

19-02-2020

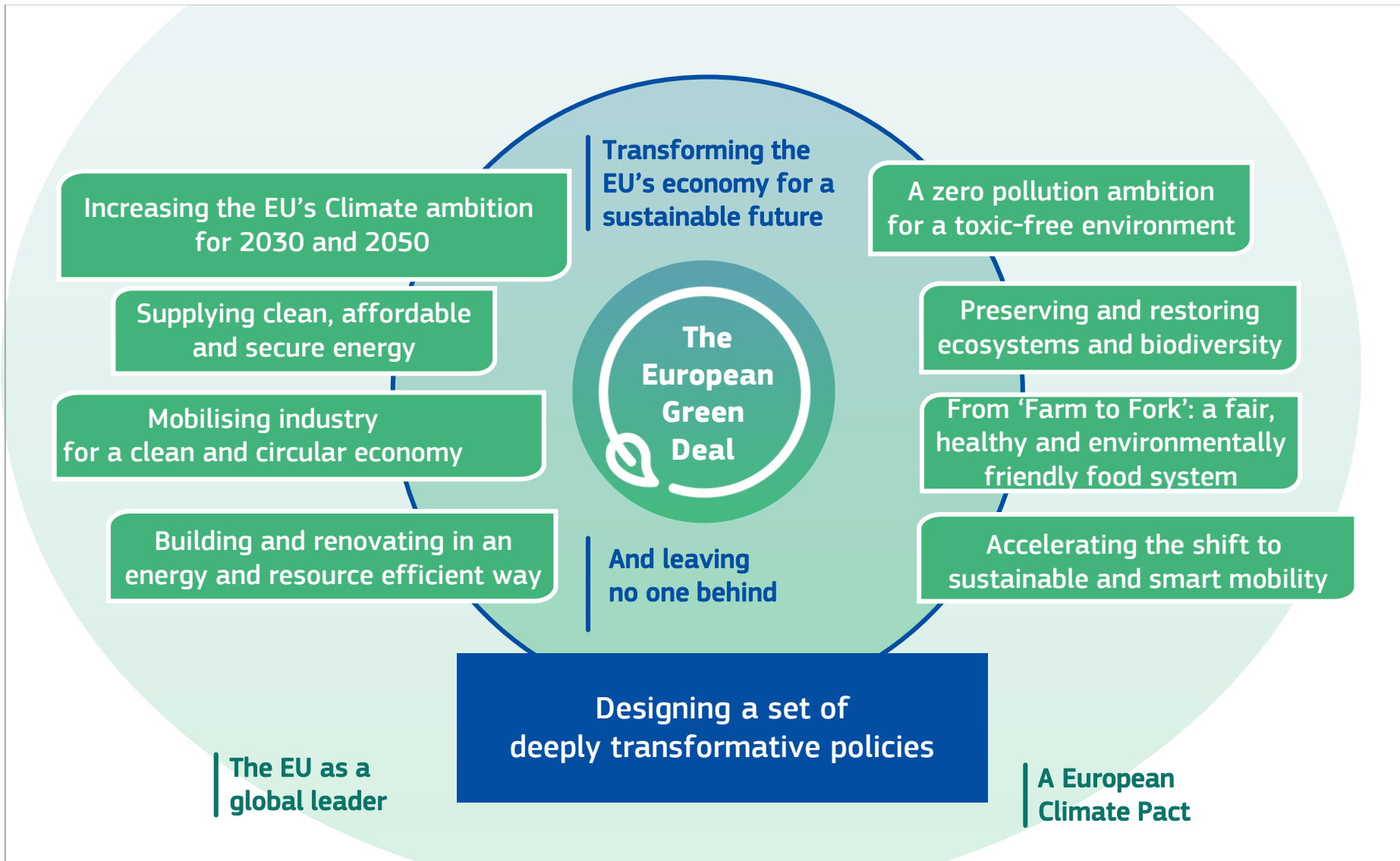


Circular design of fishing gear and EU policies

Unit on Maritime innovation, Marine knowledge and Investments

DG for Maritime Affairs and Fisheries
European Commission

The European Green Deal



Directive on the reduction of the impact of certain plastic products on the environment

Entered in force on 2 July 2019

Monitor fishing gear

- **placed on the market of the MS**
- **waste fishing gear collected**

and report to the Commission

*COM – to request the ESO to develop **harmonised standard** for the circular design of fishing gear to encourage preparing for **re-use** and facilitate **recyclability** at end of life.*

EPR schemes (by 31/12/2024)

- **for producers of fishing gear containing plastic**

*Member States to establish **national minimum annual collection targets***

- **of waste fishing gear containing plastic for recycling**

Standard for circular design of fishing gear

1. Study – existing challenges, solutions, practices, technologies, gear classifications, gear designs etc. WS – to validate findings, to get collective intelligence. Project ends: 21 August 2020
2. MARE will ask by end of 2020 GROW to submit stand request to CEN (already in 2020 Union WP for EU standardization)
3. CEN - expert group to develop standard – at least 2 years

Why standard:

- To encourage re-use
- To facilitate recyclability at the end of life
- To potentially use in fee modulations

Revised Port Reception Facilities Directive

Goal: enhance the availability and use of port reception waste facilities.

*Entered in force:
27 June 2019*

- **MS should set up adequate port reception facilities**
- **Introduction of 100% indirect fee**
- **All ships must deliver their waste before departure (incl.: passively fished waste)**



EPR schemes for fishing gear included in the SUP directive should support the proposed 100% indirect fee system and help to avoid any increase in the fee and ensure a right of delivery.

Plastic ML – solutions?

EC (MARE-ENV-MOVE)

- Drafts and implements legislation, strategies
- Drives investments where most needed
- Encourages new initiatives (e.g. Plastic alliance aiming to reach recycled content in plastic products 10 Mio tons in Europe by 2025)
- Organizes stakeholder events that all relevant voices are heard and wise decisions are made as well as to spread good practices
- Awareness raising, literacy, youth engagement



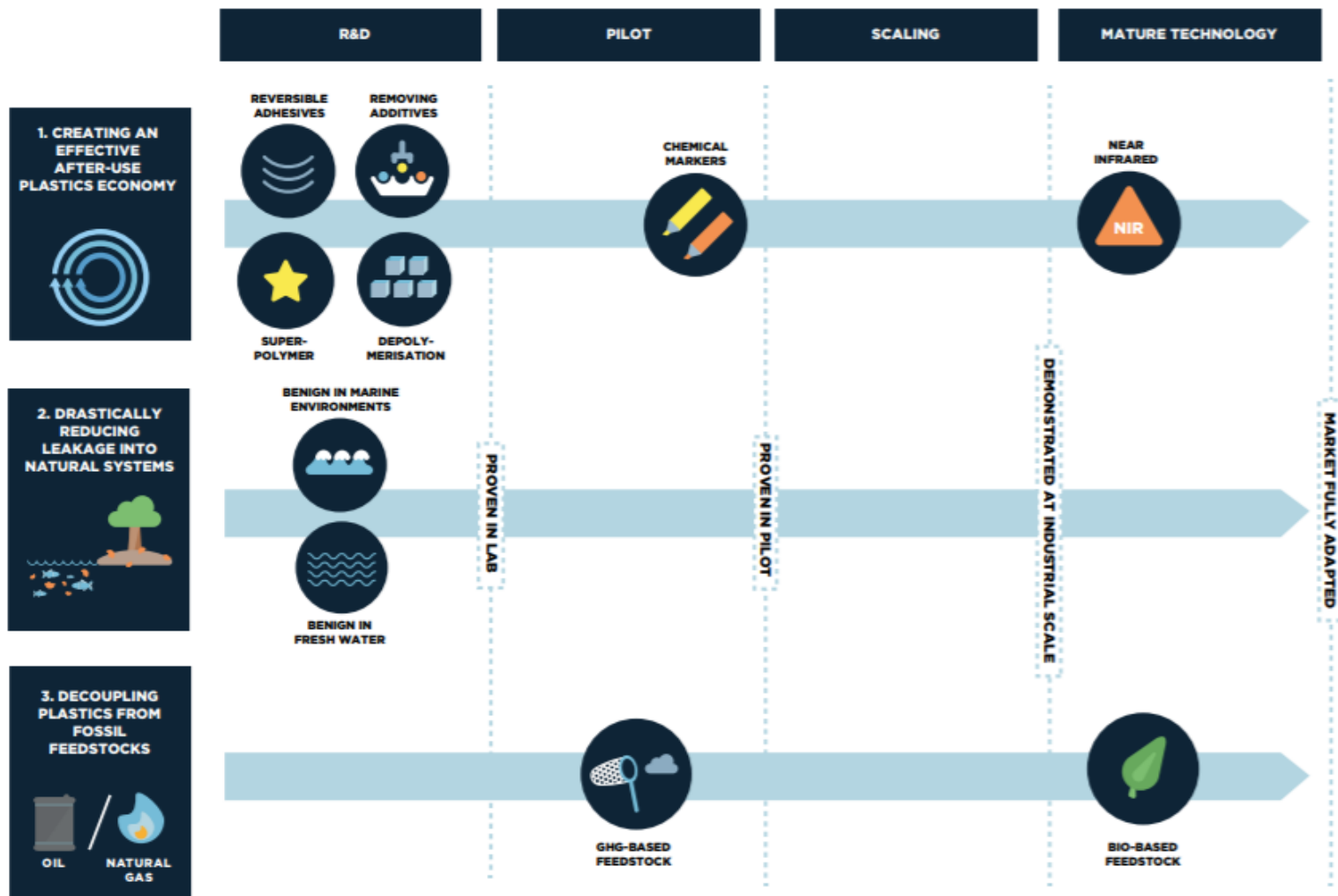
Plastic ML – solutions?

Stakeholders

- **Voluntary commitments collections (UN Ocean, OOC)**
- **Business opportunities:**
- Plastix Global (furniture. Bottles etc)
- Healthy Seas (produces socks),
- Axiom (cycling gear),
- Fishy filaments (3D printing from nylon nets),
- Bureo (frisbee gears),
- Verdura (shoes),
- Econyl (swimwear) and many more
- **Local initiatives**



FIGURE 10: EXAMPLES OF PROMISING ENABLING TECHNOLOGIES FOR THE NEW PLASTICS ECONOMY AND THEIR LEVEL OF MATURITY



“The beginning of the end of waste”

ADIDAS III loop approach

Recycled Loop – Made from Recycled Materials: Supported by the introduction of **PRIMEBLUE** and **PRIMEGREEN** ***performance fabrics – 18 mio sold.***

Circular Loop – Made to be Remade: Products whose lifecycles continue after each use, like the Futurecraft Loop running shoe - 2021 on market.

Bionic Loop – Made with Nature: adidas' ambition to create future where every adidas product can have multiple lives and then return to nature.







European
Commission

Thank You!

Fishing Gear as a source of marine litter in Northern Europe

Wouter Jan Strietman – Wageningen Economic Research



Introduction



- Wouter Jan Strietman
- Wageningen Economic Research, the Netherlands
- Marine governance, fisheries, marine litter



...and this is me in Iceland, 2019, collecting beach litter

Particularly
smaller off-cuts
from trawl nets
and ropes

A substantial
amount of beach
litter in Northern
Europe is fishing
gear

In some areas, aquaculture is also an important source of beach litter



However, a substantial amount of fishing gear sinks to the seabed, particularly gillnets, pots and cages



In the EU alone, ALDFG could potentially amount to 4-10 mln kilos on an annual basis

Source: Viool V. et al., 2018 - Study to support impact assessment for options to reduce the level of ALDFG

Isle of Harris, Scotland, November 2019









WAGENINGEN
UNIVERSITY & RESEARCH

Photo: Scottish Marine Animal Stranding Scheme



**There are various reasons
for fishing & aquaculture
gear to end up in the sea**

For example, off-cuts are a by-product of mending the nets



Photo: Kibaunot - Flickr



Photo: WJ Strietman

Weather conditions and seabed conditions also play their part



**There are various ways
to address these
challenges**

Usually I work with fishermen and other experts on location to identify the sources and causes of beached fishing gear and solutions to prevent this



Today I brought some of those items for you to **identify** and to discuss the **potential for recycling and alternative design...**



Thank you for your attention!



Wouter Jan Strietman

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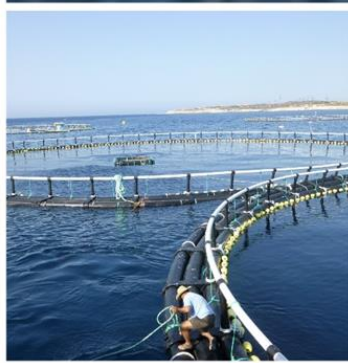


STUDY ON CIRCULAR DESIGN OF THE FISHING GEAR FOR REDUCTION OF ENVIRONMENTAL IMPACTS

EASME/EMFF/2018-1.3.2.4/Lot2/SI2.809933-SC01



DR DAVID FEARY



- Better understand recyclability of ALDFG and end-of-life fishing gear
 - Identify existing challenges (legal, practical) to collect, redesign, reuse and/or recycle ALDFG and end-of-life fishing gear
 - Identify best available practices and technologies, voluntary commitments and certification processes
- Propose recommendations for effective, useful and harmonized standards for the circular design of fishing gear.
- Summarise types of, and criteria underpinning fishing gear classification
 - Collate and summarise materials and procedures necessary to facilitate the development of a standard for circular design of gear,
 - Validated recommendations of how to effectively classify fishing gear and its parts at point of sale and at collection in ports, according to the recyclability.
- Provide clear recommendations for future fishing gear design

Data collection: Undertaken using Literature Review, Stakeholder Engagement

Literature review

- What are the legal and practical 'challenges' and best available practice/technologies for the collection, redesign, reuse, recycling and/or monitoring of recycling of ALDFG and EOL fishing gear?
- Two secondary questions also addressed
 - What *voluntary commitments* have been undertaken to address challenges and what have been their effect?
 - What *certification processes* have been undertaken to address challenges, and what have been their effect?

Stakeholder engagement

- Engagement with stakeholders will shed light on areas where primary and secondary literature offers limited information and insufficient detail
- Range of stakeholders utilised:
 - Academic research on ALDFG or EOL fishing gears;
 - Companies/organisations with experience in fishing gear design and manufacture;
 - Companies undertaking collection, recycling, ecolabelling, and/or reuse of fishing gear;
 - Fishing industry;
 - National/Regional government with regards to marine litter programs;
 - Companies/non-governmental organisations (NGOs) that have undertaken projects and/or have advisory roles for marine plastics; and
 - Expertise in development of ISO certification for fishing gears.

Data assessment: Undertaken using Expert stakeholder workshop

- 2-day workshop with 30-40 participants (utilising key individuals) to validate findings, and gather collective intelligence on practical solutions to address challenges identified.
- Main Objectives
 - Detailed overview and validate existing challenges identified in literature review and stakeholder engagement;
 - Open discussion with all key stakeholders on practical solutions to address the identified challenges;
 - Examine the types of, and criteria underpinning fishing gear classification, identifying the materials and procedures necessary to facilitate the development of a standard for circular design of gear;
 - Examine and make clear recommendations to develop a practical way to classify fishing gear and its parts at point of sale and at collection in ports, according to the recyclability;
 - Identify lessons learned from ongoing efforts and identify possible bottlenecks to answering challenges; and
- Provide recommendations for circular design of fishing gear
 - Provide substantial recommendations on objectives, criteria, and fishing gear classification considered for the development of a standard for circular design of the fishing gear
- Provide recommendations for gear classification for point of sale and port collection
 - Consider diversity of port infrastructure and gear types across Atlantic EU Western Waters and the feasibility of a generic approach versus multiple approaches tailored to port classification
 - Providing pragmatic recommendations that are achievable under a range of circumstances.

- Seek feedback from key individuals on draft findings and recommendations on:
 - Circular design of fishing gear
 - Classification of fishing gear for point of sale and port collection
- The value of the proposed recommendations will be assessed by asking key individuals to rate each recommendation (presented in a random order) in terms of three attributes:
 - What is the level of priority of such recommendation and level of urgency?
 - Is there a knowledge gap to implement the recommendation?
 - Would it help to implement the recommendation by launching a research to market project?



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COMMISSION

*Protecting and conserving the
North-East Atlantic and its resources*

OSPAR and fishing gear as source of marine litter

OSPAR Project Design and Recycling of Fishing Gear

Mareike Erfeling

Brussels

19 February 2020



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COMMISSION



OSPAR's vision is a clean, healthy and biologically diverse NE Atlantic Ocean, used sustainably



OSPAR Is the mechanism by which **15 Governments** and the **EU** cooperate to protect the marine environment of the North-East **Atlantic.**



The North-East Atlantic



Region I: Arctic Waters

Region II: Greater North Sea.

Region III: Celtic Seas

Region IV: Bay of Biscay and
Iberian Coast.

Region V: Wider Atlantic





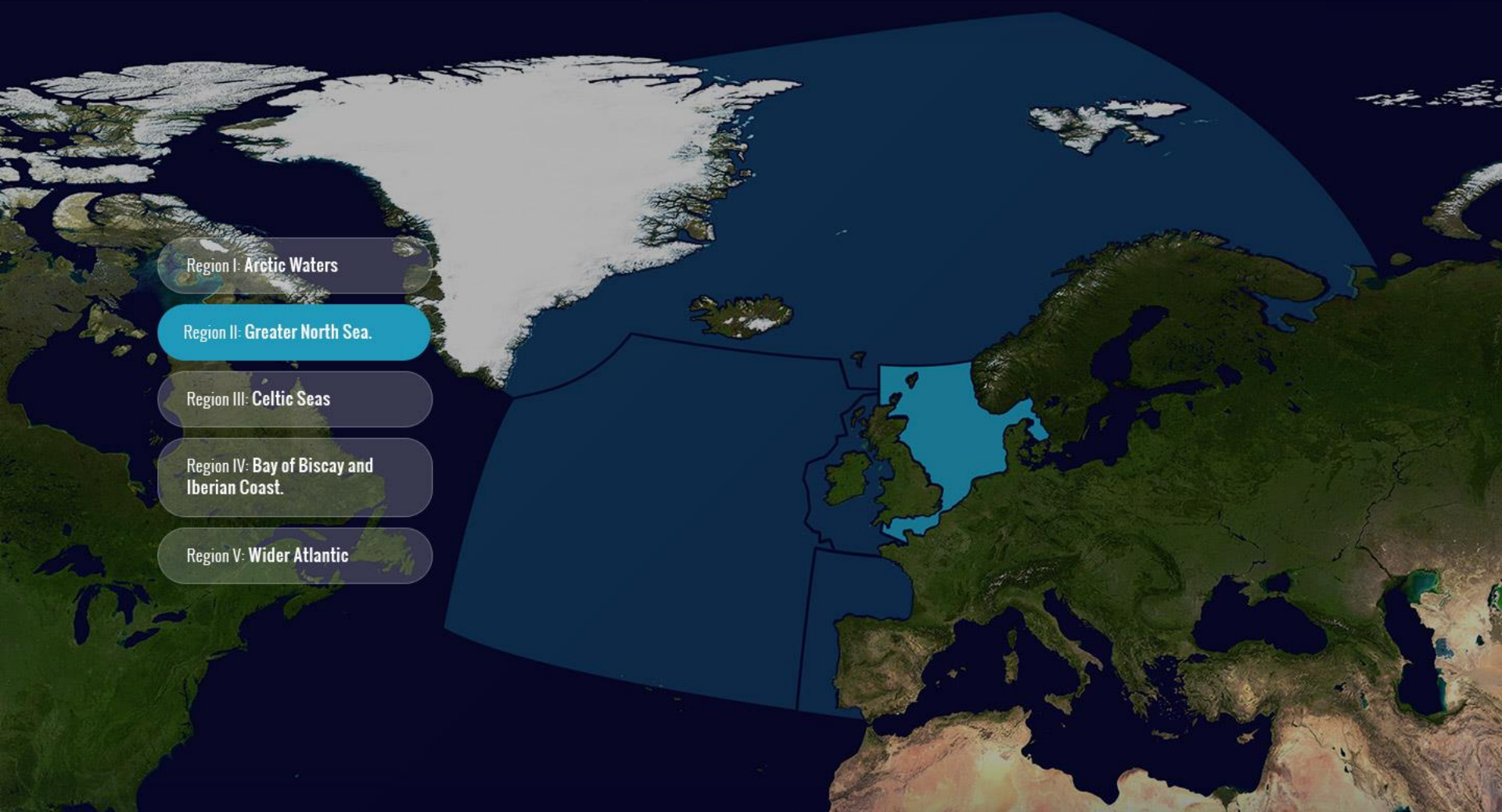
Region I: Arctic Waters

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16 Contracting Parties

- Belgium
- Denmark
- Finland
- France
- Germany
- Iceland
- Ireland
- Luxembourg
- The Netherlands
- Norway
- Portugal
- Spain
- Sweden
- Switzerland
- The United Kingdom
- European Union



OSPAR Maritime Area and Regions:

Region I: Arctic Waters

Region II: Greater North Sea

Region III: Celtic Seas

Region IV: Bay of Biscay/Iberian Coast

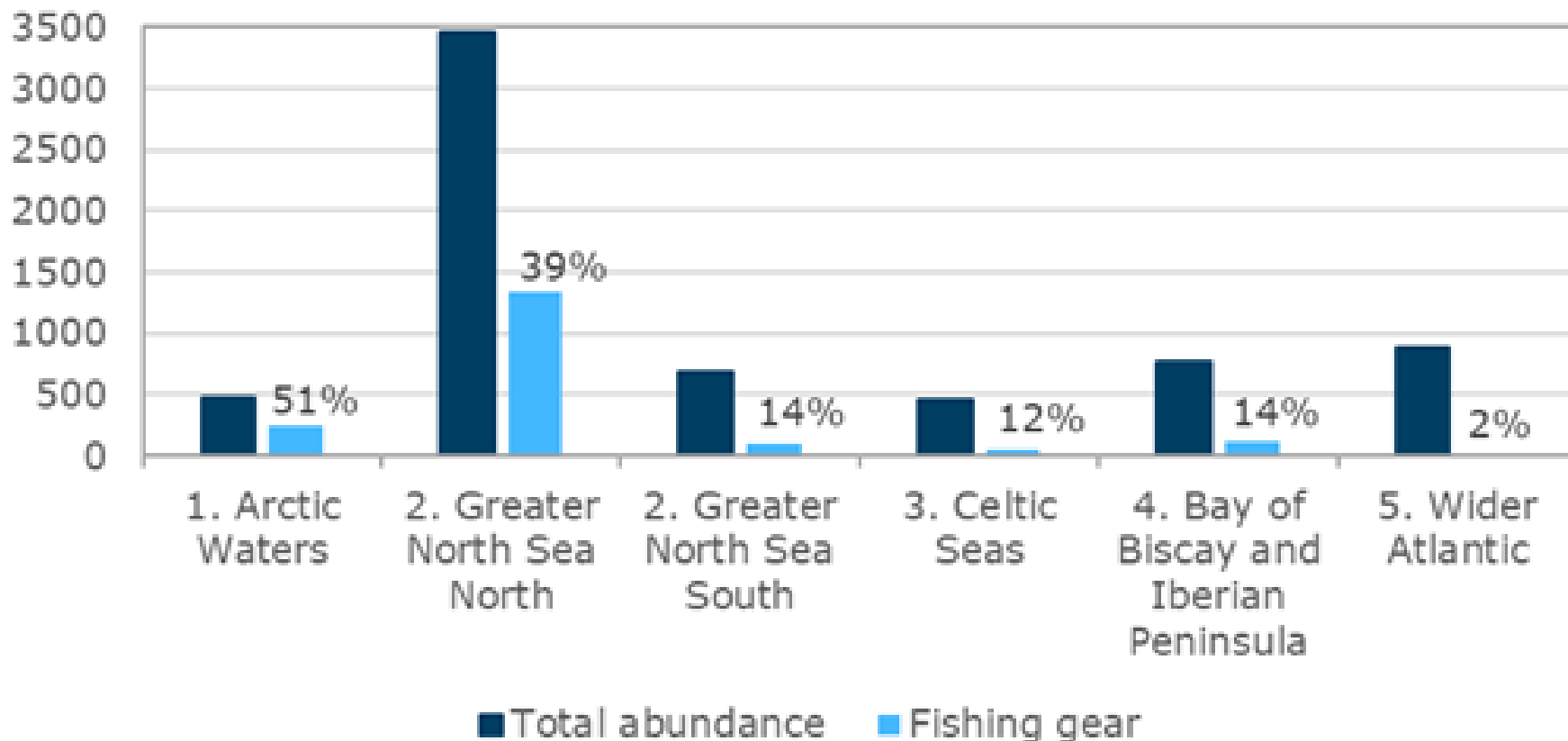
Region V: Wider Atlantic



Title, date, name

EVIDENCE

Mean litter abundance per survey (2012-2018)



Top litter items – beach litter monitoring 2011- 2017

Litter type	Ranking (from a total of 110 litter items) without fragments	number of items recorded	% of total number of litter items recorded
Plastic Rope 31	9	24222	1,43
Plastic Strapping 39	16	14266	0,84
Plastic Industrial sheeting 40	21	9575	0,56
Plastic Cleaner bottles 5	35	3411	0,20
Plastic Gloves_pro 113	40	2787	0,16
Wood Pallets 69	57	1068	0,06
Paper Milk Tetrapak 118	58	1030	0,06
Metal Aerosol 76	61	913	0,05
Plastic Injection_gun 11	68	806	0,05
Plastic Gloves 25	71	767	0,05
Plastic Tags 114	74	693	0,04
Plastic Oil_small 8	77	637	0,04
Glass Bulbs 92	86	412	0,02
Wood Brushes 73	88	335	0,02
Plastic Oil_large 9	92	200	0,01
Metal Paint_tins 86	98	96	0,01
Plastic Hard_hats 42	100	53	0,00
Metal Oil 84	101	46	0,00

What are we looking at ?

Beach litter monitoring

- ❖ Oyster trays
- ❖ Rope (diameter more than 1 cm)
- ❖ String and cord (diameter less than 1 cm)
- ❖ Nets and pieces of net
- ❖ Tangled nets/ cord/ rope/ string
- ❖ Fish boxes
- ❖ Fishing line
- ❖ Gloats / Buoys

In addition: information collected when cleaning seafloor (removing ghost nets or fishing for litter)

Why does fishing gear end up in the oceans?

- ❖ (Un)intentional discarding of smaller and rope cut-offs and larger sections of net
- ❖ Conflict with other gear or with seabed/wrecks
- ❖ Lack of adequate waste management
- ❖ Weather conditions
- ❖ Intentional discards (behaviour)

Options for addressing issue

- ❖ Education and awareness
- ❖ Fishing for litter
- ❖ Adequate port reception facilities
- ❖ Recycling
- ❖ Better Design
- ❖ Spotting and removing ghost nets and other fishing related litter
- ❖ Gear marking

OSPAR Regional Action Plan on Marine Litter



- ❖ Prevention
- ❖ Fishing for litter
- ❖ Addressing ALDFG
- ❖ Education

OSPAR actions addressing fishing related marine litter

- ❖ OSPAR Recommendation 2016/1 on the reduction of marine litter through the implementation of fishing for litter initiatives
- ❖ OSPAR Recommendation 2019/01 and Guidelines on the reduction of marine litter through the Implementation of Sustainability Education Programmes for Fishers
- ❖ Initiatives to map and remove ALDFG
- ❖ Report 2017: overview management practices fishing litter
- ❖ Workshop november 2017: conclusions on handling (plastic) waste in fishing sector
 - ❖ And now: Project on design and recycling of fishing gear



OSPAR project Design and Recycling of Fishing Gear

- ❖ Overall goal: decrease amount of fishing gear in North East Atlantic
BY: providing synthesis of knowledge, best practices, knowledge gaps and challenges (implementation SUP directive)
- ❖ Project team: NL & UK supported by experts
- ❖ Focus on commercial end-of-life fishing gear (ALDFG, recreational gear, aquaculture equipment will also be considered)
- ❖ Process:
 - ❖ questionnaire (summer 2019) – 69 responses from 11 countries (different sectors)
 - ❖ interviews
 - ❖ discussion of recommendation with experts during EC & OSPAR joint workshop on 19 and 20 February 2020: test and refine draft recommendations
 - ❖ publication in summer 2020



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Thank you for your attention

Lets have a productive and enjoyable
workshop



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*Protecting and conserving the
North-East Atlantic and its resources*

Design & Recycling of Fishing Gear

Scoping Study – Preliminary conclusions

Expert workshop, Brussels

19-20 February 2020

Roos Bol

Rijkswaterstaat, The Netherlands

roos.bol@rws.nl

Content

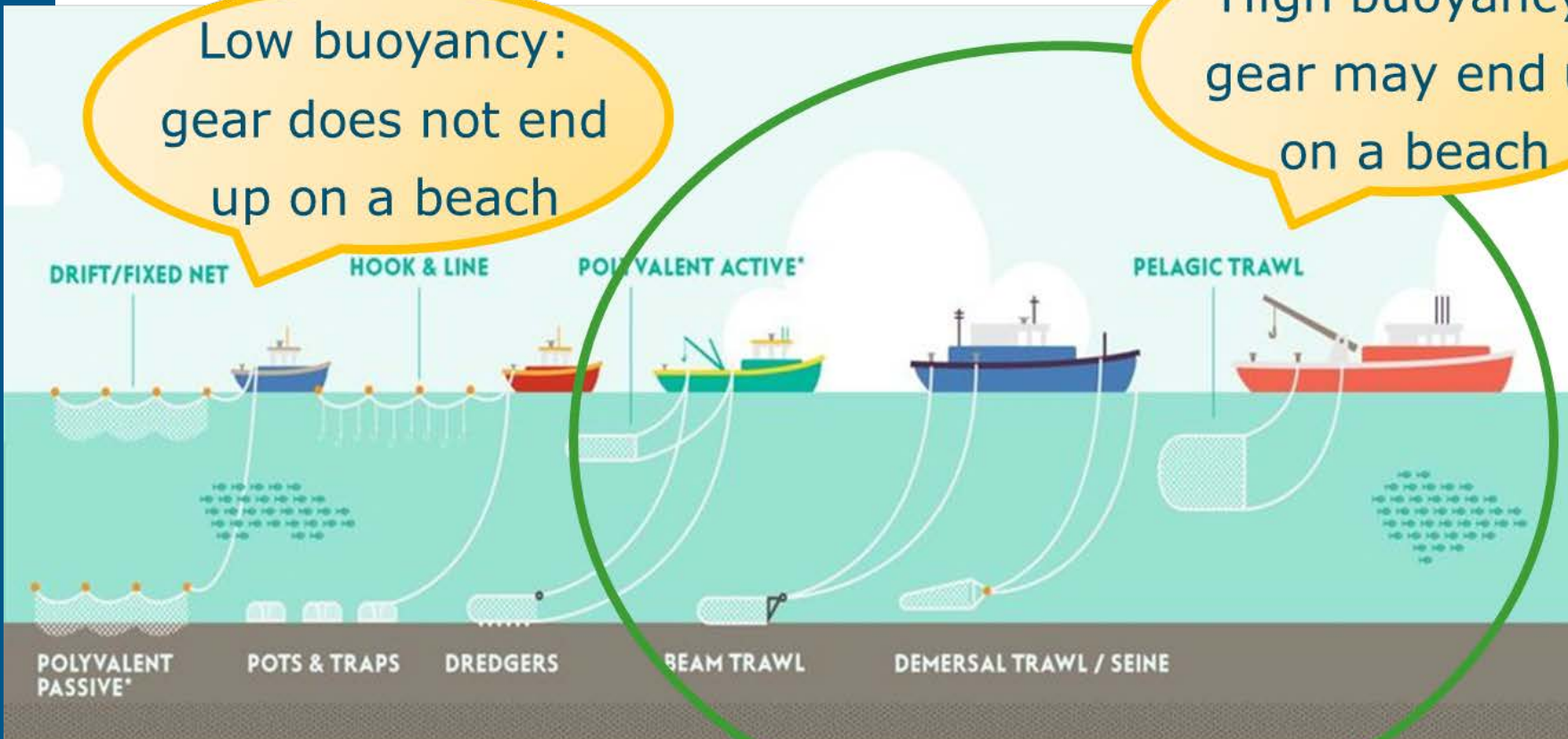
Main results of Scoping Study

- › Fishing gear types: marine litter & supply chain
- › Design & recycling as a solution:
 1. Collection & logistics
 2. Recycling
 3. Design for recyclability & re-use
 4. Design to reduce impact on the marine environment
 5. Design for better traceability

Passive gear versus active gear

Low buoyancy:
gear does not end up
on a beach

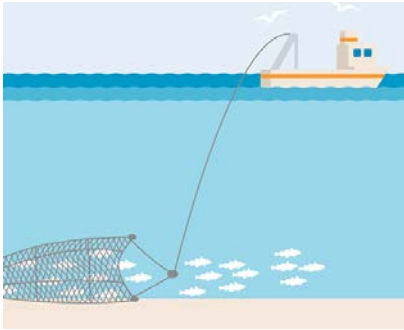
High buoyancy:
gear may end up
on a beach



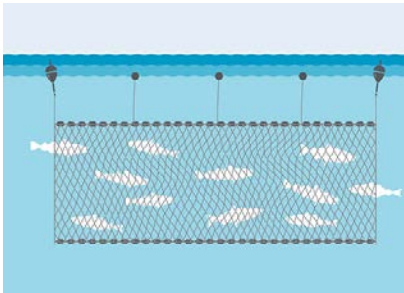
Source: Carpenter, 2017

Annual loss of aquaculture + fishing gear in Europe: **4.000 – 10.000 tonnes**
(Viool et al. 2018)

Main reasons for gear loss



- > **Trawl gear:** (un)intentional discarding of net sections / inadequate waste management



- > **Passive gear:** extreme weather / currents & conflict with other gear



- > **Aquaculture gear:** extreme weather & mismanagement / discarding

Fishing gear distribution

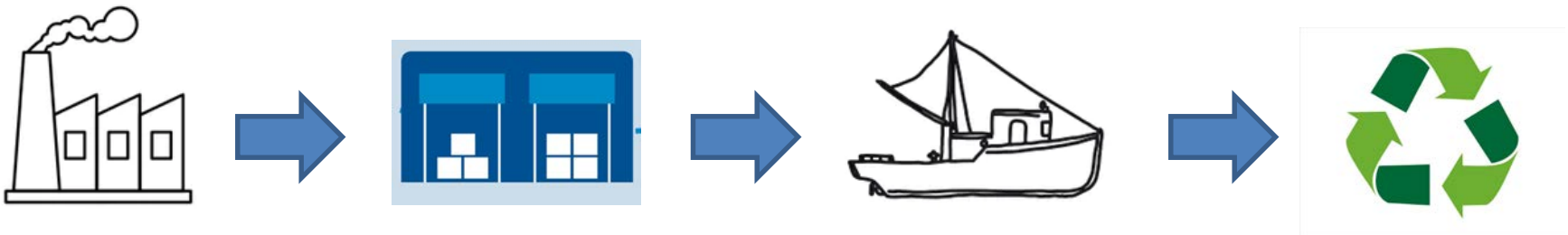
- › Bottom & pelagic trawls main gear in **North Sea/Eastern Arctic**
- › Passive gear (gillnets) important in **Baltic**, Spain, France
- › Bottom trawls & long lines in **Mediterranean**
- › In **Bay of Biscay** & Iberian coast: bottom & pelagic trawls, multi-gear (polyvalent), purse seine
- › Small scale: pots & traps (UK), drift nets (France)
- › Main **aquaculture** countries: Norway, Spain, UK, France
- › **Recreational** gear loss important in UK, Germany

Fishing gear suppliers

- > **Raw materials** predominantly from overseas
 - Big suppliers such as Euronete and Hampiðjan
 - Also wide range of local suppliers
 - Some online ordering (gillnets, rods & lines)
- > **Assembling** generally done locally, in country itself
 - Often tailormade, especially trawl gear
 - Sometimes through local fisheries cooperative
 - To some extent: self-assembling by fishermen
 - Repairs & re-use

Fishing gear supply chain

- › Complex supply chains with many actors
- › Valuable product stream – high potential for re-use
- › Differences between countries
- › Recommendations:
 - › Perform mapping exercise of supply chain in each country
 - › Involve all stakeholders (designers, users, recyclers) in the discussion on minimising marine litter



Design & recycling of fishing gear

as a potential solution

1. Collection & logistics

> **Challenges for collection:**

- No legal obligation for recycling
- Lack of port facilities
- Mismanagement / behaviour

> **Logistical challenges:**

- Only 2 main recycling companies in Europe: Plastix & Aquafil
- Highly selective in material & recycling method
- High standards on accepted end-of-life gear
- Result: high effort & costs for pre-processing & transport

1. Collection & logistics

- › **Best practice example:** PechPropre, France
 - Diagnosis of current plastic management in fishing
 - Survey of 67 fishing ports



- › **Recommendations:**
 - National legislation to support recycling
 - Economic incentives to support logistics
 - Expand possibilities & funding for recycling projects

2. Recycling: materials

> Main plastics:

- Polypropylene (PP)
- Polyethylene (PE)
- Nylon (PA6)
- PET (in gillnets)



> Other materials:

- Metals
- PVC
- Polystyrene
- PVDF
- HMPE (e.g. Dyneema®)
- Rubber
- Foams
- Hazardous materials (lead weights, copper coatings)

2. Recycling: state of play

> **Recycling pathways:**

- **Steel** (and sometimes lead) - regular metal recycling (all countries)
- **PP/PE**: floats, lines and nets; single polymer trawl / purse seine nets - mechanical recycling (Plastix Denmark)
- **PA6 (nylon)**: mostly in gillnets - chemical recycling (solvolysis) and re-threading into yarns (Aquafil Slovenia)
- **PET**: chemical recycling and re-threading into yarns (Antex Spain)

> **Challenges:**

- Mix of polymer types requires costly sorting/dismantling
- Contamination (ALDFG)
- Materials mixed with hazardous waste (e.g. lead)
- Quality / market value of recycled material

2. Recycling: best practice examples

> Icelandic return scheme:

- Over 90% of fishing gear recycled
- Return scheme with fee system
- Mostly trawls & purse seines



> Healthy Seas:

- Socks made of recycled nylon from Aquafil
- Using fishing gear recycling as positive branding



2. Recycling: recommendations

- › Promote re-use & repairs; increase awareness of materials during repairs
- › Clear guidelines for pre-processing & sorting
 - › Including: degree of necessary pre-processing
- › Examine ways to reduce pre-processing costs
- › Investigate potential of colour-coding for polymer separation
- › Availability & marketing of high-quality outputs



3. Design for recyclability and re-use

- › Several materials cannot be recycled or re-used:
 - **Lead lines** containing a mixture of lead, PP, Dyneema and soft PVC
 - **Mixed materials** difficult to dismantle / separate;
e.g. bridle lines, sweep lines, head and foot ropes or towing warps -
different polymers, sometimes metal fortification
 - **Treated nets** (e.g. copper or other antifouling): potential toxicity
- › Currently **design for functionality** - no waste management considerations
- › Design as a potential solution to enhance recycling & re-use

3. Design for recyclability and re-use

> **Recommendations:**

- > (National) economic incentive to increase purity (reduced mixture) in gear manufacturing
- > Utilise alternatives for copper threads / coating in ropes & lines
- > Innovation: develop environmentally friendly coatings
- > Innovation: move away from exclusive consideration of functionality towards more circular economy oriented design

4. Design to reduce impact

- › Still use of hazardous materials
- › Little research on environmentally friendly design
- › Off-cuts / discards are a problem (behaviour)
- › **Biodegradability** as a solution?
 - › Increasing research, but: need to consider fisherman's perspective
 - › Only if loss cannot be prevented!
 - › Risk of 'perverse incentive'



4. Design to reduce impact

- > **Best practice examples:**
 - Biodegradable panels / ropes on pots & traps
 - Pilots: DollyRopeFree & DropS
- > **Recommendations:**
 - Reduce / replace hazardous materials
 - Increase research & field testing
 - Design criteria to include environmental impact
 - Increase awareness of impacts
 - Economic incentives for enhanced collection of discards on board & in port



Pictures: DollyRopeFree; Wouter Jan Strietman & Dirk Kraak

5. Design for better traceability

- › New technologies: e.g. electronic tags, QR codes, colour coding, metal tags, radio beacons
- › Gear labelling of material: to easily identify material
- › Gear marking for ownership: to ensure traceability
- › Challenges:
 - Current lack of standardized approaches
 - Often only portion of gear is lost
 - No legal obligations



Picture: GGGI

5. Design for better traceability

- › **Best practice example:** mandatory gear marking of all passive & trawl gear in the UK
 - › Fishers easily identified by enforcement agencies
 - › Fines for non-compliance & prosecution for violations
- › **Recommendations:**
 - › Gear marking only if there is chance of loss of larger sections
 - › Extend marking to retrievability of lost gear (e.g. echolocation)
 - › Investigate marking systems for owner identification
 - › Improve legislation & enforcement

Concluding remarks

- > **Enhanced recycling of fishing gear is one of the solutions**
 - > To reduce marine litter from intentional discards
 - > Challenges remain in logistics & recycling
 - > **Design modifications are part of the solution**
- > Workshop: verify & expand recommendations; focus on practical aspects and feasibility
- > Recommendations will:
 - > Aid OSPAR Contracting Parties to assist fishing gear handlers in the best way possible, and with effective implementation of SUP
 - > Support the Commission in development of standard for circular design of fishing gear

Circular Product Design considering Fishing Gear

Brussels, 19.02.2020





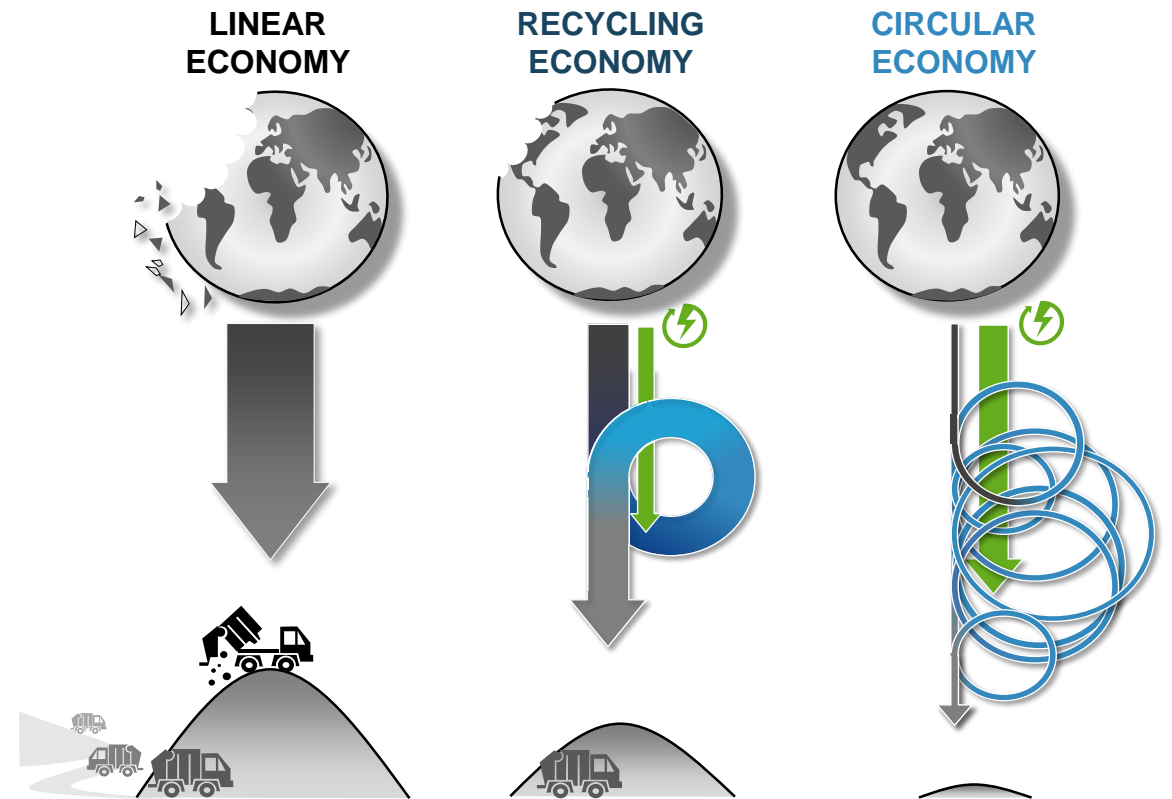
Our purpose:

We create
chemistry for a
sustainable future

CIRCULAR ECONOMY MEANS...

...Decoupling growth from resource consumption

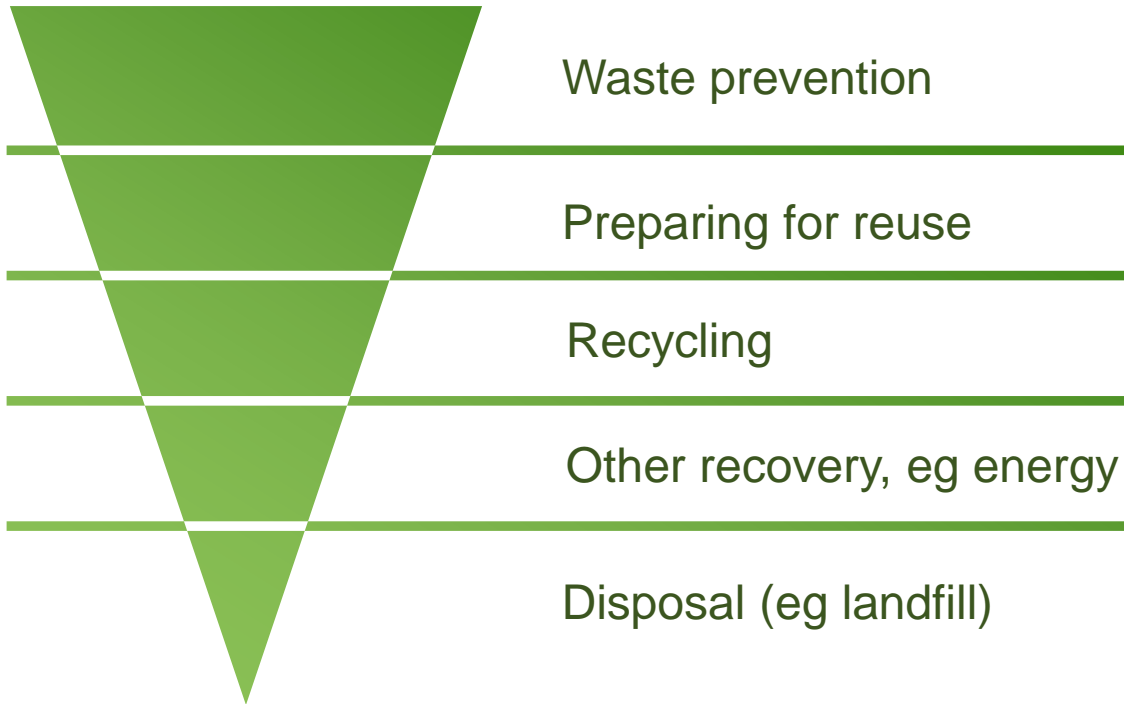
- Keep **resources in use** for as long as possible
- **Minimize** residual **waste**
- **Recover and regenerate** products and materials



CIRCULAR PRODUCT DESIGN

The EU waste hierarchy provides guidance on circular product design through prioritization of End-of-Life options

Waste Hierarchy (2008/98/EC, Art. 4)



Waste Framework Directive

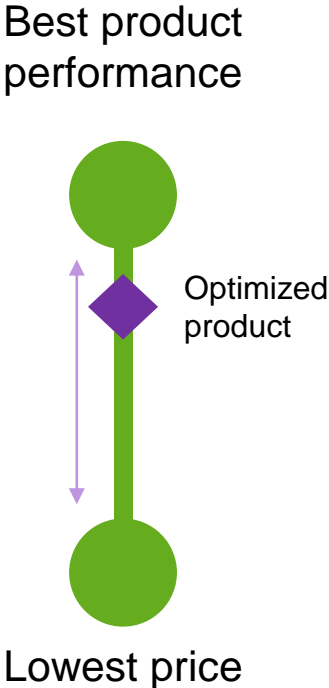
(Directive 2008/98/EC, Nov. 19th 2008)

- Aims at
 - reducing waste generation
 - optimizing waste handling and
 - encourages responsible resource consumption
- Provides guidance on EoL handling through Art. 4
- Art. 3/17 defines recycling as „recovery operation by which waste materials are reprocessed into products, materials or substances”; excludes energy recovery

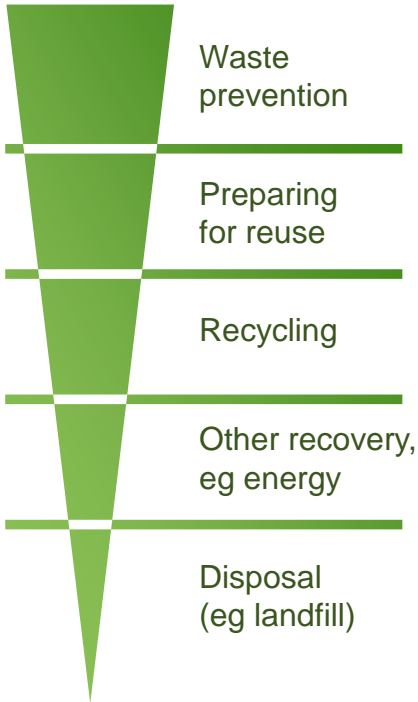
DESIGN DIMENSIONS

Circular product design adds another dimension to consider on product development

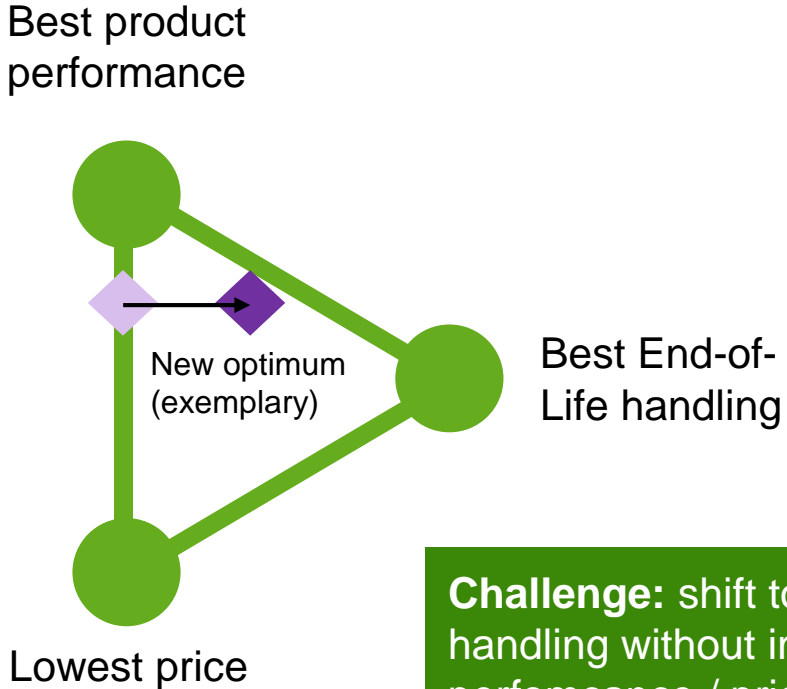
Conventional Design



Waste Hierarchy



Circular Design

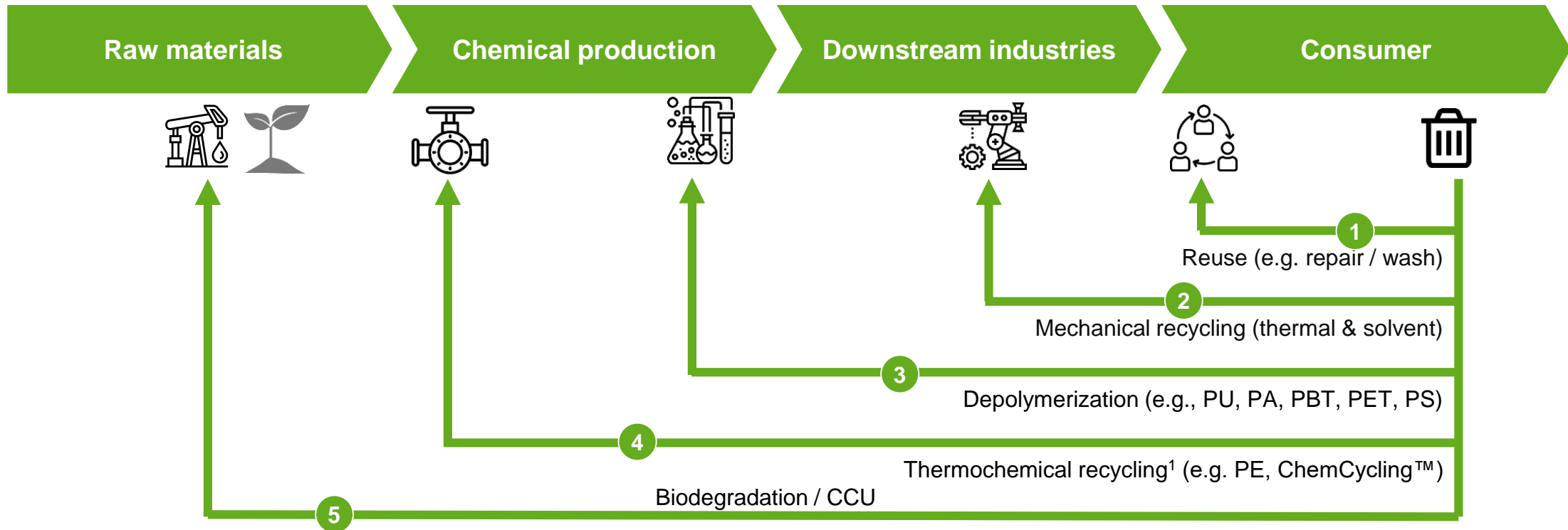


Challenge: shift to better EoL handling without impacting performance / price optimum

CIRCULARITY LOOPS REGARDING MATERIALS

Resource circulation is maximized by keeping the loops as small as possible while also considering optimized future “loopability”

All recycling processes convert waste into feedstocks



Sources: Adapted from Accenture/CEFIC “Taking the European chemical industry into the circular economy”; Icons by Eucalypt, mynamepong, srip from www.flaticon.com
1 reuses material; this is not to be confused with fuel generation or direct energy recovery

SO WHAT IS THE CHALLENGE?

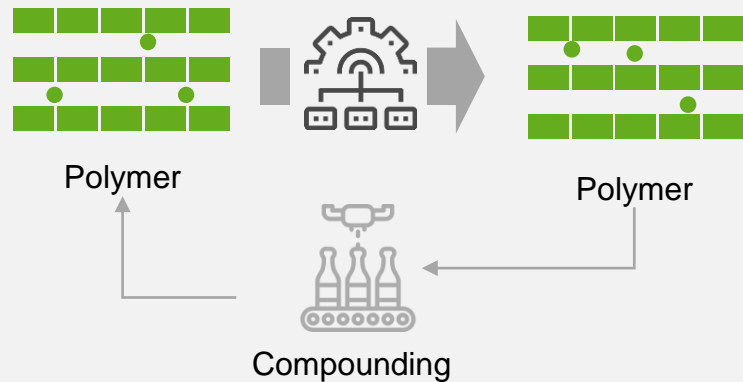
Fulfilling the sorting requirements is key to generate high performance recyclates – these requirements differ for each method

Highly Simplified

Mechanical

Loop 2

Polymer to polymer

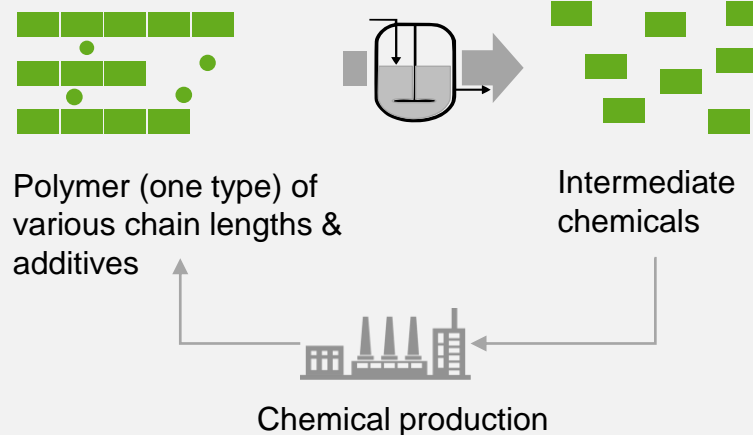


Best recyclate with defined quality of one polymer (or alternative application)

Depolymerization

Loop 3

Polymer to monomer

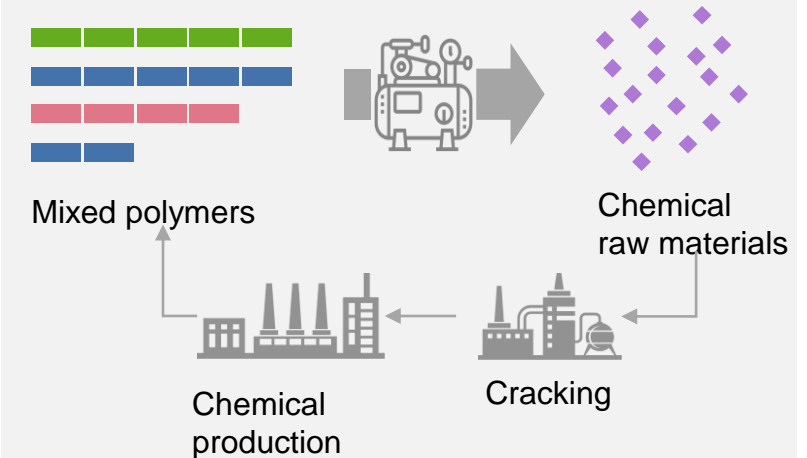


Tolerance to various qualities of one polymer type

Thermochemical

Loop 4

Polymer mix to raw material

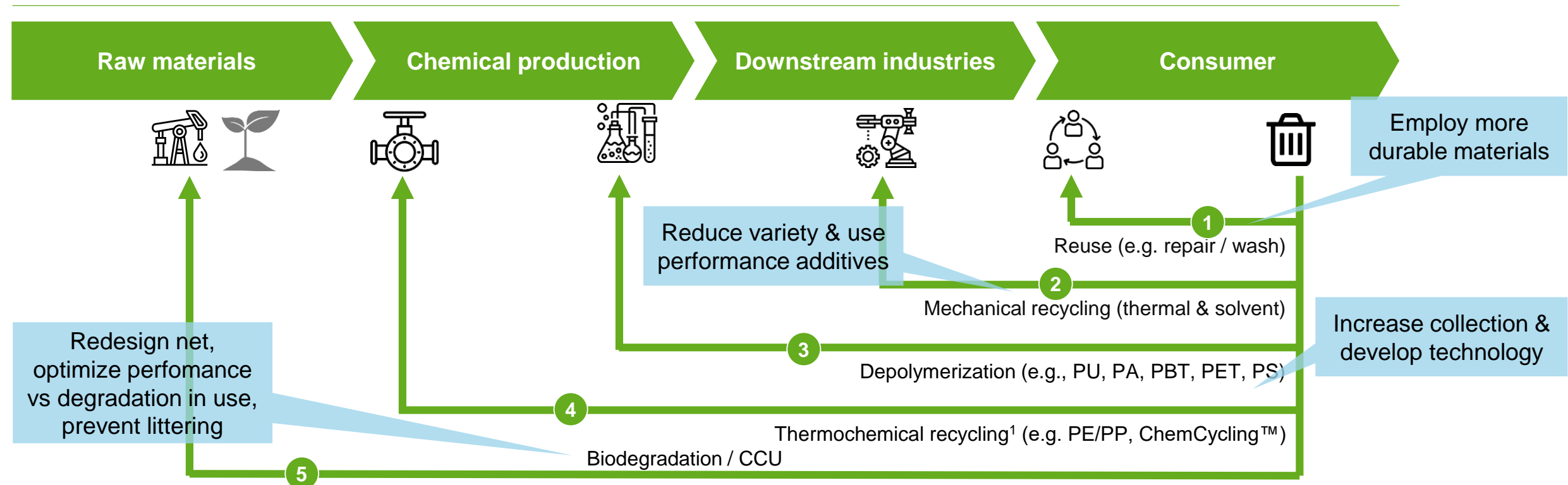


Tolerance to various qualities of a broader polymer type mix

CIRCULARITY LOOPS REGARDING MATERIALS

For fishing gear each loop offers room for optimization to increase circularity

All recycling processes convert waste into feedstocks



Sources: Adapted from Accenture/CEFIC "Taking the European chemical industry into the circular economy"; Icons by Eucalypt, mynamepong, srip from www.flaticon.com
1 reuses material; this is not to be confused with fuel generation or direct energy recovery

BIODEGRADATION OR RECYCLING?

Both options tackle different issues and shall be assessed concerning overall environmental and social impact along with practical feasibility

Biodegradation (new FG material)



Issue aimed at

Unintended loss of nets on sea (accumulation of new GFG) and abrasion during usage



- Biodegradation dependent on specific environment
- Reduced durability upon usage may lead to increased abrasion & resource consumption

Design rationale & key

- Can be an option when loss is unavoidable¹
- **Requires fundamental fish net redesign for performance, cost & degradation optimum**

Recycling (current+new FG materials)



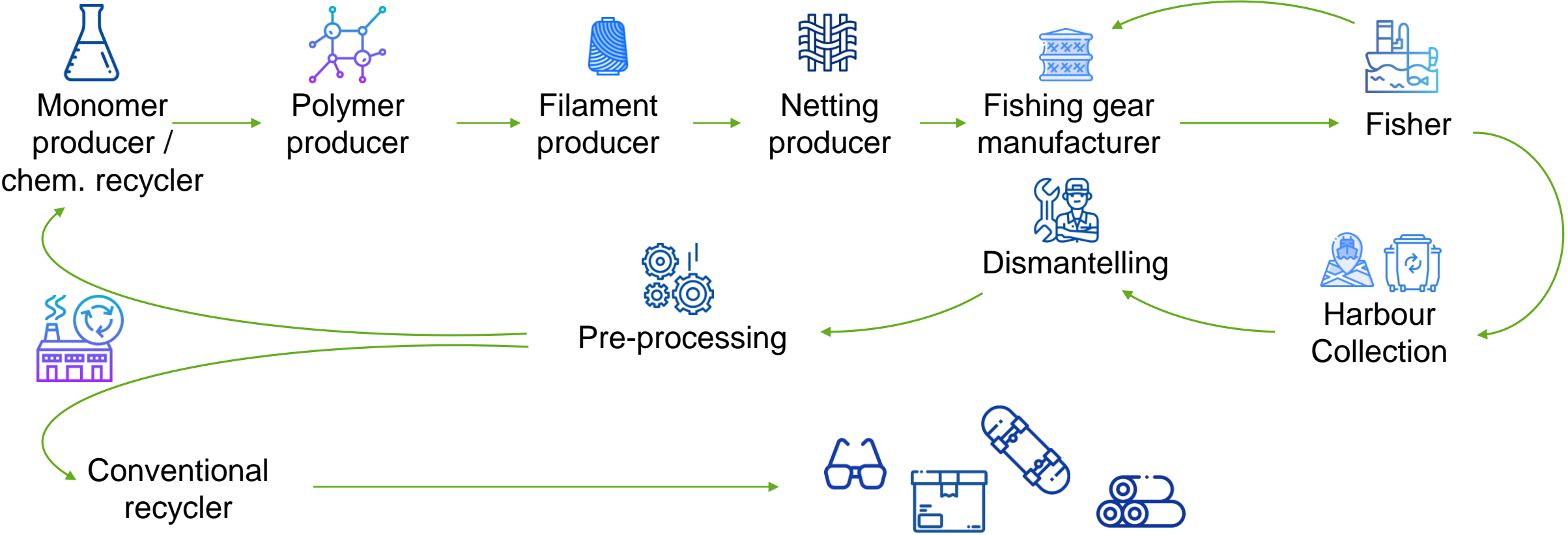
Disposal cost avoidance (waste storages / intended loss on sea), virgin resource saving, subsidized: conv. GFG²

- Manual dismantling & pre-processing
- Extremely high manual effort for ghost fishing gear pre-processing raises the need for subsidies
- Recycling can enable closed loop³ & create jobs
- **Requires establishment of fish net collection network and dismantling by polymer**

¹ this shall only be considered when biodegradation is proven in the specific environment regarded and intentional loss is excluded; ² ghost fishing gear (GFG) might be a mid-term target when subsidies become available, but currently recycling is not feasible due to extremely high manual effort; ³ especially depolymerization and thermochemical recycling

FISHNET RECYCLING ECOSYSTEM

Circularity through recycling can be increased by a network covering collection, dismantling & pre-processing when reverse efforts are shared



Icons by Goloubev, Eucalypt, smashicons, smalllikeart, surang, freepik downloaded from www.flaticons.com



We create chemistry

Circular Design

19th February 2020

DG MARE

Brussels, Belgium

Professor Martin Charter

Director, The Centre for Sustainable Design [®]

Senior Associate, Business School for the Creative Industries

University for the Creative Arts (UCA)



SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

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THE GLOBAL GOALS
For Sustainable Development

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE AND JUSTICE STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



EC Circular Economy Policy: 4 Key Areas of Action & 5 Priority Sectors





Circular Economy 2.0

Closing the loop –
An EU Action Plan for the Circular
Economy – March 2020



EUROPEAN COMMISSION

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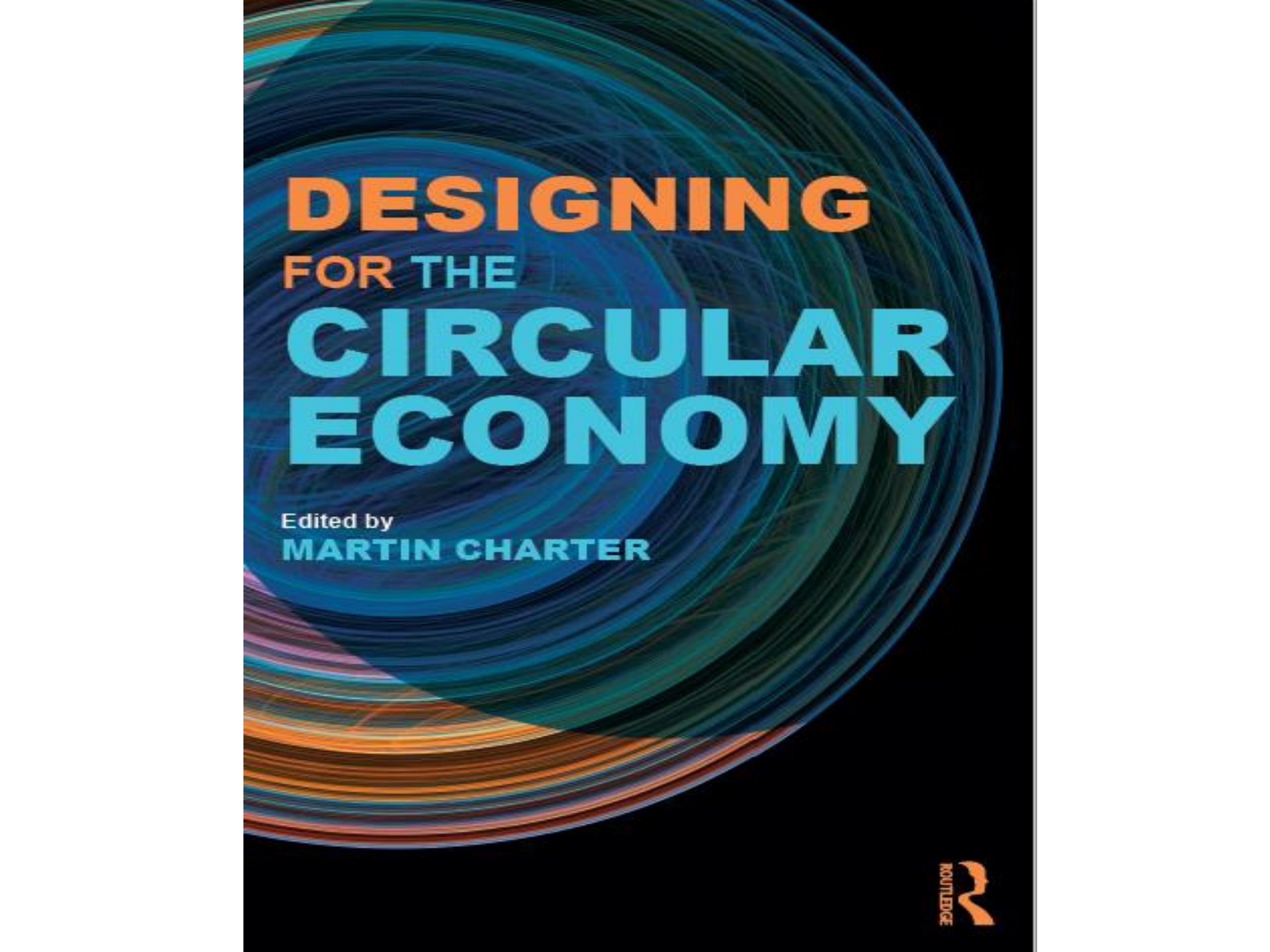
European Commission - Statement

Circular Economy: Commission welcomes European Parliament adoption of new rules on single-use plastics to reduce marine litter

Brussels, 27 March 2019

The European Parliament today agreed on the ambitious measures proposed by the Commission to tackle marine litter coming from the 10 single-use plastic products most often found on European beaches, as well as abandoned fishing gear and oxo-degradable plastics.

EPR



DESIGNING
FOR THE
CIRCULAR
ECONOMY

Edited by
MARTIN CHARTER

80%

VALUE

WASTE



'Cradle to grave' product life thinking (traditional)



Extraction of raw materials



Manufacturing



Packaging and distribution



Use and maintenance



Incineration and disposal

EXTENDED LIFECYCLE PERSPECTIVE

Focus on *Use* phase *not*
'End of Life'

ISO TC 323

bsi.

BS8001: 2017



**INVESTORS
IN PEOPLE**



By Royal Charter





Maintenance

Repair

Recondition

Repurpose

Upcycle

Remanufacturing

Recycle

Terminology

Sustainable design

Green design

Design for Environment

Eco-design

Environmentally conscious design

Eco-innovation

Cleantech

Environmental design

Environmentally sustainable design (ESD)

'Cradle to grave' product life thinking (traditional)



Extraction of raw materials



Manufacturing



Packaging and distribution



Use and maintenance



Incineration and disposal

International Standards on Ecodesign & related Environmental Management

ISO/TC 207 Environmental management

- Scope:
 - Standardization in the field of environmental management systems and tools in support of sustainable development
 - Includes environmental auditing & related environmental investigations, environmental labelling, environmental performance evaluation, LCA, GHG management
- Note: The TC for environmental management will have close cooperation with ISO / TC 176 in the field of environmental systems and audits

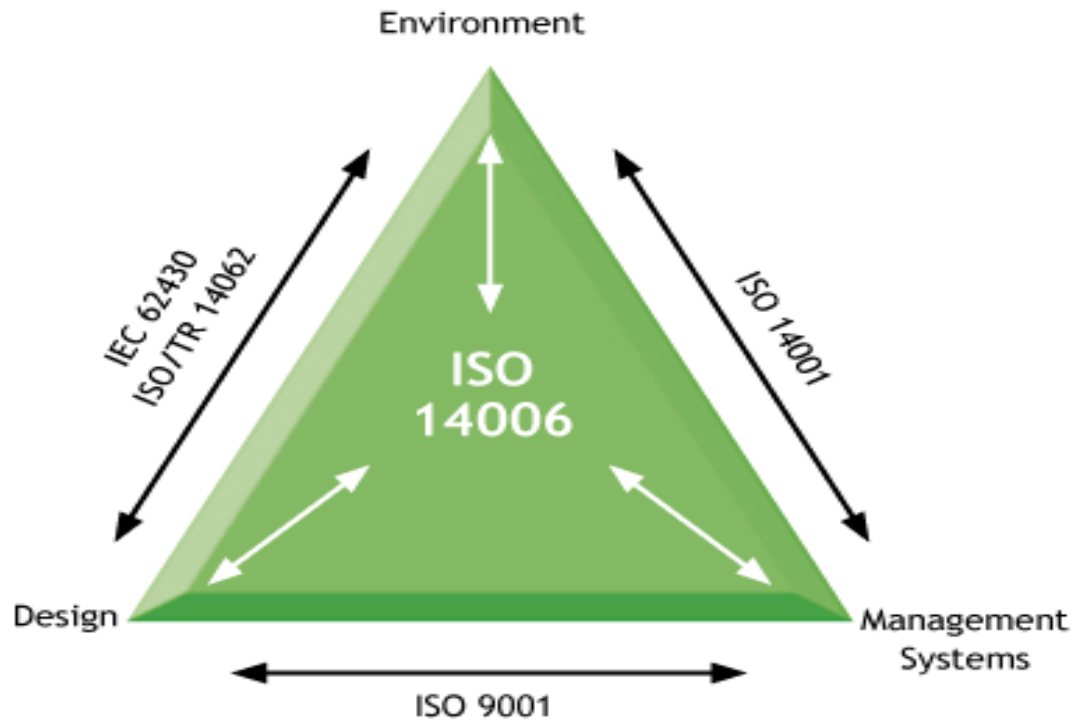
ISO Ecodesign Standards Overview

- In general use continuous improvement cycle of identify, plan, execute & review
 - *ISO/TR 14062: 2002 - environmental management - Integrating environmental aspects into product design and development*
 - *ISO 14006 : 2011 - environmental management systems - Guidelines for incorporating ecodesign (updated in 2019)*
 - *ISO 14006: 2020 - environmental management systems - Guidelines for incorporating ecodesign (updated version)*

ISO 14006: 2011

- EMSs - Guidelines for incorporating ecodesign
 - Guidance on incorporating ecodesign into Environmental Management System (EMS) e.g. ISO14001 and other management systems
 - Establish, document, implement, maintain, and continuously improve an ecodesign management system that integrates with an EMS
 - Most EMS are only site focused however ISO 14006 takes a product life-cycle perspective
 - Process
 - Identify life cycle impacts
 - Identify ecodesign measures to implement
 - Manage the ecodesign implementation
 - Feed ecodesign into EMS
 - Links primarily to ISO 14001 EMS & ISO 9001 QMS

ISO 14006: 2011 (contd.)



Inside the triangle is ISO 14006, which links all three functions and the three ISO standards.
Outside the triangle we can only link two functions/standards but we cannot link all three

ISO 14006: 2020

Title:	Environmental management systems – Guidelines for incorporating ecodesign
Owners:	ISO TC 207/SC1
Background:	Revision of ISO 14006: 2011
Convenor:	UK
Scope:	All products/all sectors
Focus:	Management of ecodesign
Audience:	Environmental managers
Publication:	February 2020
Notes:	Aligned to changes to ISO 14001:2015 & ISO 9001: 2015, avoids duplication IEC/ISO JWG 62959: 2019

IEC TC 111

- Title: Environmental Standardization for Electrical and Electronic Products and Systems
- Established 2004
- Focus is on environmental standards that span the electrotechnical industry
- Liaises closely with ISO/TC 207 - Environmental Management

BS EN 62430: 2009

- Environmentally Conscious Design (ECD) for electrical and electronic products
 - Takes life cycle approach
 - Requirements and procedures to integrate environment into normal design process
 - Intended for all companies in every stage of supply chain

IEC/ISO 62959: 2019

Title:	ECD – Principles, requirements and guidance
Owners:	IEC TC 111/Double logo (IEC/ISO)/JWG
Background:	Base was IEC 62430: 2009 (EEE)
Convenor:	Japan
Scope:	All products/all sectors
Focus:	Ecodesign at operational design level
Audience:	Designers
Publication:	December 2019
Notes:	Avoids duplication with ISO 14006: 2019



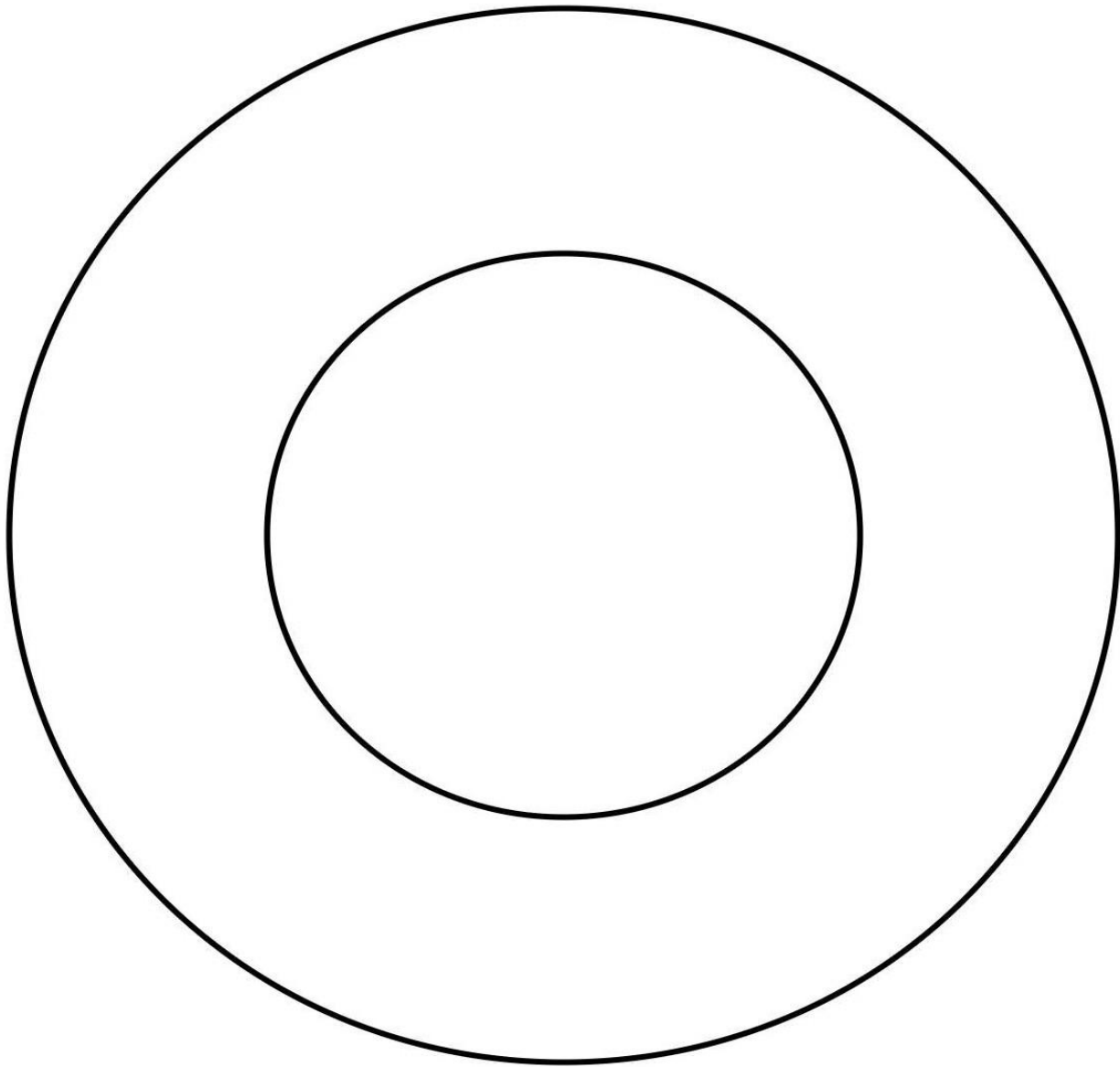
Ecodesign in industry & CE

- Industry has been applying ecodesign tools and approaches for over 20 years **BUT not in fishing gear design and development**
- The principles being applied in industry and standards include aspects closely linked to CE e.g. design for repairability, etc
- The emergence of the CE policy in Europe are broadening the scope of ecodesign policy in some sectors from an energy focus to now including resource efficiency



Conclusions

- To date design and development of fishing gear has not incorporated environmental considerations (ecodesign) including circularity
- Taking a life cycle perspective ensures all the environmental impacts are considered and addressed
- There are international standards that can be utilised to help implement ecodesign, whether part of an EMS or a separate management system, or within a product development and design process



Product Circularity

Impacts, Aspects and Design Parameters

Environmental Impact

- Climate change
- Ozone layer depletion
- Air pollution
- Loss of habitat and biodiversity
- Resource depletion

Environmental Product Aspect

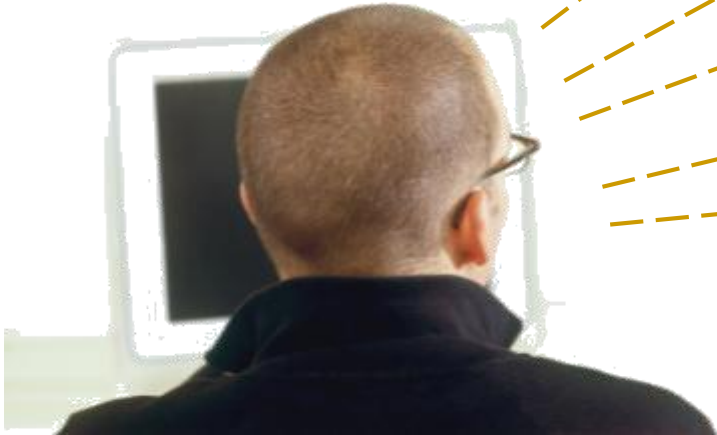
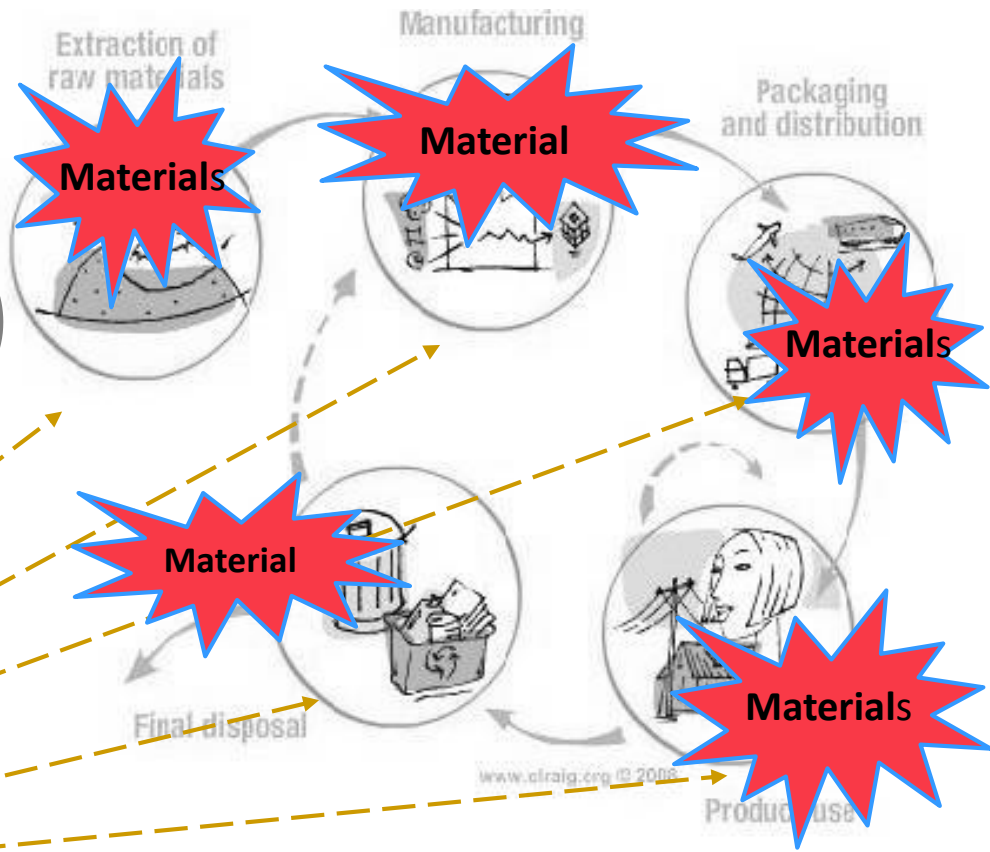
- Energy consumption
- Water consumption
- Emissions to air, water and soil
- Generation of waste
- Ease of reuse and recycling
- Material content and amount

Product Design Improvement

- Weight and volume
- Shape
- Number of parts
- Platings
- Fixings
- Choice of materials
- Mix of materials
- Fabrication techniques
- Assembly techniques
- Power supply consumption and efficiency
- Fuel consumption
- Use of consumables

Designing for Product Circularity

Consumption of materials, energy, water, etc.?
Anticipated emissions to air, water, or soil?
Anticipated pollution through noise, vibration, radiation, electromagnetic fields etc.?
Expected generation of waste material
Possibilities for reuse, recycling and material recovery?



FNRCPs

Fin- and Shell-fish:
Fishing nets, ropes,
components &
peripherals (FNRCPs)



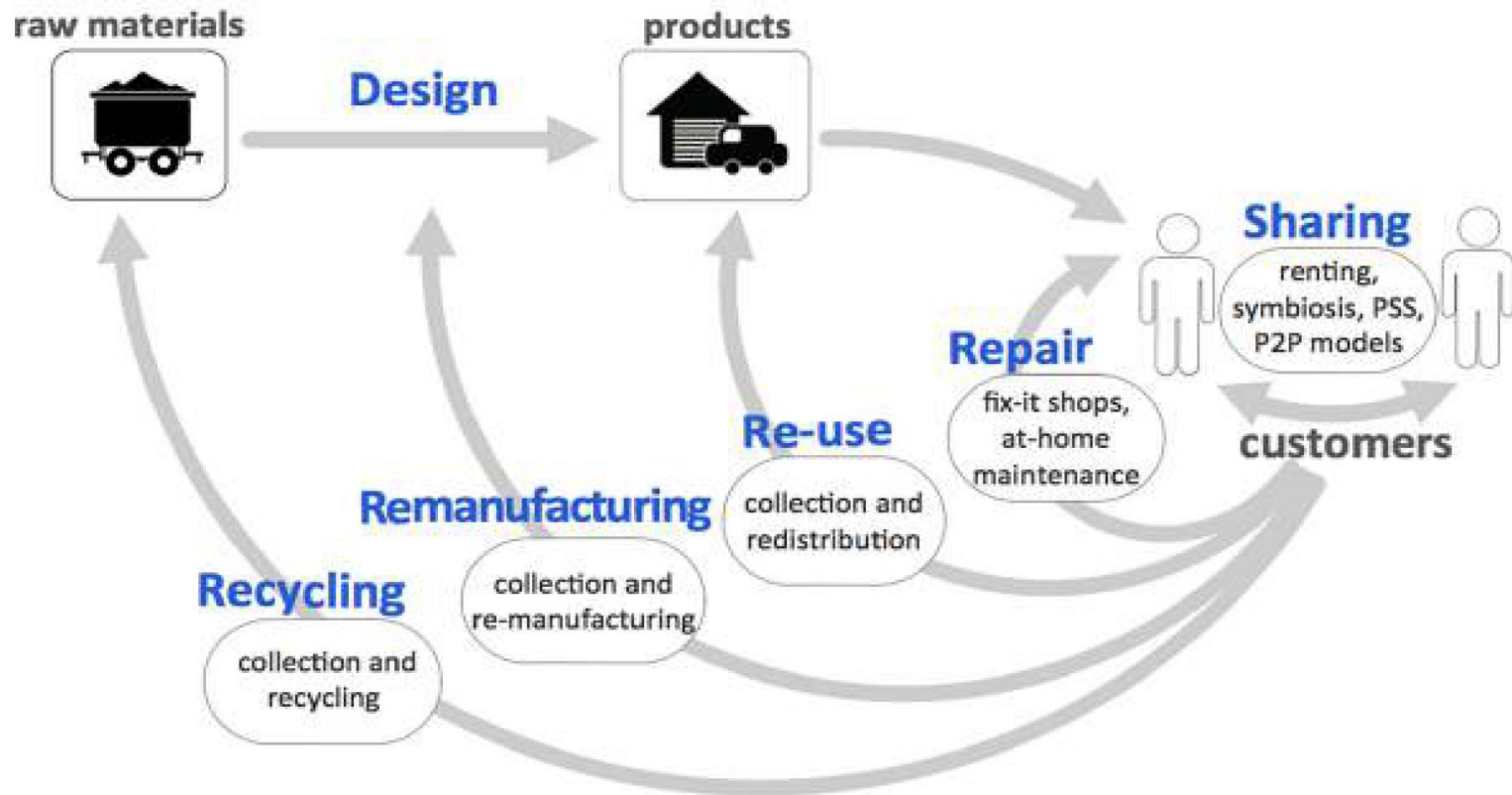




80%



Circular Economy



Source: Eco-innovate (2016), The Eco-innovation Observatory



circular ocean



BLUE CIRCULAR

ECONOMY



Northern Periphery and
Arctic Programme
2014 - 2020



EUROPEAN UNION

Investing in your future
European Regional Development Fund

www.bluecirculareconomy.eu

Open Loop

v

Closed Loop



ECONYL[®]
REGENERATION FOR LIFE

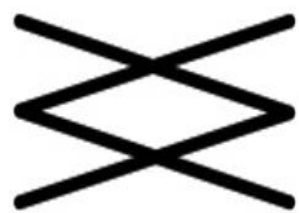
100% REGENERATION

100% PERFORMANCE





RE-USE



VERDURA

MADE IN ITALY





BRACENET
SAVE THE SEAS. WEAR A NET



RE-GEN

RE-COMMERCIALIZATION



WORLD-WIDE NYLON 6
WASTE RESCUE



ECONYL®
REGENERATION FOR LIFE

TRANSFORMATION INTO
ECONYL® NYLON YARN



ECONYL®
REGENERATION PLANT



Socks



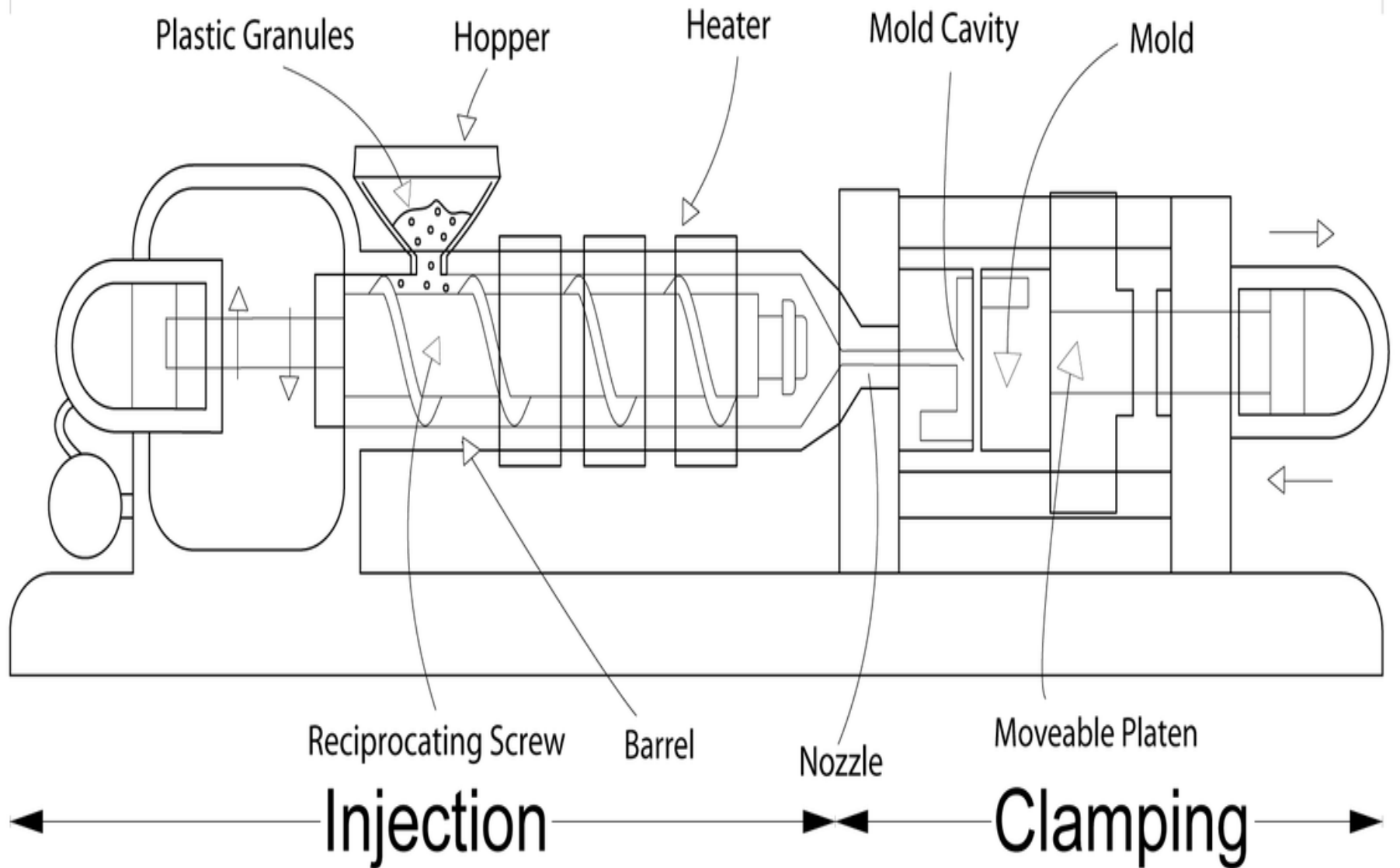
Swimwear



RECYCLE



Injection Molding Machine





3DP



Fishy
Filaments

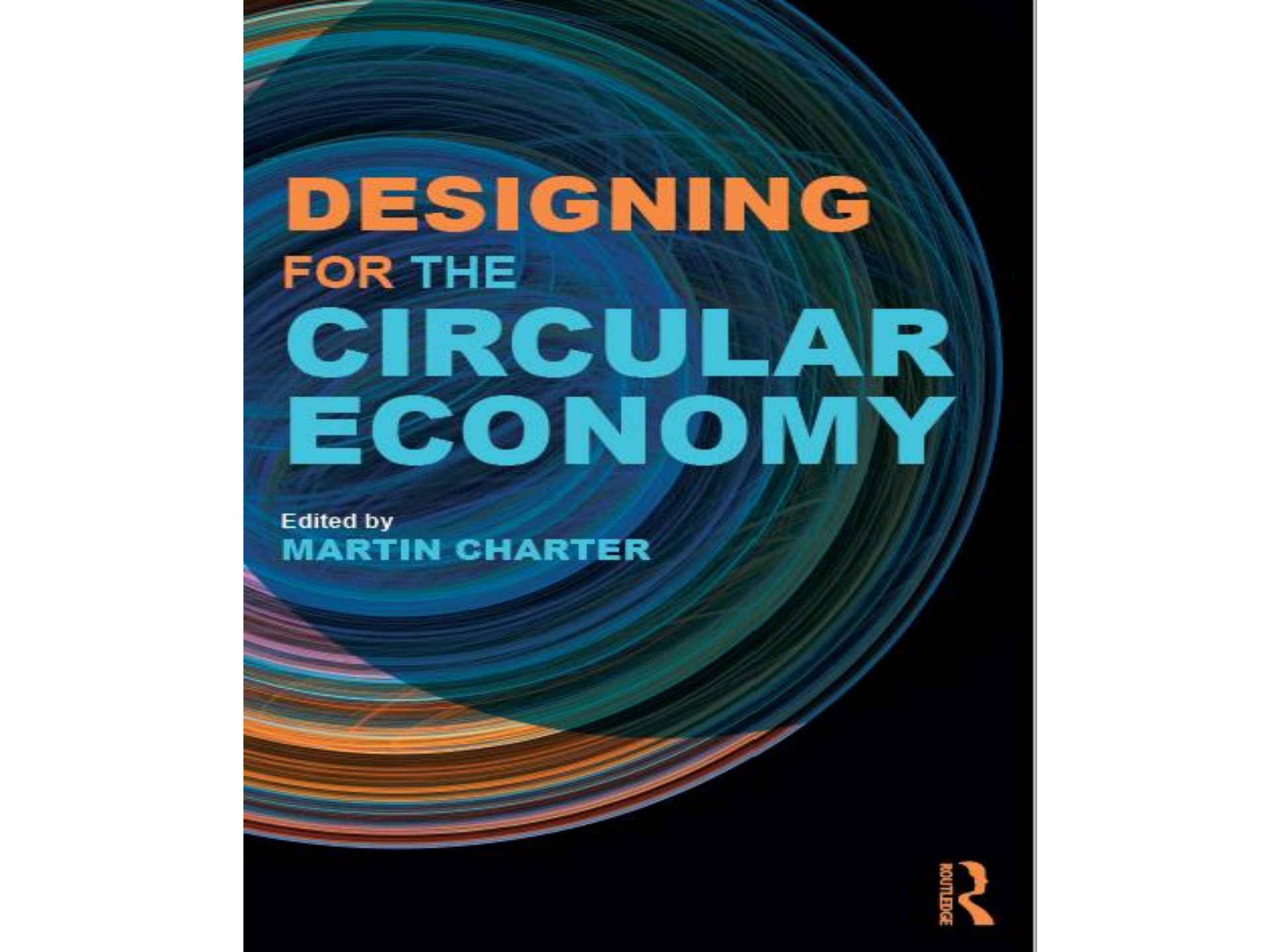


CREATE

YOUR

FUTURE

80%



DESIGNING
FOR THE
CIRCULAR
ECONOMY

Edited by
MARTIN CHARTER



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DOING NOTHING IS NOT AN OPTION

BERNARD MERKX

- Entrepreneur
- CEO GreenWavePlastics
- Co-founder WasteFreeOceans
- Honorary President
PlasticsRecyclersEurope
- Board of Directors Member
PLASTIX Denmark / a.o.

Business as usual

2016



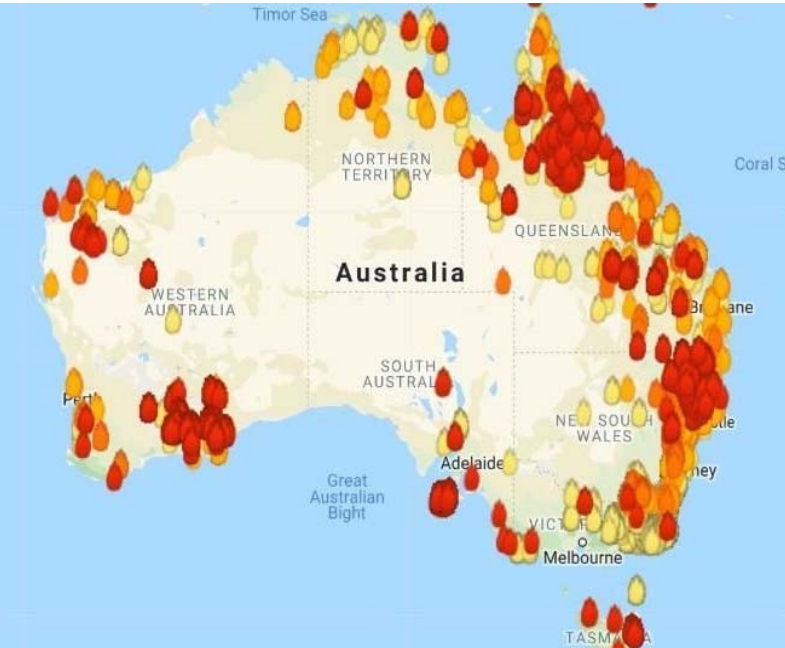
2050



REALITY:

REALLY ????

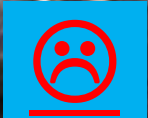




JAKARTA & VENICE FLOODING / AUSTRALIAN FIRES / GLORIA STORM SPAIN



IMAGINE... YOUR LIFE
SURROUNDED BY LITTER..





NO ONE ON THE PLANET WANTS TO BE SURROUNDED BY LITTER ☹️



WE, HUMANS, ARE MAKING A MESS OF IT (and not only on planet Earth)... ☹️





FISHING FOR LITTER – TACKLING EXISTING MARINE DEBRIS



WFO EUROPEAN RIVER SIDE & BEACH CLEAN UPS WITH VOLUNTEERS





LITTERATI - DATABASE





100% RPET BOTTLE OF WHICH 11% RPET DANUBE COLLECTION

CO – CREATION & HORIZONTAL VALUE CHAIN COOPERATION NEEDED

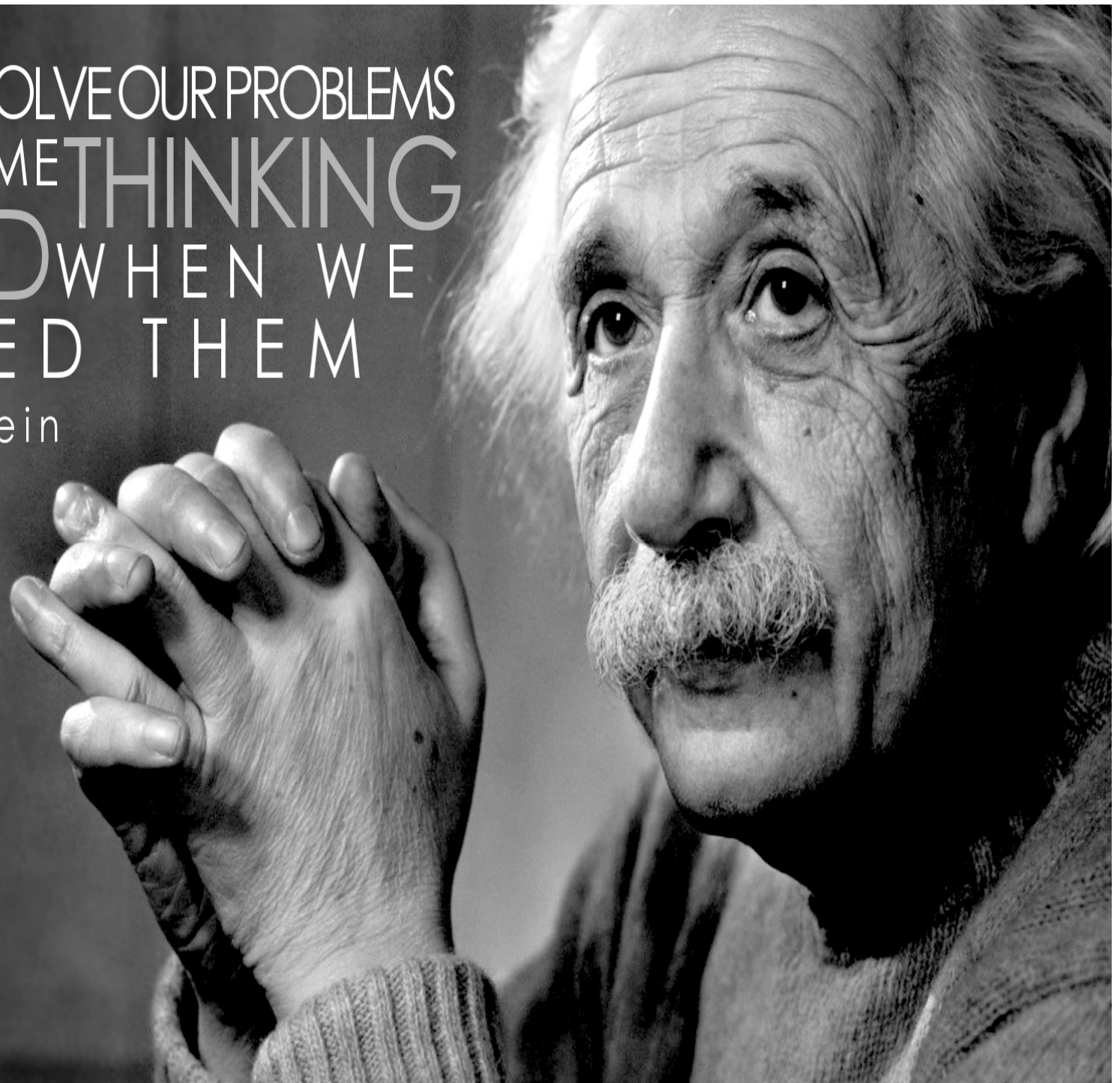



WHICH DIRECTION ??



WE CANNOT SOLVE OUR PROBLEMS
WITH THE SAME THINKING
WE USED WHEN WE
CREATED THEM

- Albert Einstein



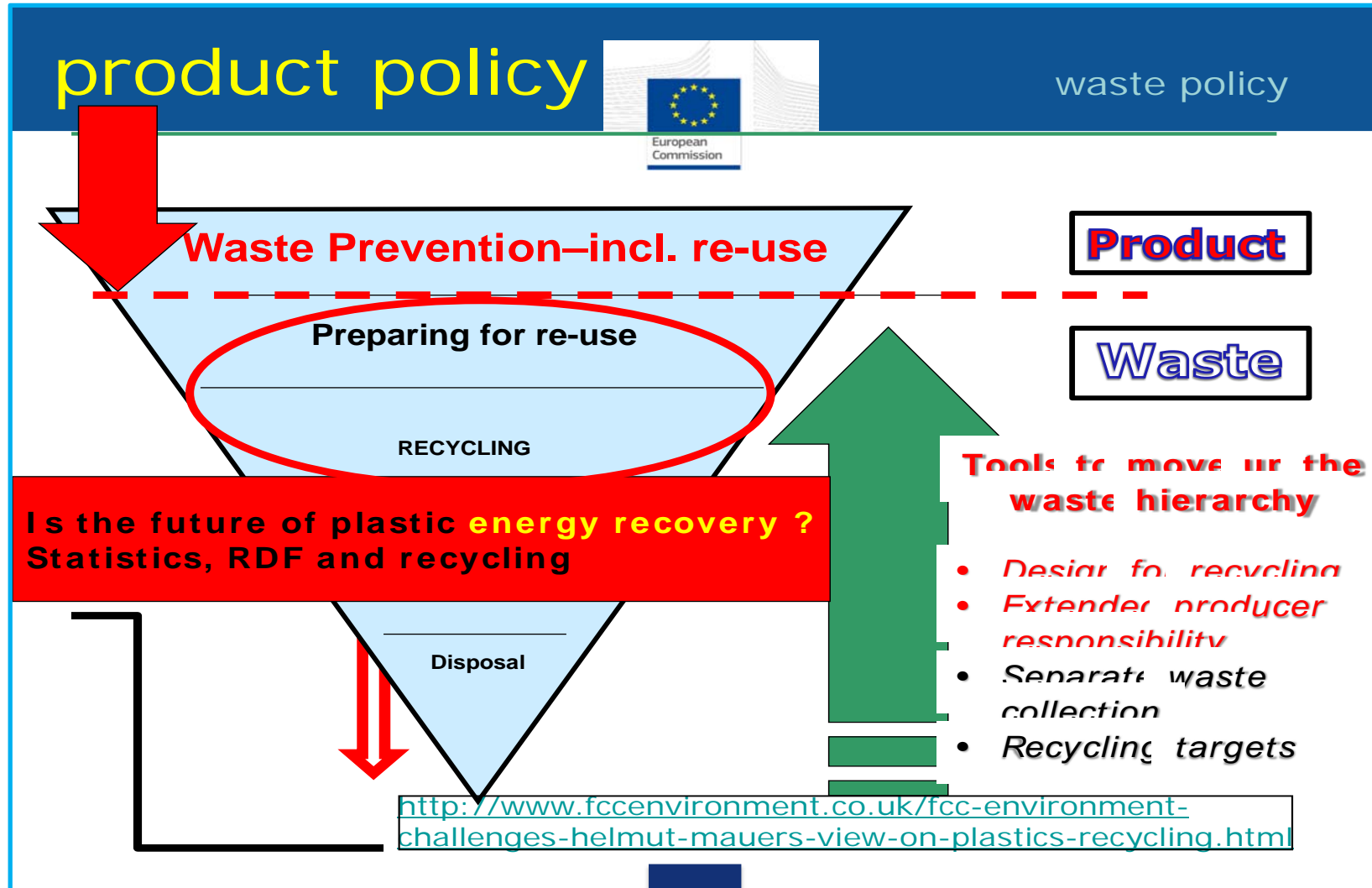


Linear Plastic we have

- ◆ Treated as **cheap disposable** material
→ litter
- ◆ **Ruthless marketing without pointing to harm** to the environment if not properly handled
- ◆ Disposed in landfills = in the oceans
- ◆ **Incineration looks clever for the naive**
- ◆ Invites to design for early obsolescence
→ no repair, no upgrade, short life, hazardous additives, not recycling friendly
- ◆ **Radically expansive production**
(cosmetics/irrational and ignorant uses)



GOING TOWARDS A MORE CIRCULAR ECONOMY



PLASTICS IN THE SPOTLIGHT – MANY EU LEGISLATIONS ONGOING



Brussels, 16.1.2018
COM(2018) 28 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS

A European Strategy for Plastics in a Circular Economy

{SWD(2018) 16 final}

**Plastics Strategy
Circular Economy Package**

DIRECTIVE (EU) 2018/...
OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of ...

amending Directive 2008/98/EC on waste

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular
Article 192(1) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee¹,

Having regard to the opinion of the Committee of the Regions²,

Acting in accordance with the ordinary legislative procedure³,

**Port Reception Facilities Directive
Marine Strategy Framework Directive**



Brussels, 28.5.2018
COM(2018) 340 final
2018/0172 (COD)

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the reduction of the impact of certain plastic products on the environment

(Text with EEA relevance)

{SEC(2018) 253 final} - {SWD(2018) 254 final} - {SWD(2018) 255 final} -
{SWD(2018) 256 final} - {SWD(2018) 257 final}

**Single-use Plastics Directive
'Fishing gear' Directive**

MAIN IMPACTS 2019 EU LEGISLATIONS

SOME PRODUCTS WILL NO LONGER BE ALLOWED ON THE MARKET
OTHERS NEED TO BE RE-DESIGNED

FROM 2025 MINIMUM MANDATORY CONTENT FOR BOTTLES >25%
BY 2030 > 30%

COLLECTION FOR RECYCLING (!) :
77% BY 2025
90 % BY 2029

EPR FOR TABACCO INDUSTRY TO COVER COSTS LITTERING (?)
EPR FOR CHEWING GUM PRODUCERS TO COVER COSTS LITTERING (??)

CLEAR SUPPORT TO ROLE OUT DEPOSIT / REVERSED VENDING SYSTEMS

POLITICAL VOTING WITH VAST MAJORITY IN EU PARLIAMENT
(ENVIRONMENT HAS LOST ITS POLITICAL COLOURS)

IT ALL STARTS WITH CLEAR DEFINITIONS

What is RECYCLING ?

(Waste Framework Directive 2008/98/EC definition)

Recycling means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.

It includes the reprocessing of organic material but does **NOT** include energy recovery and the reprocessing into material that are to be used as fuels or for backfilling operations.

Hence: Collection, logistics, sorting and "recovery" is **clearly not recycling**

Mechanical recycling not only safeguards valuable resources but at the same time also a considerable amount of CO2 emissions compared to virgin plastics

ECO FOOTPRINT WHEN REPLACING VIRGIN PLASTICS BY RECYCLATES

**PLASTIX REDUCES CO₂
EMISSIONS UP TO 82%
COMPARED TO VIRGIN PLASTICS**

1 TON OCEANIX rHDPE OR rPPC USED MEANS
1,7 TONS CO₂ EMISSIONS SAVED IN THE WORLD

Source: PLASTIX' Life Cycle Assessment (LCA)



Circularity - Four points for reflection

Mandatory content

Design WITH Green Plastics

Design FOR Capture at End of Life

Design FOR Recyclability

Design FOR Disassembly

Modular products

Reduce waste through reuse

Single type of polymer

Marking & Tracking schemes

Extended Producer Responsibility

Return & Deposit schemes

Legislation as an accelerator

QUALITY OF RECYCLATES : 'WE ARE WHAT WE EAT'



ALL TYPES OF PLASTIC ARE RECYCLABLE, THEORETICALLY !

(ACTUALLY ONLY THE DARK GREEN SQUARES ARE MONO MATERIALS)

		Secondary fraction**																			
Primary fraction*	Material	ABS	PA6	PA66	PBT	PC	PC/ABS	LD PE	HD PE	PET	PMMA	POM	PP	PP co	PS	PVC rigid	PVC soft	SAN	TPE-PP/PE	TPU	
	ABS	Green	Orange	Orange	Orange	Orange	Yellow	Orange	Orange	Orange	Orange	Red	Red	Red	Red	Yellow	Red	Red	Yellow	Yellow	Light Green
	PA6	Orange	Green	Yellow	Orange	Orange	Orange	Yellow	Yellow	Orange	Orange	Red	Orange	Orange	Orange	Red	Red	Red	Orange	Light Green	Yellow
	PA66	Orange	Light Green	Green	Orange	Orange	Orange	Light Green	Light Green	Orange	Orange	Red	Orange	Orange	Orange	Red	Red	Red	Orange	Light Green	Orange
	PBT	Orange	Orange	Orange	Green	Orange	Orange	Yellow	Yellow	Yellow	Orange	Red	Orange	Orange	Orange	Red	Red	Red	Orange	Orange	Orange
	PC	Orange	Orange	Orange	Orange	Green	Orange	Yellow	Yellow	Yellow	Orange	Red	Orange	Orange	Orange	Red	Red	Red	Orange	Orange	Orange
	PC/ABS	Yellow	Orange	Orange	Orange	Orange	Light Green	Orange	Yellow	Orange	Orange	Red	Orange	Orange	Orange	Red	Red	Red	Orange	Orange	Yellow
	LD PE	Orange	Yellow	Orange	Orange	Orange	Orange	Green	Light Green	Orange	Orange	Red	Orange	Yellow	Yellow	Red	Red	Red	Orange	Light Green	Orange
	HD PE	Orange	Yellow	Yellow	Orange	Red	Red	Light Green	Green	Orange	Red	Red	Orange	Yellow	Light Green	Red	Red	Red	Red	Light Green	Orange
	PET	Orange	Yellow	Orange	Light Green	Orange	Orange	Yellow	Yellow	Green	Orange	Red	Orange	Light Green	Orange	Red	Red	Red	Orange	Orange	Orange
	PMMA	Orange	Orange	Orange	Orange	Orange	Orange	Yellow	Yellow	Orange	Green	Orange	Orange	Orange	Orange	Red	Red	Red	Yellow	Orange	Red
	POM	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red
	PP	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Red	Green	Light Green	Orange	Red	Red	Red	Orange	Light Green	Orange
	PP co	Orange	Orange	Orange	Orange	Orange	Orange	Yellow	Light Green	Orange	Orange	Red	Green	Light Green	Orange	Red	Red	Red	Orange	Light Green	Orange
	PS	Yellow	Orange	Orange	Orange	Orange	Orange	Orange	Red	Orange	Orange	Orange	Orange	Orange	Orange	Green	Orange	Orange	Yellow	Red	Red
	PVC rigid	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Light Green	Orange	Red	Red	Red
	PVC soft	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Orange	Green	Red	Red	Red
	SAN	Yellow	Red	Red	Red	Red	Red	Orange	Orange	Orange	Orange	Yellow	Red	Red	Red	Light Green	Red	Red	Green	Red	Red
	TPE-PP/PE	Orange	Red	Red	Red	Red	Red	Orange	Light Green	Light Green	Red	Red	Red	Light Green	Light Green	Red	Red	Red	Red	Light Green	Red
	TPU	Light Green	Red	Red	Red	Red	Red	Orange	Red	Red	Red	Red	Red	Red	Red	Orange	Red	Red	Red	Red	Green

* **Primary fraction** defines the larger volume of material

** **Secondary fraction** defines minor volume of material mixed into or added to the primary fraction

- Compatible / mixable
- Acceptable / partly mixable
- Acceptable, if the secondary fraction is kept below 2%***
- Normally not acceptable
- Not Acceptable / not mixable

*** The secondary fraction, which can be added in these (yellow) blends will vary from case to case. In some cases, only 1% of the secondary fraction can be added, and in other cases, up to 5-10% can be added.

WALL OF FAME (...and shame) .. AND WE MEANWHILE NEED 2 WALLS....



BACK TO SCHOOL .. !!

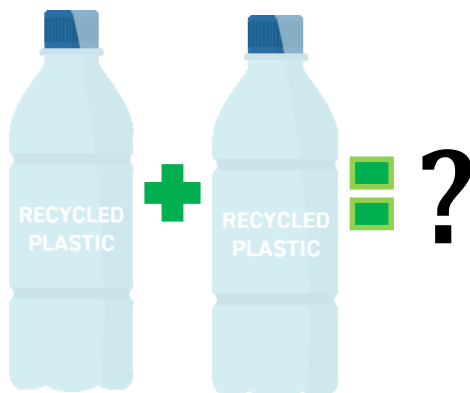
Plastics Industry challenges

Design for Recycling ->> Design WITH Recyclates



RecyClass

Test recyclates quality



Recycling Guidelines



Transparent clear | light blue PET bottles

	YES 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 PET recycling	CONDITIONAL 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 PET recycling	NO Low compatibility Materials that failed the testing protocols OR materials that have not been tested (yet), but pose a high risk of interfering with PET recycling
Container	PET		PLA; PVC; PS; PETG
Colours	transparent clear; transparent light blue	transparent; dark colours	other transparent colours; opaque; metallic
Barrier	SiO ₂ coating	carbon plasma-coating; PA multilayer with $\leq 5\%$ PA and no tie layers; PEA multilayer; PET alloy	PA multilayer with >5 with PA or tie layers; monolayer PA blend; EVOH
Additives		UV stabilisers; AA blockers optical brighteners; oxygen scavengers	bio-/non-/photodegradable additives; nanocomposites
Closure Systems	PE; PP - all with density $\leq 1\text{ g/cm}^3$		materials with density >1 g/cm ³ (e.g. highly filled PE, metals); non-detaching or welded closures
Liners, seals and Valves	PE; PE + EVA; PP; foamed PET all with density $\leq 1\text{ g/cm}^3$	silicone with density $\leq 0.95\text{ g/cm}^3$	materials with density >1 g/cm ³ (e.g. PVC, silicone, metals)
Labels	PE; PP; OPP; EPS; foamed PET or PETG all with density $\leq 1\text{ g/cm}^3$	lightly metallised labels (density $\leq 1\text{ g/cm}^3$); paper	materials with density >1 g/cm ³ (e.g. PVC; PS; PET; PETG; PLA) metallised materials; non-detaching or welded labels
Sleeves	Partial bottle coverage in PE; PP; OPP; EPS foamed PET or PETG all with density $\leq 1\text{ g/cm}^3$	sleeves transparent for IR detection in PE; PP; OPP; EPS foamed PET or PETG all with density $\leq 1\text{ g/cm}^3$	materials with density >1 g/cm ³ (e.g. PVC; PS; PET; PETG); metallised materials; heavily inked sleeves; full body sleeves

Recyclability ranking



PLASTICS INDUSTRIES IN THE EU MARKET

PLASTICS INDUSTRIES IN EUROPE (2019)

APPROX 300 BILLION EURO TURNOVER
APPROX 60 MILLION TONNES OF VIRGIN PLASTICS PUT IN THE MARKET
APPROX 5 MILLION TONNES RECYCLED PLASTICS USED IN THE EU MARKET

APPROX 100 PRODUCERS OF VIRGIN PLASTICS / ADDITIVES

APPROX 45.000 CONVERTERS OF PLASTICS (MAINLY (FAMILY) SME'S)
(of which approx. 50 ! produce fibers / ropes / gear etc)

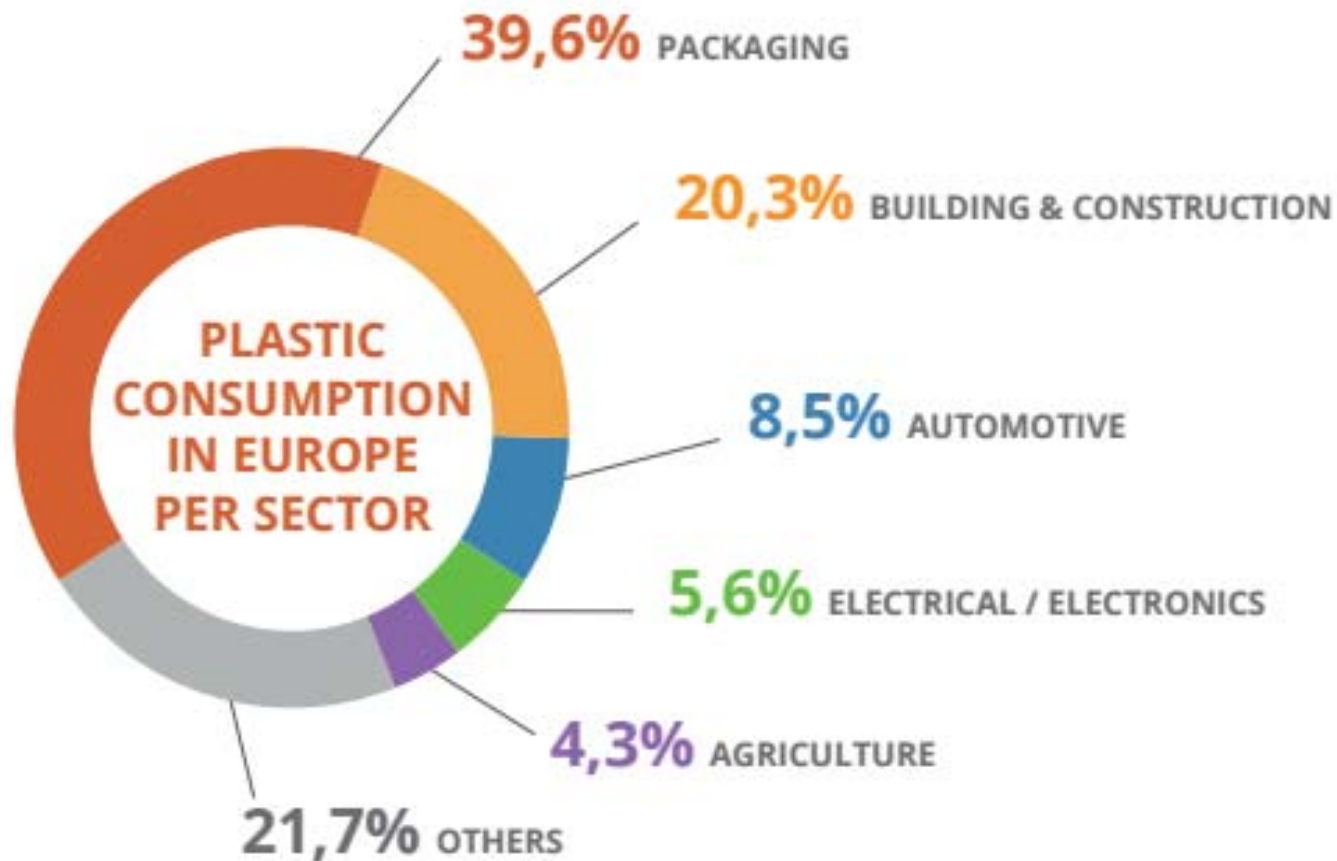
APPROX 2.500 PLASTICS RECYCLERS
YET APPROX. 100 RECYCLERS PRODUCE SOME 80% OF OVERALL VOLUME
(of which 2 leading ones recycle fishing gear / ropes)

APPROX 1.500 WASTE MANAGEMENT COMPANIES / GROUPS
(transport bulk – some own sorting plants, mainly for packaging)

MARKET CONSOLIDATION ONGOING

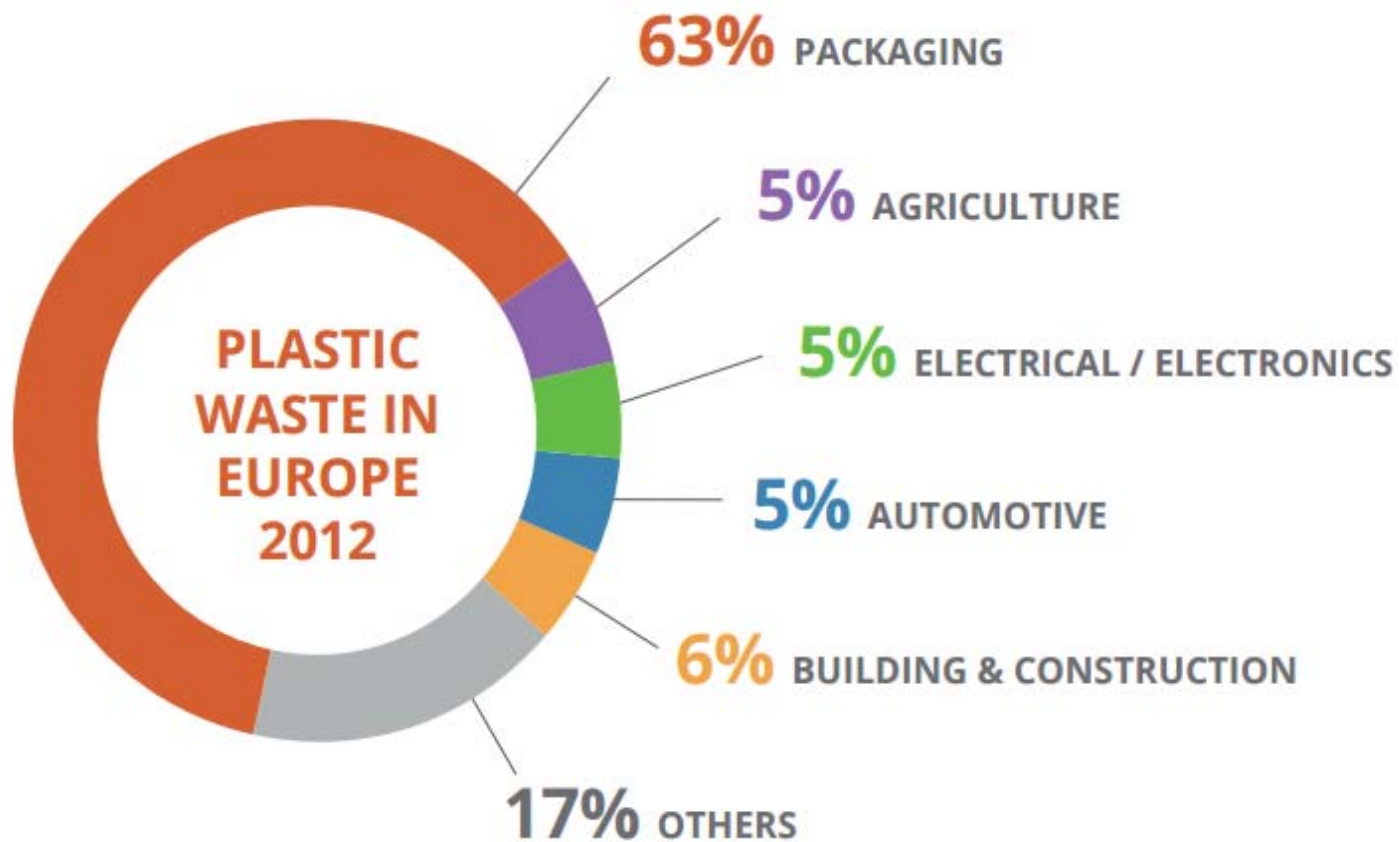
THERE ARE NOT ONLY COMMON INTERESTS IN THIS PART OF THE VALUE CHAIN

APPROX 55-60 MILLION TONS / YEAR
VIRGIN PLASTICS INTRODUCED IN EU MARKET



(2013, source: PlasticsEurope (PEI/MRG) / Conso.Mc / ECEBD)

OF WHICH A LOT OF SHORT USE (SINGLE USED) PACKAGING



source: Plastics the facts

RECENT TRENDS & FACTS

CHINA BAN

INCINERATION STILL SUBSIDIZED (SO TOO CHEAP, YET NO LONGER CONSIDERED 'RECYCLING')

2008 EU LANDFILL BAN ONLY IMPLEMENTED IN SOME 50% OF MS

CONSOLIDATION OF THE MARKET

WASTE MANAGEMENT COMPANIES IN FORWARD EXPANSION

SOME LEADING BRANDS IN STRATEGIC PARTNERSHIPS
(SOMETIMES WITH MINORITY SHARE IN COMPANIES)

INCREASED DEMAND IS NOT IN LINE WITH AVAILABLE INSTALLED CAPACITY
YET STILL SPOT BUSINESS AND NO LONG TERM COMMITMENTS
(so delay in investments)

PUSH FOR CHEMICAL RECYCLING SOLUTIONS (but ??)

WASTE MANAGEMENT IS NOT EQUAL TO RECYCLING

ONLY 1 HARMONISED EPR IN EUROPE FOR FISHING GEAR / ROPES !

YEARLY ESTIMATED 100.000 – 200.000 TONS* VIRGIN PLASTICS ARE INTRODUCED IN THE ROPES / FISHING GEAR EU MARKET

THIS IS LESS THAN 1 % OF THE TOTAL VIRGIN PLASTICS INTRODUCTION IN EU !!

FOR US IT IS THEREFORE COMPLETELY LOGIC THAT WE WILL HAVE **ONLY 1 (ONE) EPR** SCHEME FOR THE ENTIRE EU (AND NOT 27 DIFFERENT SCHEMES)

27 DIFFERENT SCHEMES WILL NOT FUNCTION, IT WILL LEAD TO FURTHER ADMINISTRATIVE BURDENS, BUREAUCRACY, CHALLENGES TO ENFORCE AND COSTS. SUCH A DECISION WILL CONSEQUENTLY HAVE LESS CHANCE OF BEING A SUCCESSFULL EPR SCHEME AS INTENDED

PRODUCTS PRODUCED OUTSIDE OF THE EU NEED TO BE MANDATORY INCLUDED IN THE SCHEME AND HAVE TO LIVE UP TO AT LEAST THE SAME RULES (NO FREE RIDERS)

RECREATIONAL AND (SEMI-) PROFESSIONAL ANGLERS GEAR NEED TO BE FULL PART OF THE EPR SCHEME AS WELL (PRODUCTS VERY OFTEN LITTERED BOTH AT SEA AND IN INLAND WATERS) – MULTI BILLION EURO INDUSTRY.

(semi-professional anglers are in straight competition with fishermen, yet bypass a lot of controls)

"BIO-DEGRADABILITY"

SOME BIOPLASTICS (DROP INS) WILL NOT CAUSE ISSUES WITH RECYCLING

SOCALLED BIO DEGRADABLE MATERIALS IN PACKAGING MARKET PRACTICE DO NOT DEGRADE, NOT EVEN IN A HIGH TECH COMPOSTING COMPANIES (example NL) ! AND CERTAINLY NOT IN NATURE

THE STANDARDS DO NOT REFLECT MARKET REALITIES

FOR RECYCLING COMPANIES SUCH MATERIALS ARE 'POLLUTANTS' AND WHEN DETECTED, THE ENTIRE LOAD ! IS REJECTED AND SENT OFF THE PREMISES

TO GET TO COMPOSTING PLANTS THE PRODUCTS NEED TO BE COLLECTED ANY WAY, SO ?? WHERE THE ADDED VALUE IS

IN TODAY'S REALITY SUCH MATERIALS THEREFORE OFTEN END UP IN INCINERATION PLANTS AND IF NOT ARE LANDFILLED WHERE THEY CAUSE ADDITIONAL CHALLENGES (like methane gaz)

EVEN BIOPLASTICS INDUSTRY REPRESENTATIVES MEANWHILE STATE THAT 'BIOPLASTICS' ARE NOT A SOLUTION FOR LITTERING / LOST AT SEA

WE ALL AGREE THAT THERE ARE CHALLENGES TO BE SOLVED, BUT WE WILL HAVE TO START AT THE SOURCE OF THE PROBLEM AND NOT AT END OF PIPE

WALL OF FAME (.....and shame)



EU GREEN DOT PACKAGING SYSTEMS
HAVE REACHED THEIR LIMITS AT AROUND 50-60% COLLECTION RATES
THERE ARE LEARNINGS TO BE MADE FOR OTHER EPR'S



WASTE MANAGEMENT CHALLENGES ARE EVERYWHERE - AMSTERDAM



From the photos you can however learn a lot:

People are willing to bring their waste close to a collection point (even if it has no value, as it is part of education, but will then not separate !. **This material will therefore go to incineration instead of recycling)**

Products that have a value (like deposit) are NOT in those bins (the small bottle in NL have no deposit as yet -> they are frequently found in (marine) litter and rank in NL top 10 most littered items)

Public services are not very flexible to cope with peak moments (like festivals, or weekend extra preventive collections)



DEPOSIT SCHEMES GIVE BOTH TRACEABILITY AND HIGH RETURN (>90%) QUALITY VOLUMES

PCW RAW MATERIAL ON ITS WAY TO A NEW LIFE





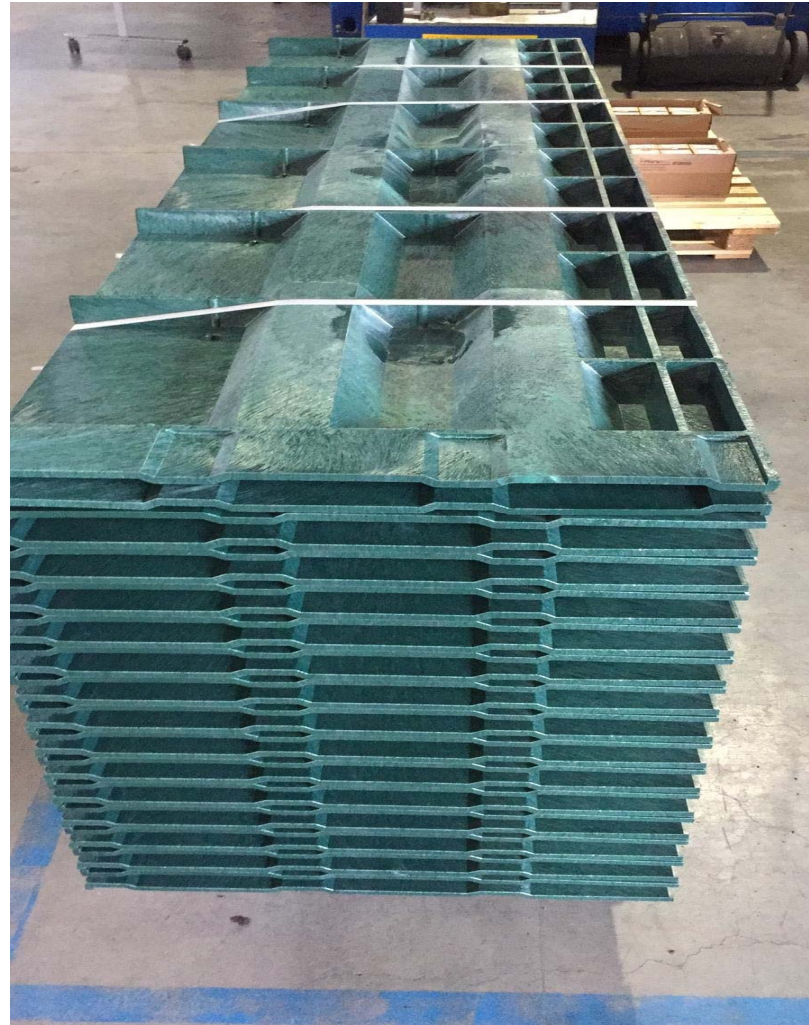
FROM 'WASTE SHIFTER' TO RAW MATERIAL PRODUCER :

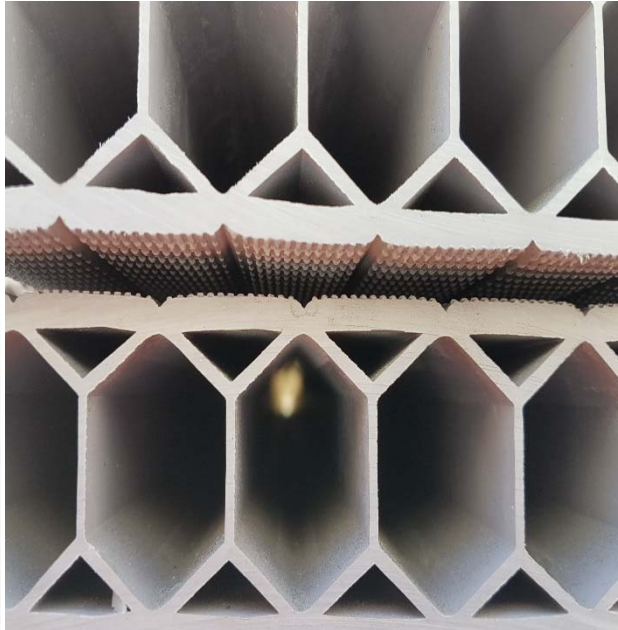


GREEN PROCUREMENT ROLE PUBLIC SECTOR (CHANGE YOUR LoR)



PORTS AND OTHERS WILL ALSO HAVE TO BUY BACK PRODUCTS MADE FROM COLLECTED WASTE





BUILDING AND CONSTRUCTION APPLICATIONS WITH HIGH RECYCLATE CONTENT



...BECAUSE WITHOUT STRUCTURAL SALES MARKETS: NO RECYCLING



FISHING GEAR CLEAN TECH RECYCLING PLANT IN DENMARK



FROM 100% FISHING GEAR RECYCLATE TO DESIGN FURNITURE



 **FINALIST**
PLASTICS RECYCLING 2018
AWARDS EUROPE

THE WORLDS ONLY MARINE PLASTIC RECYCLED KAYAKS



*WFO BIGBOXES FROM RECYCLED PLASTICS TO COLLECT PORT WASTE
AGRI ROPES AND OTHER PRODUCTS (100% RECYCLATE CONTENT)*



PIC NIC SETS MADE FROM 100% RECYLED FISHING NETS :

SHOULD BE IN EVERY PORT & ON EVERY BEACH



FILM: WHERE BLUE MEETS GREEN

OCEANIX® - MADE FROM 100% RECYCLED FISHING NETS

Denne havplastbænk er produceret af 100% genanvendt plast fra brugte fiskenet

This ocean bench is made from 100% recycled plastics from used fishing nets

Diese Bank ist produziert aus 100% recyceltem, ozeanischem Kunststoff aus gebrauchtem Fischernetz

www.plastixglobal.com

PLASTIX

Keep Nature Clean – 25% OceanIX, 75% PCR from household waste



3D PRINTED 100% RECYCLED CONTENT PRODUCTS

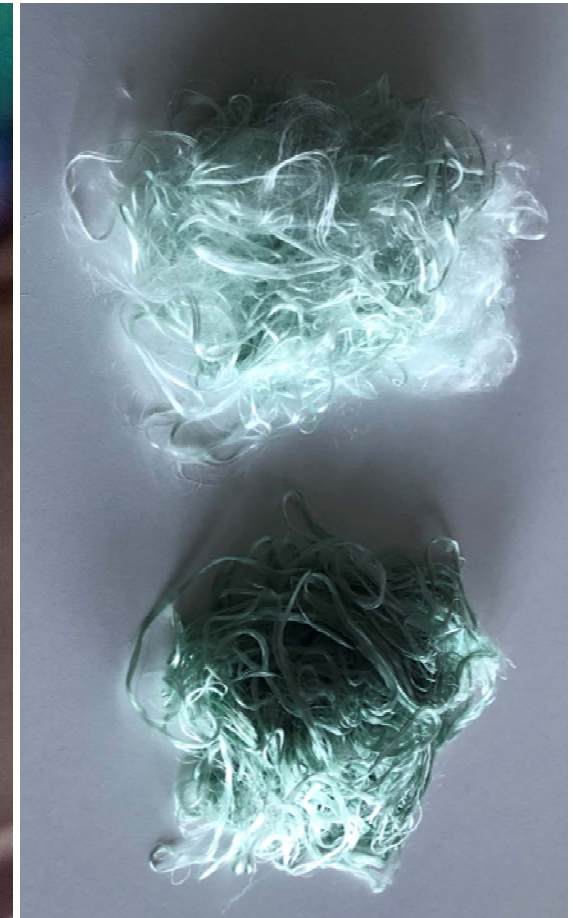
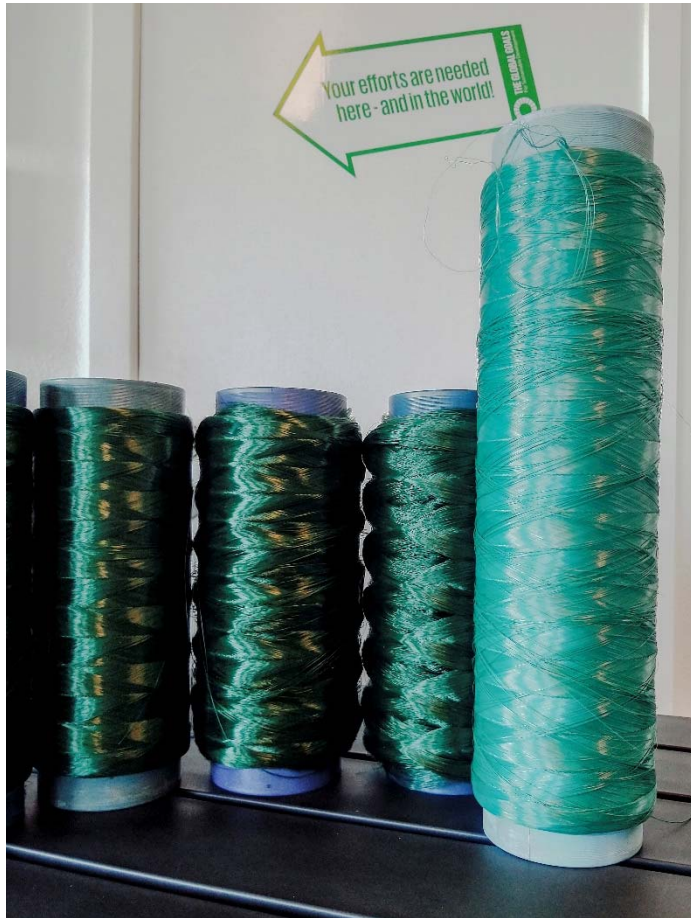


OCEAN75 – CASES MADE FROM RECYCLED FISHING NETS & ROPES



ocean75™

FIBRES MADE FROM MECHANICALLY RECYCLED FISHING ROPES



Approx. 30-50 tex fibers - made from:
100% OceanIX rPPC and OceanIX rHDPE
(30 tex = 300 gram per 10km fiber)

2,2 dtex fibers - made from:
20% OceanIX rPPC
(2,2 dtex = 2,2 gram per 10km fiber)

REFUGEES & LITTER ISSUES (AND CLIMATE CHANGE RELATED)



Lanza "Operación Castor"

Para la limpieza de los ríos Ozama e Isabela

Por: Julia Ramirez

El Ministerio de Medio Ambiente, la Fundación Farach, la Armada de República Dominicana y la fundación internacional Waste Free Oceans (WFO) lanzaron este martes el proyecto Operación Castor que busca recolectar los residuos sólidos y sedimentos en los ríos Ozama e Isabela

Esta iniciativa piloto utilizará la tecnología WFO de mallas de arrastre recolectoras de la basura flotante para hacer sus operaciones. Con esto se creará e implementará un sistema de gestión de residuos sólidos y sedimento que empieza desde su recolección, sepa-



WFO THE AMERICAS : FROM WASTE TO SOCIAL HOUSING

FROM DIFFICULT TO RECYCLE WASTE STREAMS TO PRAGMATIC SOLUTIONS



REFUGEES & LITTER SOLUTIONS : WFO REFUGEES SHELTERS



IN SUMMARY :

“FISHING GEAR AND ROPES” (SUP) DIRECTIVE, PORT RECEPTION FACILITIES DIRECTIVE (and others)

SUCCESS IS GREATLY DEPENDENT ON SPEED OF IMPLEMENTATION BY EU MEMBER STATES AND ENFORCEMENT. (EU MS track record is not very good)

IMPLEMENTATION IN MAIN PORTS BUT ALSO IN MARINAS (SOME 30 % FISHERY IS INLAND, ROPES ARE USED EVERYWHERE)

LANDFILL BAN (2008!) NEED TO BE IMPLEMENTED IN ALL EU MEMBER STATES (50% MS still not done)

WASTE FRAMEWORK DIRECTIVE AND WASTE HIERARCHY TO BE ENFORCED

REACH LEGISLATION IS A SHOW STOPPER FOR SOME RECYCLABLE MATERIALS (decision making required, a.o. for global aquaculture development)

SEPERATE COLLECTION OF VARIETY OF WASTE STREAMS IS CRUCIAL. ! (wall of fame and shame)

PORTS / INDUSTRY TO WORK WITH CERTIFIED RECYCLING COMPANIES ONLY (traceability)

MIXED STREAMS => INCINERATION

LANDFILL => POTENTIALLY BACK TO NATURE THROUGH LEAKAGE

NEITHER INCINERATION NOR LANDFILL ARE CIRCULAR

EVEN WHEN COSTS WILL GO UP SHORT TERM, LONG TERM EFFECTS ARE WORTH IT

IN SUMMARY :

ADD VALUE TO WASTE & CREATE MARKET UPTAKE

Investing in a more circular economic activity and improved resource efficiency will :

Safeguard natural resources for future generations

Have a considerable positive effect on the environment

(less litter, less health issues, improved wildlife etc)

Will considerably decrease CO2 emissions (climate change)

A **raw material transition** is therefore an important tool

Will create a large number of so-called green jobs on all levels


Therefore will decrease poverty and social inequality


Will stimulate further innovation and more sustainable progress (education) and is therefore an important tool for **social transition**

Let's turn words into real actions.

Today's available plastics recycling technologies can cope with most of the issues on hand, yet we do so far not use the huge potential of it

FROM POLLUTION TO SOLUTION(S) :

1. WE ARE ONLY AT THE START OF A TRANSITION PERIOD INTO A NEW TOMORROW
2. WITHOUT STRINGENT LEGISLATION AND MANDATORY RECYCLATE CONTENT
TRANSITION WILL REMAIN SLOW OR WILL NOT HAPPEN
3. WE NEED **ALL OF YOU** TO SPEED UP THE PROCESSES
4. DON'T TRY TO BE PERFECT..  JUST BE GOOD AND TELL IT
5. CHANGE YOUR BEHAVIORS AND MOTIVATE OTHERS TO JOIN ..

HOWEVER THE  IS TICKING, SO...

DOING NOTHING IS NOT AN OPTION !!

NEN ASSISTS AND CONNECTS

ENERGY HEALTHCARE
SMART CITIES WATER
SMART INDUSTRY
CIRCULAR ECONOMY



Standards: always a tailor-made agreement

- A standard is a voluntary agreement between interested parties in respect of a product, process, service or system
- Standardization is the process leading to the establishment of a standard
- This process is open, transparent and focuses on achieving consensus
- The standardization process results in:
 - stable and reviewable
 - broadly supported
 - generally accepted
 - coherent & non-conflicting
 - reference documents with added value
- This makes standards and standardization powerful instruments for self-regulation and deregulation

Standardization Requests

- Standardization requests (formerly named ‘Mandates’) are requests from the European Commission to the European Standardisation Organizations (ESOs) to draw up and adopt European standards in support of European policies and legislation.
- It is a “job description” that stipulates how the standardization organization should implement the essential requirements from the directive in a number of standards for the different types of products.
- The standardization request is part of the political process, but also the transition to a market-driven, technical process.
- To come into force, the standardization request is accepted by the relevant standardization organization, which undertakes the development of the standards in a given timeframe.

Gateway to the world of standardization

CEN

- 34 members
- NEN-EN standards
- Adopted mandatory in the Netherlands



NEN

- NEN standards
- Only gateway to CEN and ISO
- 44 CEN Technical Secretariats



NEN informs Dutch organizations and provides opportunities through active participation in (new) international standards development projects





Experience NEN

CEN Mandates

- Algae: M/547 Standardisation request to the European Committee for Standardisation as regards algae and algae-based products or intermediates
- Dangerous substances: M/366: Horizontal complement to the mandates for the Development of horizontal standardised assessment methods for harmonised approaches relating to dangerous substances under the construction products directive (cpd)
- Animal Nutrition: M/521, M/522, M/523: Mandate for standardisation addressed to CEN for methods of analysis in the field of animal nutrition Part I, II, III

Examples current CEN Sreq under NEN secretariat (not definite yet)

- Personal Protective Equipment (PPE)
- Pyrotechnic articles
- Fertilizers

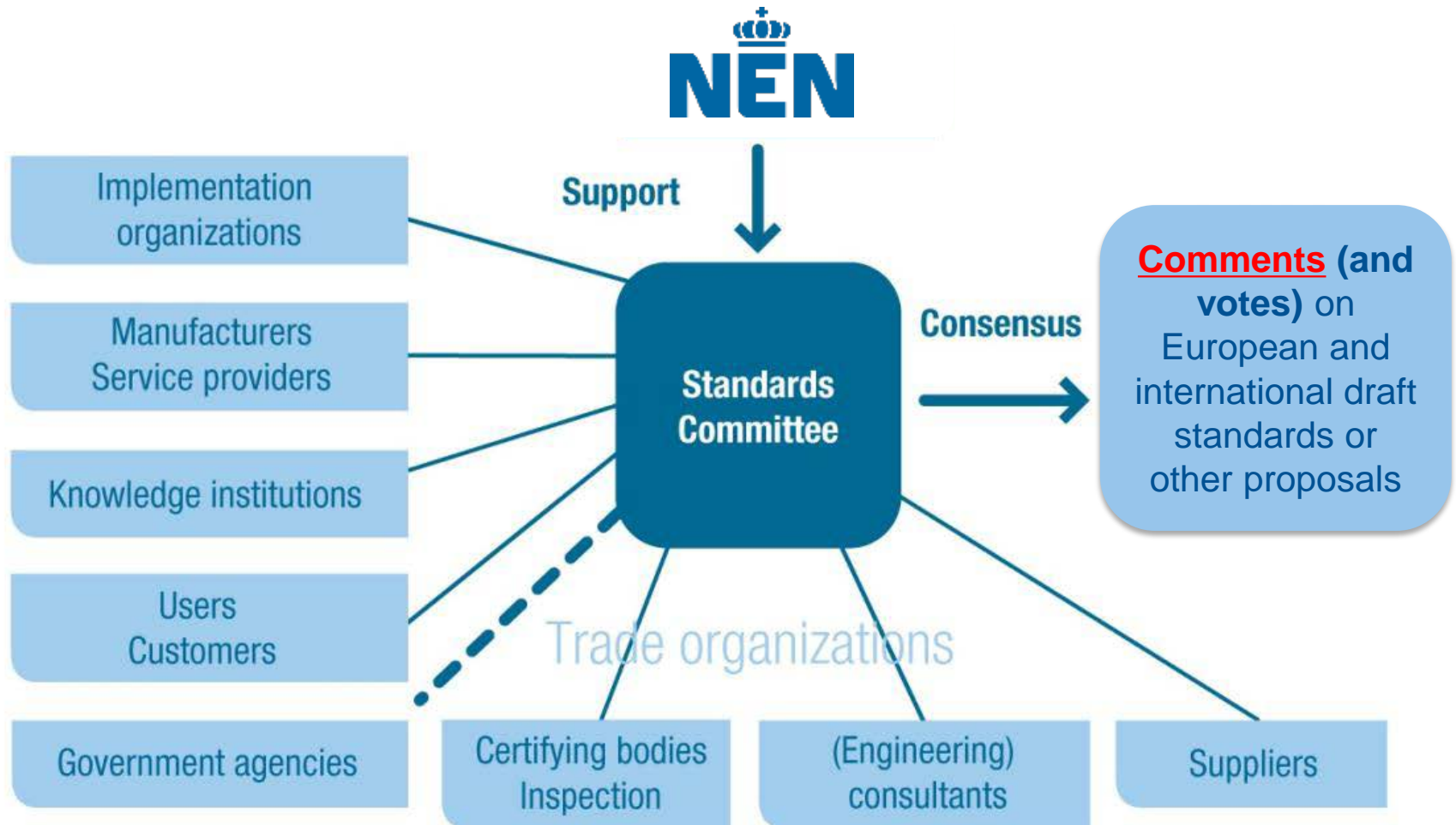
National standards body in the Netherlands

- NEN is an independent not-for-profit institute
- NEN has no direct interest in the content of standards
- Over more than 100 years, NEN provides a neutral platform where different stakeholders can meet and reach agreement
- NEN-committees contribute to/develop clearly defined and usable agreements which have a broad support

National standards bodies around the world (*NEN and many others*):

- can perform the role of secretariat for CEN- and/or ISO-technical (sub)committees or working groups
- can assist (inter)national stakeholders with setting up a CEN- and/or ISO-technical committee for a new topic
- may provide explanations regarding the development of standards to (inter)national stakeholders

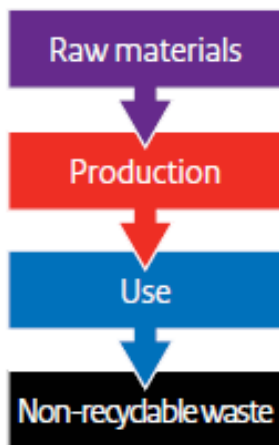
Joint responsibility



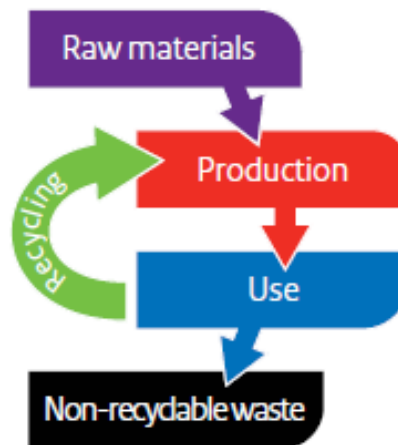
NEN & circular economy

- The transition towards a circular economy requires a transformation of our current ways of producing and consuming, collaborating and running businesses
- This calls for creating new commonly accepted agreements on 'how we will do things', that support the transition to a circular economy. And adjust existing ones.
- NEN has therefore established a program on circular economy aimed at establishing standards that stimulate the transition.

Linear economy



Reuse economy



Circular economy



NEN & circular economy

- Our activities are based on both national and international developments, e.g. the Dutch governmental program, the European Green Deal, the Circular Economy Action Plan and the SDG's.
- And relate to the sectors: Biomass, Construction, Consumer goods, Electronics, Plastics, Waste & secondary resources, Circular entrepreneurship, Food & Farming and Healthcare.
- With the experts in TC's and WG's, NEN currently works on standards for e.g. measuring CE (both national and ISO), circular textiles, mattresses and furniture (national), material efficiency of energy related products (CEN/CLC), chain of custody (ISO), plastic recyclates (both national and CEN).
- NEN is starting a Joint Group 'Circular Economy' under SABE (the strategic advisory body on environment of the CEN & CLC BT's) for the purpose of coordination of CE related standardization activities.