



# **GLCb2020 Environmental threats and security**

**Contemporary**  

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**environmental threats**

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# Agenda

- Pollution
- Overconsumption
- Waste

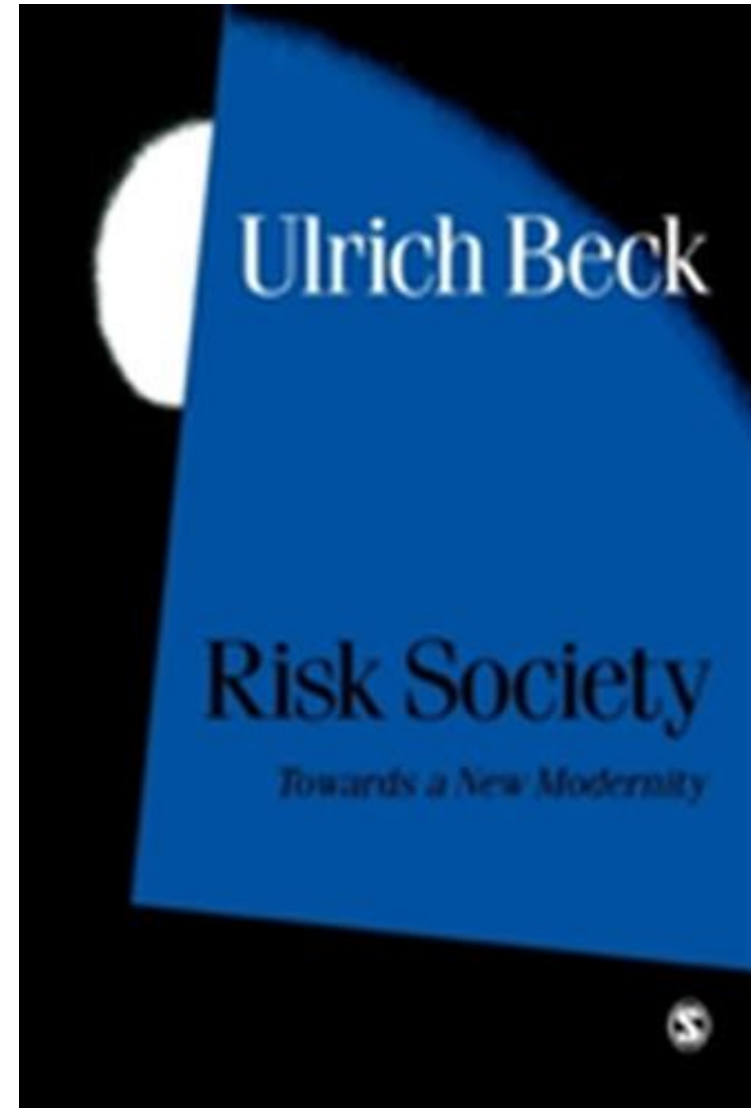
# What is killing us?

|    | Type of pollution                          | Deaths (2010) |
|----|--|---------------|
| 1. | Household air pollution (smoke)            | 3,546,399     |
| 2. | Outdoor air pollution (particulate matter) | 3,223,540     |
| 3. | Led poisoning                              | 674,038       |
| 4. | Water/sanitation pollution                 | 337,476       |
| 5. | Ozone                                      | 152,434       |
| 6. | Residential radon exposure                 | 98,992        |

Source: Lim et al. (2012)

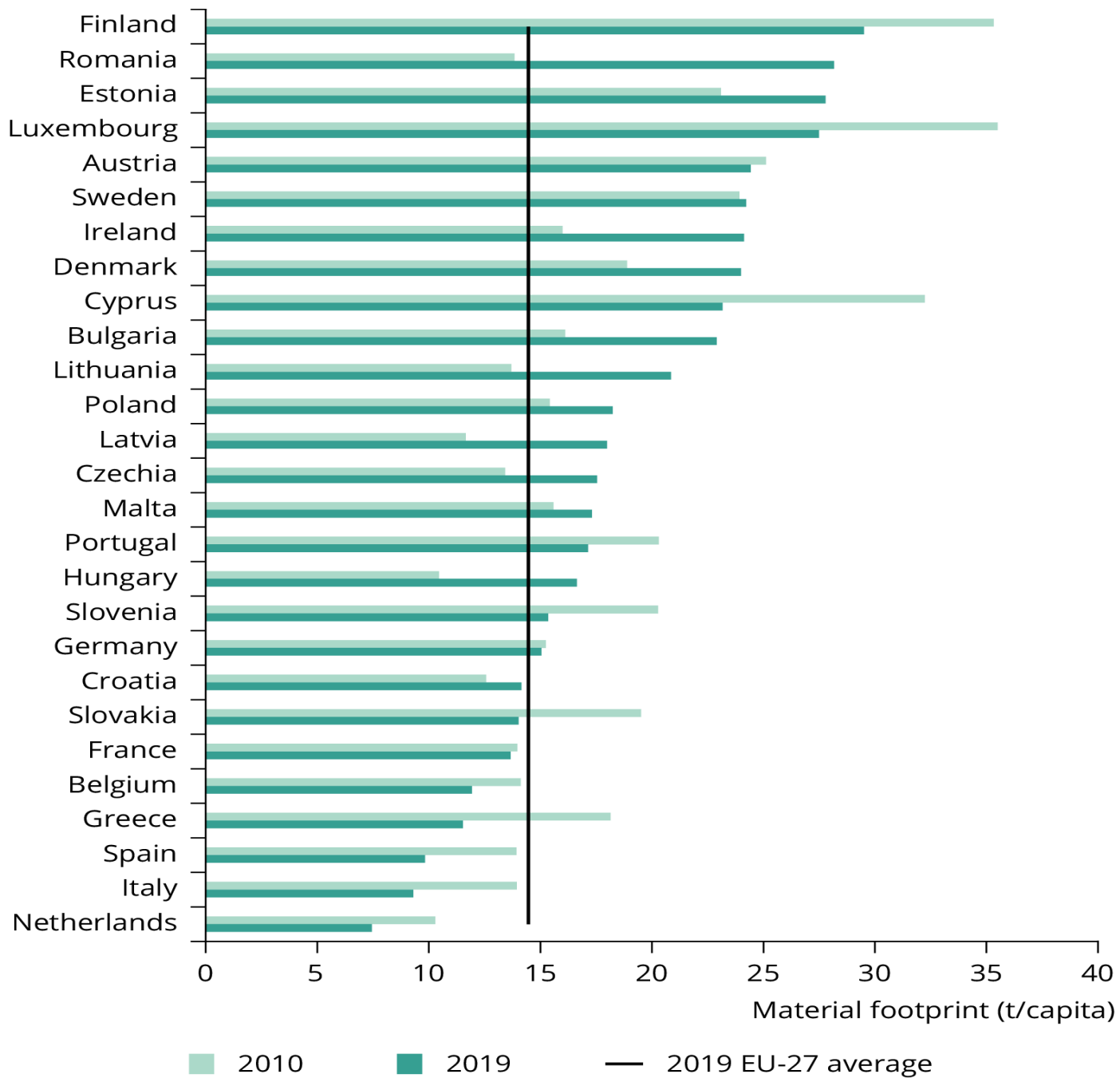
# “Risk society”

- Ulrich Beck (1992)
- People who live in risk society accept pollution and disasters as a necessary part of life.
- “Insecurity” is becoming an everyday part of life.



# Overconsumption

- **Material footprint:** “the total amount of raw materials extracted to meet final consumption demands”
  - Indicator of the pressure put on the environment due to economic growth and satisfaction of people’s material needs



# Obsolescence and consumption

- **Technological obsolescence**
  - Due to technological innovation
- **Psychological or dynamic obsolescence**
  - A change in the product style as a way to manipulate consumers
- **Planned obsolescence**
  - Limit the durability of products to stimulate repeat consumption

# Smartphone: ingredients

ELEMENTS COLOUR KEY: ● ALKALI METAL ● ALKALINE EARTH METAL ● TRANSITION METAL ● GROUP 13 ● GROUP 14 ● GROUP 15 ● GROUP 16 ● HALOGEN ● LANTHANIDE

## SCREEN



Indium tin oxide is a mixture of indium oxide and tin oxide, used in a transparent film in the screen that conducts electricity. This allows the screen to function as a touch screen.



The glass used on the majority of smartphones is an aluminosilicate glass, composed of a mix of alumina ( $Al_2O_3$ ) and silica ( $SiO_2$ ). This glass also contains potassium ions, which help to strengthen it.



A variety of Rare Earth Element compounds are used in small quantities to produce the colours in the smartphone's screen. Some compounds are also used to reduce UV light penetration into the phone.

## ELECTRONICS



Copper is used for wiring in the phone, whilst copper, gold and silver are the major metals from which microelectrical components are fashioned. Tantalum is the major component of micro-capacitors.



Nickel is used in the microphone as well as for other electrical connections. Alloys including the elements praseodymium, gadolinium and neodymium are used in the magnets in the speaker and microphone. Neodymium, terbium and dysprosium are used in the vibration unit.



Pure silicon is used to manufacture the chip in the phone. It is oxidised to produce non-conducting regions, then other elements are added in order to allow the chip to conduct electricity.



Tin & lead are used to solder electronics in the phone. Newer lead-free solders use a mix of tin, copper and silver.

## BATTERY



The majority of phones use lithium ion batteries, which are composed of lithium cobalt oxide as a positive electrode and graphite (carbon) as the negative electrode. Some batteries use other metals, such as manganese, in place of cobalt. The battery's casing is made of aluminium.

## CASING



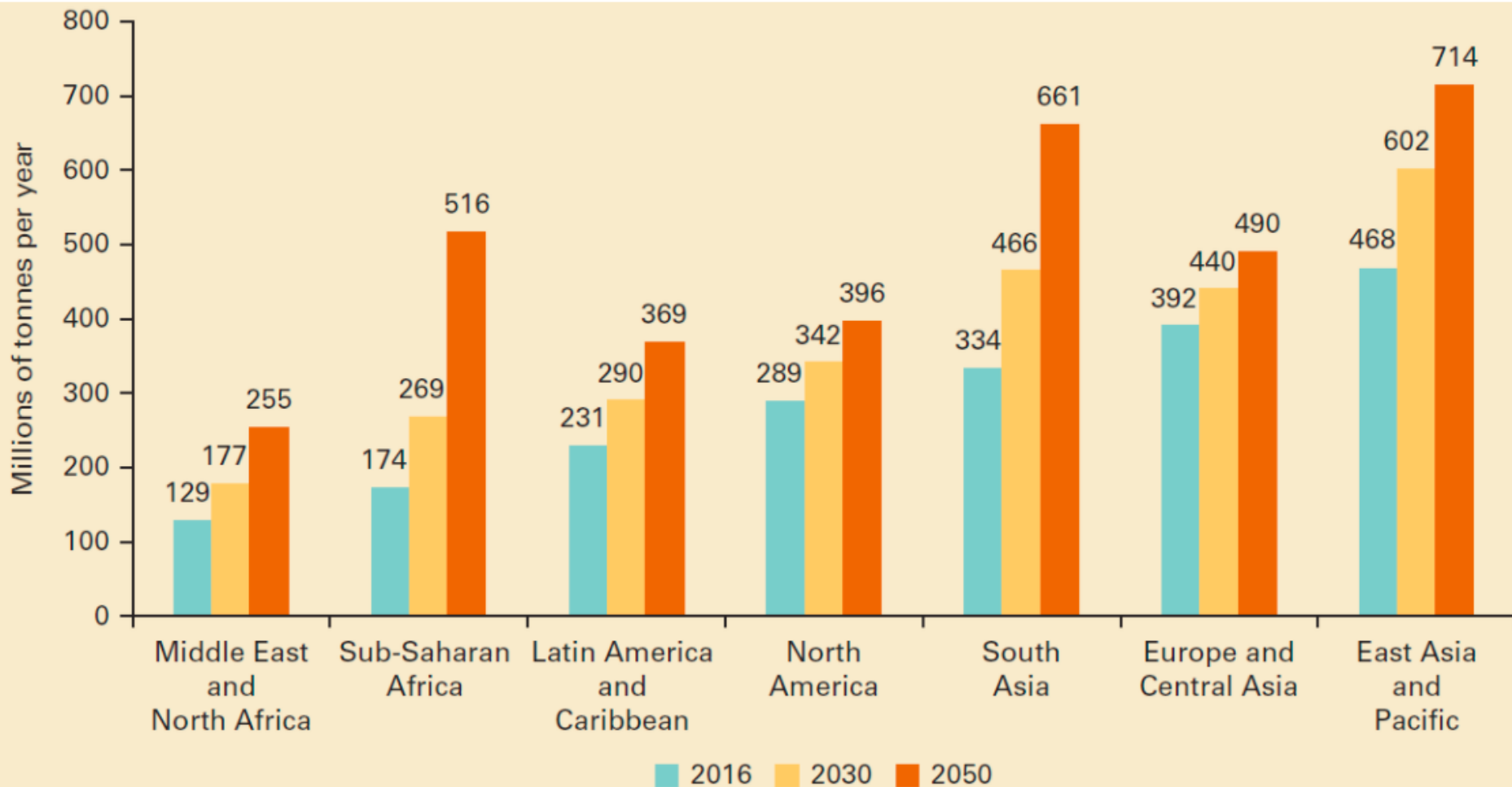
Magnesium compounds are alloyed to make some phone cases, whilst many are made of plastics. Plastics will also include flame retardant compounds, some of which contain bromine, whilst nickel can be included to reduce electromagnetic interference.





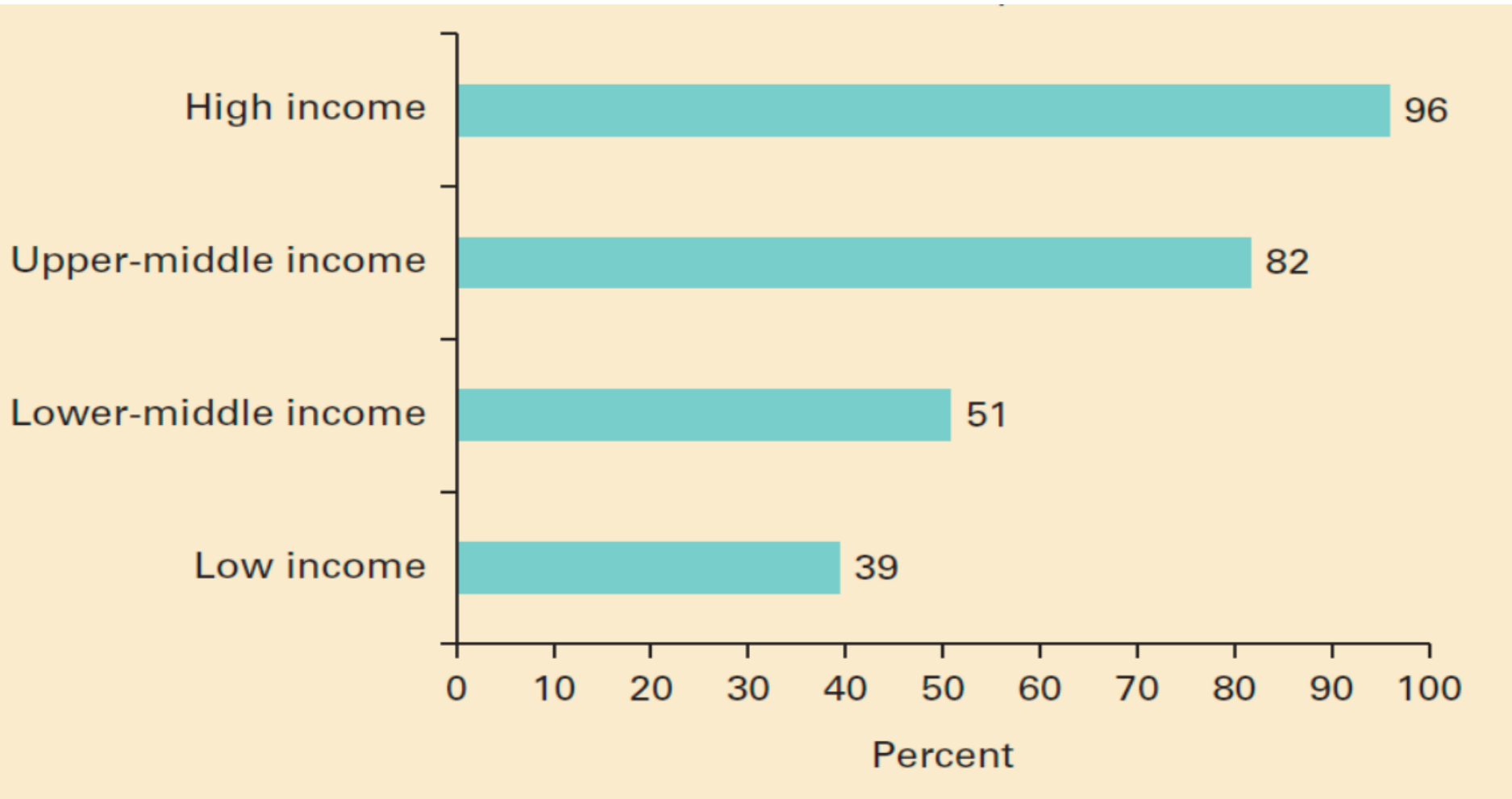
# Consumption and waste

*Projected waste generation, by region (millions of tonnes/year)*



# Waste and income

*Waste collection rates, by income level (percent)*





Questions?