



GLOBAL ENVIRONMENTAL CHALLENGES

Elisa Lanzi
OECD Environment Directorate

21 July 2023



OECD Environmental Outlooks

The OECD Environment Directorate has produced a series of Environmental Outlooks

Environmental Outlooks



Thematic Outlooks





What are the environmental impacts that follow projected socio-economic pathways?

- What is the link between economic growth and the environment?
- What environmental challenges are linked to specific sectoral changes?
- Can innovation help reduce environmental impacts?
- What can governments do to limit these environmental impacts?



Outline

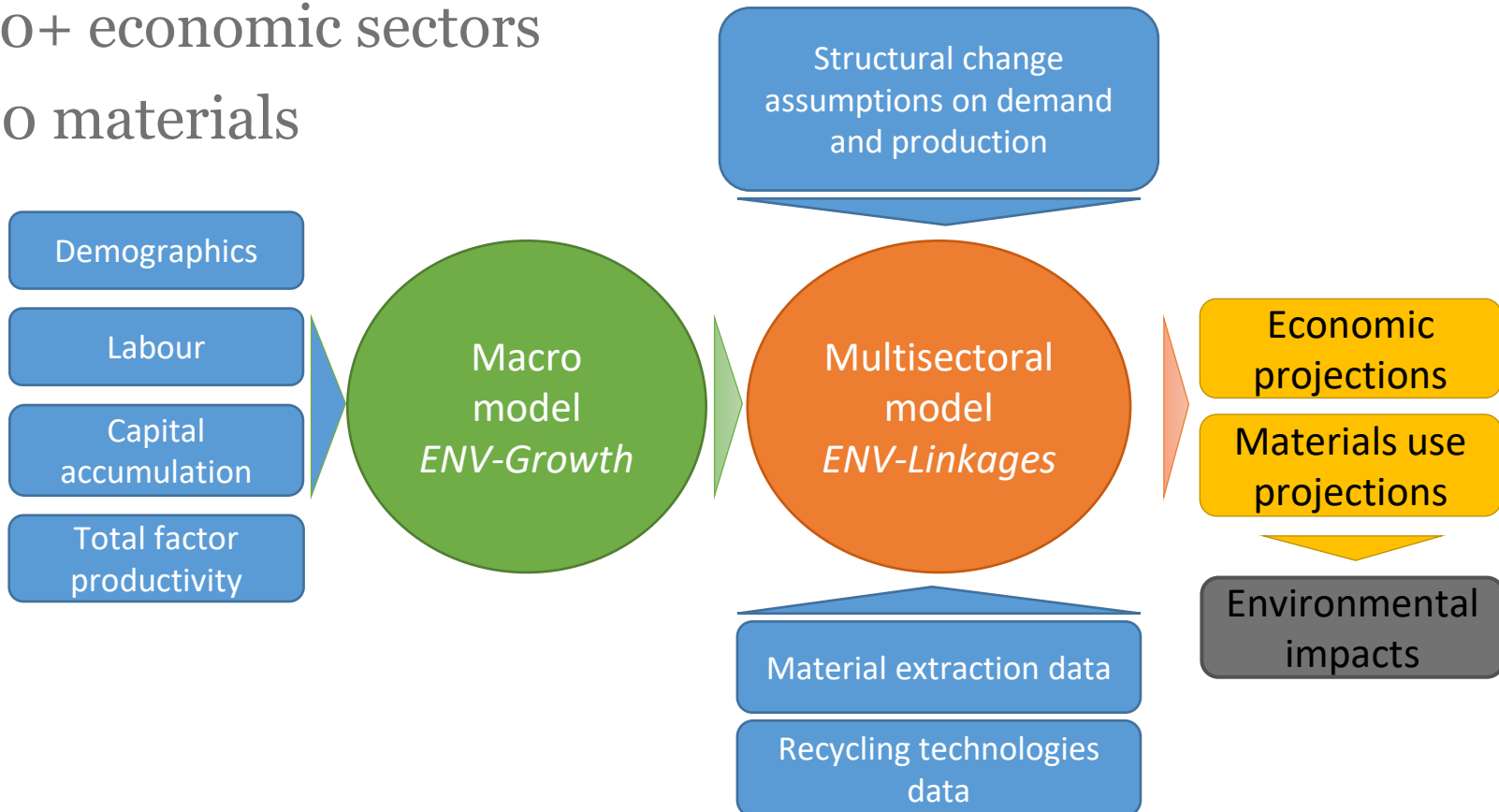
Focus on materials and the circular economy

- The economic drivers of materials use
- Materials use projections to 2060
- Environmental consequences
- Focus on plastics



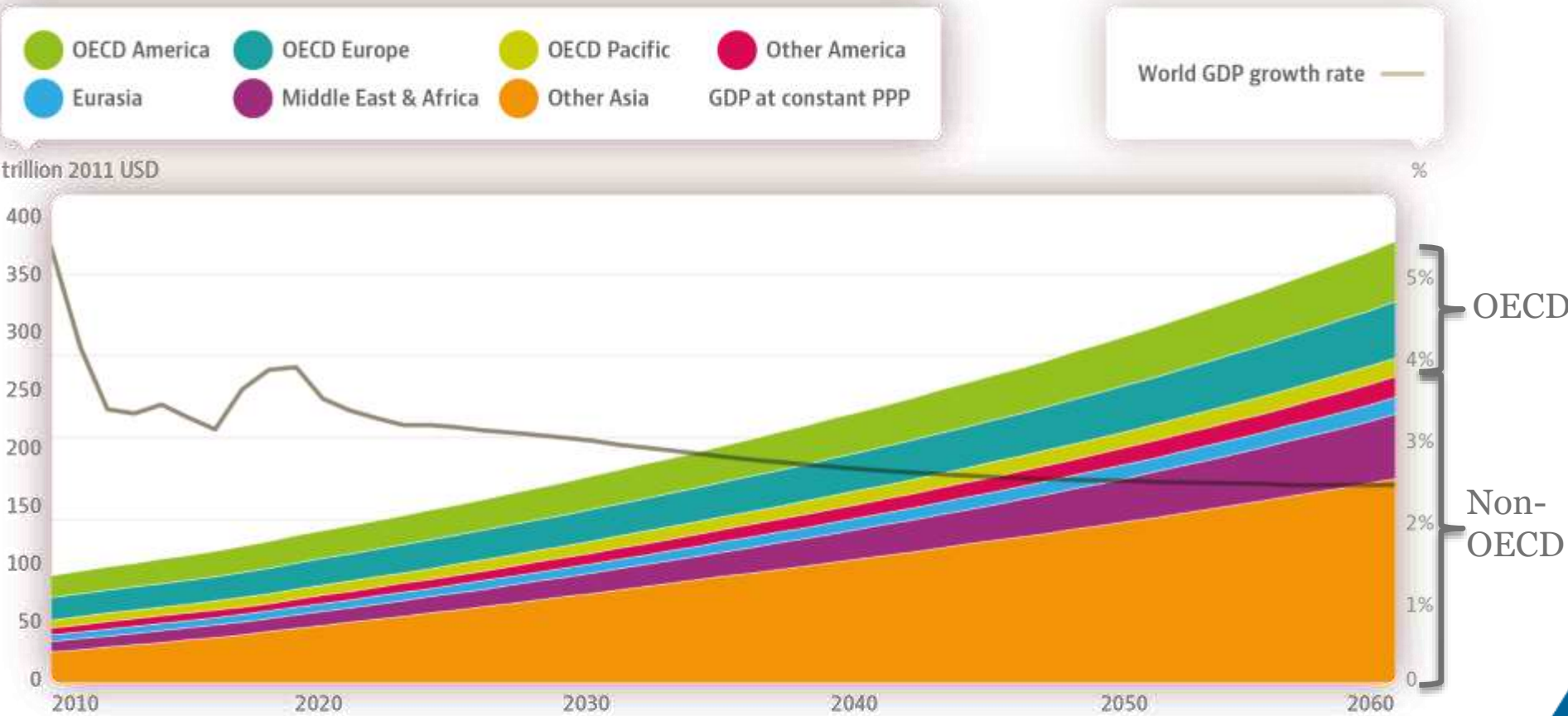
A modelling analysis of material resource use

- Global assessment (disaggregated to 12 large economies + 13 regions)
- 2060 time horizon
- 50+ economic sectors
- 60 materials





Global economy to triple ...

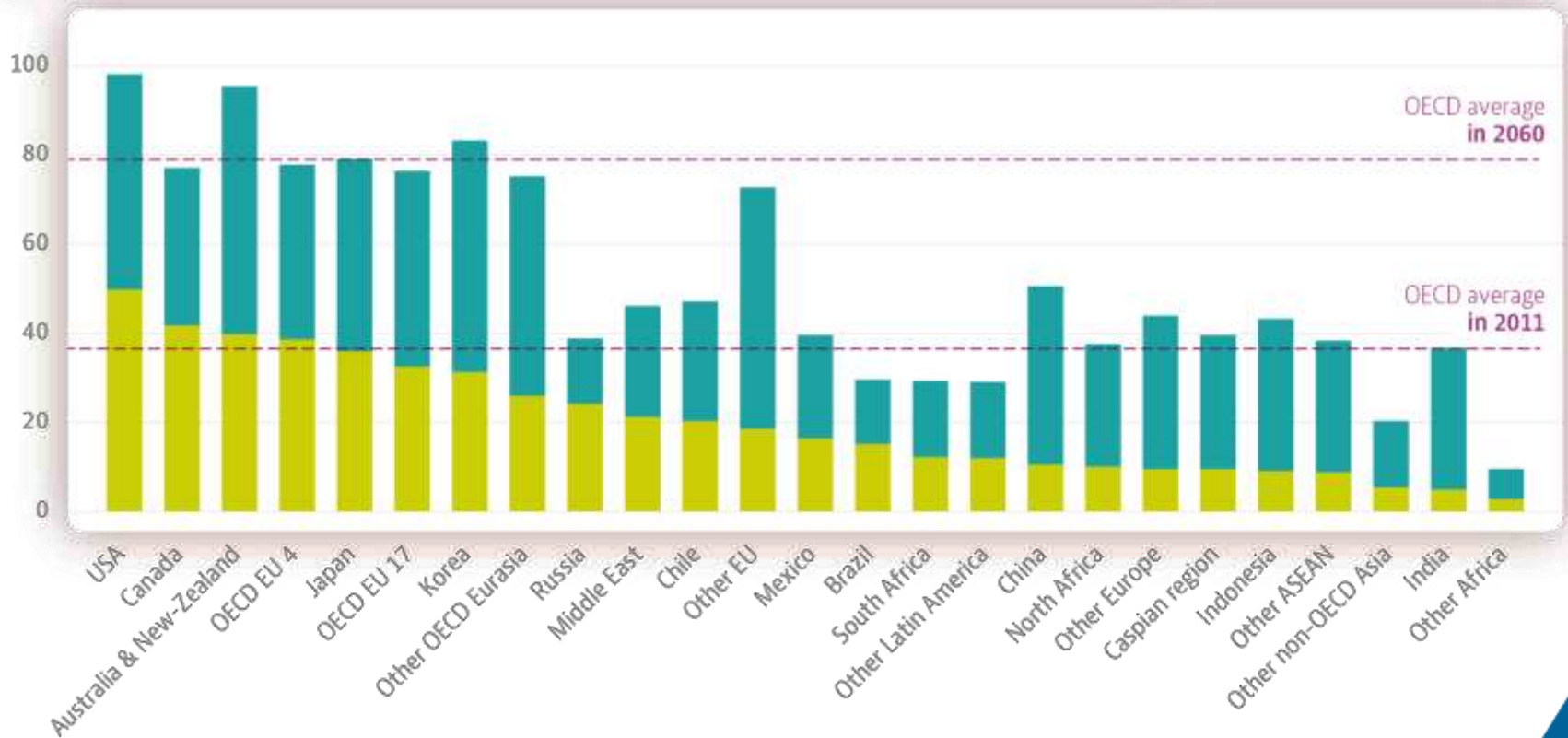


....but global growth slows down



Living standards will converge to current OECD levels

● GDP per capita in 2011 ● GDP per capita in 2060 thousand USD in 2011 PPP

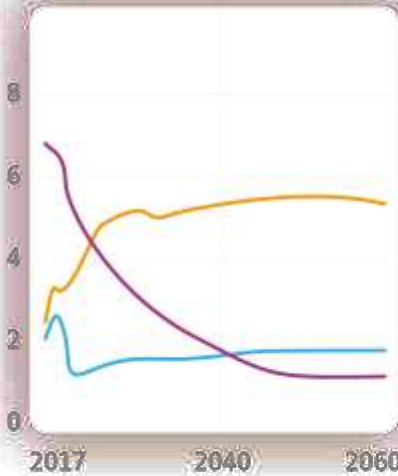




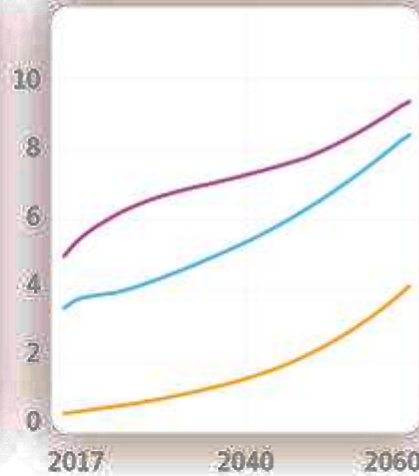
Investment increases over time and construction follows

— United States — China — Sub-Saharan Africa

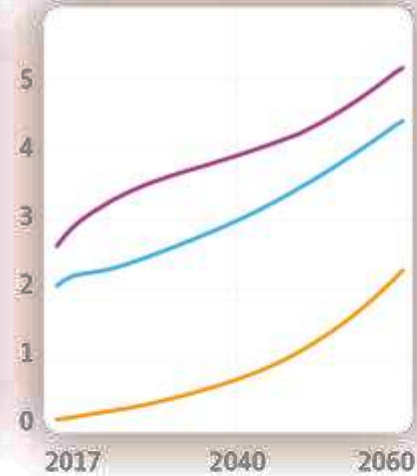
GDP growth rate
in %



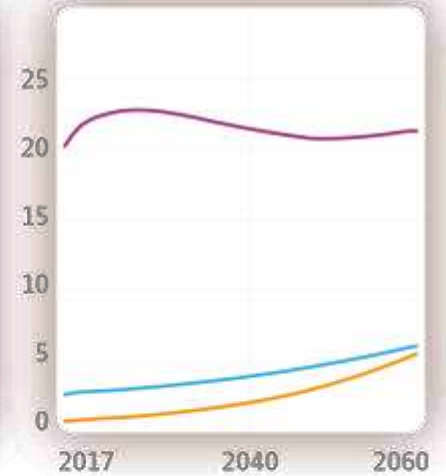
Gross investment
in tn USD



Construction output
in tn USD



Construction materials use
in Gt





Structural change shifts activity away from material intensive sectors

Material intensity in 2060 in tonnes/USD
Material intensity in 2011 in tonnes/USD

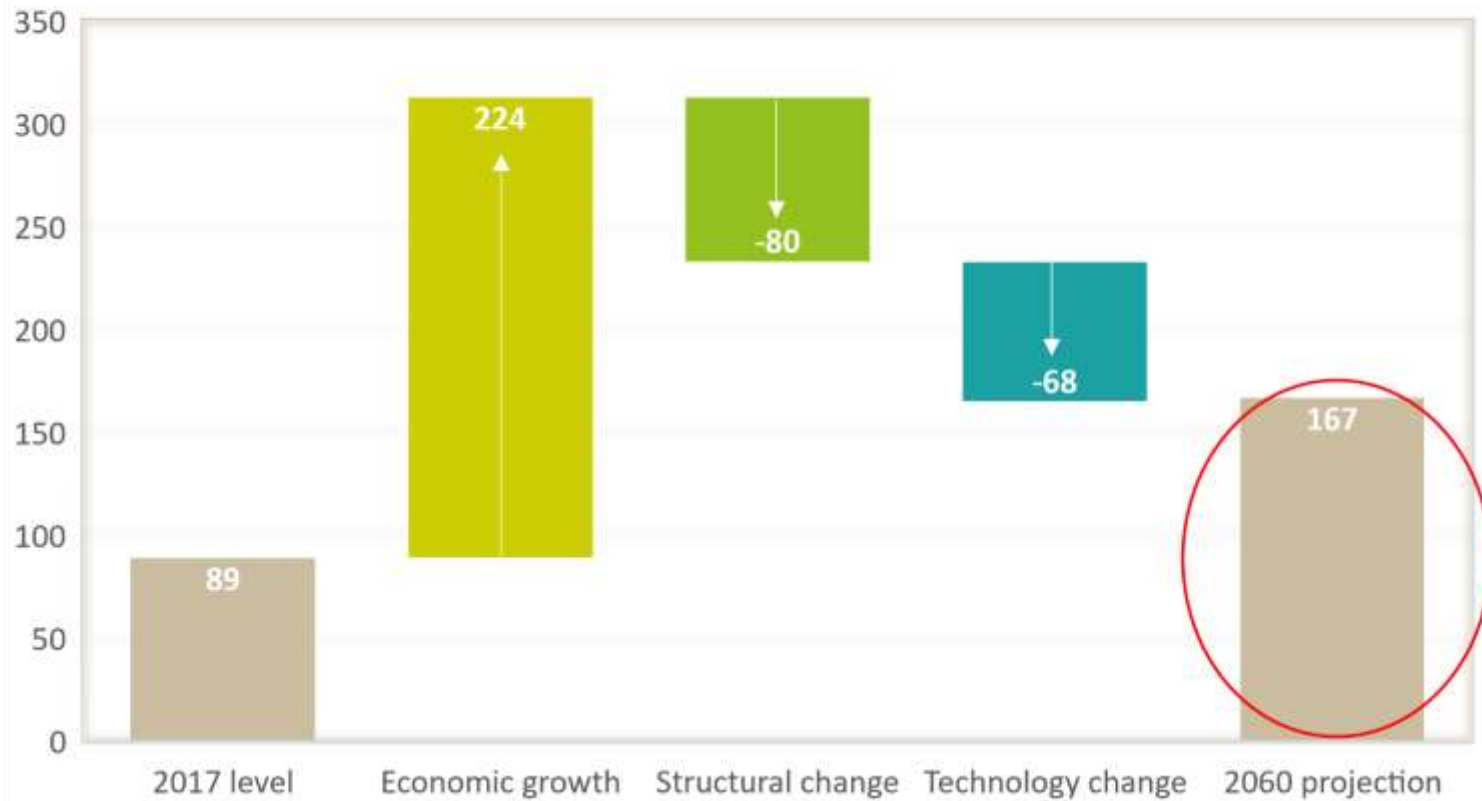
Output growth 2011-2060 in %
Average output growth 2011-2060 in %





Competing forces lead to near doubling of materials use

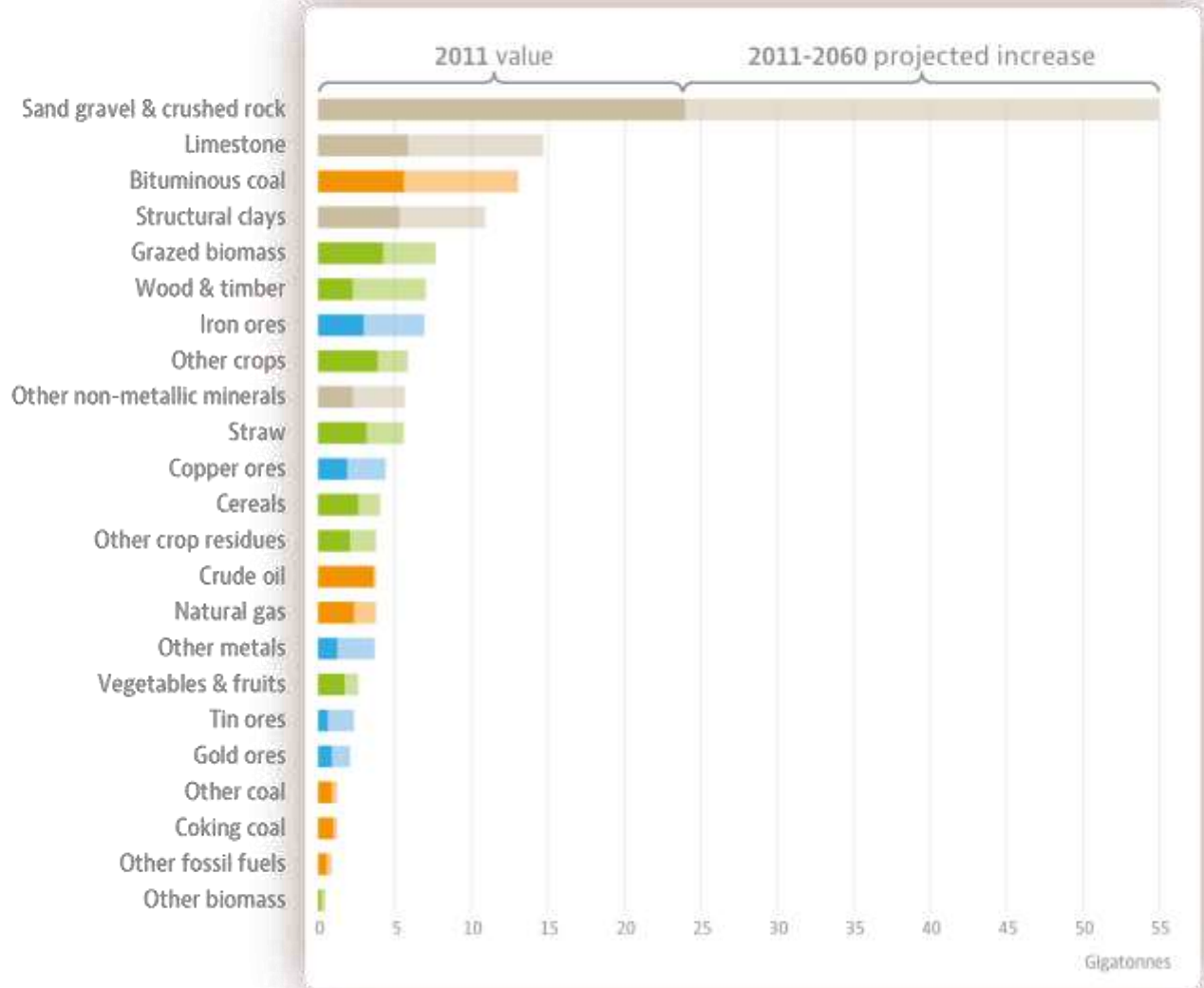
Gigatonnes





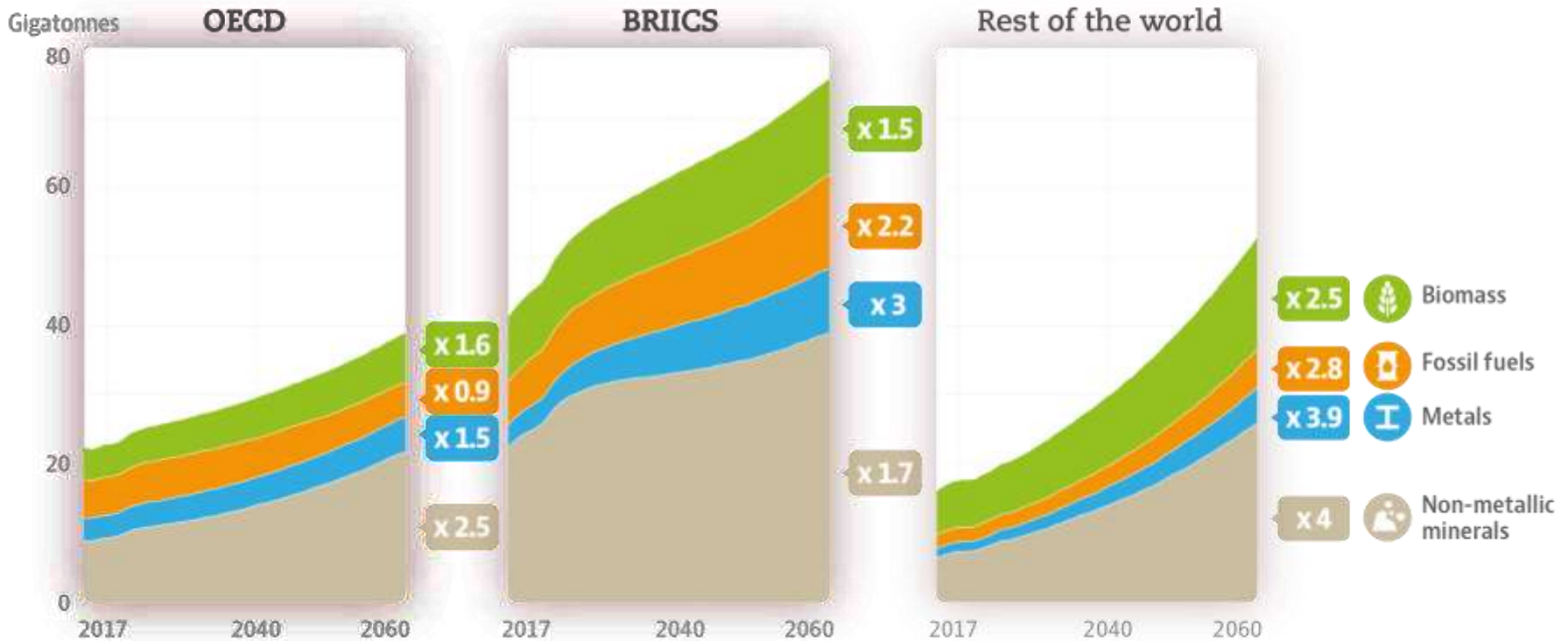
Growth in material use differs widely across materials

- Biomass**
- Fossil fuels**
- Metals**
- Non-metallic minerals**



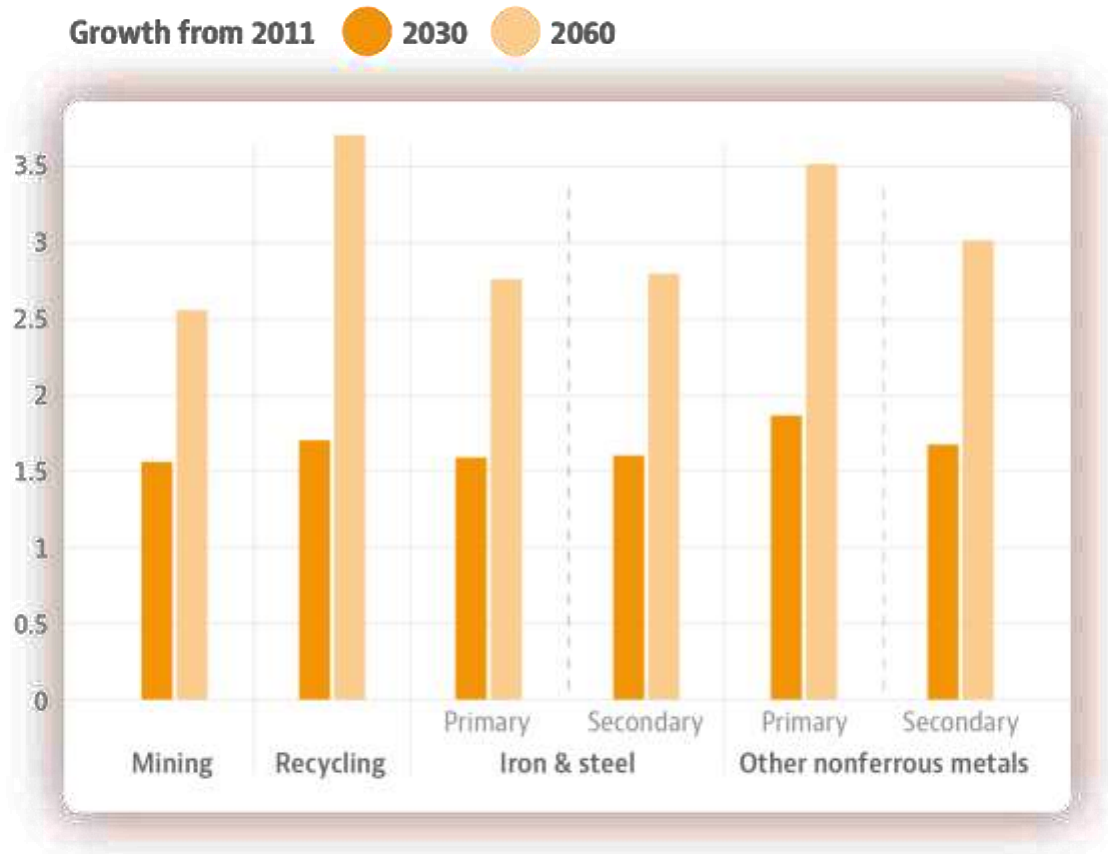


.. And across countries





Recycling grows faster than mining ..

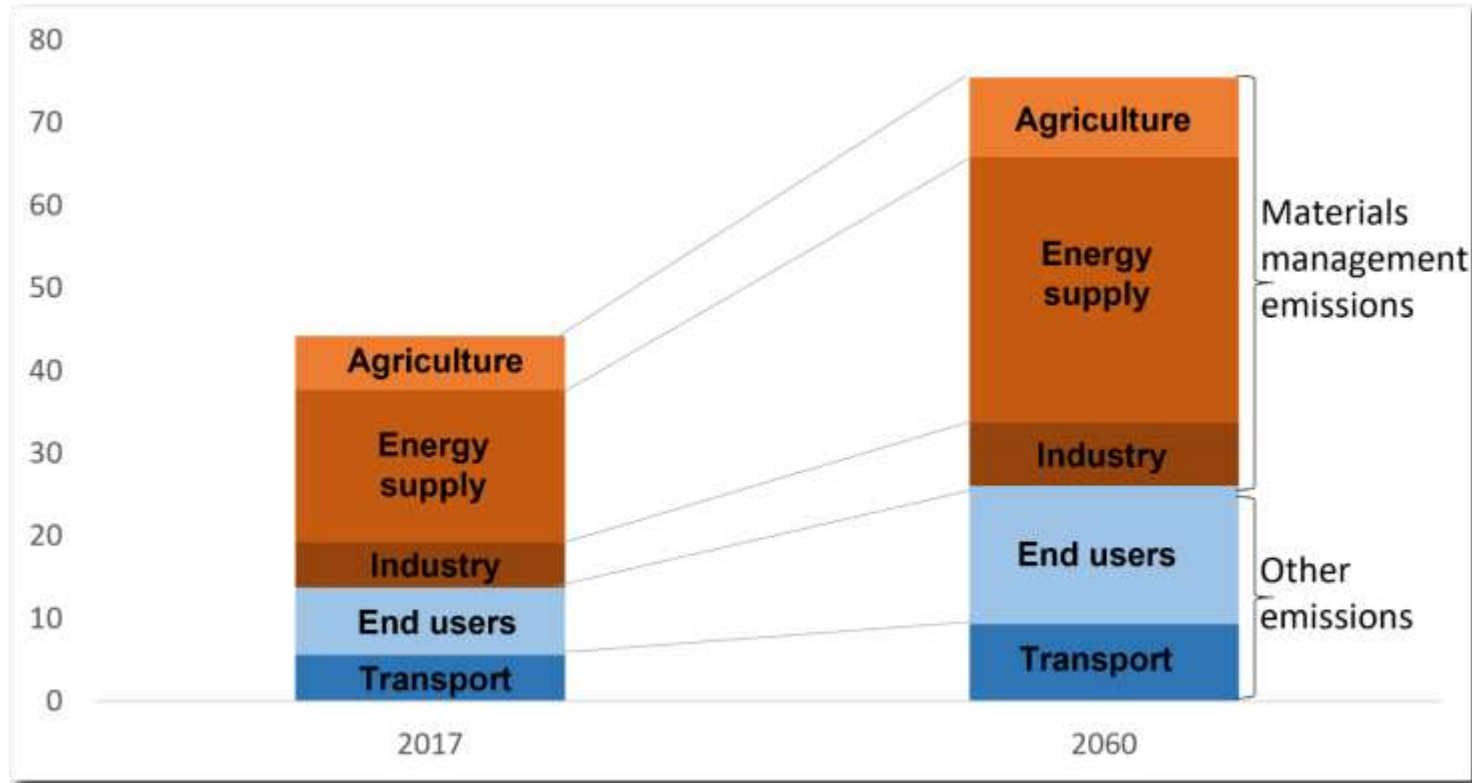


.... but remains a small share of the economy



Greenhouse gas emissions related to materials management will more than double

Global GHG emissions in Gt CO₂ equivalent



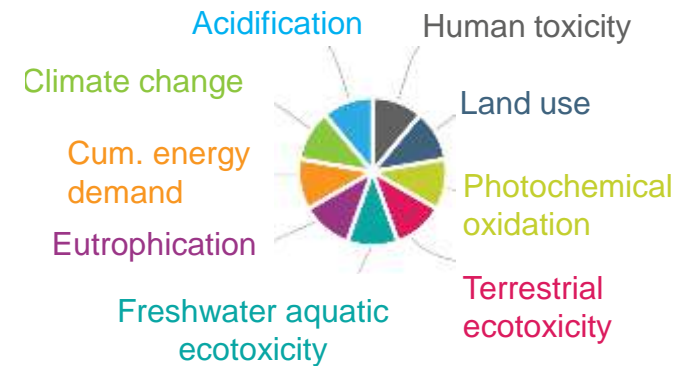
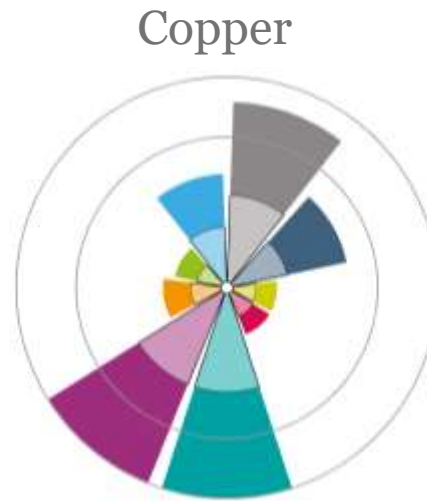
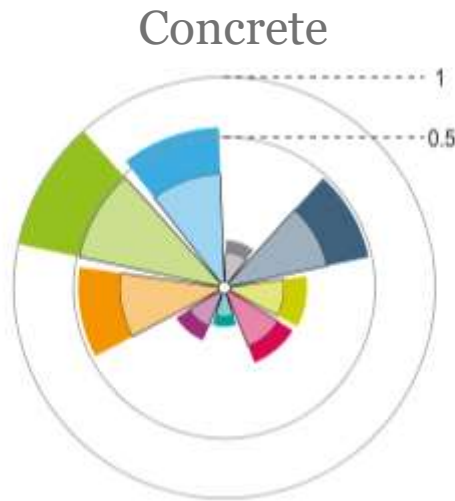
12% of total GHG emissions associated with 7 key metals

12% of total GHG emissions associated with concrete

50Gt CO₂ eq emissions associated with materials cycle



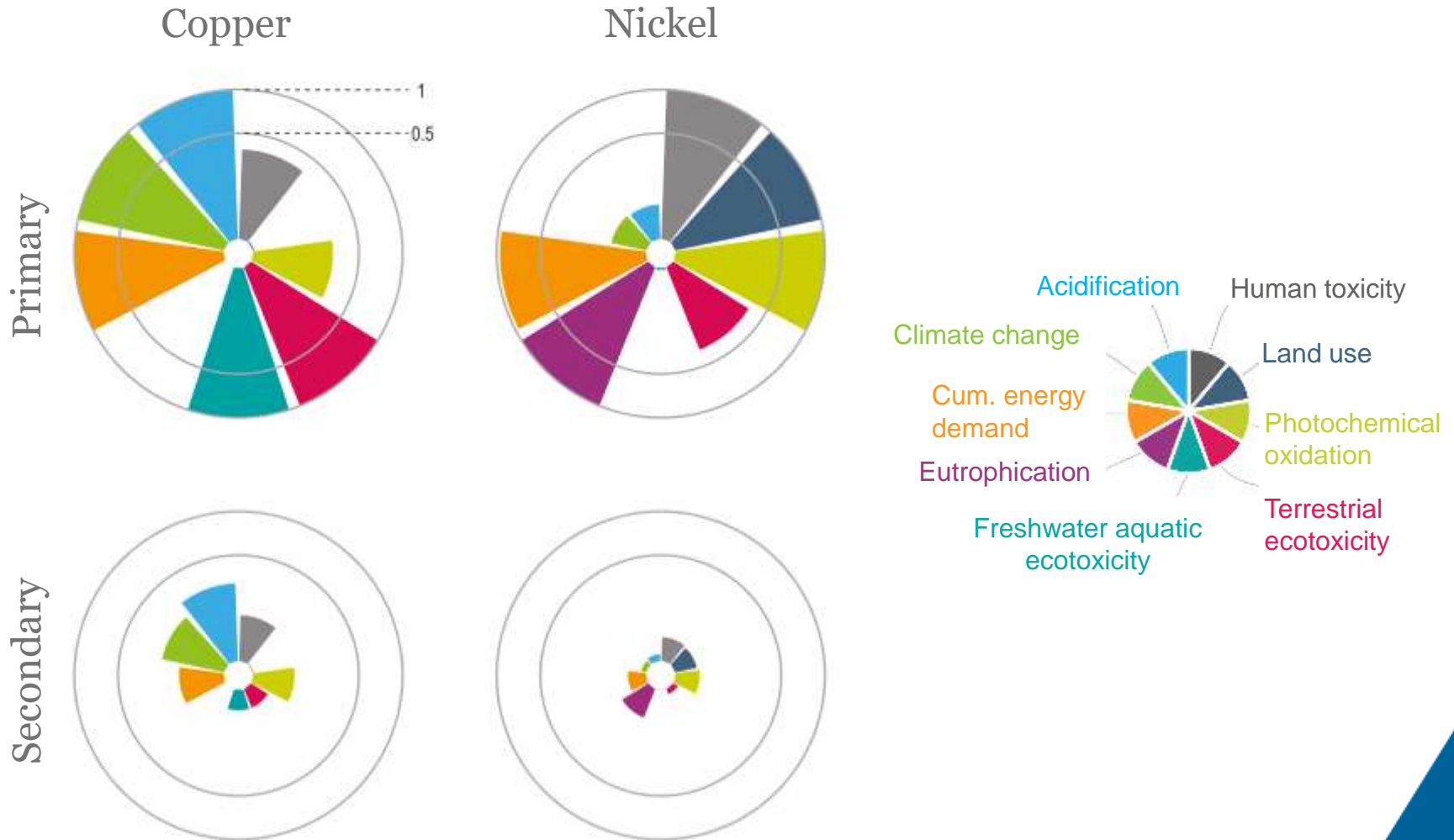
Environmental impacts from extraction and processing will more than double, but vary widely by material



Total environmental impacts (highest impact in 2060 normalised to 1)



Primary materials cause much more environmental damage



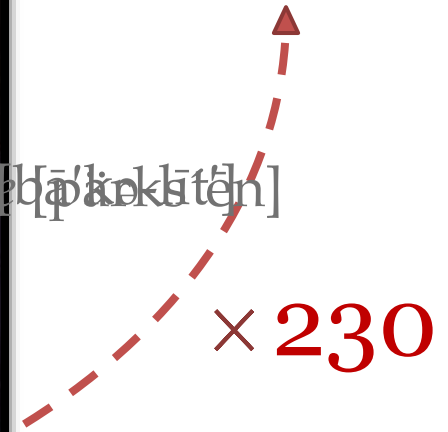
Per kg environmental impacts (highest impact normalised to 1) for 2015



A FOCUS ON PLASTICS

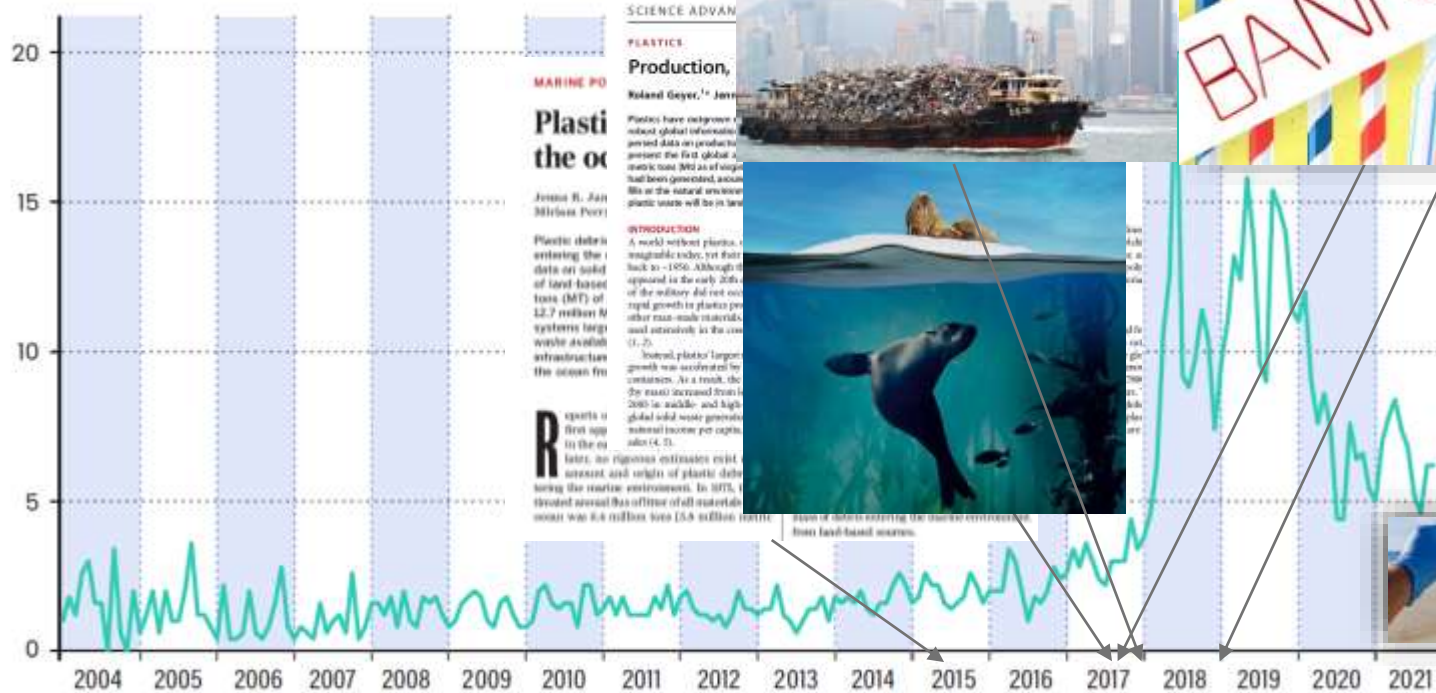


A very brief history of plastics





Growing interest for “Plastic pollution”



SCIENCE ADVANCEMENTS
PLASTICS
Production, 1950-2014
Roland Geyer,¹ Jenna R. Jambeck,² and Martin Poore¹

Plastics have undergone rapid growth in production and use over the past few decades, but little is known about the global amount of plastic waste that has been generated, accumulated in the natural environment, or how plastic waste will be in the future.

INTRODUCTION
A world without plastics, from medical tools, to food packaging, would be unimaginable. Although it appeared in the early 20th century, the military did not see rapid growth in plastics production until the 1950s, when other mass-made materials used extensively in the war (1, 2). Instead, plastics' largest growth was accelerated by consumerism. As a result, the amount of plastic waste generated increased from 1950 to 2005 in parallel with high global solid waste generation and national income per capita (4, 5). Later, no rigorous estimates exist on the amount and weight of plastic debris in the marine environment. In 2015, it is estimated around 8.4 million tons (5.8 million metric tons) of plastic debris entered the marine environment from land-based sources.



Search interest globally relative to the highest point on the chart. Values are normalised to January 2004 values. Source: Google trends



Eliminating plastic pollution

- Increased ambition to end plastic pollution
 - UNEA 5.2: *Resolution 5/14 entitled “End plastic pollution: Towards an international legally binding instrument”*
 - *Intergovernmental Negotiating Committee (INC2 in Paris 29 May – 1 June 2023)*

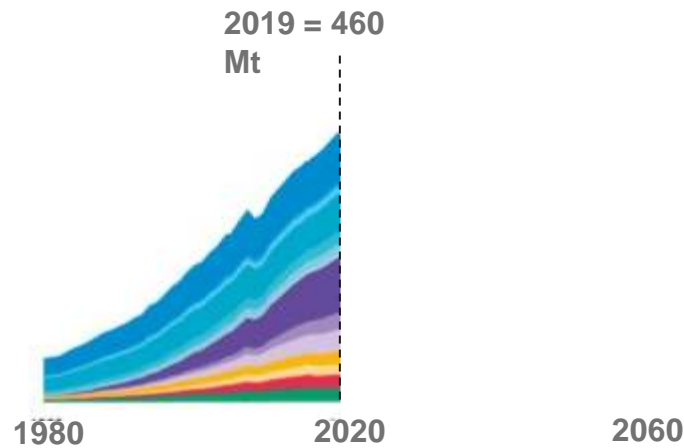
How do we



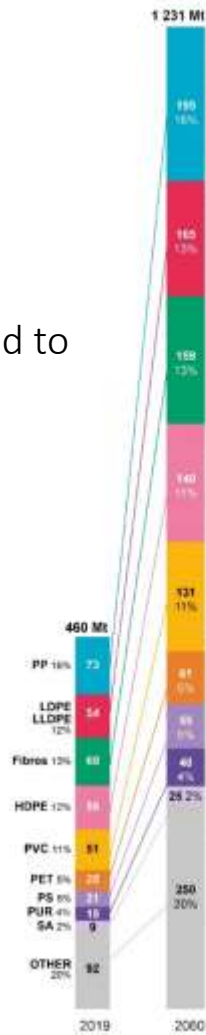


Global plastics use has been growing continuously in the last decades and is on course to almost triple by 2060

2060 = 1231 Mt

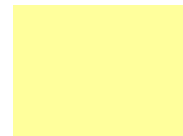
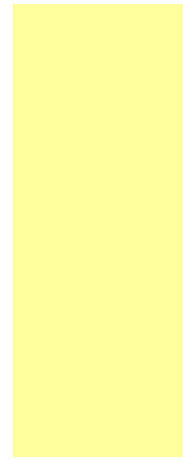


All polymers are projected to increase



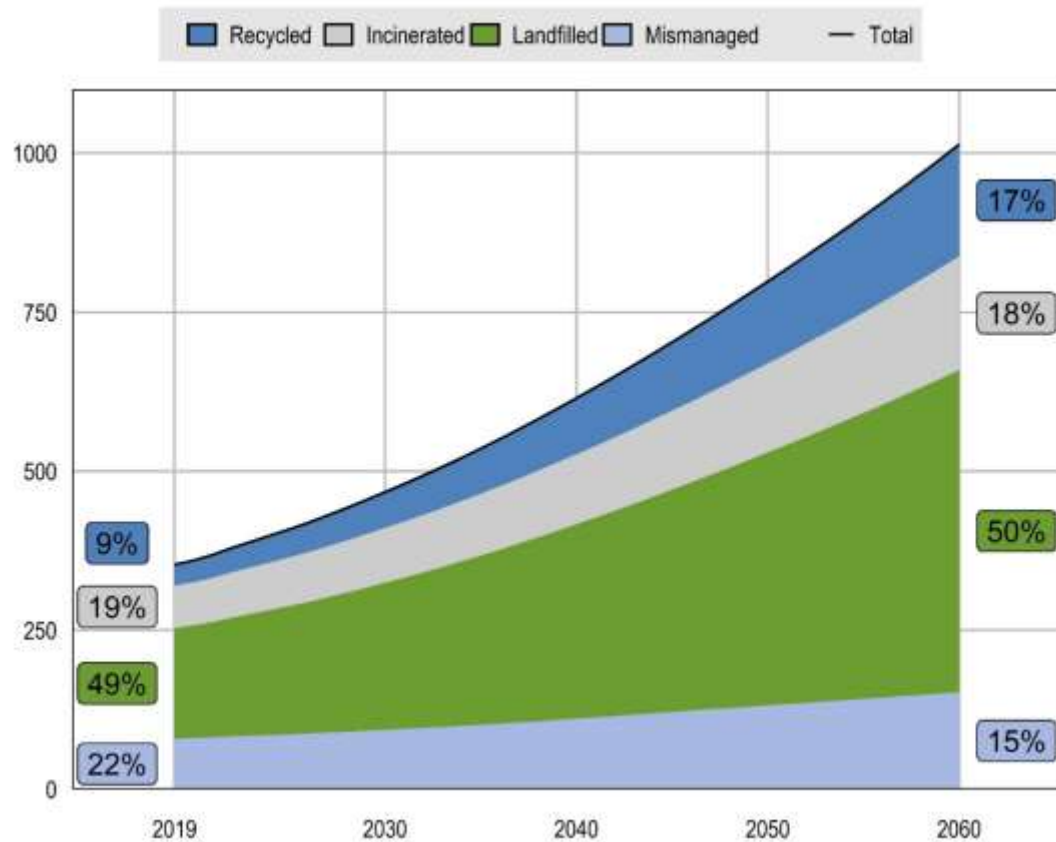
Source: OECD (2022), Global Plastics Outlook: Policy Scenarios to 2060

Packaging, construction and vehicles will be 2/3 of all use





Plastic waste will also triple, mismanaged waste will keep increasing

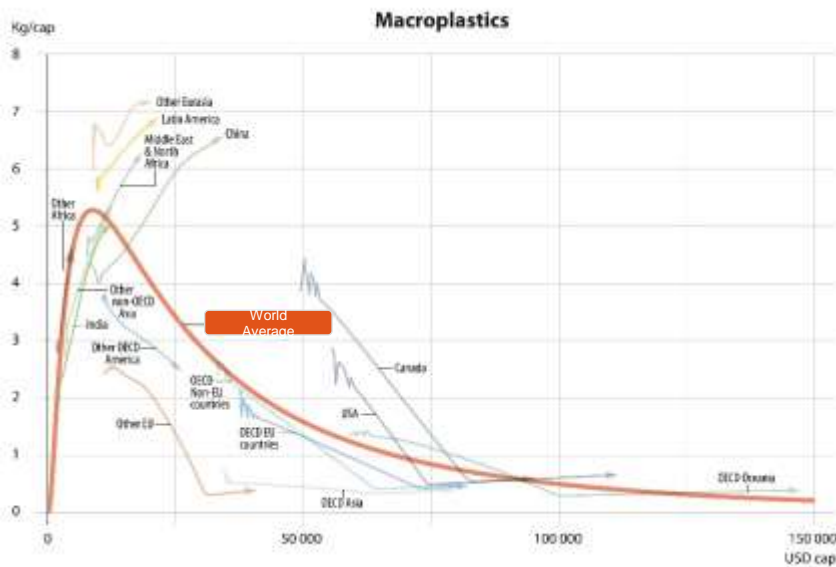




Macroplastic and microplastic leakage show different trajectories with rising incomes

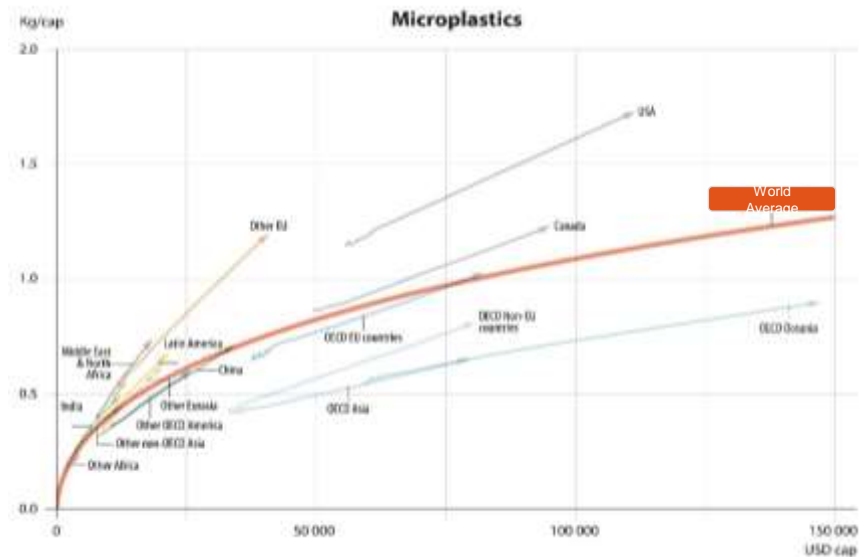
Macroplastics leakage “Kuznets curve”:

from 19.4 Mt in 2019 to **38 Mt** in 2060



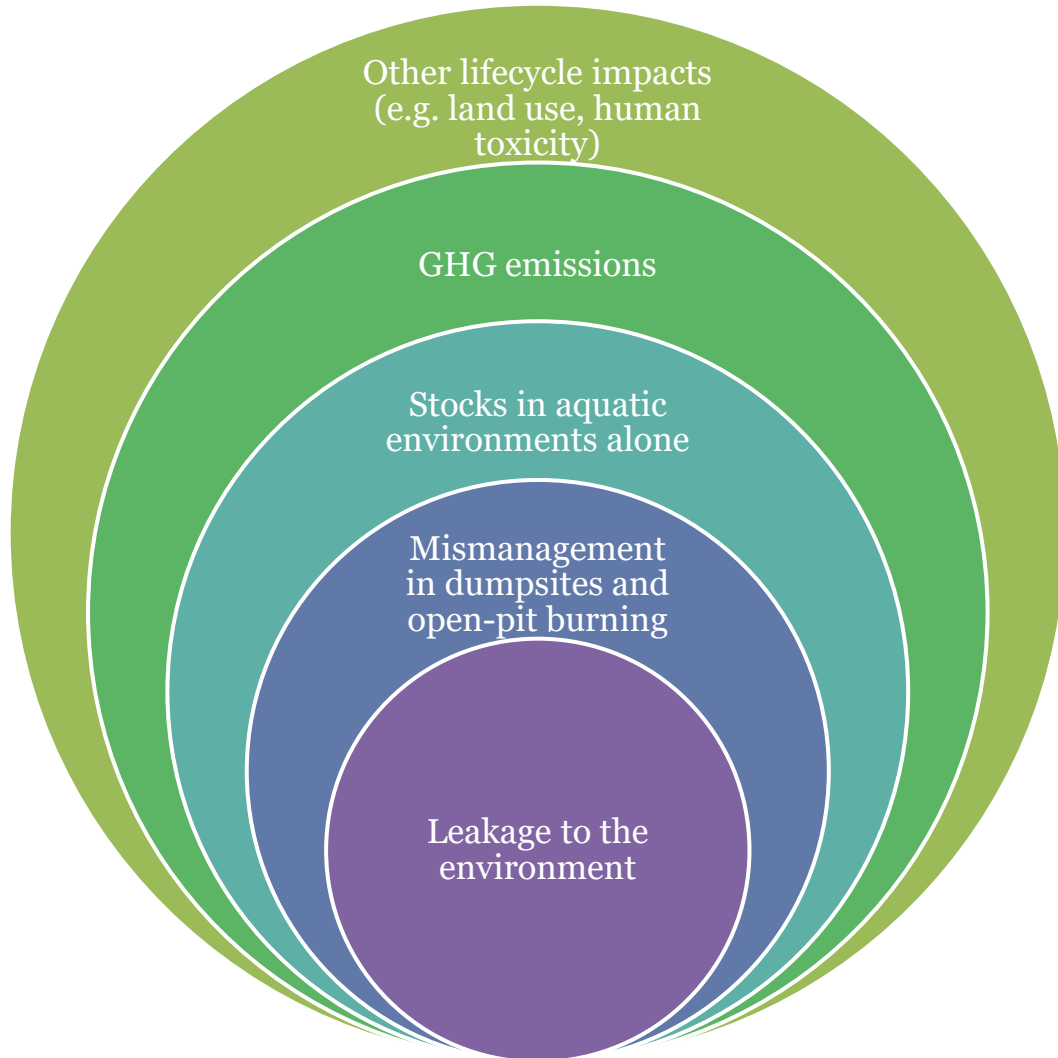
Microplastics leakage:

Doubling from 2019, to reach **6 Mt** in 2060





How far would we be in 2060 from zero plastic pollution?



Doubling from 2019 levels

4.3 Gt /year

493 Mt by 2060

115 Mt /year

44 Mt /year



What policy packages can bend the plastics curve?



The vision behind two policy packages

Regional Action

Present situation

Current circumstances and
policy landscape



How to achieve better
environmental outcomes?



Gradually increasing
stringency of measures

Global Ambition

Co-ordinated policy action



How do we get there?

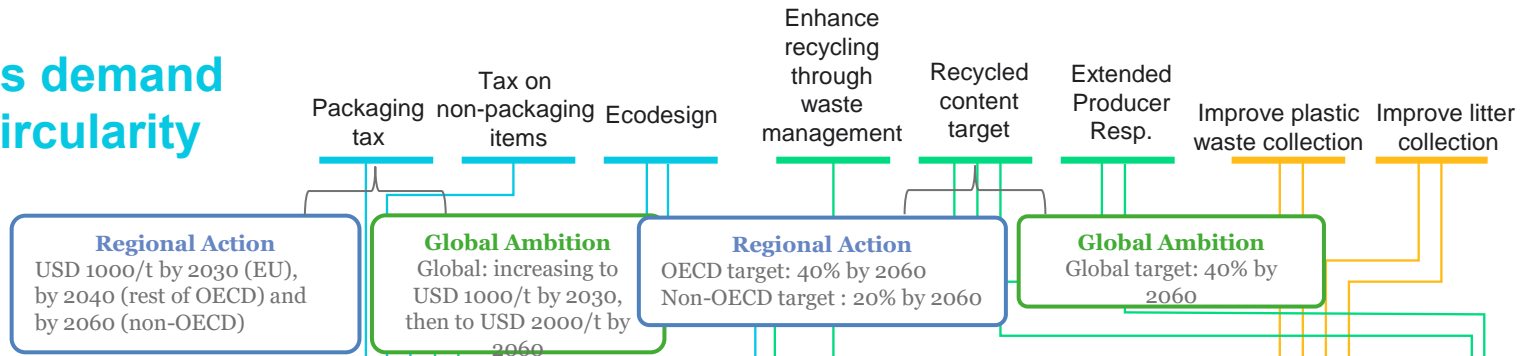


Global Goal:
Eliminate leakage



Both policy packages target the entire plastics lifecycle

Restrain plastics demand and enhance circularity



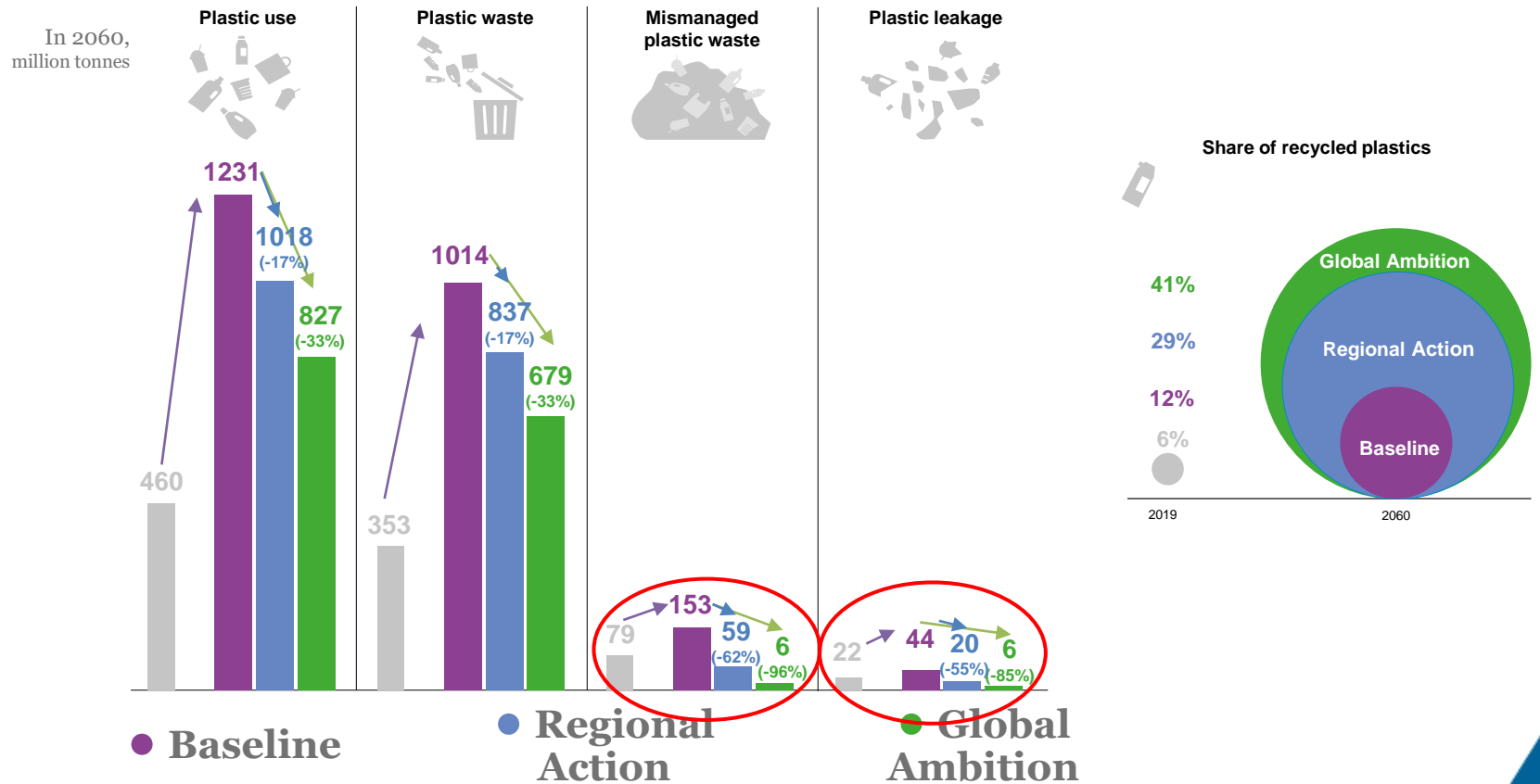
Enhance recycling

Close leakage pathways



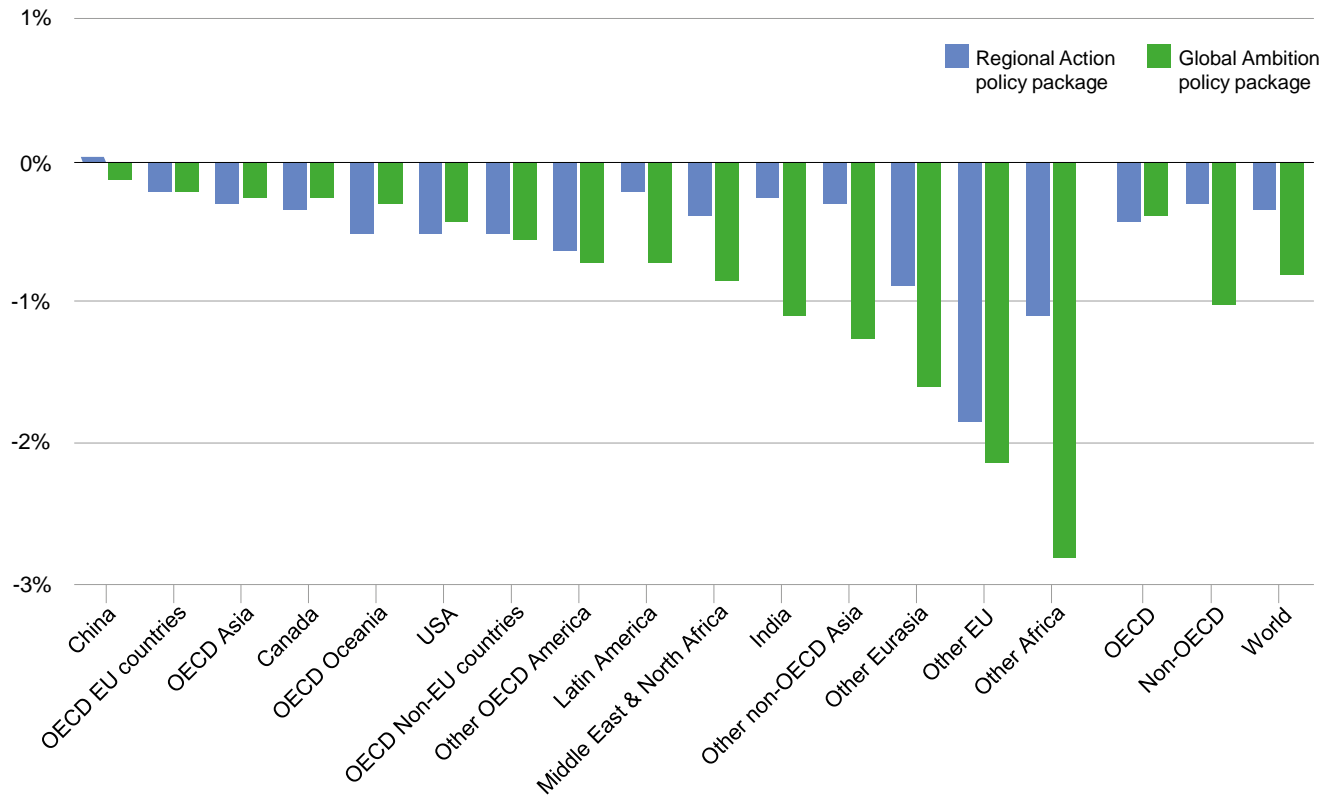


Combining policies that target different lifecycle stages can drastically reduce plastics leakage





Annual costs are less than 1% of global GDP in 2060, but with significant regional differences

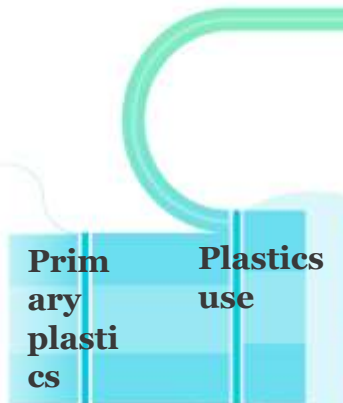




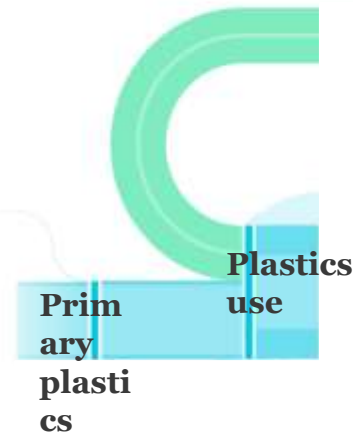
Baseline

**Global
Ambition**

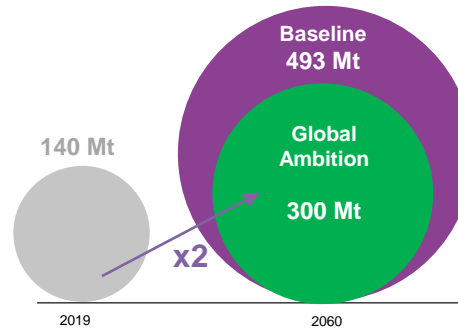
Recycled plastics



Recycled plastics



Stocks in rivers and oceans





Conclusions

- Despite structural and technological change, global materials (including plastics) use will increase
- This exacerbates a wide range of environmental impacts
- While recycling becomes more competitive over time it is not sufficient to shift the balance between primary and secondary materials use
- Eliminating plastic leakage requires global action on all aspects of the plastics life-cycle
- Even if leakage is eliminated, stocks of accumulated plastics in rivers and oceans will still increase, highlighting the need for efforts to tackle clean-up



Thank you for your attention!

Elisa.LANZI@oecd.org