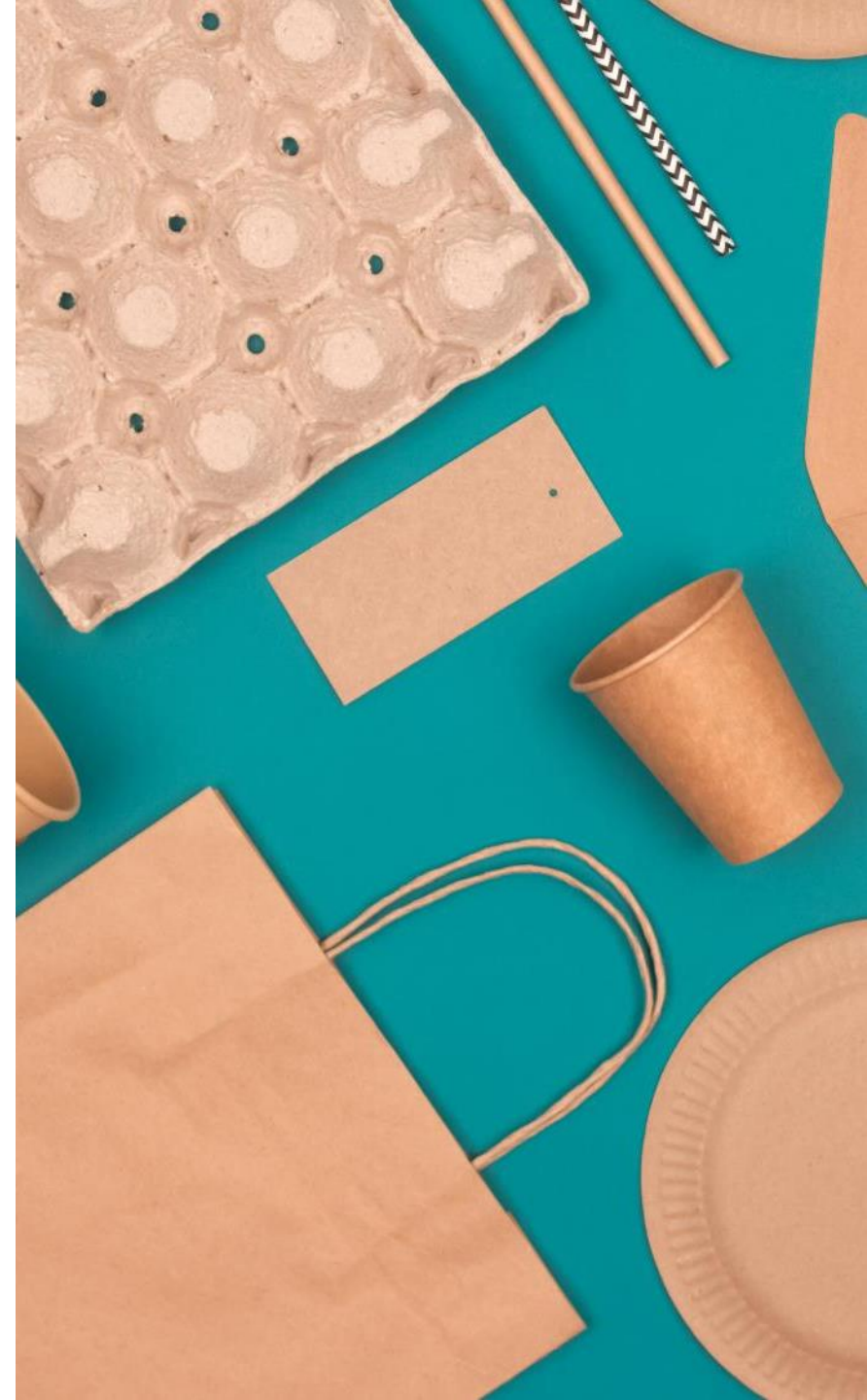


# Circular Economy for PLM Green Alliance

Darren West  
Product Expert, Circular Economy  
February 2022

# Agenda

- 1 My role and how did I get here?
- 2 How is sustainability and in particular, a circular economy reflected in SAP's future approach?
- 3 How will SAP address circularity?
- 4 What should we expect to see in the future?
- 5 Where to go to learn more and to keep informed?

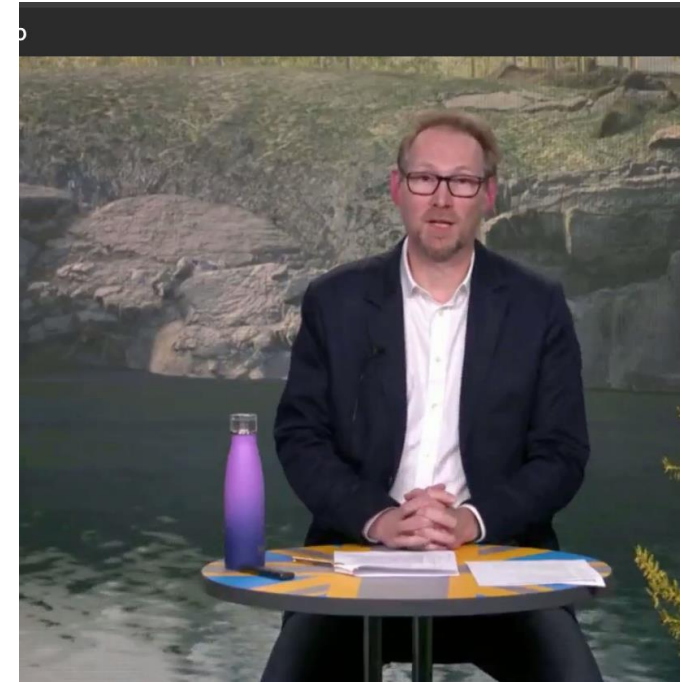


# My role – and how did I get here?



# Introduction

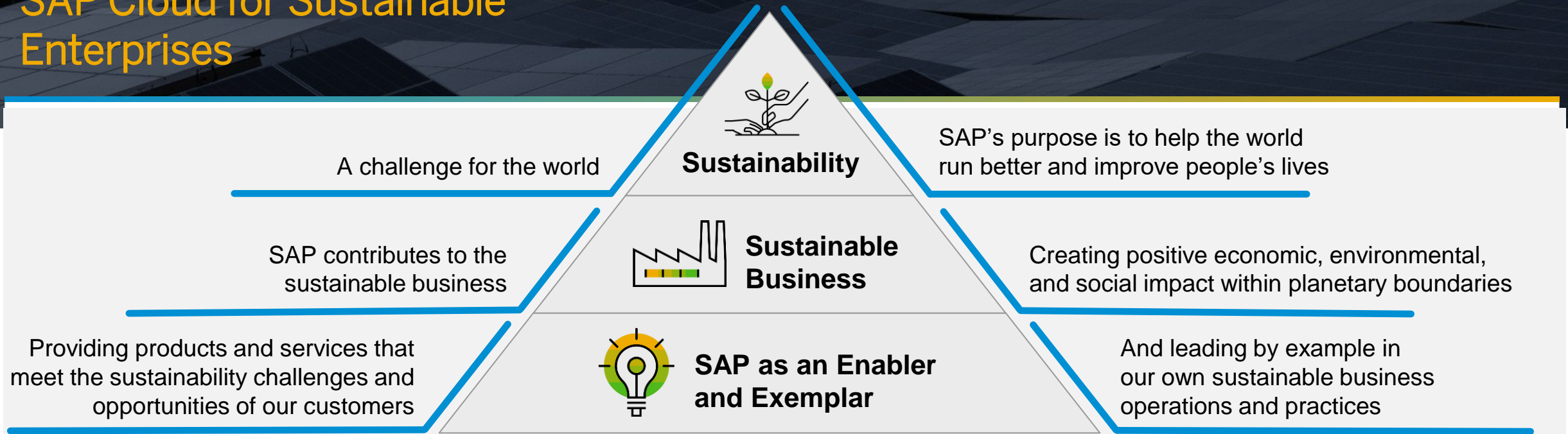
- Product management lead for SAP's Circular Economy solutions.
- Tackle circular economy topics such as:
  - Extended Producer Responsibility
  - Plastic Taxes
  - Recirculation of Materials
  - Regenerative Business
  - Material Passports



# Sustainability and CE at SAP



# SAP Cloud for Sustainable Enterprises

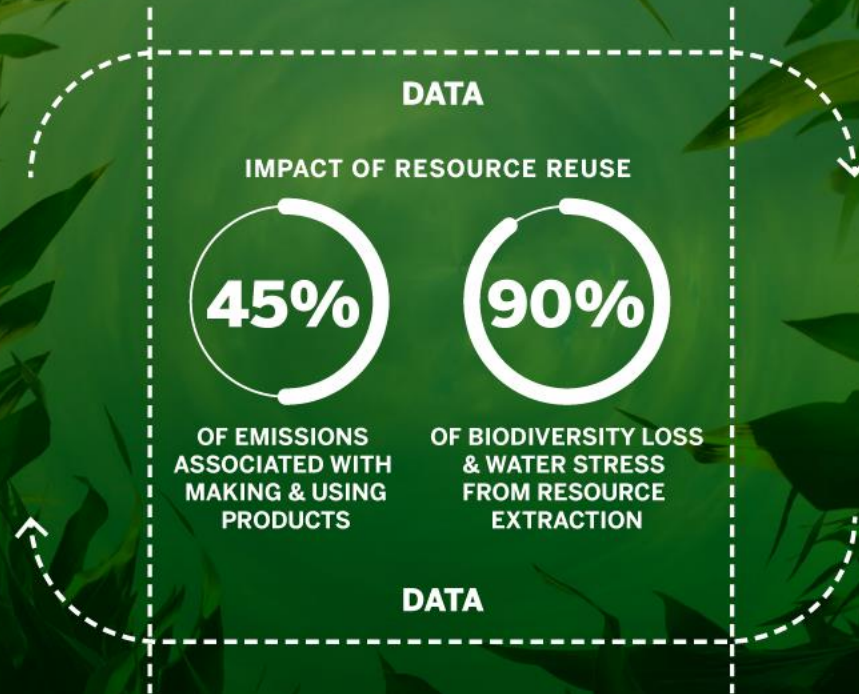


# NEED FOR INCLUSIVE, LOW-CARBON AND CIRCULAR ECONOMY

9.2% → 8.6%  
**CIRCULAR**



**EXTRACTING  
MORE  
RE-USING  
LESS**



**ENVIRONMENTAL POLLUTION**  
→ INCREASING FOCUS FOR CUSTOMER BRANDS

**350**  
MILLION TONS  
OF PLASTIC PRODUCED  
EACH YEAR



**8 MILLION**  
OF WHICH ENTERS THE OCEAN

# A shift is needed to a circular economy

Start by understanding materials that will create the most impact



Plastic



Textiles



Food



Building Materials



Electronic Components



Batteries



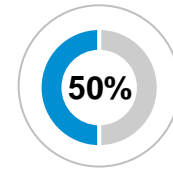
production expected to quadruple by **2050**



Global cotton production requires over **250 billion** tons of water annually



**40%** of agricultural land use in EU directly



of total resource use consumption



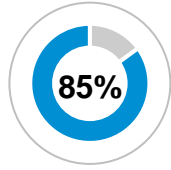
Raw materials valued at approximately **\$57 billion** are lost in e-waste globally



**\$4 trillion** of new battery materials needed by 2050



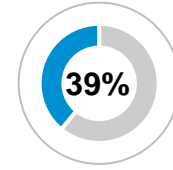
**61%** of world population have no access to recycling infrastructure



of textiles go into landfills



influenced by **top 10 FMCGs** and retailers



of energy emissions



# Stakeholders demand business to eliminate waste and take action on plastics and packaging

## Citizens and consumers are pushing for action



**91%** of consumers concerned about plastic waste<sup>1</sup>



**73%** of consumers are willing to pay more for eco-friendly packaging<sup>2</sup>



## Governments are responding with regulation



**170** Nations have pledged to 'significantly reduce' use of plastics by 2030<sup>3</sup>



**400+** Extended Producer Responsibility (EPR) schemes and plastic taxes in place or planned<sup>4</sup>



## Extended Producer Responsibility (EPR) schemes

- Places responsibility for environmental impact of products on producers. Producers pay fees based on their packaging of plastic volume in a market (e.g. fee for 1 tonne of plastic).
- Provides incentive to prevent waste at source.



## Plastic Taxes

- New taxes that apply to plastic packaging produced or imported (e.g. fee charged p/tonne of plastic).
- Provides incentive for business to use recycled material in the production of plastic packaging, which creates greater demand for this material.



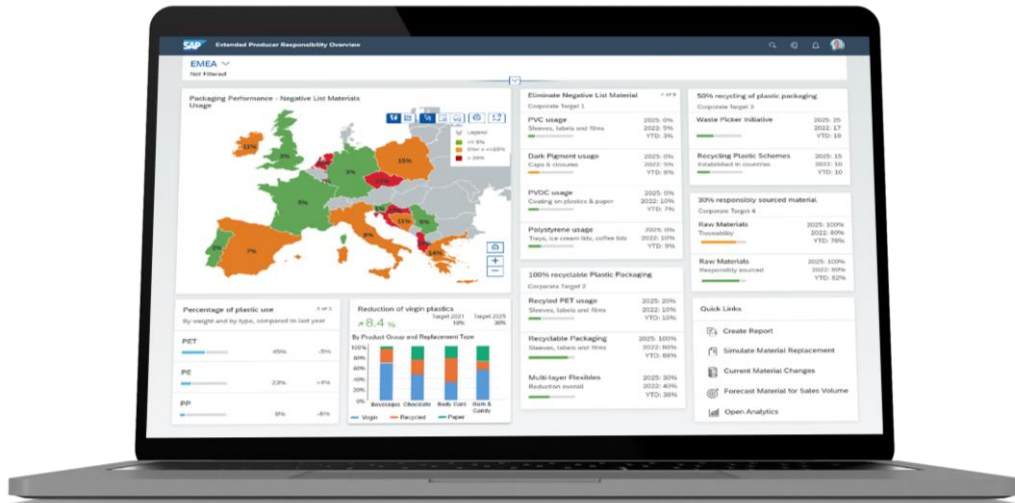
## Voluntary Agreements

- Commitments that business have taken on towards action on plastic packaging which are voluntary CEO led or signed up to via NGOs (e.g. Ellen MacArthur Foundation, WRAP, WWF).
- These commitments cover how plastic is produced, used, and reused/recycled with concrete targets for 2025-2030 and focus on year-on-year reporting.



<sup>1</sup> Source: [UNEP](#), <sup>2</sup> Source: [Trivium Packaging & BCG](#), <sup>3</sup> Source: [WEF](#), <sup>4</sup> Source: [OECD](#)

## Holistically manage packaging and regulatory risk across global markets and support transition to sustainable portfolio



### In a Nutshell

SAP Responsible Design and Production helps producers manage their EPR obligations and plastic taxes so they can control and eliminate the costs of the downstream waste system and make design changes to eliminate waste.

### OBJECTIVE

Provide tailored intelligence that will enable businesses to keep pace with EPR regulations and plastic taxes, embed circularity principles into core business processes and optimize design for regenerative business.

### CAPABILITIES

- Manage EPR declarations and Materials Taxes in line with latest regulations
- Maintain a global view of progress and support circular design processes.
- Provide transparency and reporting to third party NGOs on Voluntary Agreements.

### INTEGRATION

- S/4 HANA
- PLM
- ECC 6 (requires ABAP plug in)
- CSV/Excel Import

### BENEFITS

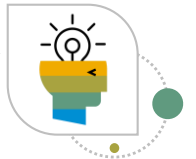
#### Reduced Costs

Calculate fees and taxes accurately and implement measures to reduce regulatory exposure.



#### Deliver Commitments

Identify the right trade-offs and enable the strategic portfolio decision making process.



#### Empowered Consumers

Transition to a circular product portfolio and increase consumer engagement through authentic delivery of zero waste commitments.



# Global obligations are not easily managed by current systems and involves manual data collection and tracking



### Regulatory Compliance

Extended Producer Responsibility



### Voluntary Agreements

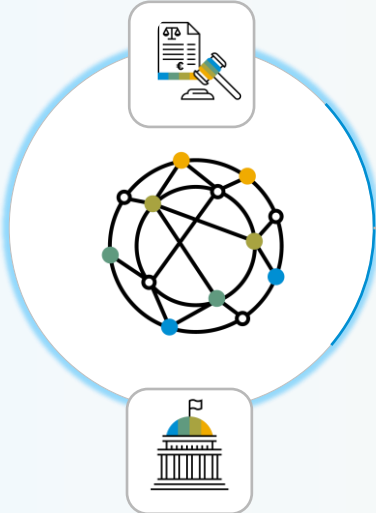
Ellen Macarthur Foundation, WRAP, WWF



### Good Business

Value creation, maintenance and efficiency

**Business Needs**

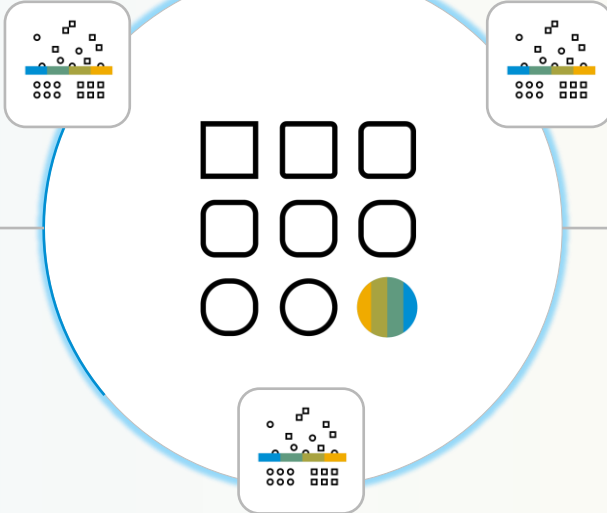


### Global Complexity

Global regulations are complex, increasing in severity and varying by market.

Lack of dynamic tracking of regulations and tax by market

Lack of scenario modelling to account for material earnings impact

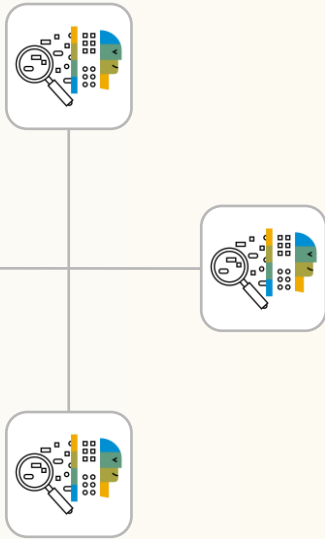


### Distributed Data

Data is distributed across multiple systems and largely manual effort to collect and process.

Manual data collection across multiple systems

Unable to organize data for analysis on material impact



### Stakeholder Insights

Lack of insights to support collaboration between stakeholders towards circularity.

Design process disconnected from insights on material use.

Siloed reporting limiting effective collaboration

**Business Challenges**

# SAP Circular Economy Strategy

Building **Regenerative Business**  
in a **Circular Economy**



**Mission led**

Led by commitments of  
our most ambitious and  
sustainable customers



**Customer First**



Global  
Commitment

Catalyzed by leading global  
NGO partners



**Critical Partnerships**



WORLD  
ECONOMIC  
FORUM

3 priorities based on  
problematic materials for a  
global impact



**ELIMINATE**

Empower business to  
eliminate waste



**CIRCULATE**

Stimulate increase  
in value of materials  
for re-use



**REGENERATE**

Shift from product consumption  
to re-use models

Plastics

Textiles

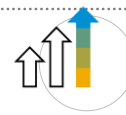
Batteries

Food

Building  
Materials

Electronic  
Components

Leveraging the  
Intelligent Enterprise



**Scale for Impact**

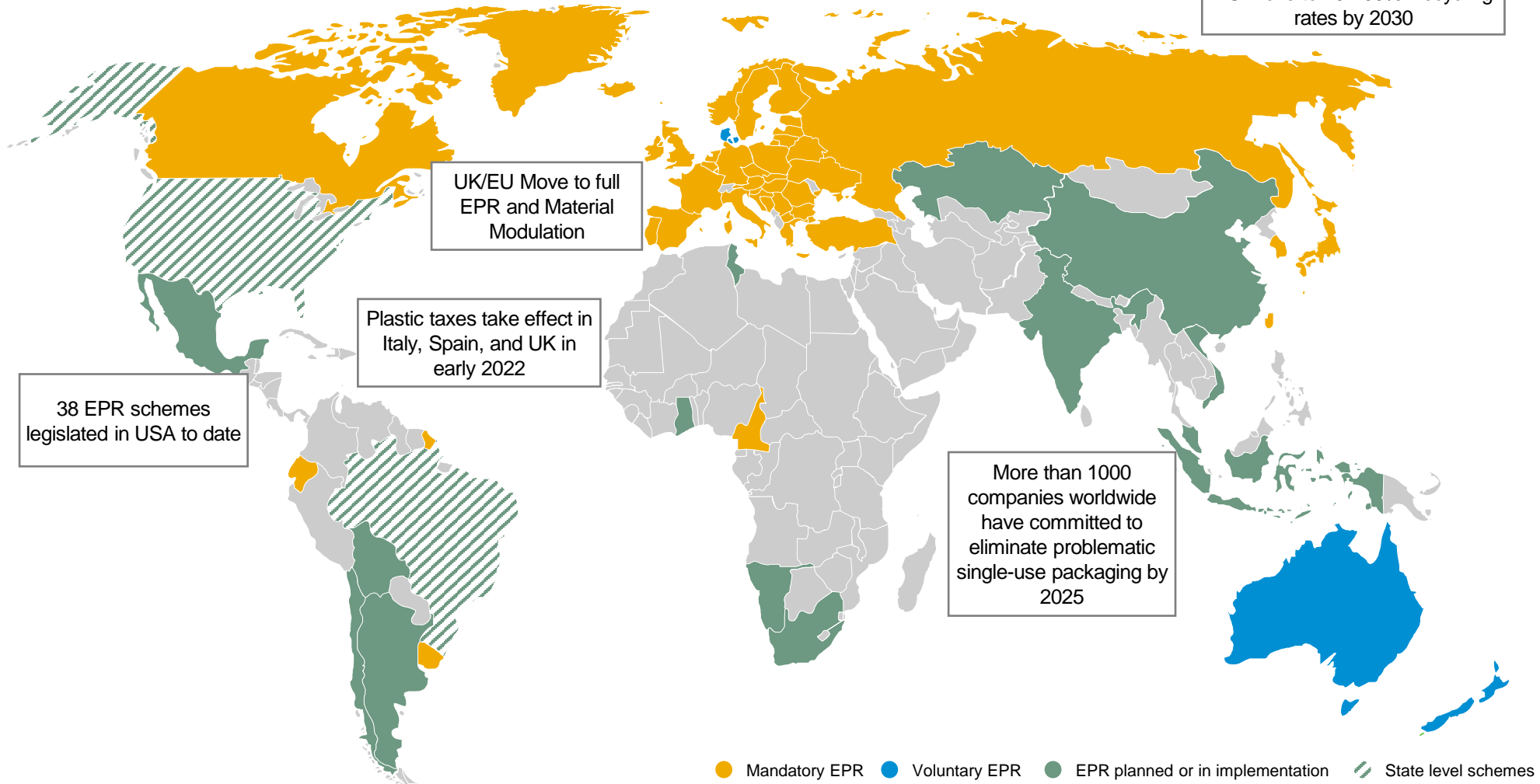
Incubating the Regenerative startup ecosystem via SAP IO

Global partner network

# Global regulations, EPR schemes and plastic taxes continue to increase worldwide

## Plastic Pacts in place

1	UK
2	France
3	Chile
4	Netherlands
5	South Africa
6	Portugal
7	USA
8	Canada
9	Poland
10	Europe
11	Malaysia



# Examples of Extended Producer Responsibility (EPR) declarations

## These vary by country in content, structure and format

France: CITEO

Simulateur 2020 «UVC»

102900 Masquer les plastiques

Sommaire Actualiser

Poids unitaire par matériau en Grammes

Référence (optionnel)	Libellé de votre UVC	Papier-carton					Plastique					
		Acier	Aluminium	Papier-carton autre que briques	Briques	Verre	Bouteilles et flacons en PET clair	Bouteilles et flacons en PET foncé/opaque/colore ou PE ou PP	Autres bouteilles hors PVC (PLA, complexes...)	Emballages rigides PE ou PP ou PET	Emballages rigides en PS	Autres Emballages rigides hors PVC (PLA, complexes...)
Barq7AZ	Barquette traiteur										16,000	
YX4	Yaourts aromatisés par 4			22,680						17,200		
	Boîte de jouet			59,041							7,940	
Choco SPAT	Boîte de 24 chocolots		4,800	306,000							19,200	1,700

Belgium: VAL-I-PAK

**VAL-I-PAC**

### Formulaire R/A: déclaration des emballages réutilisables

A remplir par l'adhérent qui est responsable d'emballages industriels de type A. A savoir, toute personne qui a emballé ou a fait emballer en Belgique des produits en vue ou lors de leur mise sur le marché belge. A renvoyer à VAL-I-PAC au plus tard pour le **28 février 2013**.

Année de référence: 2012		Numéro d'adhésion:		
Type d'emballage	Volume/Dimension	Matériau	Poids unitaire	Nombre d'emballages réutilisables <sup>(1)</sup>
Palettes Euro	80 x 120 cm	bois	25 kg	
Palettes CP (Pallet Return System)	114 x 114 cm	bois	25 kg	
Palettes CHEP	80 x 120 cm	bois	25 kg	
Palettes CHEP	100 x 120 cm	bois	28 kg	
Palettes CHEP	80 x 120 cm	plastique	19 kg	
Casiers EPS (Euro Pool System)		plastique		
Autres				

UK: VALPAK

Information

Supplier Code: 12345  
Supplier Name: Supplier Ltd

dataeam@valpak.co.uk  
144 (0)1789 208 733

Date From	Product Code	Product Name	Barcode	Single Product Weight/Size (not including packaging or batteries)	Packaging Level	Material				Lamination		
						Base Material	Extended Material	Colour	Plastic Coating	Laminated	Co-Extruded	Single/Double Side
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Primary	Glass	Glass	Green	No	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Primary	Plastic	HDPE	Mixed	No	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Primary	Steel	Steel		Yes	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Primary	Paper	Carton Board		No	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Secondary	Paper	Carton Board		No	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Secondary	Plastic	LDPE	Clear	No	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Transit	Plastic	LDPE	Clear	No	No	No	
01.01.2018	123456	6 Pack of bottled beer	5000184321552	275ml x 6	Transit	Wood	Wood		No	No	No	
01.04.2018	5432190	Can of Fizzy Drink	5000224013201	330ml	Primary	Aluminium	Can		Yes	No	No	
01.04.2018	5432190	Can of Fizzy Drink	5000224013201	330ml	Secondary	Paper	Carton Board		No	No	No	
01.04.2018	5432190	Can of Fizzy Drink	5000224013201	330ml	Secondary	Plastic	LDPE	Clear	No	No	No	
01.04.2018	5432190	Can of Fizzy Drink	5000224013201	330ml	Transit	Plastic	LDPE	Clear	No	No	No	
01.04.2018	5432190	Can of Fizzy Drink	5000224013201	330ml	Transit	Paper	Corrugated		No	No	No	

Italy: CONAI

**6.2IMPORT TEST RUN** Spett.le CONAI - CONSORZIO NAZIONALE IMBALLAGGI annual decl. (IMPORTO) per l'invio via fax al n.: 02.54122656 / 02.54122680 oppure on line: https://dichiarazioni.conai.org o in alternativa via posta (raccomandata A.R.): via P.Litta, 5 - 20122 MILANO

01.01.2010 - 31.12.2013

### DICHIARAZIONE PERIODICA per attività di importazione di imballaggi e/o materiali di imballaggio

#### SCHEDA DI LIQUIDAZIONE DEL CONTRIBUTO AMBIENTALE

Dichiarazione  ANNUALE  TRIMESTRALE  MENSILE

0002	0001	X	0001
I	II	III	IV
Gen	Feb	Mar	Apr
Mag	Giun	Lug	Ago
Set	Ott	Nov	Dic

(selezionare un solo periodo di riferimento)

Codice socio:  Iscritto in quanto  Produttore  Utilizzatore

Ragione Sociale: Firma Ides AG  
Indirizzo: Postfach 160529 - D-60070 FRANKFURT  
Partita IVA: DE123456789 Codice Fiscale:  
Referente per la compilazione: Tel.:  
E-mail:

MATERIALE IMBALLAGGIO	quantitativi in esenzione		contributo ambientale Euro/ton	valore tot. contributo Euro	COSTITUZIONE IMBALLAGGI (A+B)	
	ton	ton			primari ton	secondari ton
Acciaio	0	0,003	15,49	0,04	0,003	0
Alluminio	0	0	25,82	0,00	0	0
Carta	0	0,002	15,49	0,02	0,002	0
Legno	0	0	2,58	0,00	0	0
Plastica	0	0	72,30	0,00	0	0
Vetro	0	0,034	5,16	0,18	0,034	0
Totale	0	0,038	0,00	0,24	0,038	0

**PROCEDURE SEMPLIFICATE PER IMPORTAZIONE DI IMBALLAGGI PIENI:**

# SAP's Industry Thought Leadership

## Sustainability & Business Networks



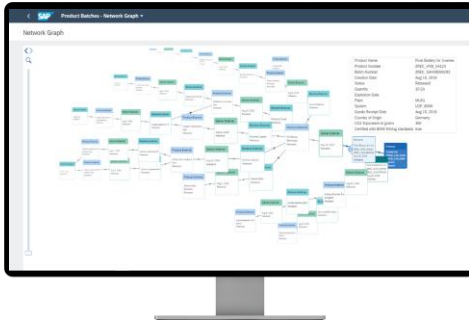
### Catena-X

SAP is a founding partner of Catena-X. Catena-X vision is to enable a secure and cross-company wide data exchange of all participants of the automotive value chain. Alliance addressing challenges such as resilience, sustainability and geopolitics.

Use Cases addressed

- Parts Traceability
- Circular Economy
- Carbon Footprint Traceability

SAP Showcase



Members

26+ members

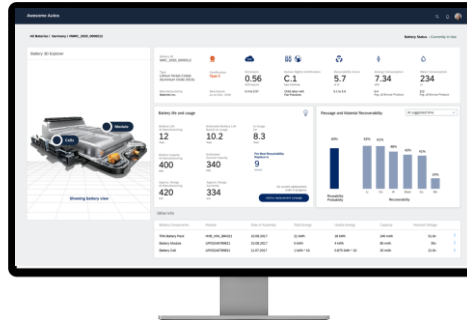
[Catena-X website](#)



### Global Battery Alliance

SAP is a knowledge partner to GBA. GBA vision is to develop a Battery Passport as a digital representation of EV batteries including information on sustainability and lifecycle requirements.

- Carbon Footprint Traceability
- Human Rights & Child Labour elimination
- Circular Economy & Material Recoverability



70+ members

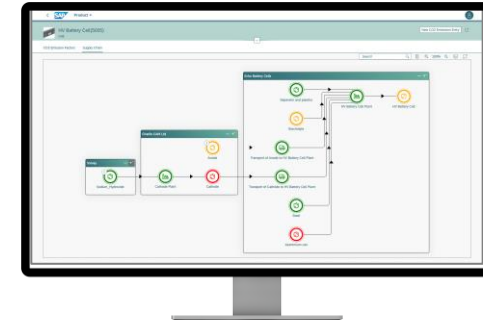
[WEF / GBA website](#)



### WBCSD Pathfinder

SAP is a member of WBCSD. WBCSD Pathfinder is dedicated to enabling decarbonization through Scope 3 emissions transparency.

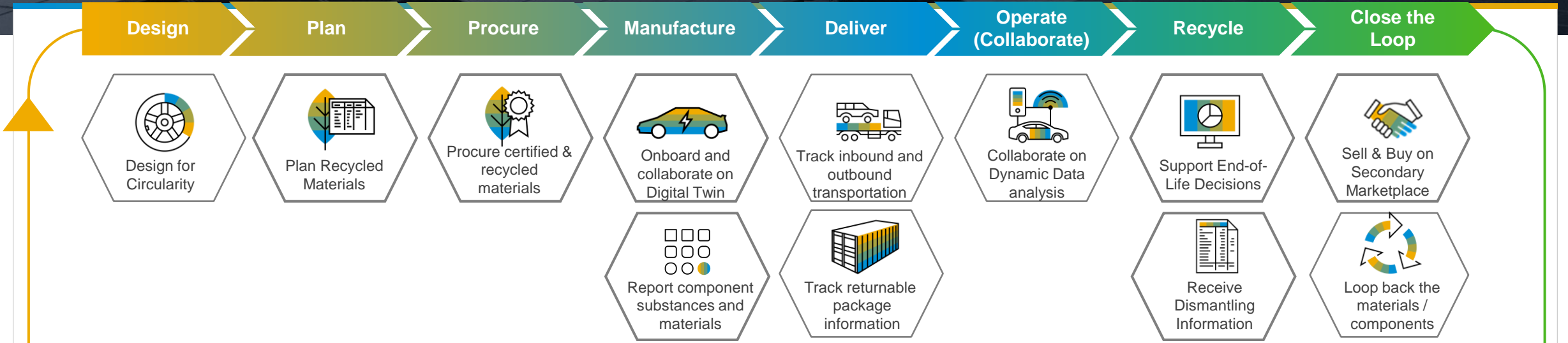
- Carbon Footprint Traceability
- Technical & Methodological Work



15+ members

[WBCSD website](#)

# Circular Economy | Process in Automotive



## Use Case Objectives

- Design for Circularity
- New design dimensions: Modularity, Recyclability, Cost of disposal (materials)
- Plan demand reusable components and recycled materials for production
- Procure certified materials
- Prove the origin of materials
- Gain access to secondary marketplaces for recycled materials
- Gain transparency on material purity
- Collaborate on consistent digital twin information (upstream & downstream)
- Calculate and report secondary material quotas
- Trace the logistics operations and deliveries
- Add transparency on carbon emissions for logistics operations
- Trace returnable package information
- Analyze dynamic data)
- Analyze Component age, usage information
- Update maintenance history
- Get support on End-of-Life Decisions:
  - → reuse
  - → remanufacture
  - → recycle
- Match Demand & Supply of recycled & reusable materials/ components
- Secondary Marketplace



# Product Passports: Example Batteries

## Circular value chain and connected business



- **Battery passport**, allowing data exchange on materials chemistry, origin, state of health and chain of custody **for life extension and end-of-life treatment**
- **Regulators** should **incentivize** battery manufacturers and utilities to **implement V1G and V2G**
- **Regulators** should incentivize **electric shared and pooled mobility** to increase EV adoption
- **Harmonization of regulations** regarding
  - transboundary movement of batteries
  - tightened recycling targets differentiated by materials
  - improved Extended Producer Responsibility schemes.

## Sustainable business and technology



- Regulators must review and revise current framework for **battery-enabled renewables**
- Adherence to principles regarding accountability and transparency of payments and **support local value creation** under fair conditions.

## Responsible and just value chain



- **KPIs** on social and environmental practices ensuring **transparent impact measurement** as well as the exchange of **best practice\***. National legislation to support by using the battery passport.
- Establish **regulations** on life cycle emissions to verify **GHG disclosure** based on life cycle considerations.

\*\*\*OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas"  
"UN Guiding Principles on Business and Human Rights".

1:[http://www3.weforum.org/docs/GBA\\_EOL\\_baseline\\_Circular\\_Energy\\_Storage.pdf](http://www3.weforum.org/docs/GBA_EOL_baseline_Circular_Energy_Storage.pdf)  
2: <https://www.mdpi.com/2071-1050/12/1/341/pdf>  
3: [https://ec.europa.eu/environment/topics/waste-and-recycling/batteries-and-accumulators\\_en](https://ec.europa.eu/environment/topics/waste-and-recycling/batteries-and-accumulators_en)

## China

Regulation calls for battery and vehicle companies to arrange for recycling and assessment of second life potential.<sup>1</sup>

The "Guidance on Promoting Energy Storage Technology and Industrial Development" is the first guidance policy, which supports the development of large-scale energy storage technologies and industrial applications in China.<sup>2</sup>

## EU Batteries regulation<sup>3</sup>

The aims are to improve the **environmental performance** of all operators in the battery life cycle and give producers the **responsibility** for waste management of batteries and accumulators

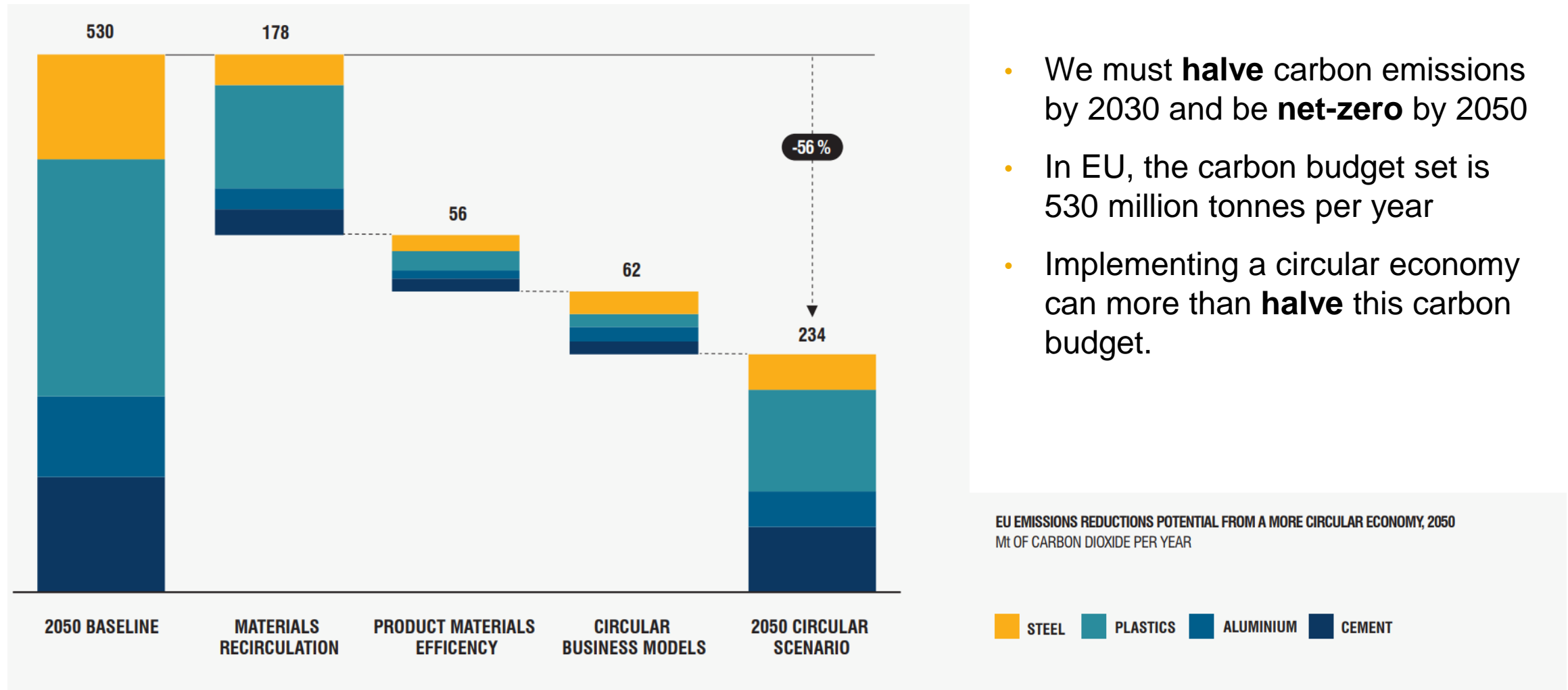
Prohibits the marketing of batteries containing some **hazardous** substances

Defines measures to establish schemes for **collection and recycling**

Fixes **targets** for collection and recycling activities

Labelling batteries and their **removability** from equipment

# Material Economics



# Society is increasing pressure on business to eliminate waste

The business ecosystem is mobilizing and responding with ambitious commitments.

## Regulators & NGO

More than **400** Extended Producer Responsibility (EPR) schemes and plastic taxes in place or planned.

## Investors

**X10** increase in number of private market funds for circular economy from 2016 to 2020.



Responsible employees are **#1** priority amongst job-seeking millennial and Gen Z.

## Employees

**7.1%** faster growth for sustainability-marketed products.

## Consumers & Citizens

<sup>1</sup> Source: OECD, <sup>2</sup> Source: Ellen MacArthur Foundation, <sup>3</sup> Source: Business Green, <sup>4</sup> Source: NYU Stern

# The role of business **is critical**

Industry needs to understand current risks and capture the opportunities in a circular economy

## RISKS

## OPPORTUNITIES



**Packaged goods, retailers, hospitality and food service**

Brand, regulation and investor pressure

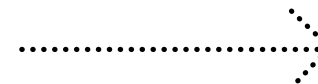


Innovation and growth, differentiation and anticipation of regulation



**Raw material producers, packaging and suppliers to plastics**

Regulation, investor pressure, stranded assets and downside earnings



Innovation & growth, future-proofing supply chain, anticipation of regulation



**Collection, sorting and recycling industry**

Stricter regulation



Growth through supply of high quality material. Anticipating regulation & import bans

Source: Ellen MacArthur Foundation

# Addressing full circularity across all material flows

## Building Regenerative Business in a Circular Economy



### Regulatory Compliance

Extended Producer Responsibility



### Voluntary Agreements

Ellen Macarthur Foundation, WRAP, WWF



### Good Business

Value creation, maintenance and efficiency

Driven by multiple **disruptive factors**



### Eliminate

**Empower business to eliminate waste**

Embedding Insights into business processes and driving transparency to stakeholders for collaboration towards regenerative business



### Circulate

**Stimulate increase in value of materials for re-use**

Increasing the value of waste through an open business network to stimulate investment in closed-loop solutions

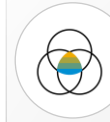


### Regenerate

**Shift from product consumption to re-use models**

Enabling new regenerative business models to accelerate new consumption behaviours

Providing full circle transparency to enable **3 priorities**



### Innovation Products

#### SAP Responsible Design and Production

Switching to more sustainable products & packaging. Available Nov 2021.

with critical interventions

- Design for Circularity
- Optimize Resource Use

Targeting key processes

- Design
- Production

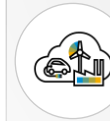


#### Responsible Sourcing & Marketplace Solutions

predictably sell/source recyclable/recycled feedstocks. Planned 2022

- Enable Recommerce
- Maintain value, eliminate waste

- Sourcing & Marketplace
- Consumption Recovery & Reuse



#### SAP Industry Cloud

(fashion, retail & consumer products) pivot to new business models. Planned 2022

- Innovate for Circularity
- Manage Takeback

- Finance
- Logistics & Transport

With new solutions leveraging the **Intelligent Enterprise**

## Where to find out more

- Ellen MacArthur Foundation
- SystemIQ
- SAP – use [sap.com/ce](https://sap.com/ce) as a shortcut for all things circular economy
- WEF GPAP
- WBCSD
- Circularity Gap Report
- WWF
- Material Economics

# Thank you.

Contact information:

Darren West

Product Expert, Circular Economy

[Darren.west@sap.com](mailto:Darren.west@sap.com)

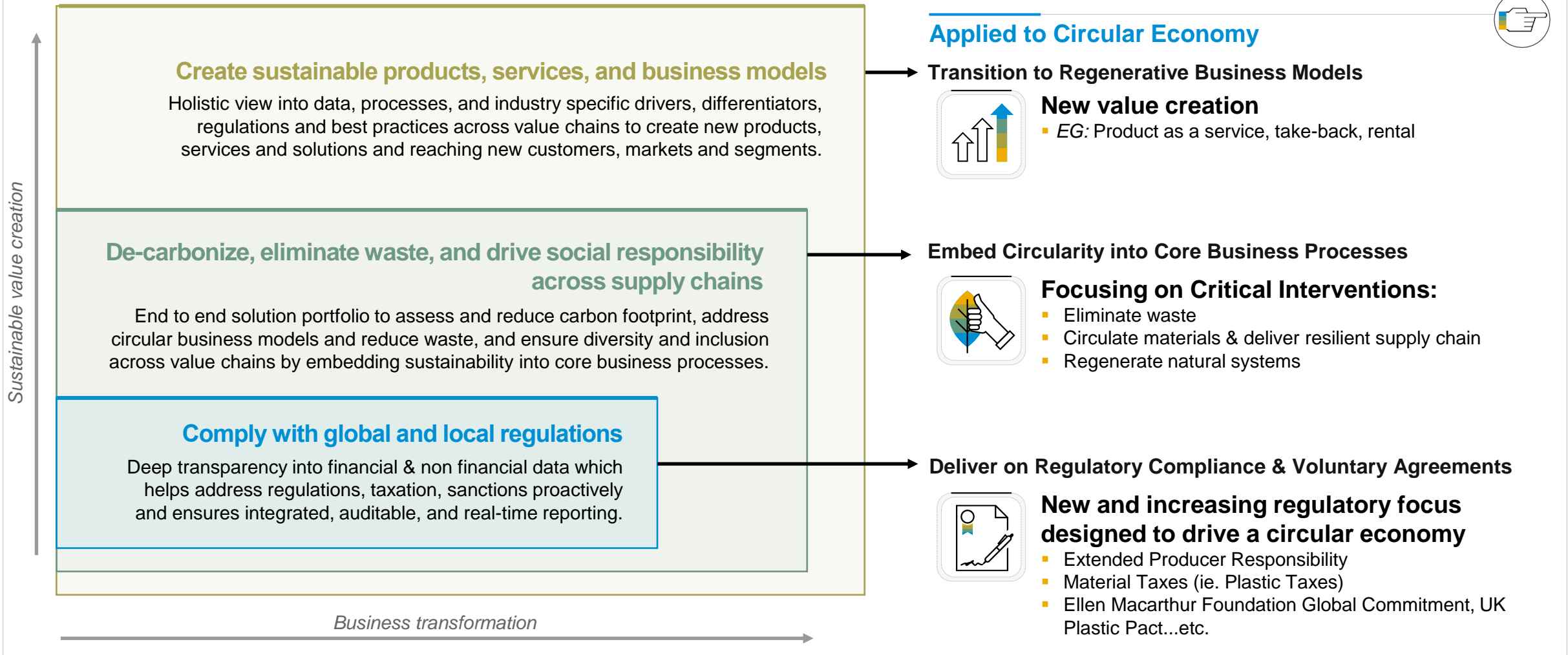




# ADDITIONAL MATERIALS



# SAP as an Enabler: **Creating Sustainable Business Value**





**8.6%**

of Global  
Economy is  
Circular



**50%**

Cut in GHG  
by 2030 to hit  
1.5 degrees



**45%**

CO<sub>2</sub>  
Emissions  
due to  
Products (\*)

(\*) Figures vary from 45% from EMF to 70% from Circle Economy (Circularity Gap Report)

# Circularity Gap Reports

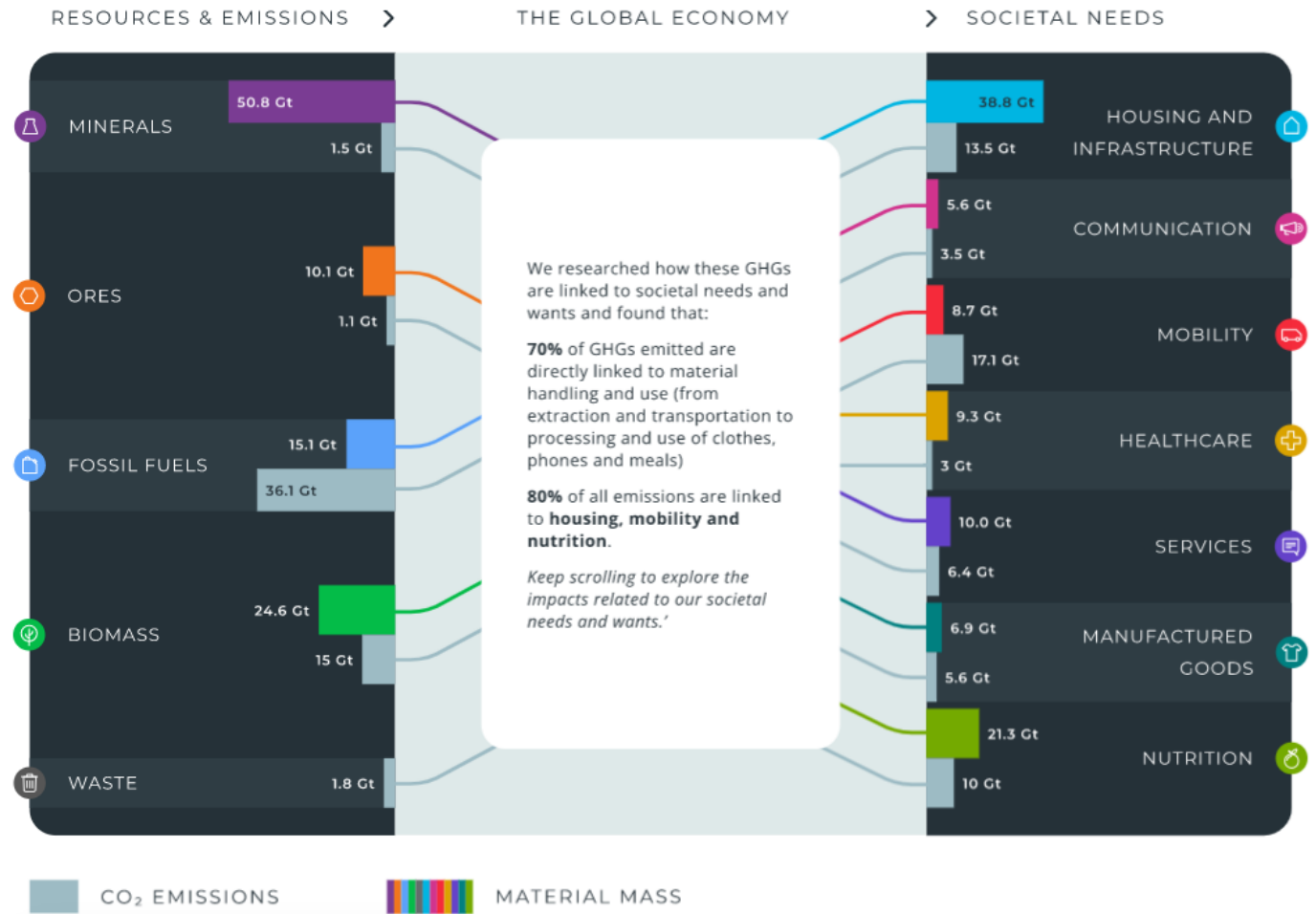
*“70% of all global greenhouse gas emissions are related to material handling and use. So unless we radically transform how we use materials to satisfy our needs, we cannot meaningfully cut emissions.”*

Circle Economy

<https://www.circularity-gap.world/2022#Emissions-x-ray>

Terminology: 1 Gigatonne (Gt) =  $1 \times 10^9$  tonnes (a billion tonnes)

For reports from the last 5 years – see: <https://www.circularity-gap.world/2022>



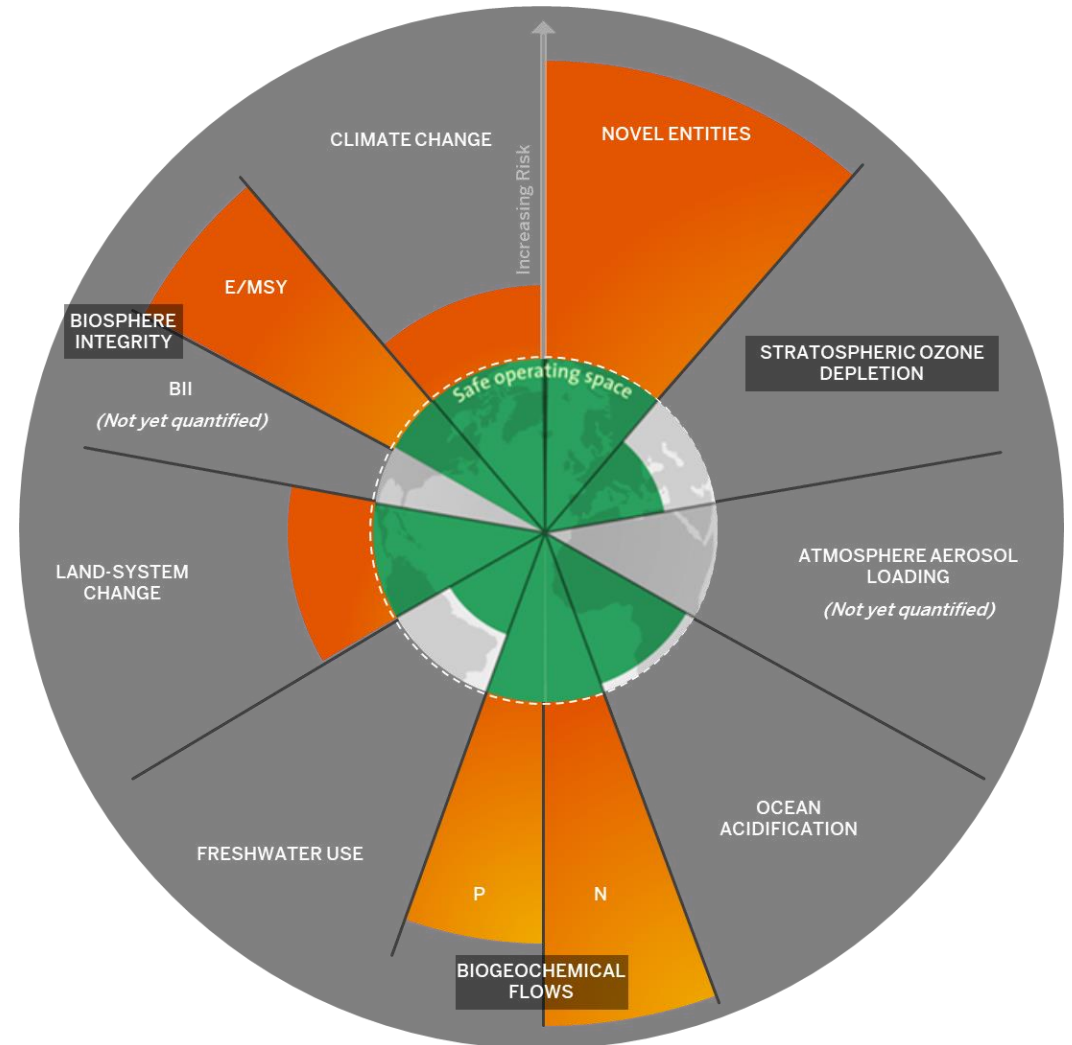
# Chemicals

Patricia Villarubia-Gómez from the Stockholm Resilience Centre (SRC) at Stockholm University:

- “There has been a 50-fold increase in the production of chemicals since 1950. This is projected to triple again by 2050,”
- “The pace that societies are producing and releasing **new chemicals and other novel entities** into the environment is not consistent with staying within a safe operating space for humanity.”

*Environmental Science and Technology:*

<https://pubs.acs.org/doi/pdf/10.1021/acs.est.1c04158>



# Oceans

## WWF:

- “Future trajectories could result in a four-fold increase of oceanic macroplastic concentrations by 2050 and a 50-fold increase of ocean microplastic concentrations by 2100.”
- “...clear-cut cases of harm done to certain marine species, ecosystems and locations, where harm to date is mostly attributed to macroplastics. We should heed the examples given as ominous warning signs of much more common and widespread damage to come unless the future trajectory of plastic pollution is drastically changed..”

[Link](#)

