UN environment programme

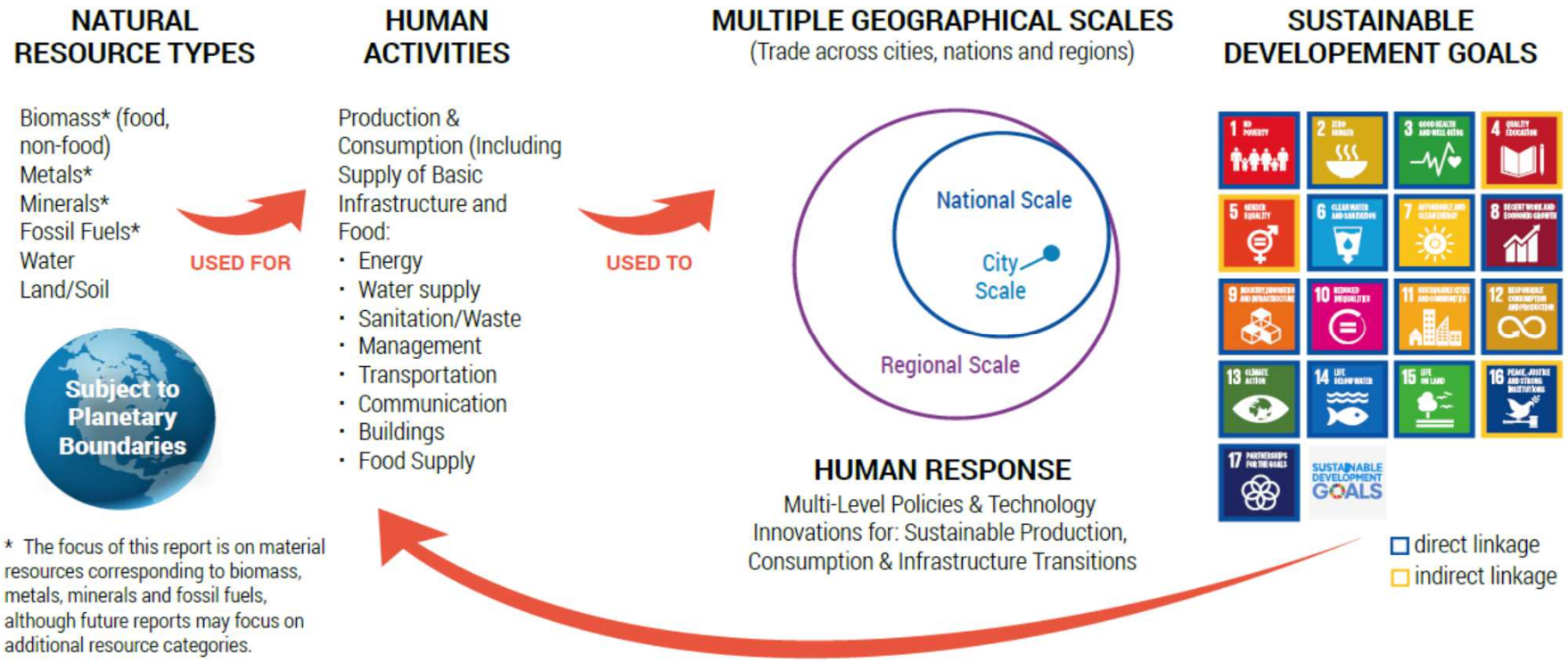
Challenges and opportunities for a global sustainable economy: the essential role of resource efficiency and circular economy in consumer goods

Ligia Noronha

Director

G7 Alliance for Resource Efficiency on Value Retention Policies
Paris, 19-20 November 2019

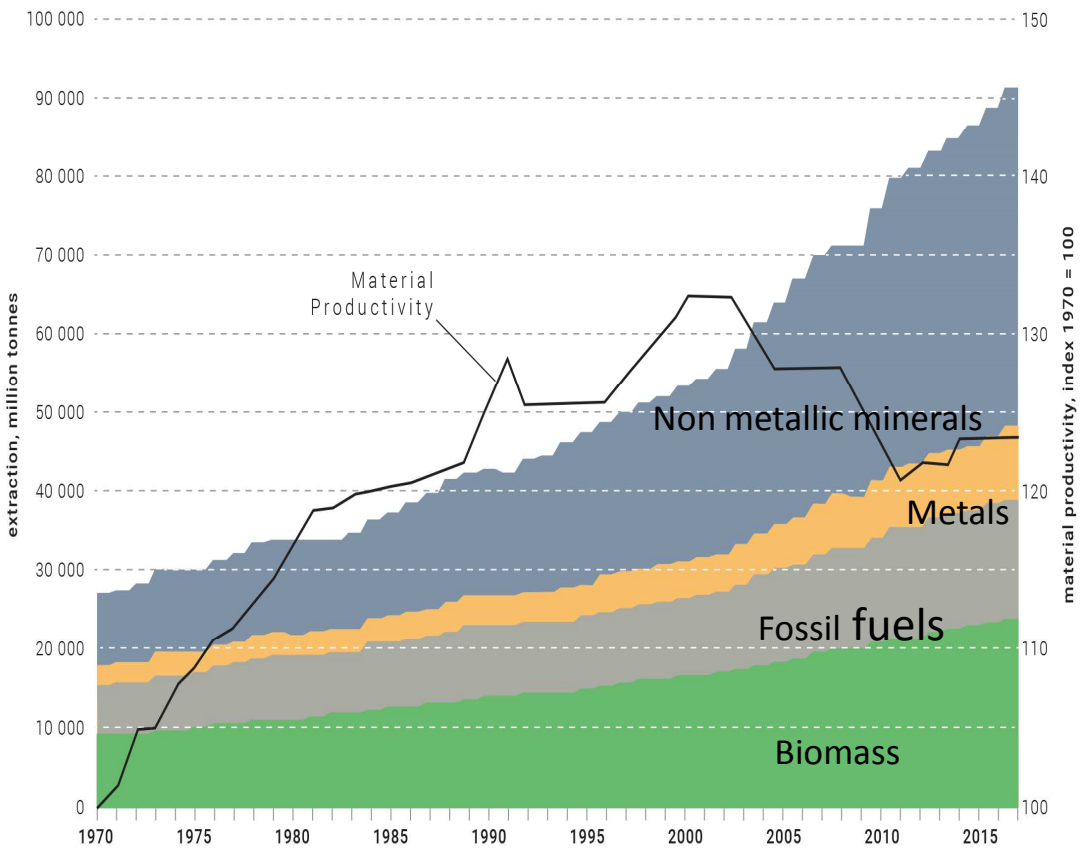
I. Natural resources flow through society via production, consumption and infrastructure provisioning - impacting SDGs at different scales



Source: IRP

Resource demand and use is increasing at an unsustainable pace

Global material extraction and material productivity, 1970 - 2017



The pressures on natural resources will only increase

By 2030:

- ✓ food requirements will increase **60%**
- ✓ water use will increase **40%**

By 2050:

- ✓ global cropland will increase **55%**

Environmental/Health impacts in the value chain

Resource extraction and processing phase:

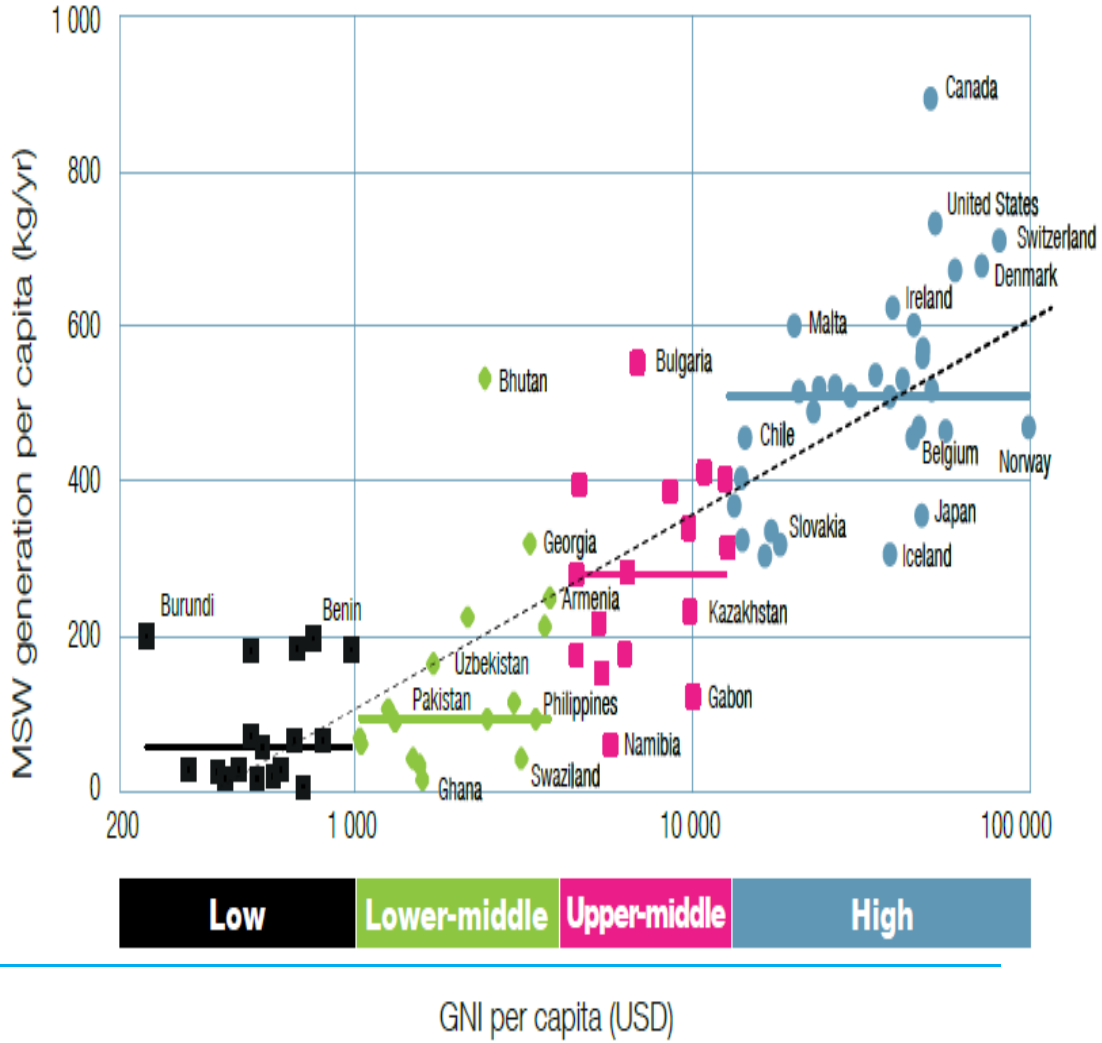
- ✓ **90%** of global **biodiversity loss** & **water stress**
- ✓ **50%** of global **climate change** impacts
- ✓ **1/3** of global **air pollution**

Source: IRP

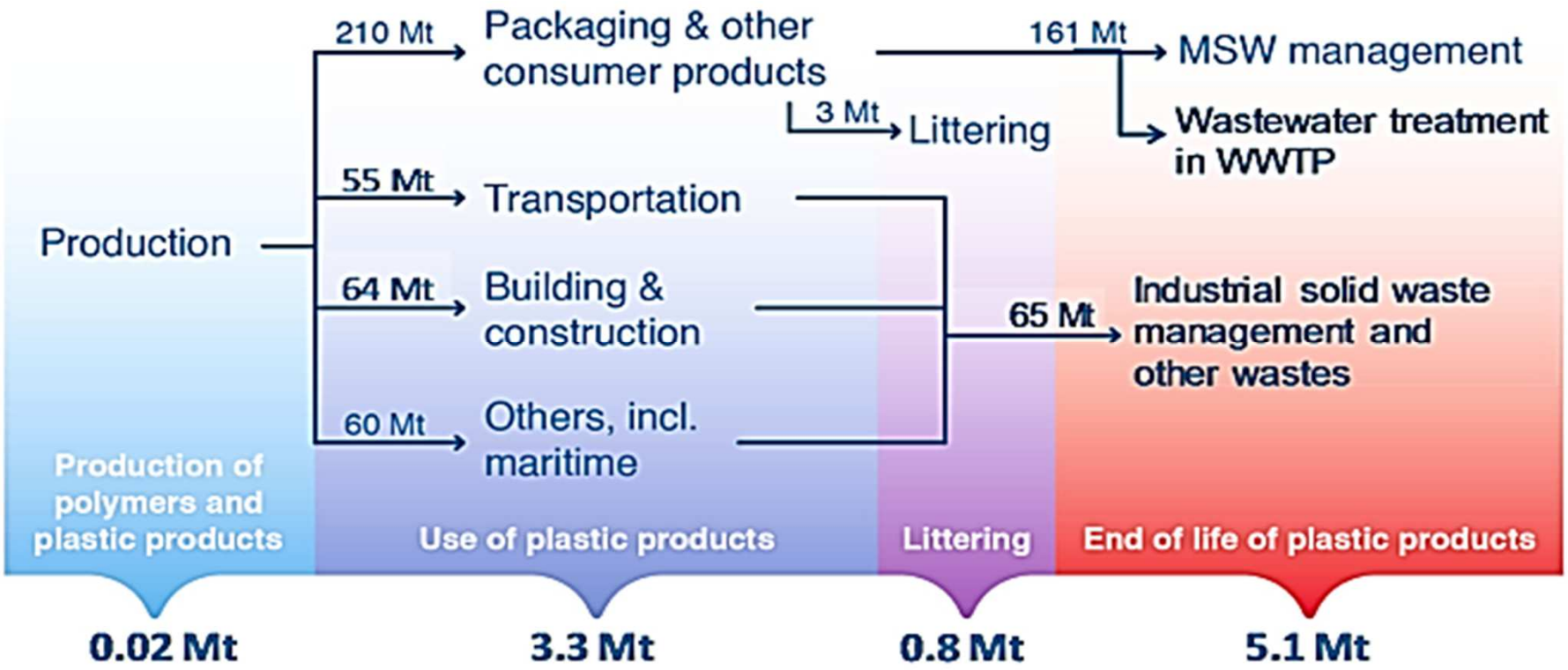
Increasing Waste Generation

- Currently, cities generate 1.3 billion tonnes of solid waste per year.
- By 2025 This volume is expected to increase to 2.2 billion tonnes.
- MSW generation rates vary widely within and between countries.
- The generation rates depend on income levels, socio-cultural patterns and climatic factors.

Waste generation versus income level by country, UNEP/ISWA (2015)



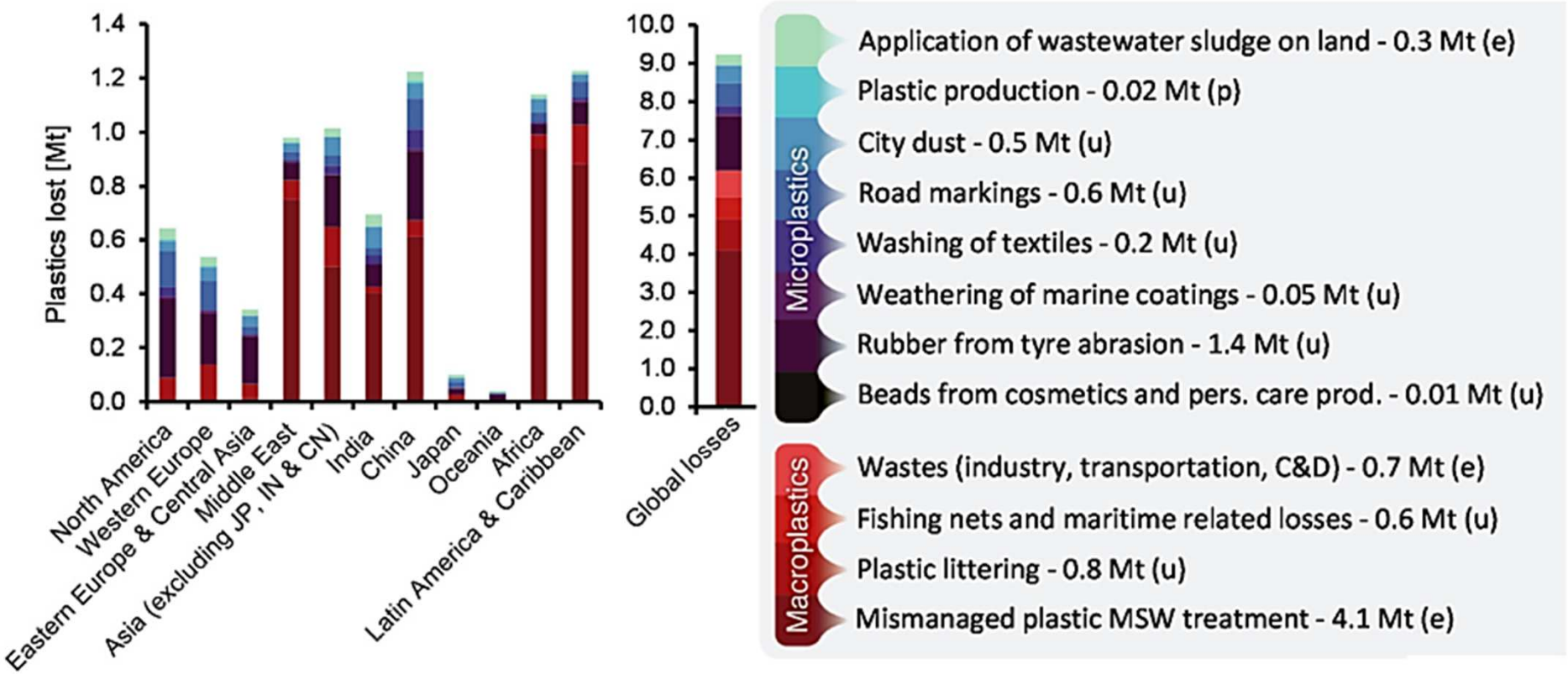
Plastics in the Environment



Source: Ryberg, M., et al. 2019. Global environmental losses of plastics across their value chains. Resources, Conservation and Recycling. Volume 151, 104459

Plastics…

Losses of microplastics and macroplastics to the environment (marine, freshwater, and terrestrial compartments) according to region and sources.



Source: Ryberg, M., et al. 2019.

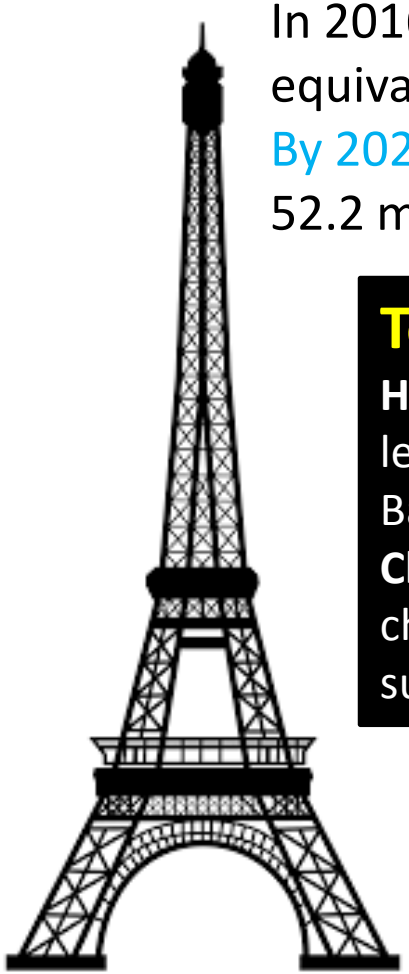
Source: Ibid.

Impacts of the textile industry

UN environment
United Nations Environment Programme

- 93 billion cubic meters of water per year
- 9% of annual microplastic losses to the oceans
- More carbon emissions than all international flights and maritime shipping combined
- Loss of over $500 billion in value every year due to under-utilized clothes and the lack of recycling

Waste from electronics



In 2016, **44.7 million tonnes** of e-waste were generated, equivalent of almost 4,500 Eiffel towers

By 2021- The amount of e-waste is expected to increase to 52.2 million mt

Toxicity

Hazardous metals: Hg, Cd, Cr, Pd, lead glass (2,200 kilotons)
Batteries (300 kilotons)
Chemicals: BFR, hexavalent chromium (PVV), Ozone depleting substances (4.4 kilotons) etc.

Resources

Material	kilotons	Million €
Fe	16,283	3,582
Cu	2,164	9,524
Al	2,472	3,585
Ag	1.6	884
Au	0.5	18,840
Pd	0.2	3,369
Plastics	12,230	15,043

Estimated value of raw materials at
55 BILLION EUROS

Source: UNU. The Global E-waste Monitor 2015 and 2017

Consumers want durable, repairable goods...

UN environment
United Nations Environment Programme

Consumers often feel frustrated about how long products last

81% think business should be required to provide repair, maintenance and disposal support

Consumers pay high attention to information on durability at point of sale

77% would rather repair their goods than buying new ones

92% would like to see information on products lifespan

65% of people feel frustrated about the short lifecycles of their products.

... but they face barriers to choose durable goods and repair them

- Cost of repair
- Quality of repair services
- Access to spare parts/software updates, diagnostic, tools
- Lack of updates on smartphones and other electronic products
- Information (such as diagrams or exploded views of products)

Sources:

- *Green Alliance's 'By popular demand' report, 2018*
- *Eurobarometer survey - Attitudes Of Europeans Towards Waste Management And Resource Efficiency*

II. Resource efficiency, circular economy and value retention processes

UN environment
United Nations Environment Programme

Resource Efficiency/ circular models

- seek to maximize system efficiency through both resource utilization and value retention.

Value-Retention Processes (VRPs)

- Processes that retain value within a system through: **direct reuse**, **repair**, **refurbishment**, and **remanufacturing.**

Resources are saved
Waste is reduced

Innovation is incentivized
Businesses opportunities are created
Costs are saved

Consumers get better value for money
Consumers are better informed

IRP Report: Redefining Value – The Manufacturing Revolution

Advancing circularity through different resource value options for consumer goods

UN environment
United Nations Environment Programme

Shorter loop: where a product remains close to its user and function (client / user choices)

- **Refuse (R0)**: Shifting to post-material lifestyles, i.e. rejecting packaging or shopping bags. Refuse the use of hazardous substances in the design of a product.
- **Reduce (R1)**: Change in consumer behavior, including using products for longer. Dematerialization as a design principle.
- **Resell – Reuse (R2)**: Use 2nd hand products, or product reused after cleaning, without the need for further processing

Medium long loop: where products are upgraded and producers involved again (products improvement)

- **Repair (R3)**: Extending the product lifetime, by replacing broken parts, removing defects, …
- **Refurbish (R4)**: Bringing the product up to "state of art", with newer more advanced components
- **Remanufacture (R5)**: Where the full structure of a multi-component product is disassembled, checked, cleaned and when necessary replaced or repaired in an industrial process

Long loop: where products lose their original function (downcycling)

- **Repurpose (R6)**: By reusing discarded goods or components adapted for another function, the material gets a distinct new life cycle (i.e. plastics used in handbags)
- **Recycle materials (R7)**: processing of mixed streams of post-consumer products or post-producer waste streams using expensive technological equipment.
- **Recovery of energy (R8)**: capturing energy embodied in waste
- **Re-mine (R9)**: retrieval of materials after the landfilling phase

System thinking approach / consumer focus

Based on the typology of resource value retention options (ROs) developed in Reike, Vermeulen, Witjes, The circular economy: New or Refurbished as CE 3.0? (2017)

III. Public policy and collaboration

Policy measures based on value retention loops

UN environment
United Nations Environment Programme

Shorter loop: where a product remains close to its user and function (client / user choices)

- Predominantly consumer – consumer
- More suitable to more advanced economies
- Offers potentials for leapfrogging and building on traditional choices
- Potential policies: taxation, pricing, labeling, economic incentives, industry standards, chemicals regulation, consumers protection, measures to promote innovative consumption, funding for innovation, …

Medium long loop: where products are upgraded and producers involved again (products improvement)

- Predominantly business – consumer
- Integration of the Product *concept and design* lifecycle
- Potential policies: regulation on eco-design, regulation on planned obsolescence, taxation, economic incentives, industry standards, public procurement, labeling, chemicals regulation, regulation for innovation, funding for R&D, …

Long loop: where products lose their original function (downcycling)

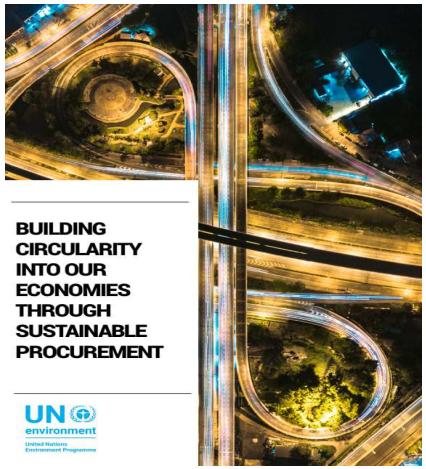
- Predominantly business – business
- More relevant / more demanded in developing countries
- Potential policies: Extended Producer Responsibility, incentives to recycling, waste legislation including landfilling targets, integration of informal sector …

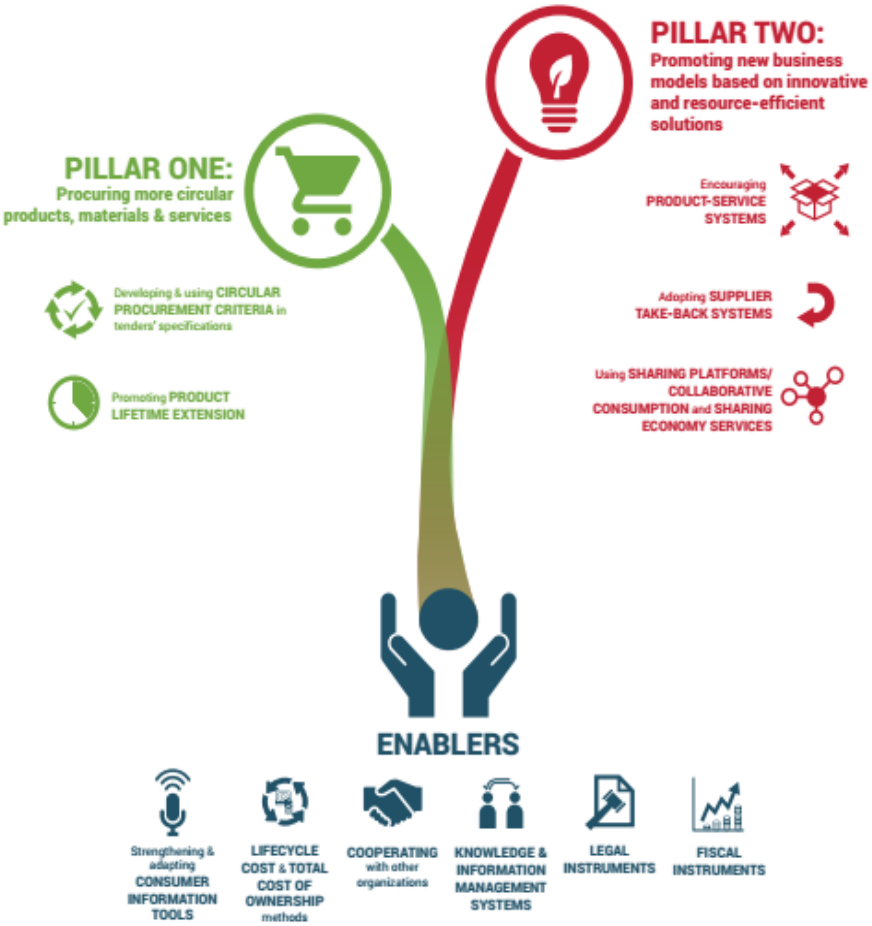
Policy Shifts to support extended business models that focus on resource value creation, preservation and recovery

Focus on functionality rather than ownership

- ✓ Better control over energy use for lighting as well as end-to-end solution to maximize recycling in line with circular economy aspirations

- ✓ Procurement according to “Lighting as a service” model





Public private collaboration on circularity in electronics

UN environment
United Nations Environment Programme

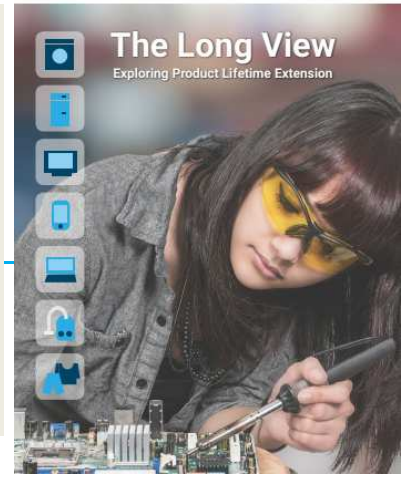
- Support the Government of Nigeria in implementing the Extended Producer Responsibility (EPR) legislation in the electronics sector
- Establish an efficient collection system through various channels, as well as engaging informal collectors
- Establish cost-effective recycling solution for various product categories, and work with producers to develop upstream circular economy solutions for the electronics sector in Nigeria

UN environment programme
nesrea
gef

Consumption choices have consequences; awareness and information is key

- ✓ Life of product can be extended by:
  - ✓ simply using products for a long(er) time,
  - ✓ extending their use through maintenance and upgrades, and/or
  - ✓ recovering broken products through repair, refurbishment or remanufacturing
  - ✓ accessible and efficient end-of-use product collection systems to support reverse-logistics

- ✓ The French Consumption Law Decree no 2014-1482 requires manufacturers and retailers to inform consumers about how long **spare parts** will be available when consumers buy the product.
- ✓ For certain categories of products, **minimum durability criteria** are integrated as mandatory requirements in the European Eco-design Directive



UN environment programme

Thank you

www.unep.org