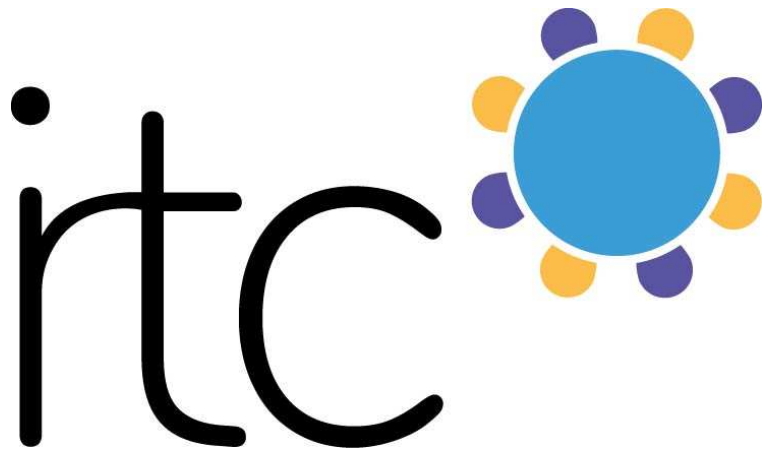


UN-IRP'S VIEW ON THE CIRCULAR ECONOMY



Ester van der Voet
Leiden University / IRP

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation



*The **International Resource Panel – IRP** was launched in 2007 with the idea of creating a science-policy interface on the sustainable use of natural resources and in particular their environmental impacts over the full life cycle*

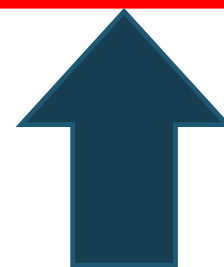
Climate Change

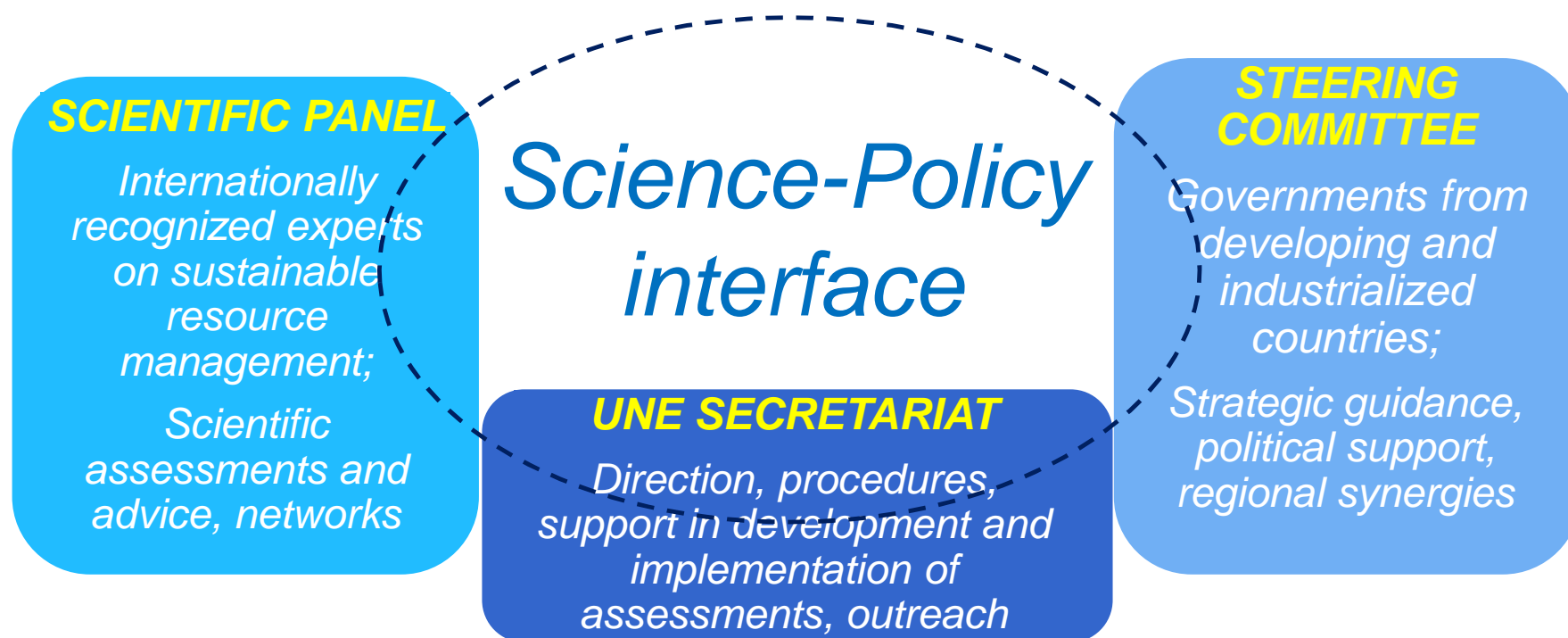


Biodiversity Loss



Resource Efficiency

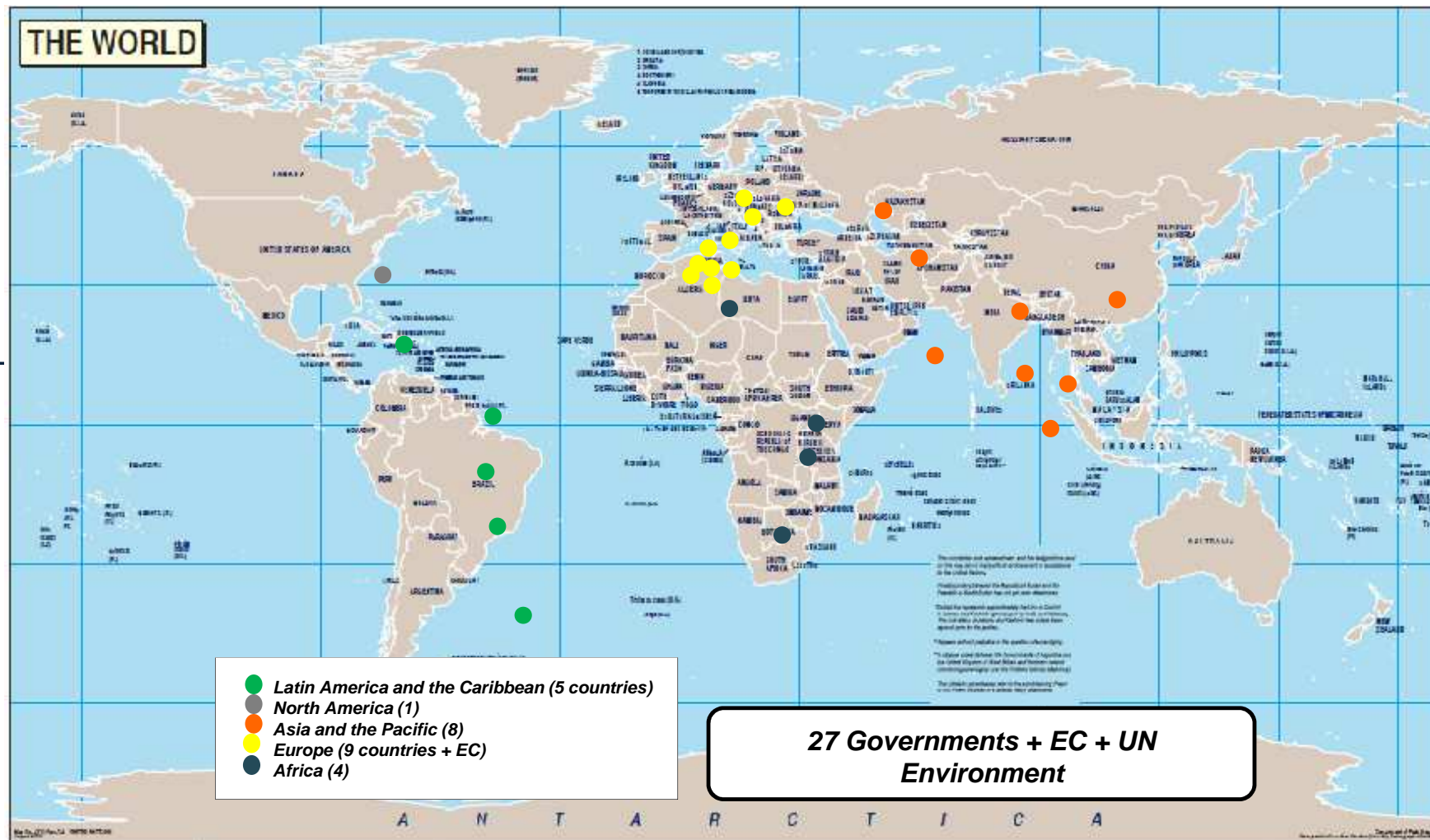


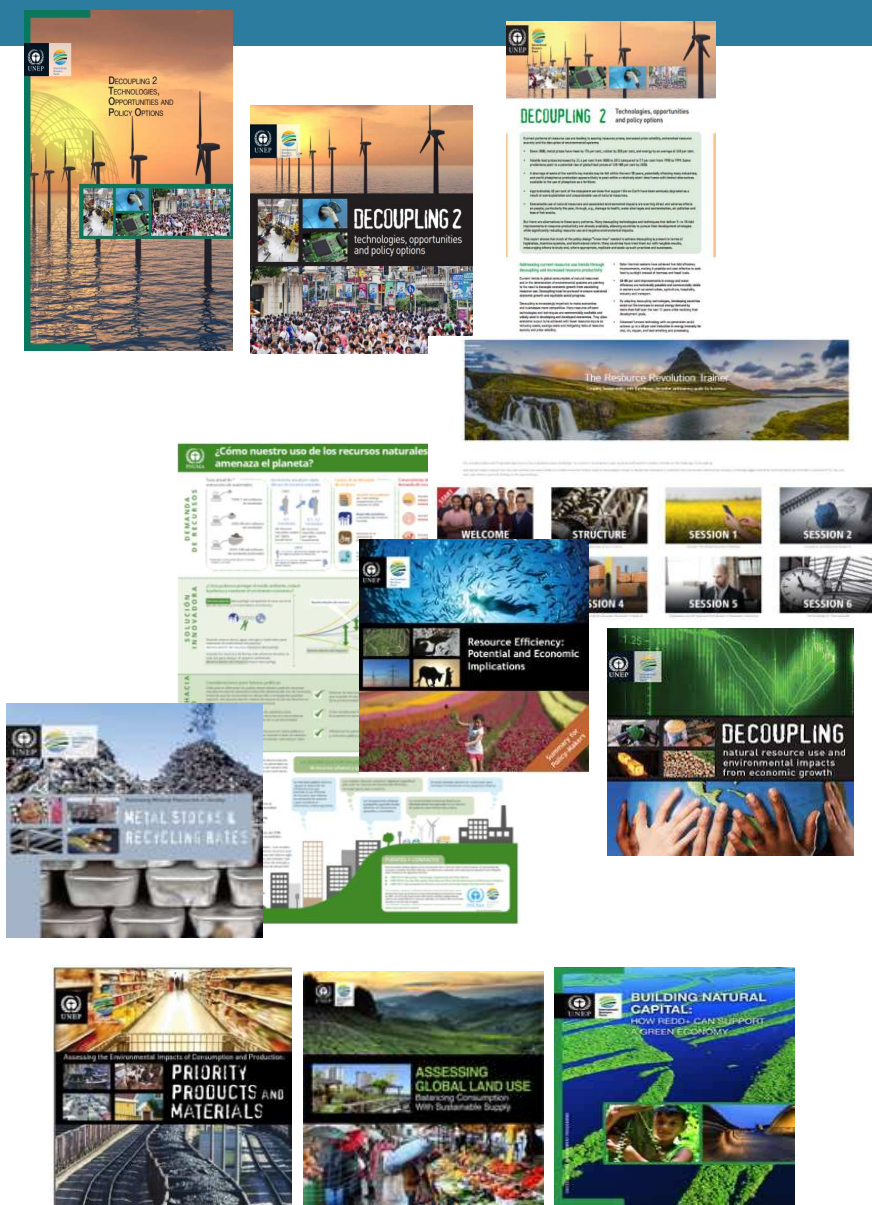


A GLOBAL SCIENCE-POLICY PLATFORM



International
Resource
Panel





*25 reports published
from 2007*



SUSTAINABLE DEVELOPMENT GOALS



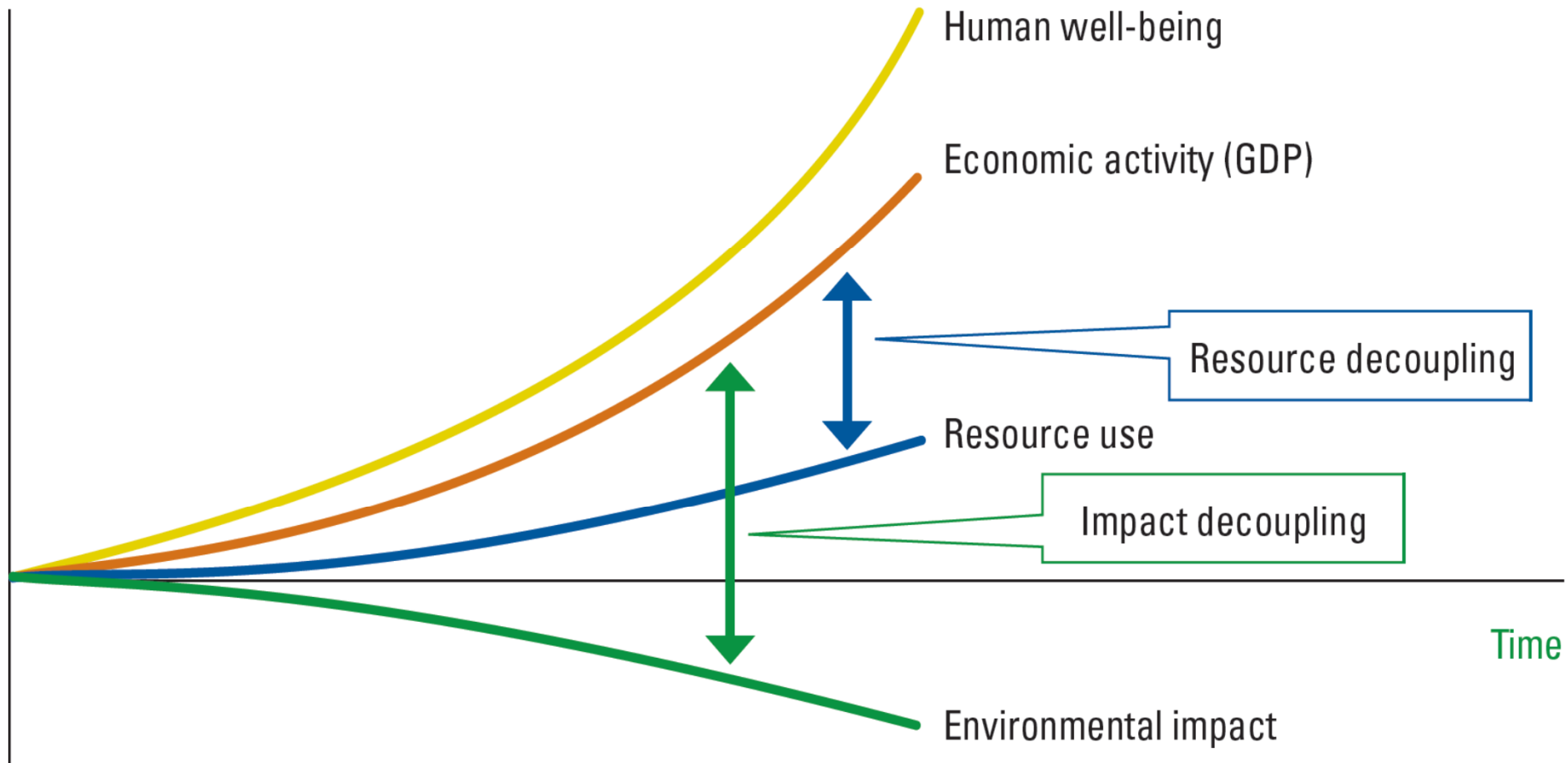
DECOUPLING IS THE IMPERATIVE OF MODERN ENVIRONMENTAL AND ECONOMIC POLICY



International
Resource
Panel

- Resources: the missing link between the economy and the environment
 - Resource use is needed to achieve SDGs related to development (1, 2, 3, 6, 7, 8, 9, 10)
 - Resource use will lead to environmental impacts (13, 14, 15)
- How to reconcile?
- From decoupling to double decoupling

DECOUPLING IS THE IMPERATIVE OF MODERN ENVIRONMENTAL AND ECONOMIC POLICY





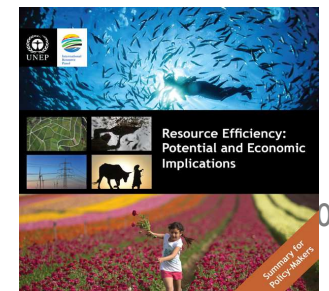
In the mid-term, except in specific cases, resource shortage will not be the core limiting factor of our (economic) development ...

... but the environmental and health consequences caused by this excessive and irresponsible use of resources will be!



DISCONNECT BETWEEN RESOURCE EFFICIENCY AND ECONOMIC EFFICIENCY

*There is a need to rebalance the cost of labour, and the costs of resources and pollution by **pricing externalities**, using **taxation** and **other incentives** for actors to favour paying for labour to save materials, rather than for materials to save labour*



RESOURCE EFFICIENCY REPORT: CONCLUSIONS



- *With concerted action, there is **significant potential for increasing resource efficiency.***
- ***Markets will not achieve** higher rates of resource efficiency **by themselves. Public policy and political will** is needed.*
- *There are **significant barriers** to the increases in resource efficiency required, **but they can be removed.***
- *Improving resource efficiency is indispensable for meeting climate change targets cost effectively.*

The IRP and the circular economy

Circular economy is one way, perhaps the only really effective way, towards achieving ALL sustainable development goals, resource efficiency and double decoupling

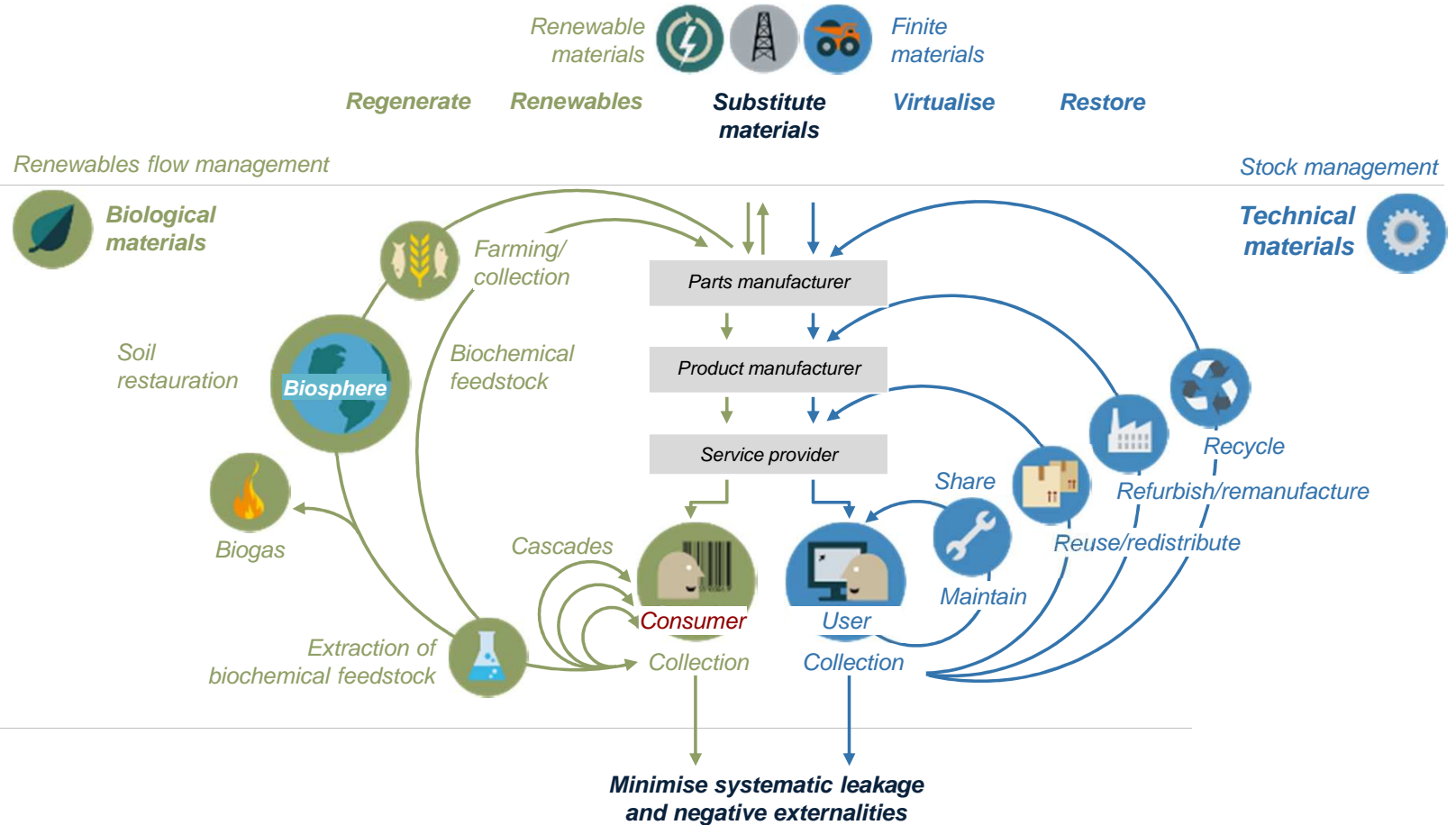
OUTLINE OF A CIRCULAR ECONOMY SYSTEM

Principles

1 **Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows**

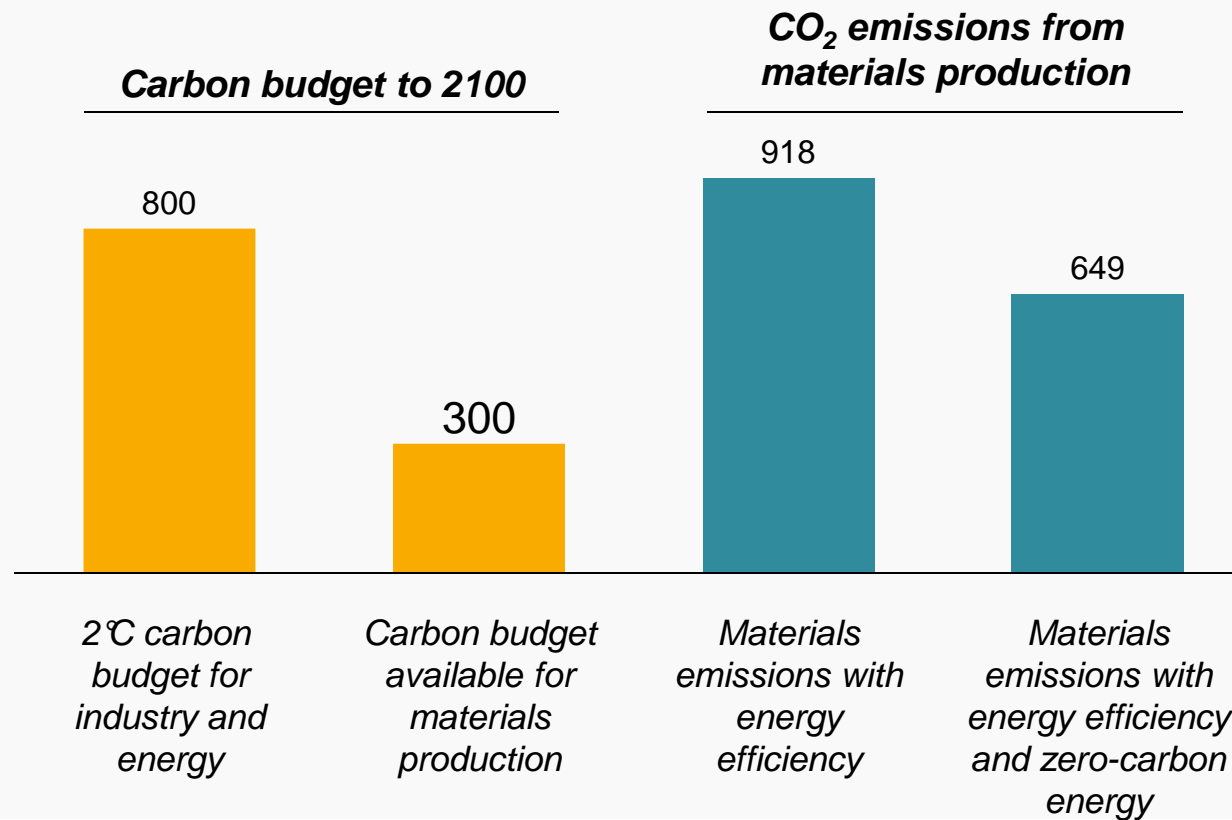
2 **Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles**

3 **Foster system effectiveness by revealing and designing out negative externalities**



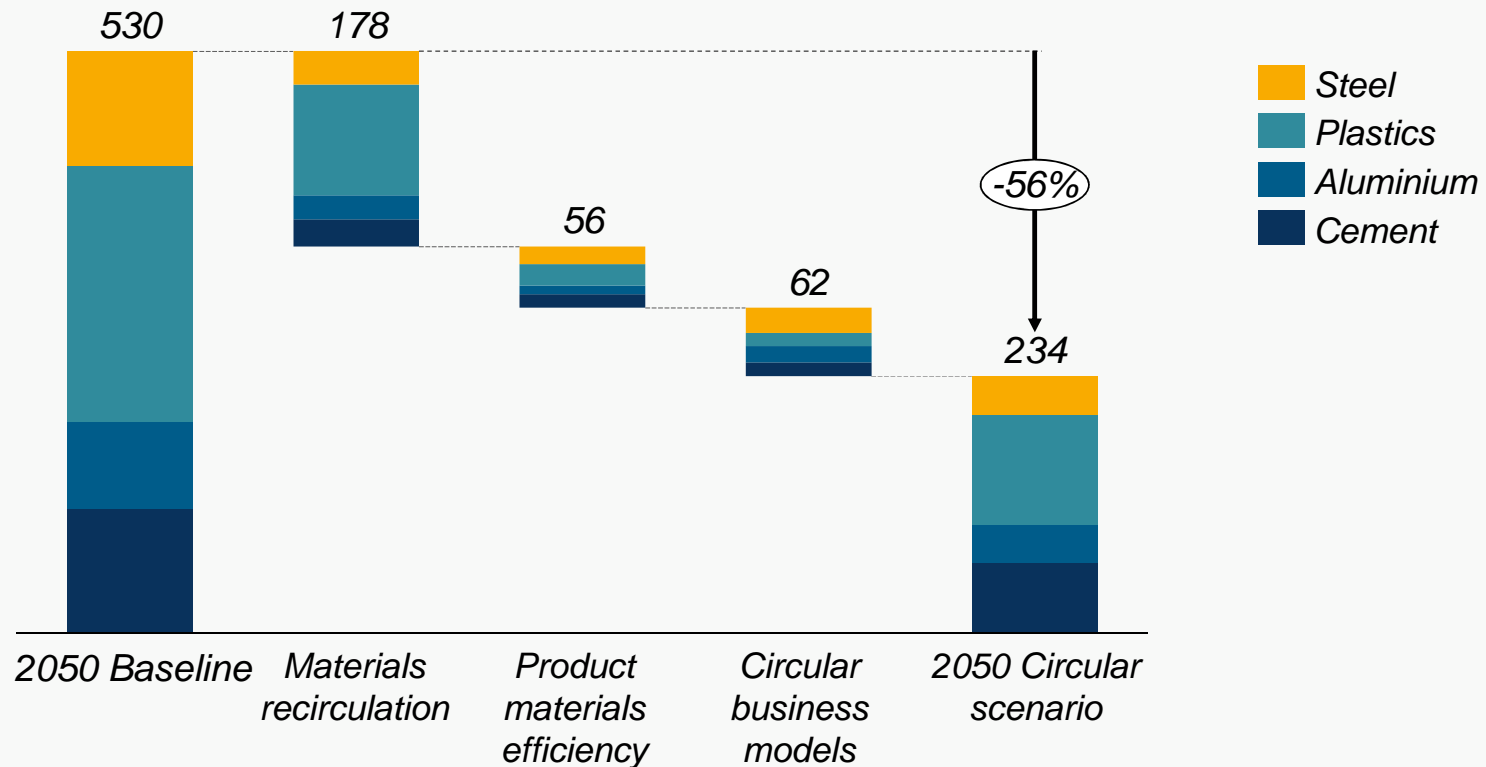
A LOW-CARBON ECONOMY MUST BE CIRCULAR – LOW-CARBON ENERGY WILL NOT BE ENOUGH TO MEET CLIMATE OBJECTIVES

CO₂ emissions and carbon budget
Gt CO₂



A MORE CIRCULAR ECONOMY CAN REDUCE EU EMISSIONS FROM MATERIALS BY 56%

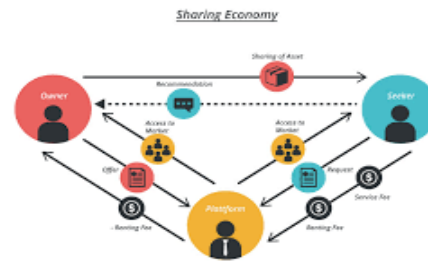
EU emissions reductions potential from a more circular economy, 2050
Mt CO₂ per year



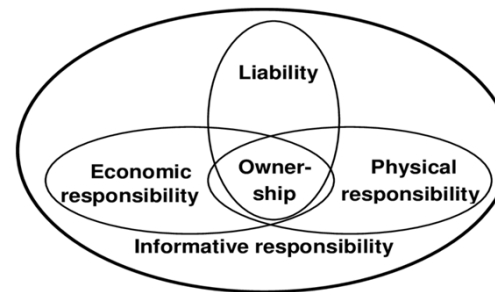
Design of the products (ECO Design)



Business models – From owing to using and sharing



Extended producers Responsibility (EPR)

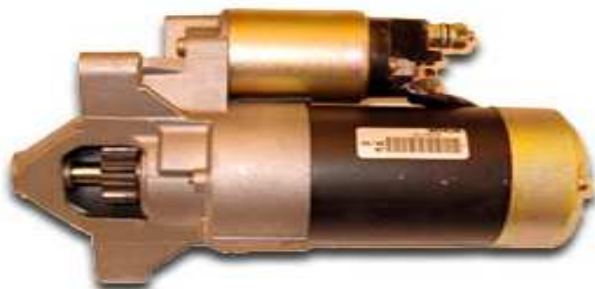


IRP report on **REMANUFACTURING AND THE CIRCULAR ECONOMY**

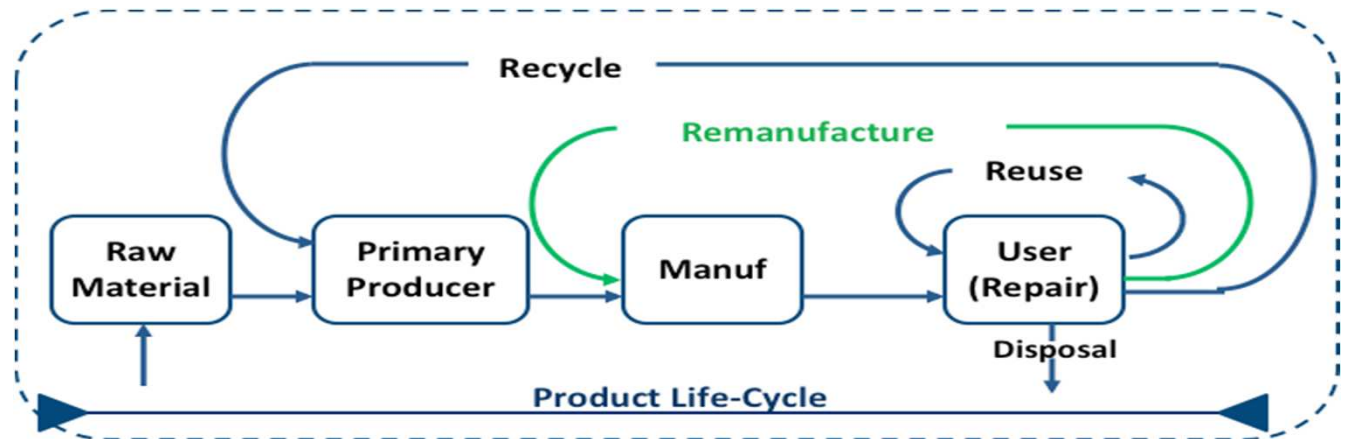
**BEFORE
REMANUFACTURING**



**AFTER
REMANUFACTURING**



Remanufacturing is a comprehensive and **rigorous industrial process** by which a previously sold, worn, or non-functional product or component is returned to a “**like-new**” or “**better-than-new**” condition.



BENEFITS OF REMANUFACTURING

CASE STUDY: CYLINDER HEAD

- *GHG EMISSIONS:* 50% LESS
- *WATER USE:* 90% LESS
- *ENERGY USE:* 80% LESS
- *MATERIAL USE:* 99% LESS
- *LANDFILL SPACE:* 99% LESS



MOBILE PHONE ... OUR POCKET PARTNER

- *Wedding ring: 10 tonnes of gold ore
10 kilos of mobile phones*
- *Less than 10% recycled*
- *In EU more than 100 mil each year in the drawers*

*2.4 tonnes of gold
25 tonnes of silver
1 tonne of palladium
900 tonnes of copper*



IRP on critical materials

Critical materials addressed in Global Metal Flows Working Group

Four reports published

- *stocks in society*
- *present recycling rates*
- *potential and limitations for increasing recycling rates*
- *environmental impacts of metal cycles*

One more report in the pipeline

- *projections of future metal demand*

END OF LIFE RECYCLING INPUT RATE EU28

End-of-life recycling input rate (EOL-RIR) [%]

H																	He			
Li	Be														B*	C	N	O	F*	Ne
Na	Mg														Al	Si	P*	S	Cl	Ar
K*	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr			
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe			
Cs	Ba	La-Lu ¹	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn			
Fr	Ra	Ac-Lr ²	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo			



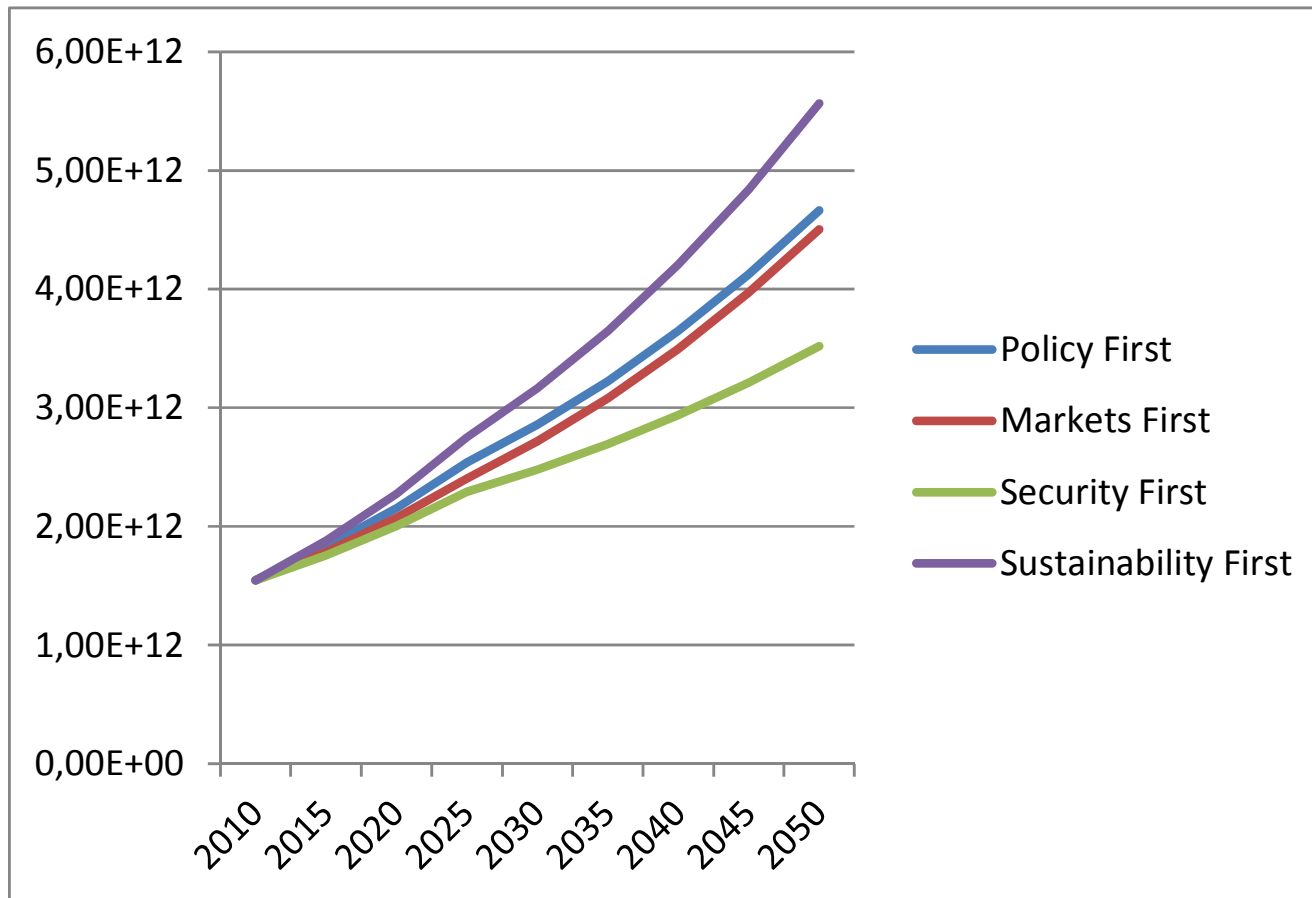
¹ Group of Lanthanide	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
² Group of Actinide	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Aggregates	Bentonite	Coaking Coal	Diatomite	Feldspar	Gypsum	Kaolin Clay	Limestone	Magnesite	Natural Cork	Natural Graphite	Natural Rubber	Natural Teak Wood	Perlite	Sapele wood	Silica Sand	Talc
7%	50%	0%	0%	10%	1%	0%	58%	2%	8%	3%	1%	0%	42%	15%	0%	5%

* F = Fluorspar; P = Phosphate rock; K = Potash, Si = Silicon metal, B=Borates.

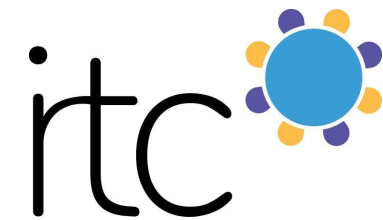
Source: JRC elaboration based on the EC list of Critical Raw Materials (2017)

Projected demand for 7 major metals



IRP on critical materials

- *IRP focuses mostly on major metals*
 - *relevance from environmental perspective*
 - *relevance from development perspective*
- *Critical materials*
 - *recycling rates presently low*
 - *increasing possible but many constraints: technical, economic, environmental*
- *IRP has expressed no specific point of view on CRMs*
 - *general point of view: CE efforts must lead to decoupling*
 - *also valid for CRM*



Thank you for your attention!