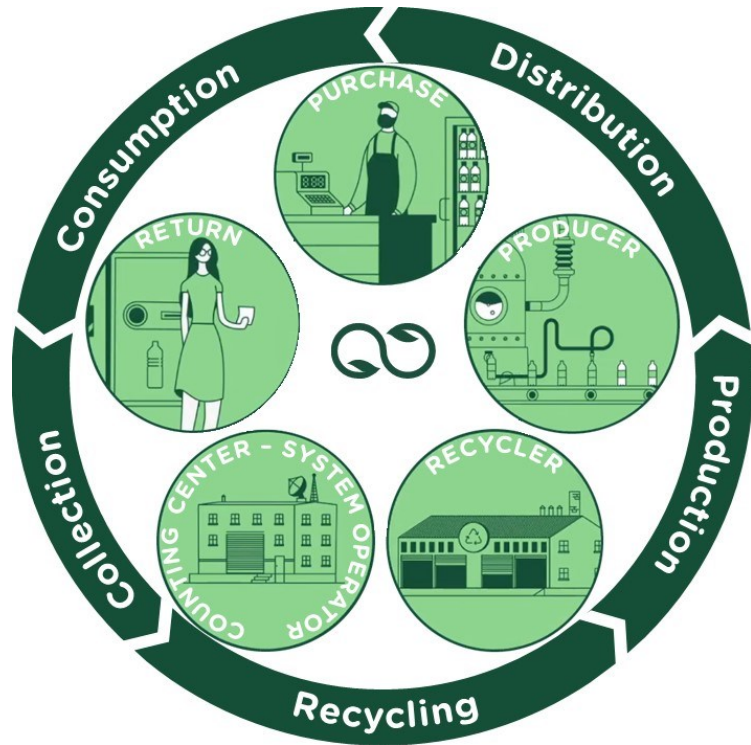
# Preconditions for Circular Economy



Among other measures supporting development of Circular Economy, eco-design is one of the most important preconditions for closing the loop of the secondary raw materials.



# Circular Economy best practice



## PET BOTTLES

NO	YES
<b>CAP</b> Thermoset PS PVC Metal	<b>CAP</b> HDPE PP
<b>LINER MATERIAL AND ADDITIONAL SEALING</b> PVC Metal Silicone	<b>LINER MATERIAL AND ADDITIONAL SEALING</b> PE EVA
<b>BOTTLE</b> Other than A-PET	<b>BOTTLE</b> A-PET
<b>BARRIER</b> Coating Scavengers Additives	<b>BARRIER</b> Glaskin Bestpet
<b>LABEL &amp; GLUE</b> PVC PET OPS Self-adhesives (under conditions) Hot-Melt Heavy metal inks	<b>LABEL &amp; GLUE</b> Paper OPP Density lower than 1 Water solvent glue (60°C) Recyclable HotMelt



Graphics credits: INFINITUM

Deposit systems serve as a role model for recirculation of materials. Since many years back, the deposit systems operators have implemented stringent quality requirements securing cost efficiency and high quality material recycling. As long as DRS is implemented, **80% recycle content for PET is possible** today and in Sweden and Norway the loop is being closed **locally** in the respective markets.

Sweden - best practice for Circular Economy on national level

# Eco-design for plastics' recyclability

- Nordic guidelines

Frode Syversen, Mepex Consult

## Optimal plastic packaging in Norway/Nordic countries

27.08.2020 Webinar Reloop



# Agenda

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## 1. Introduction

- Mepex
- Plastic packaging waste flows
- Plastic reduction initiatives
- Sorting and recycling plants

## 2. Design for recycling

- Tools og guidelines
- Practical testings
- Examples bad design
- Use of recycled material
- Changing process



# Mepex – independent waste consultancy:

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- **32 years of experience – 16 employees**
- **Studies and strategies for national environmental authorities**
- **Mapping waste streams and markets**
- **Developing better waste management systems for municipals and companies**
- **Developing, optimizing and controlling EPR-systems**
- **Building and optimizing waste treatment, sorting and recycling plants**
- **Facilitates design for recycling and other circular economy processes.**



# Some facts for Norway plastic packaging

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## Consumption:

- 40 kg/inhabitant

## Beverage deposit system share

- 10-11 % (90 % recycling)

## Recycling rate all systems:

- 30-35 %

## Energy recovery rate:

- 65-70 %

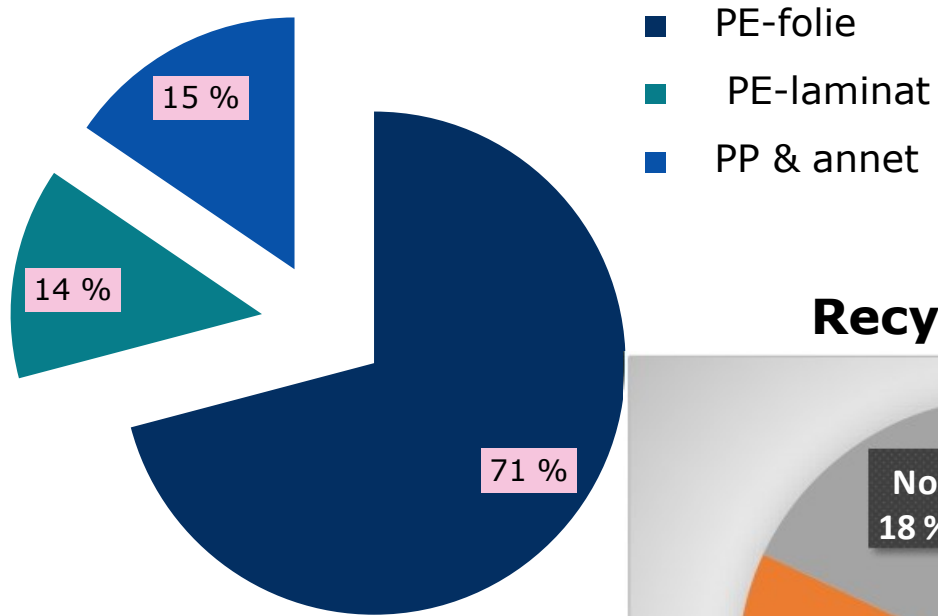


# Similar composition of household plastic packaging in Norway and Sweden

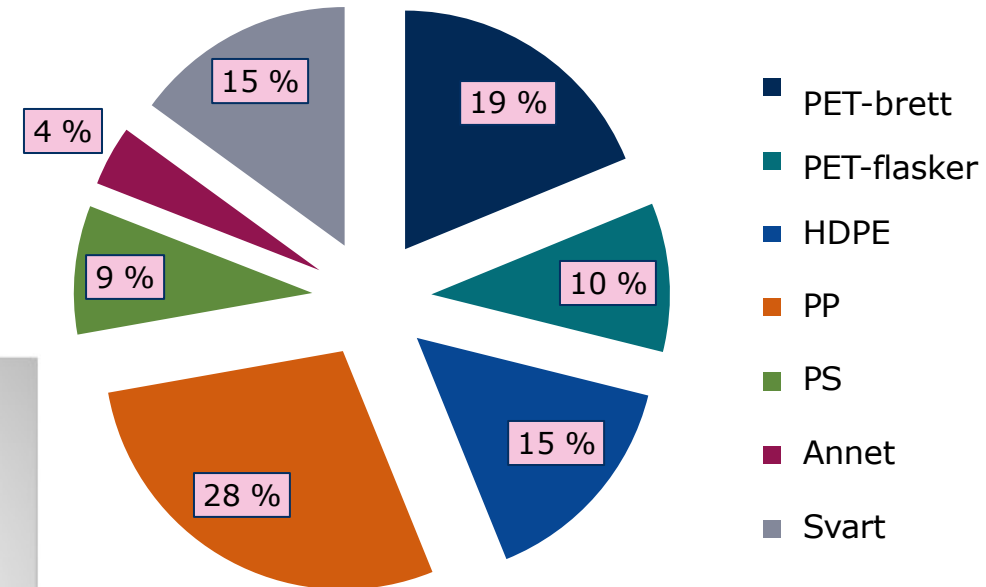
	SWEDEN	NORWAY
<b>FILM TOTAL</b>	<b>49,8 %</b>	<b>53,1 %</b>
LDPE-folie	35,3 %	40,6 %
LDPE-laminat	5,2 %	4,8 %
LDPE-alu	1,0 %	0,8 %
PP & annat	8,1 %	4,7 %
Black film	0,1 %	2,1 %
<b>RIGID PACKAGING TOTAL</b>	<b>37,9 %</b>	<b>36,4 %</b>
PET trays	4,7 %	6,0 %
PET bottles	5,0 %	3,6 %
HDPE	7,1 %	5,4 %
PP	12,5 %	10,6 %
PS	2,0 %	2,8 %
Other	2,6 %	2,2 %
PP, black	3,1 %	5,9 %
EPS	0,8 %	1,0 %
Annen plast	11,6 %	9,4 %
<b>Plast totalt</b>	<b>100,0 %</b>	<b>100 %</b>

# Composition of household plastic packaging

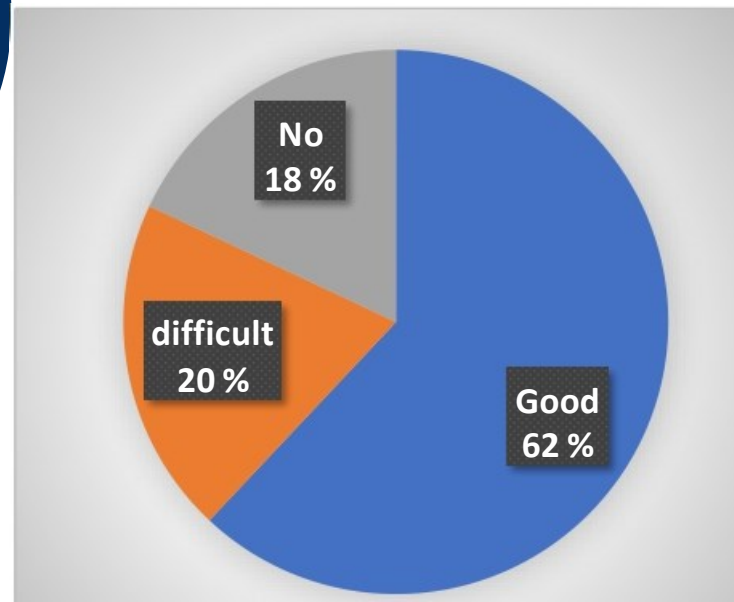
## Film households (55%)



## Rigid households (45 %)



## Recyclability





# Marine littering in Norway

---



# Ambitious targets

100 % recyclable packaging (Orkla)



Unilever: use of 100 % recycled plastic within 2025

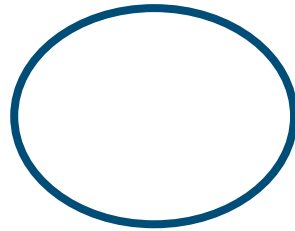
20% reduction of plastic on fruit and vegetables  
NorgesGruppen



# Biodegradable plastic no good alternative

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- No good recycling options
- Making problems in biogas plant (AD)
- Contribution to littering and microplastics



# More laminate carton packaging with plastic layers - problem solved?

- **Different plastic layers**
  - PE (fossil or renewable)
  - PLA
- **Not wanted in paper recycling**
  - Loss of fibre
  - Possible microplastic?
- **NIR-sorting with tetra?**
  - Potential



# ROAF plant residual waste

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Build 2014: 40 tons/hour

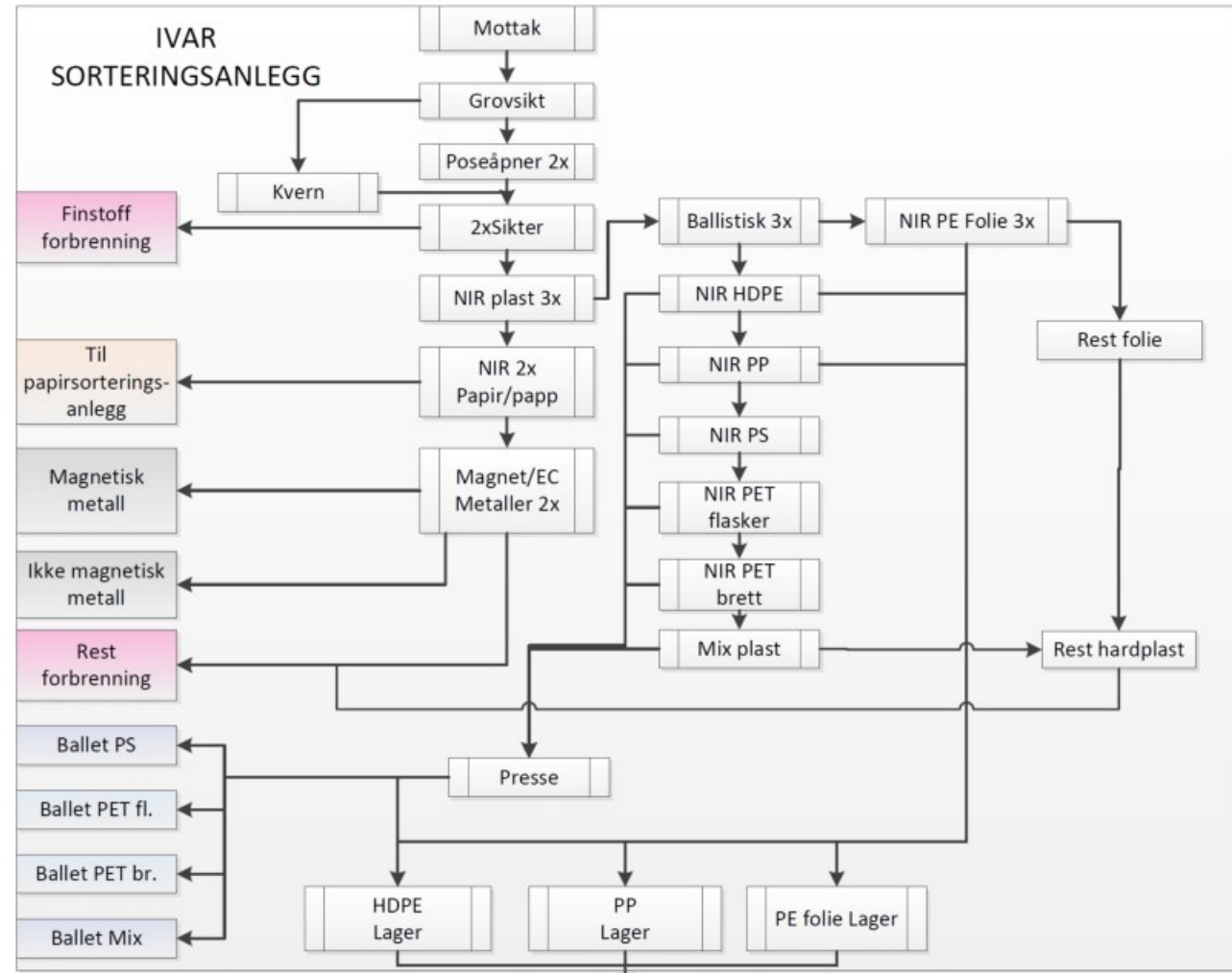
Investments : 230 NOK

Capacity : 100.000 tons/year

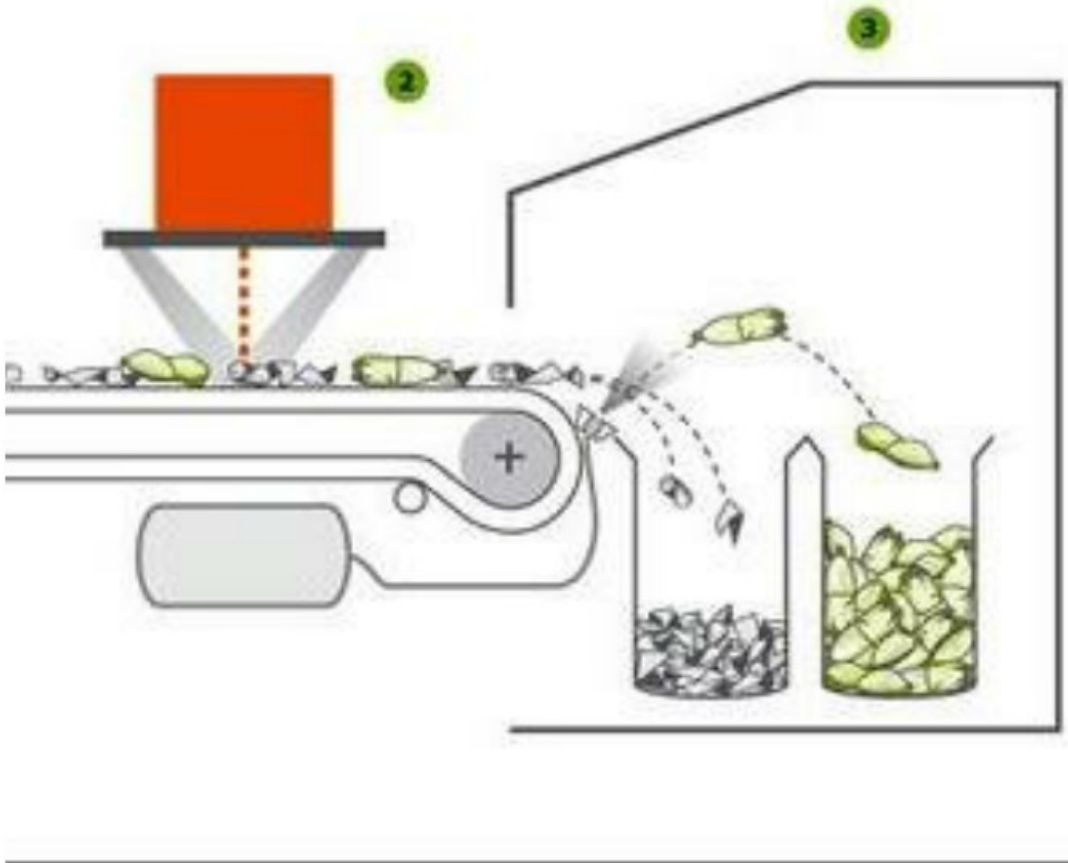


# Sorting plant 100.000 tons residual waste

	Yield in weigth %	Purity in weigth %
<b>PE-film</b>	84-89	93-96
<b>PEHD</b>	74-80	97
<b>PP-rigid</b>	70-75	96-98
<b>PET- bottles</b>	70-75	97
<b>PET-trays</b>	60-62	97



# NIR-skanner main technology identification



- **Reflection of rear infra-red rays**
- **Each material result in individual spectrogram**
- **Software can identify unic combinations and items**
- **Material sorted with air-stream**
- **Effective – fast speed 2 m/s, and 3 meter wide conveyor**

# PP- bottle with PETG sleeve will not be sorted as PP

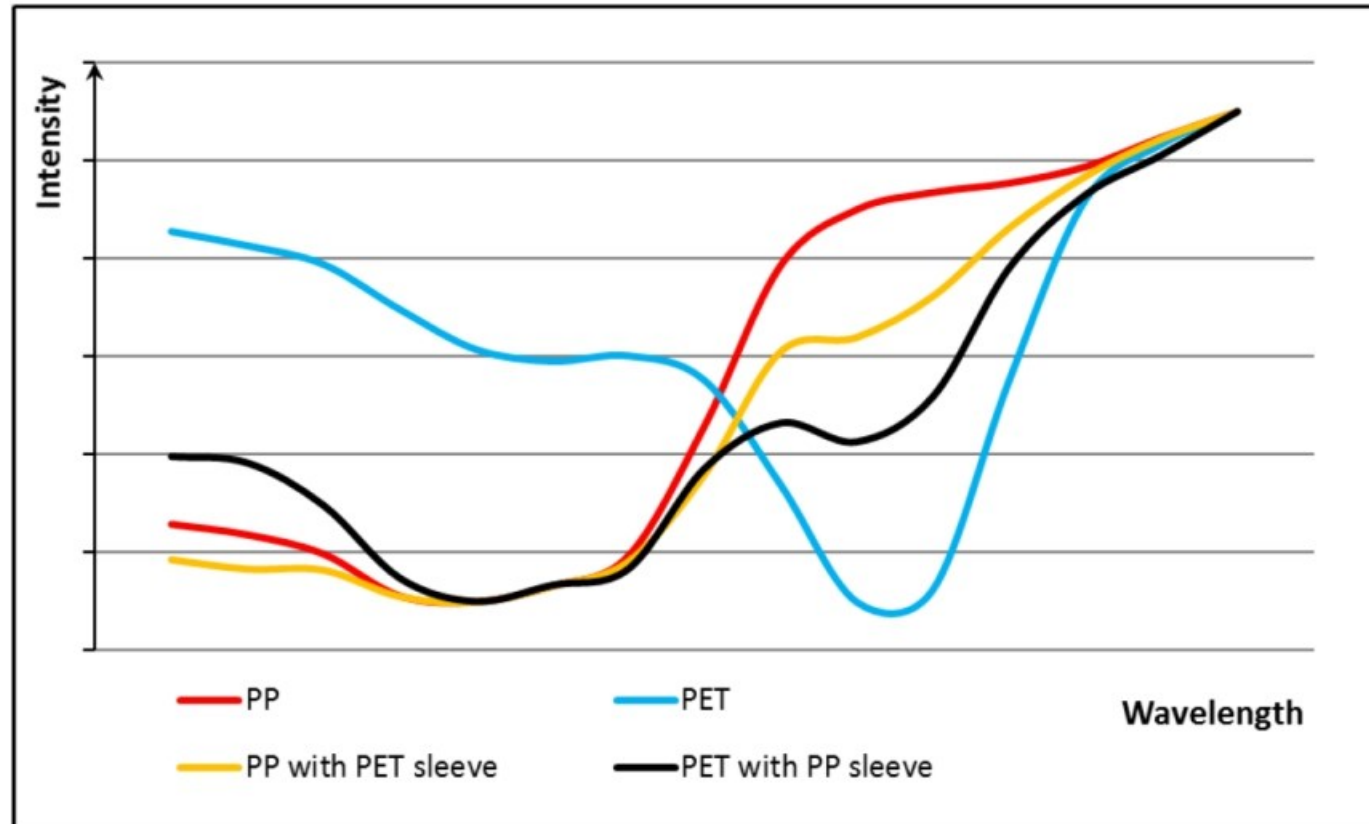


Figure 17: Spectra of PP and PET



# Quality source separated vs. residual w.



# Storage area Motala (source separated and IVAR (mixed residual waste))



# IVAR –material to finale product



# More processing possible – flake sorting



Frode Syversen

# Design for recycling – key factor for increased recycling?



# 2017: Design guide – Sweden+ Norway

<https://www.grontpunkt.no/media/2777/report-gpn-design-for-recycling-0704174.pdf>



# Tools for design for recycling

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- **Reports with guidelines**
  - Green
  - Yellow
  - Red
- **Several RecyClass certification bodies**
- **Green Dot Norway launching National calculator**
- **Practical projects and trials**

# Design for recycling



Packaging material:  
PP (RIGID)

## PACKAGING MATERIAL

COLOURS	ARRIER MATERIALS/ LAMINATED PLASTICS	ADDITIVES
✓ Colourless, transparent and light semi-transparent colours	≤ 3 % EVOH, ≤ 1 % PA	No additives
✓ White and dark opaque colours	SiO <sub>x</sub> , AlO <sub>x</sub> , TiO <sub>2</sub> and 3-5 % EVOH as long as the overall density of the product remains < 1 g/cm <sup>3</sup>	Additive loads and other agents that do not increase the density of PP to > 1 g/cm <sup>3</sup>
✗ Carbon black	Aluminium barriers, multiple layer of other resins, PVdC, > 1 % PA and > 5 % EVOH	Additive loads and other agents that increase the density of PP to > 1 g/cm <sup>3</sup>

- ✓ GOOD CHOICES
- ✓ APPROVED, YET UNFAVOURABLE CHOICES
- ✗ POOR CHOICE

Using recycled plastic reduces the environmental footprint of packaging, creates economic incentives for design for recycling and developing circular value chains.

## DESIGN

LABELS/SLEEVES	GLUE/ADHESIVES	PRINT
✓ No labels/sleeves and PP/OPP, LDPE and HDPE if the label/sleeve does not cover more than 60 % of the packaging and is < 5 % of the packaging's total weight	Non-toxic (aqueous, plant-based), washable and residue-free glue that dissolves at temperatures < 60 °C	No print directly on the product other than the best-before date, non-washable, non-toxic (aqueous, plant-based) ink
✓ PS/OPS if the label/sleeve does not cover more than 60 % of the packaging and is < 5 % of the packaging's total weight	Non-toxic (aqueous, plant-based), washable and residue-free glue that dissolves at temperatures 60-80 °C	
✗ Paper, PVC, PET, metal and aluminium	Non-washable in alkaline solutions of > 80 °C, acrylic, ultra-adhesive or self-adhesive glues	Ink directly on the packaging product more than just the best-before date, inks highly coloured with a high level of bleed and metallic inks

## CLOSURE SYSTEMS

### MATERIAL CHOICES

22 ✓ Releop 27.08.2020

✓ LDPE and HDPE

## About PP

### APPLICATION

Clear film packaging, carpet fibres, housewares, rope, labelling, stationary, reusable containers, automotive components, laboratory equipment and thermal underwear.

### QUALITIES

PP is a versatile material that is tough, yet flexible and classed as semi-rigid. It is extremely resistant to heat, chemicals and fatigue.

### RAW MATERIAL / SOURCE

Fossil, recycled, and biobased materials exist.



### SORTING AND RECYCLING

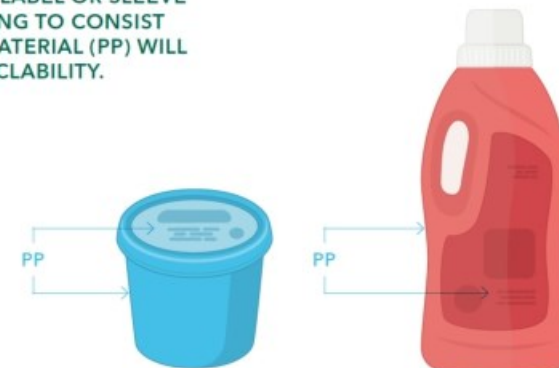
PP can be sorted and recycled to secondary raw material that is in demand. Even though the packaging material is recyclable, decisions made in the design of the product can create challenges in the sorting and recycling stages. It is generally considered that PP can be recycled in a 'closed loop' up to four times before thermal degradation will have a negative impact on the polymer.

### MARKET FOR RECYCLED MATERIAL

There is good access to fossil and recycled PP and the quality of the recycled material is good. After a dip in global demand during the global recession, PP is in high demand once more. PP can be recycled back into many different products, including clothing fibres, industrial fibres, food containers, dishware, compost bins, speed humps, and gardening apparatus.

## Example of successful design choice

CHANGING THE LABEL OR SLEEVE ON PP-PACKAGING TO CONSIST OF THE SAME MATERIAL (PP) WILL INCREASE RECYCLABILITY.





# Main recommendations

- **Avoid combinations of different materials if possible**

- Plastic, paper, metal
- Different plastic materials (polymers)
- Multilayers
- Additives (Chalk)

- **Correct choice of materials**

- PP, HDPE, LDPE, PET
- PET- trays difficult (Thermoformed PET))
- Transparent instead of colour
- Colour prior black

- **Sleeves and labels**

- Avoid wrong signals for NIR-sorting
- Limited area of packaging
- Glue solved in water



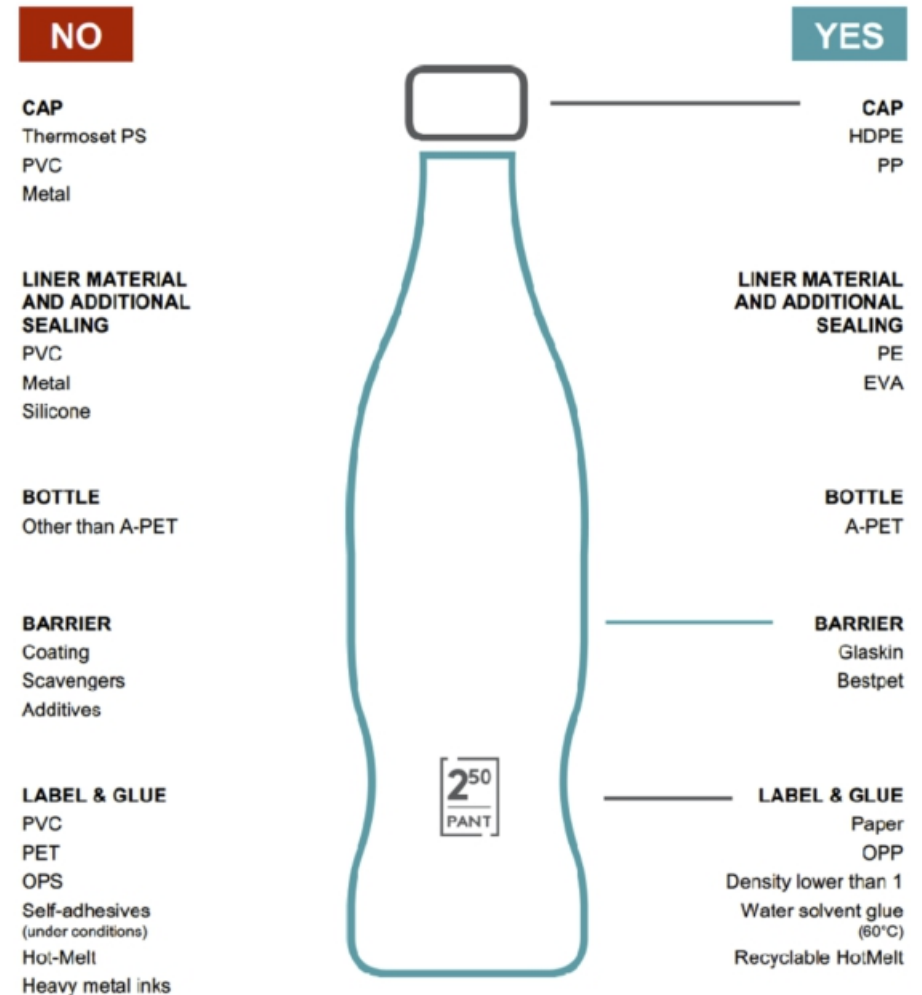
# Design for recycling PET – bottles (deposit)



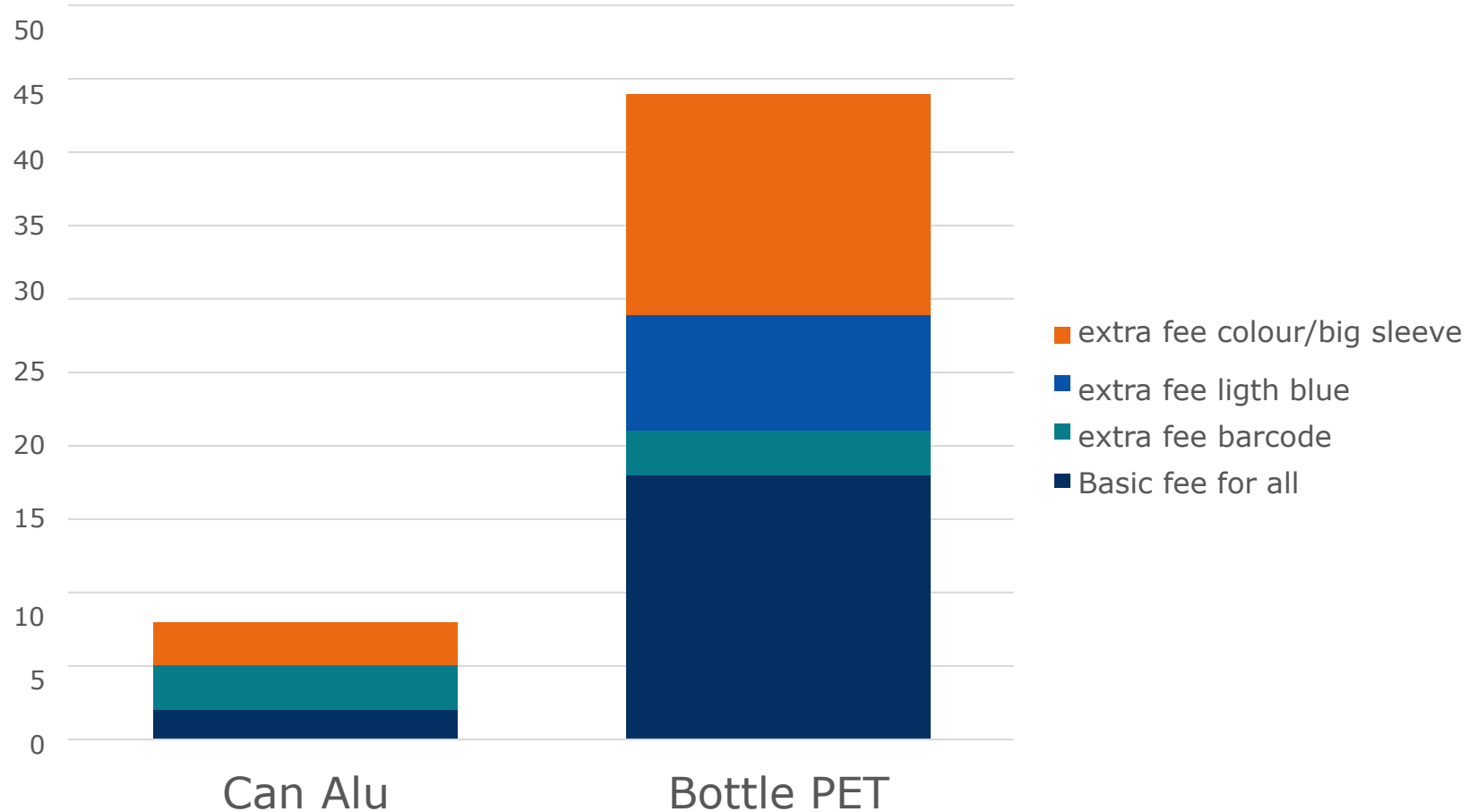
"RIGID"  
APPROVAL  
SECURE  
HIGH-GRADE  
RECYCLING

DESIGN FOR RECYCLING  
SINCE 1999!

## PET BOTTLES



# Put on market fee (øre/unit) ( 1 EURO = 950 øre)



# Design for recycling speeding up



# Leading brands working together

Workshops – Ecodesign / Sorting and recycling technologies



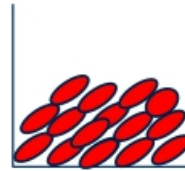
# Testing and analyses using NIR scanner





### Before: PP with PE sleeve

45,8 %



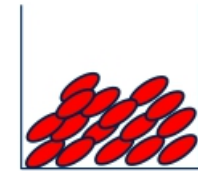
PP

12,5 %

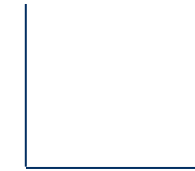


HDPE

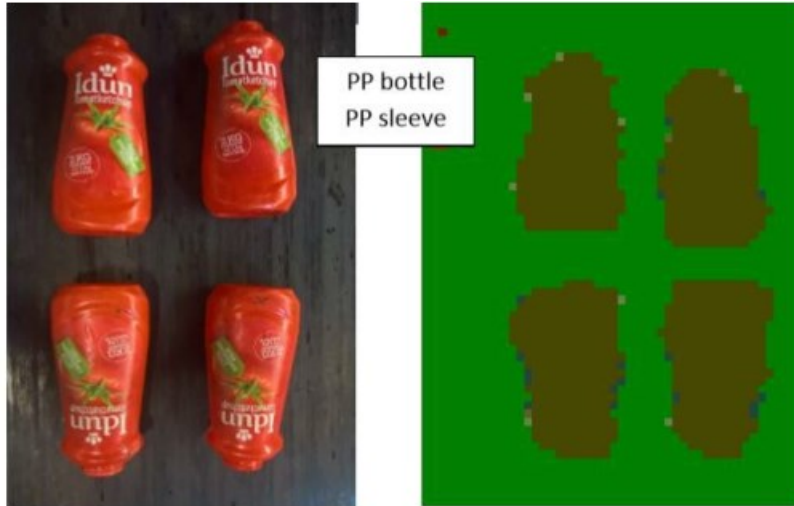
41,7 %



REST

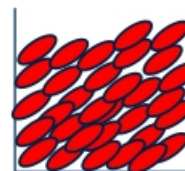


PET



### After: PP with PP sleeve

80,0 %

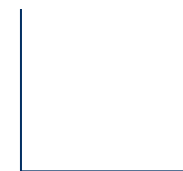


PP

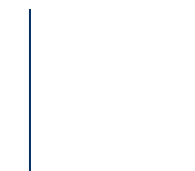
20,0 %



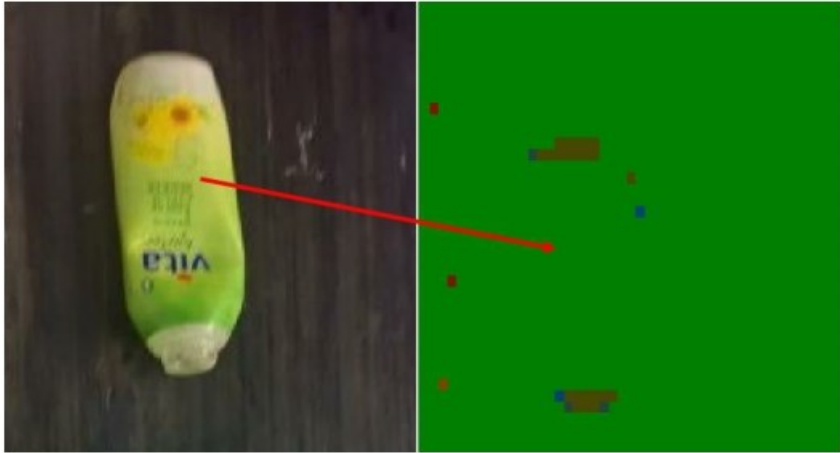
REST



HDPE



PET



**Before: PP with PETG sleeve**

6,3 %



PP



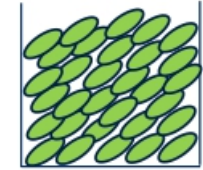
HDPE

6,3 %



PET

87,5 %

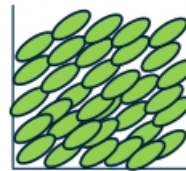


REST

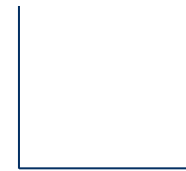


**After: PP with OPP sleeve**

85,4 %



PP



HDPE



PET

14,6 %



REST



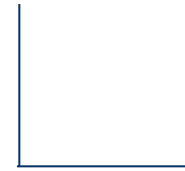


### Before: PP with carbon black

15,6 %



PP



HDPE

4,4 %



PET

80,0 %



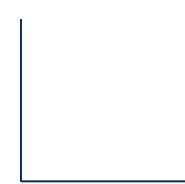
REST

### After: PP NIR black, 4 % in masterbatch

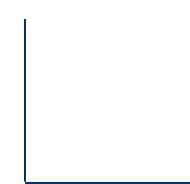
100,0 %



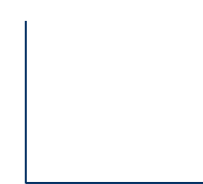
PP



HDPE



PET



REST

# Designs in action – carbon black alt.

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# Sleeves often a challenge

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# Sorting yield depending of different

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- **Combination of polymers materials or other (paper/alu)**
- **Area covered with labels/sleeves**
- **Thickness of sleeve**
- **Barrier material in body**
- **Product residuals**

# 100 % lost in sorting process

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- PET- bottle
- PS - sleeve

# 86 % lost in sorting process

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- PET-bottle
- PP sleeve

# 97% lost in sorting process

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- PET flaske
- PET sleeve

# PET-trays still problematic



# Now more trays PP/HDPE naturell





# Bread packaging with poor solutions



# Too much PP-film in use



# Carbon black

**Alternative sorting technology available?**

- **Black eye sorting**
- **MIR-technology**
- **No good solutions**

**Alternative NIR-black**

- **Expensive alternative**

# PET-trays

**Will recycling be developed og should PET trays be changed out?**

**PET-trays have potential to be good closed loop recycling.**

**How fast will recycling market be developed?**

# Use of recycled HDPE and PP

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- **Leading brands**
  - Jotun
  - Orkla H&PC
- **Searching for suppliers**
  - Total
  - Plastix
  - De Paul recycling
  - ...
- **Testing production**
  - RPC
  - EMBALLATOR



# Use of recycled material in new products

Long process covering:

- Contact with suppliers and producers
- Material quality testing
- Production changes
- Testing total value chain
- Internal cooperation



**45 % recycled material**



**OMO Aktiv & Sport**  
 Gir skinnlig ayeintasjon.  
 Dersom det er nødvendig med legesjelp, ha produktets beholder eller etikett for hånden.  
 Oppbevares utilgjengelig for barn.  
 VED KONTAKT MED ØYNE: Skyll forsiktig med vann. Fjern eventuelt kontaktlinsene dersom dette enkelt tar seg gjen. Fortsett skyltingen. Ved vedvarende ayeintasjon: Søk legesjelp.

Har du spørsmål om vask av fôr, kontakt Orkla Forbrukerservice gratis: ☎ 22 04 27 80 eller på [www.orkla.no](http://www.orkla.no)

Lilaborg AS  
 Postboks 575 Skøyen, 0204 OSLO

**Orkla**  
 Flasken er i 100% resirkulert materiale

Flaske og kork kan resirkuleres

**595 ml**  
 Gir opptil 11 vask. 9 vask ved middels hardt vann.

OMO Aktiv & Sport inneholder bl.a.  
 15-20 % Ikke-troske overflateaktive stoffer  
 < 5 % Phenyletanol, Fosforater, Parfum, Enzymer.

7 046 110 3035 11 >



**Flaskene er i 100% resirkulert materiale**



# Design changing process

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- **Supported by leading management**
- **Knowledge from different stakeholders in value chain**
- **Expect higher costs**
- **Challenging processes**
- **Be sure about positive result**
- **Better procedures for documentation of recyclability**
- **Patient about effects in market.**



# New incentives

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## Stronger producer responsibility

- **Volunteer pledges**
- **Eco-modulated fees and certified packaging, including share of recycled material**
- **Systems to sharing knowledge**
- **Revenue to support high sorting rates**
- **Taking more active role in developing the market**



# More ambitious extended producer responsibility for plastics through greater eco-modulation of fees





# Thanks!



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[www.mepex.no](http://www.mepex.no)

@mepexfrode





**Thank you for the participation!**

**W: [www.reloopplatform.org](http://www.reloopplatform.org)**

**E: [anna.larsson@reloopplatform.org](mailto:anna.larsson@reloopplatform.org)**

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