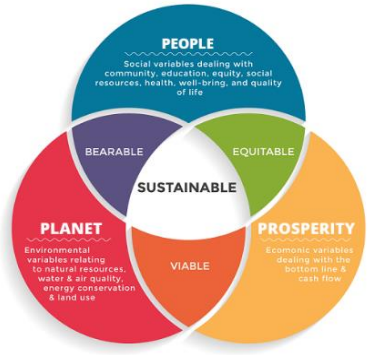
Sustainable IT Awareness for the Green Days

Emmanuel Laroche - Sopra Steria

Université Paul Sabatier / IRIT - 2024, March the 28th

Overall context : the 3 P of Sustainability Planet, People, Prosperity



Environmental Impacts

- **4% of GHG emissions. Same order of magnitude** as civil aviation. Increasing by 6 to 8% per year.
- 10% of world Electricity for IT.

  Doubles every 10 years

Business impact

- **Pressure** from Clients / **Shareholders** / Young talents / Employees
- **Political** stakes for mineral resources

Social impact

- **Digital inclusion & accessibility**
- **Beginning and end of the life cycle:** forced / children labour prevention

Overall context:

an example to avoid

https://www.wsj.com/articles/pg-e-wildfires-and-the-first-climate-change-bankruptcy-11547820006

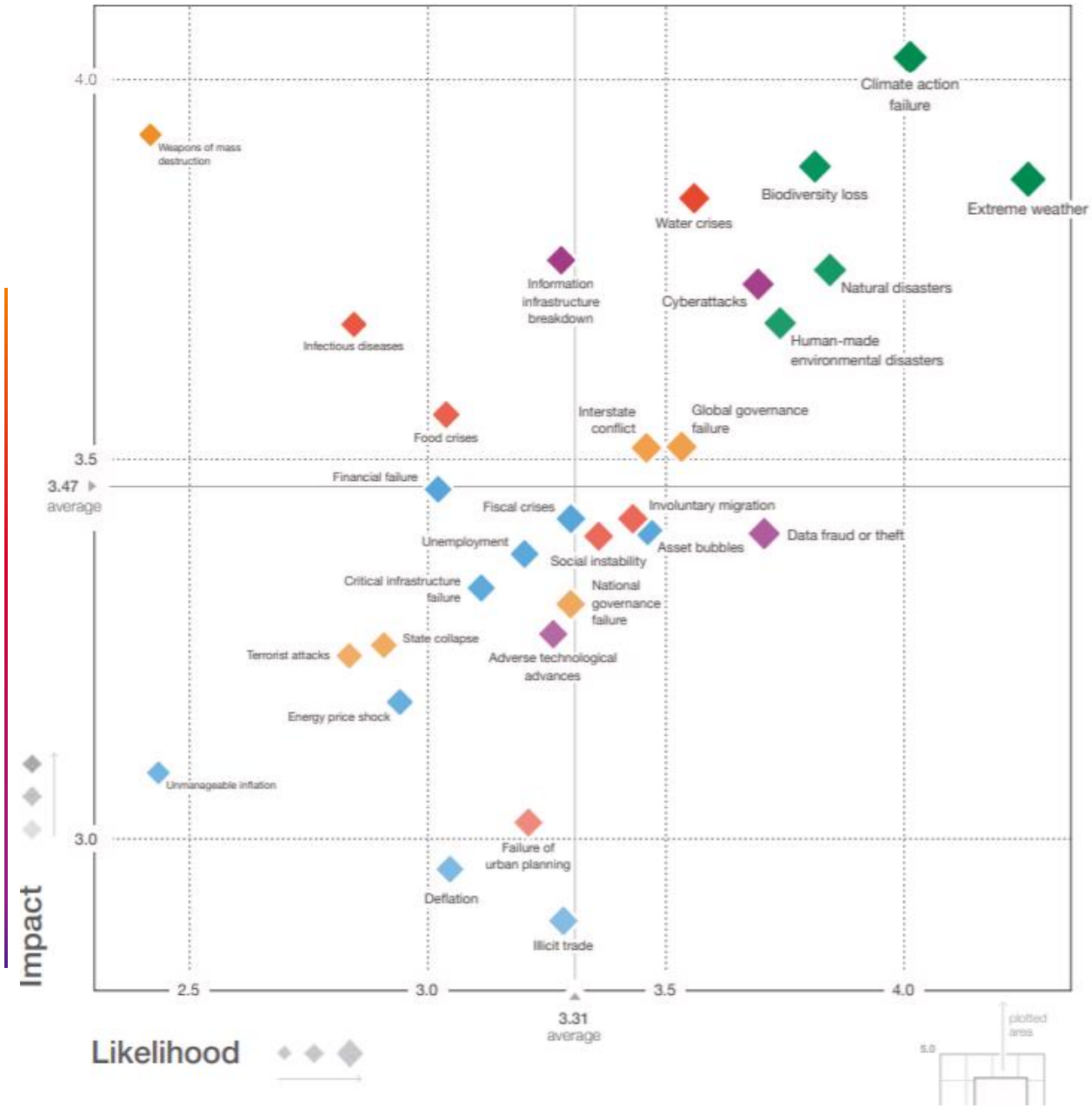
Overall context:

Top risks for Global Economy

6 relative to environmental disturbance generated by human beings

2 relative to Digital

Source: page 3 of
http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf



Overall context:

2024 update

FIGURE C

Global risks ranked by severity over the short and long term

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period."

Source

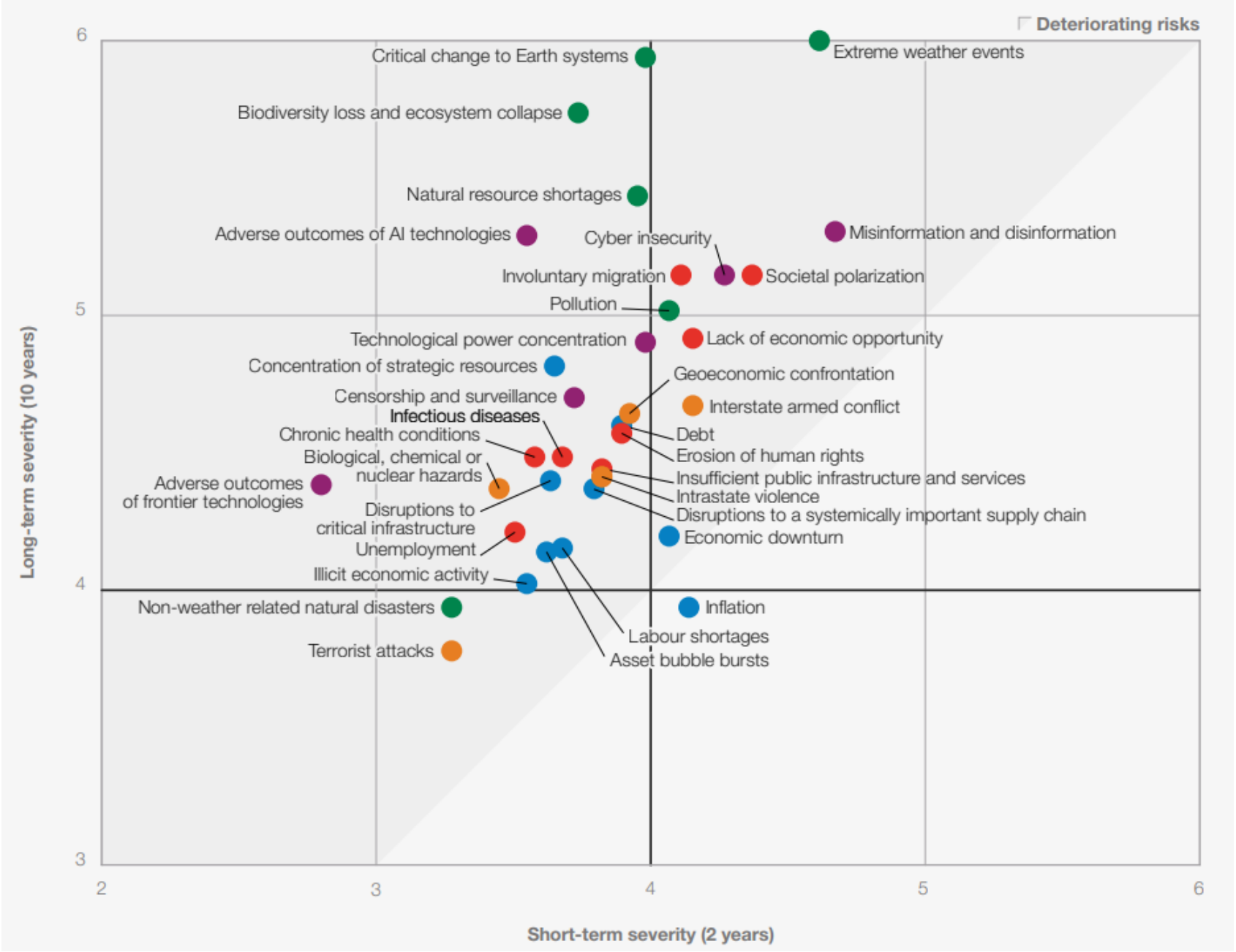
World Economic Forum Global Risks Perception Survey 2023-2024.

Page 8 of www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf

Overall context:

WORLD ECONOMIC FORUM

2024 update



Page 37 of www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf

What's about ICT ? Indirect impacts are preponderant

Environmental impacts

70% are due to raw-material extraction to produce equipment

Aerial view of the Dexing mine; photo by DXZSJ[15]

The devastated Le'an River; photo by Jiangxi Jxnews[21]

Source: INRIA / CNRS EcoInfo
https://www.fun-mooc.fr/en/courses/environmental-impacts-of-digital-technologies/

EU: https://ipen.org/sites/default/files/documents/Case%20Study%20Report%20Dexing%202015r.pdf

Waste management

70% of wastes feed illegal trafficking (**high risk** of public bashing)

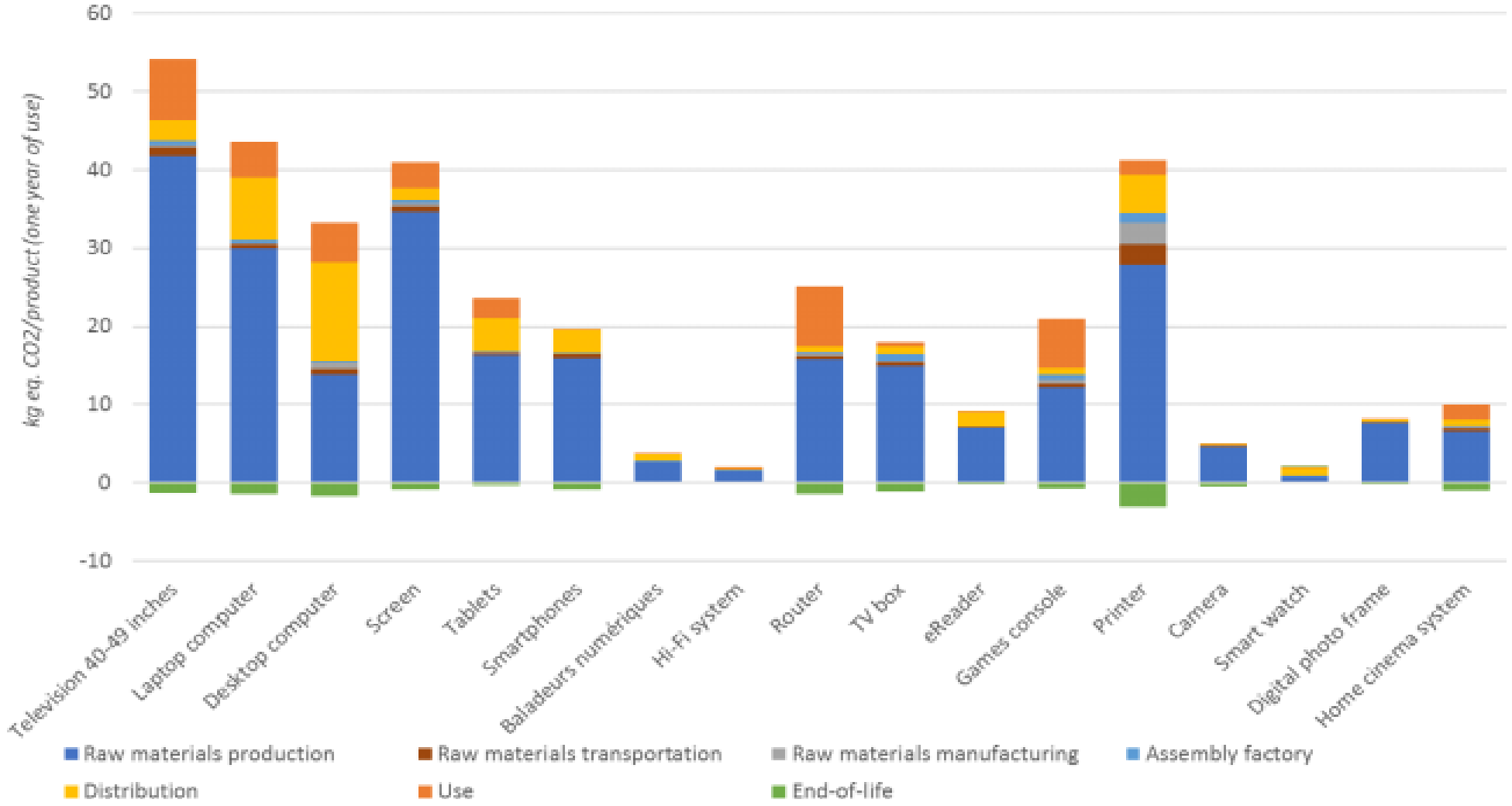
A child picks over the giant waste pile at the dump site Agbogbloshie in the city of Accra, Ghana, Feb. 28, 2014 (Photo courtesy Fairphone)

Interpol report:
https://www.interpol.int/content/download/5173/file/Countering%20WEEE%20Illegal%20Trade%20-%20Summary%20Report.pdf

German documentary: http://www.welcome-to-sodom.com/

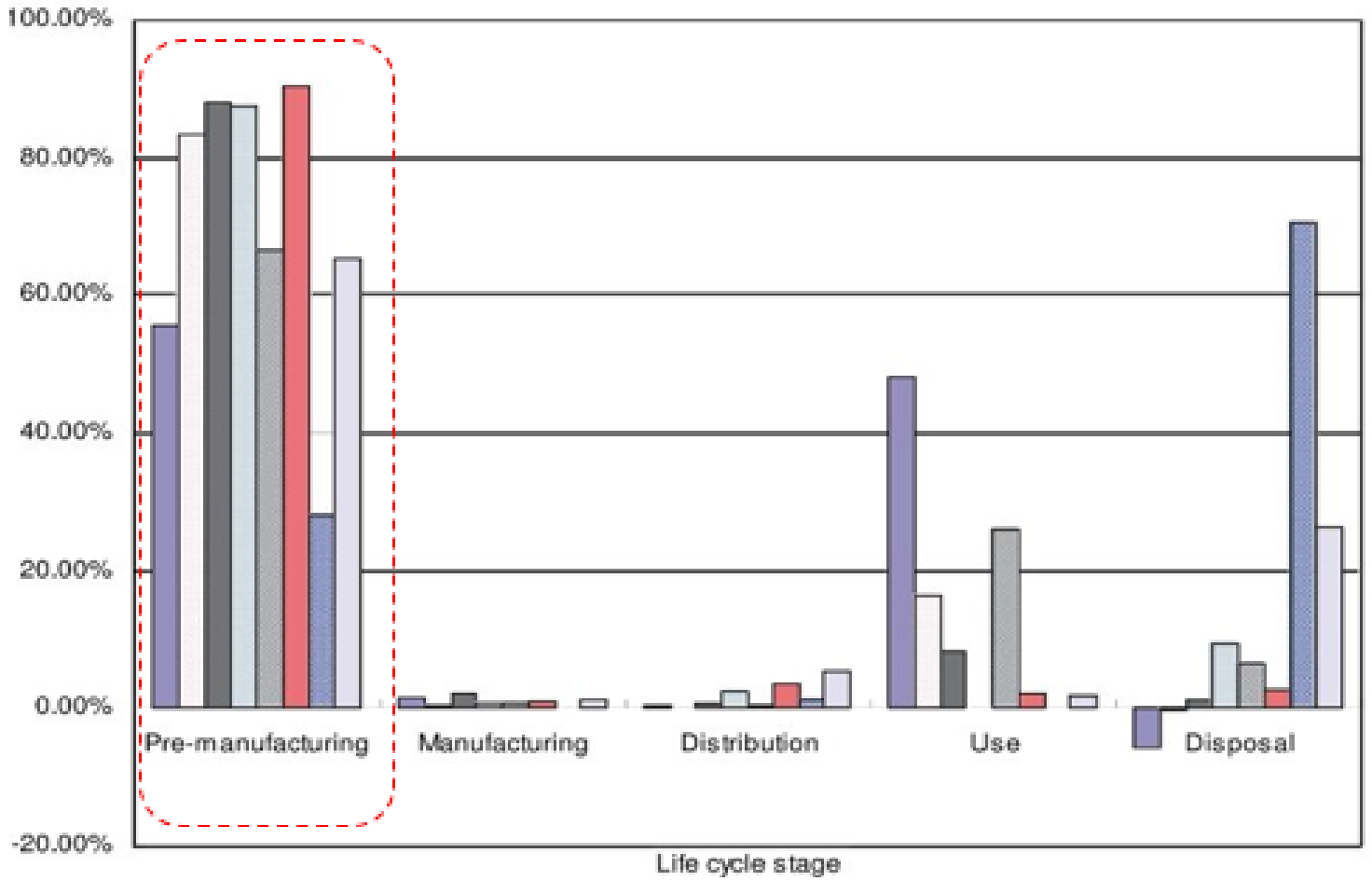
https://international-partnerships.ec.europa.eu/policies/programming/projects/e-waste-management-ghana-grave-cradle_en

Life Cycle Assessment



Source: ADEME report page 17 - https://www.ademe.fr/sites/default/files/assets/documents/acv-biens-equipements-201809-synthese.pdf

Life Cycle Assessment



- *Abiotic resources depletion*
- *Acidification*
- *Global warming*
- *Ozone layer depletion*
- *Eutrophisation*
- *Photochemical oxidation*
- *Human toxicity*
- *Ecotoxicity*

Sources : UC de PC coréen, taux de recyclage de 46%, Choi et al, 2006

New challenges

Environmental & Energetic Transition

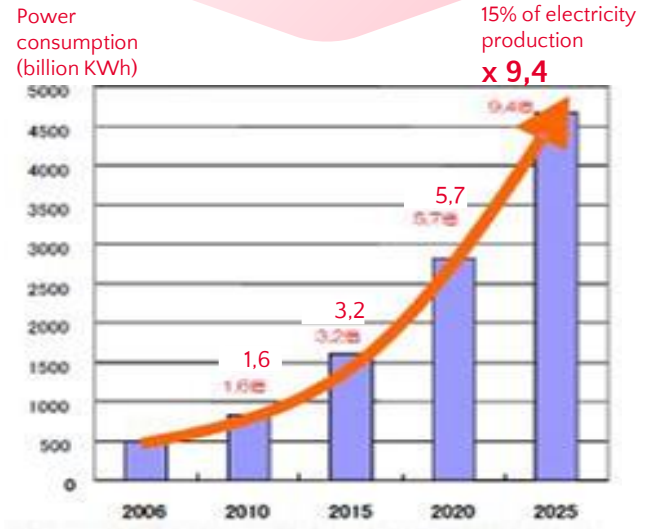
21st Century challenges

Digital Transition

Conflicts of usage

Rare-earth metals

Metals depletion



Source METI / Green IT Promotion Council (2008)

Electricity consumption

Water

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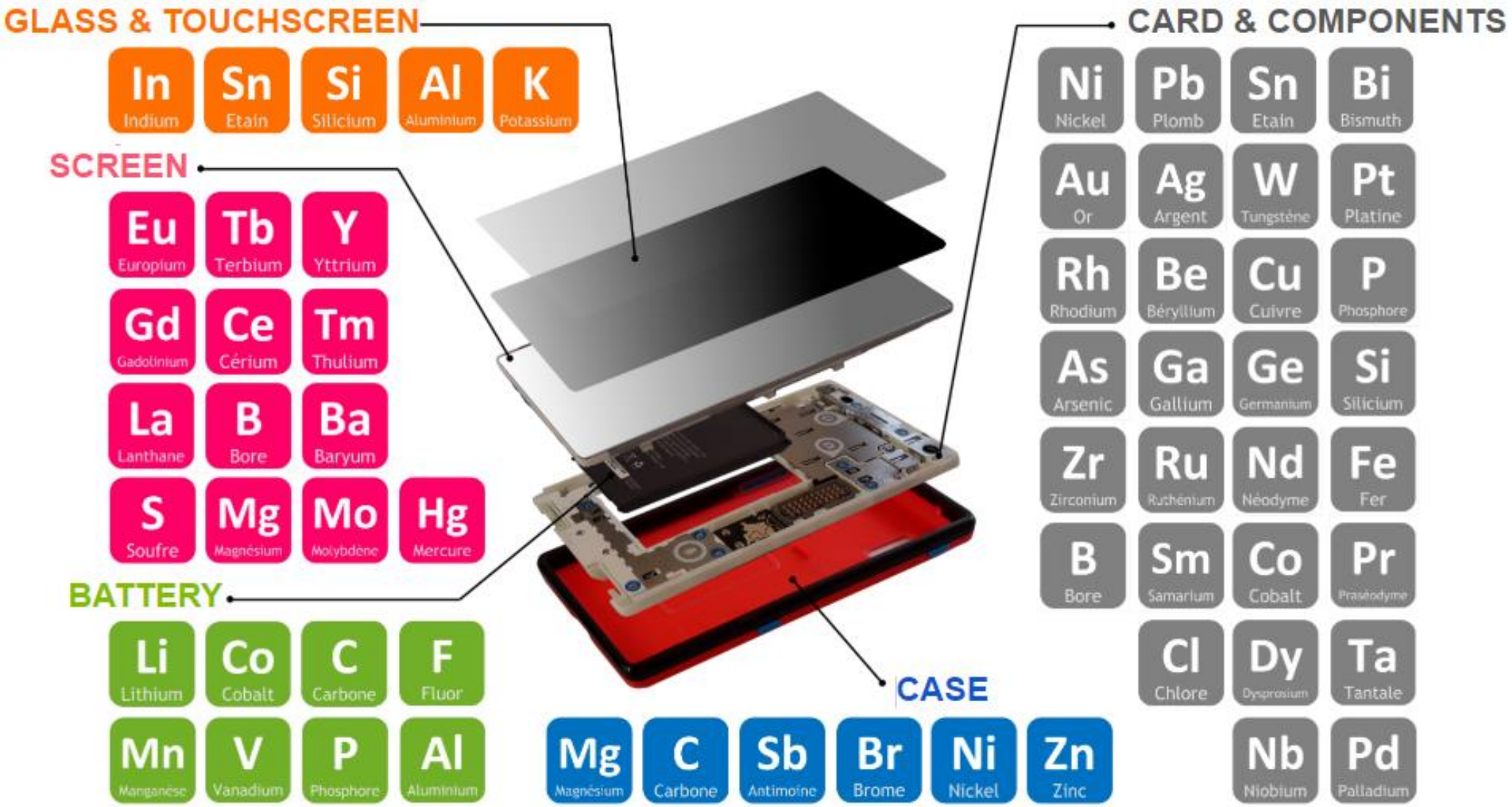
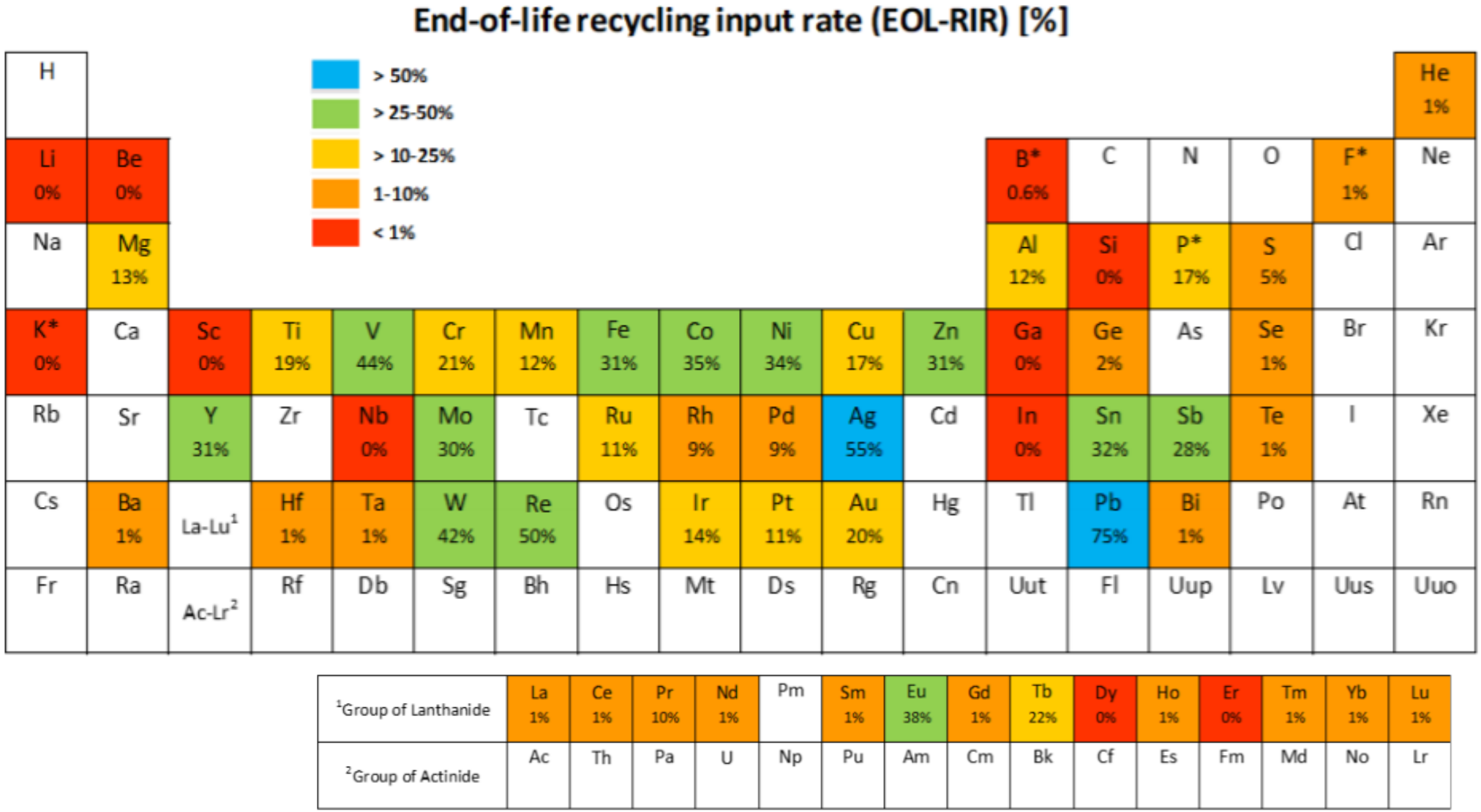
IN A SMARTPHONE: ⅔ of the elements of the Universe



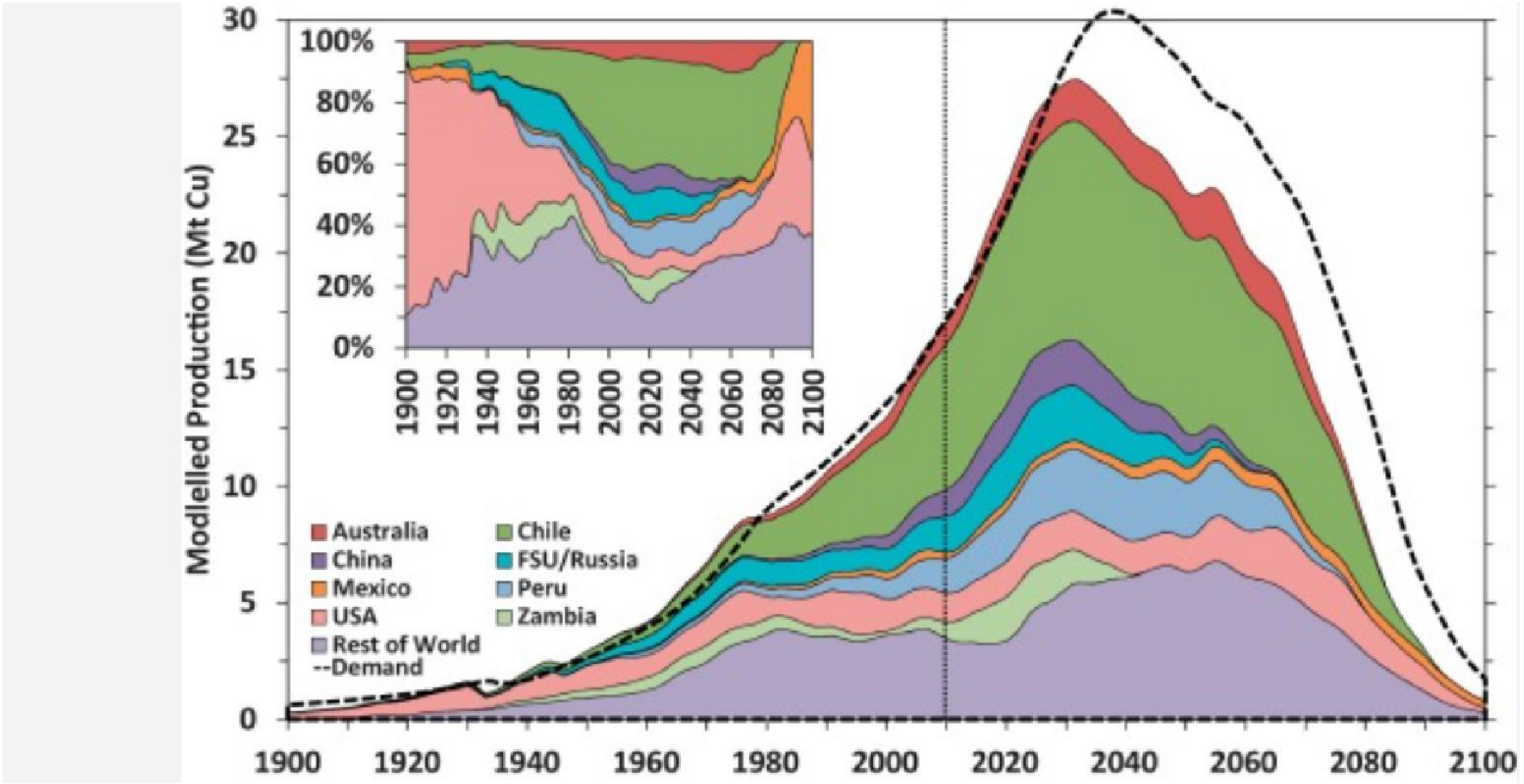
https://www.systext.org/sites/all/animationreveal/mtxsmp/#/1

Resources depletion



https://publications.jrc.ec.europa.eu/repository/bitstream/JRC116131/aaa_20190506-d3-jrc-science-for-policy-recovery_of_rm_from_mining_waste_and_landfills_4_07_19_online_final.pdf - page 16

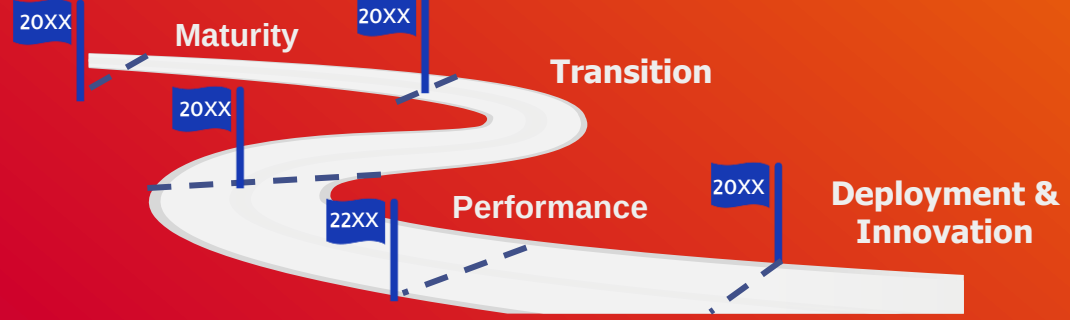
Resources depletion: copper example



Modelling future copper ore grade decline based on a detailed assessment of copper resources and mining - ScienceDirect

https://www.sciencedirect.com/science/article/abs/pii/S0921344913002127

Action plan



Governance
- Priorities / annual Top Objectives
- Maturity & Perfo KPI
- Audit
- Benchmark
- CapEx & Business case

Indirect Emission reporting
- Cloud providers
- WAN (Orange, DT)

Communication
- Internal & external
- Websites
- Accessibility
- RFI: main suppliers

Digital Services
- **Sustainable by Design**
  - EcoDesign referential
  - Generic footprint evaluat°
- Simplify

✚
- Maintenance
- Code quality
- Cost savings
- Cybersecurity

Competencies
- ISIT member
- Training offer
  - Awareness / MOOC
  - Fundamentals
  - Ecodesign
  - Life Cycle Assessment

Data Centres
- Consumption & Efficiency monitoring
- PUE for strategic ones
- Virtualisation & Decommissioning
- Masterplan

IT equipment & devices
- Inventories & removal
- Ecolabels / refurbished
- Critical Raw Material
- e-Waste Management
- Obsolescence fighting

IT for Green:

. **"2nd Life" tool:** reuse instead of buying.
. **Digital signature tool**

Sustainable IT: a full transversal

A real network of ICT jobs & competences

How can I contribute as an individual employee ?

- **SUFFICIENCY**: what we **really need** to **work efficiently.**

  Ex: 2 large screens ? Bluetooth is not mandatory for a headset. Hear cushions …

- How long do we store the **recorded meeting** ?
- **Refurbished** equipment & BYOD
- Enable and contribute to **decommissioning**
- Life cycle mindset: **act locally** & **think globally.**
- Reduce IT Accessories (renewal by example)
- **Training**

https://www.fun-mooc.fr/fr/cours/impacts-environnementaux-du-numerique/

- **Best practices referential:**

https://ecoresponsable.numerique.gouv.fr/publications/

. About conflict minerals: https://peertube.designersethiques.org/w/eCTeXbdkjUcdNzpZNtCdVX

Specific innovation topics

- Data governance & qualification.
- Footprint measure: some PhD running (including end of life data), LCA (attributive / consequential).
- Rebund effets prevention.
- Quantify the performance of equipment – comparison new / refurbished.
- Synergies with UXUI & Quality & Maintenance & **Cybersecurity.**

Do not hesitate ! Our future is at stake

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6R

Ralentir la vitesse de décision afin de
Réfléchir aux vrais besoins et utilisations.
Refuser toute technologie ou service qui ne correspond pas aux usages.
Réduire l'empreinte environnementale et sociétale par choix des matériels, équipements et logiciels.
(Réparer et) réutiliser les équipements et les ressources numériques déjà disponibles.
Recycler en ultime fin de vie.

Kaya identity … *a useful tautology to raise action levers*

(1993 - Yoichi Kaya - Japanese economist)

$$CO2 = \frac{CO2}{NRJ} \times \frac{NRJ}{GDP} \times \frac{GDP}{POP} \times POP$$

CO2 emission intensity of energy

Emission factor
(site, regional, or national electrical mix)

Energy Intensity

(= 1 / Efficiency)

Technology

Revenues Living standard

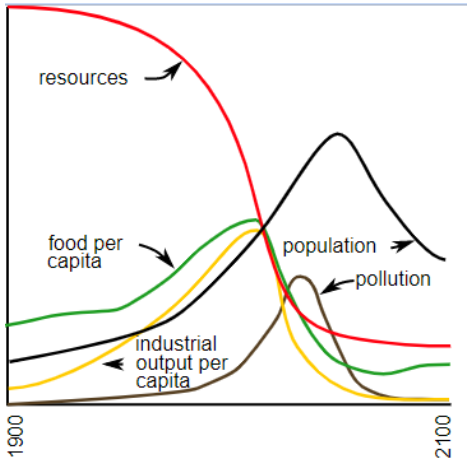
Productivity
OR
consumption

Proposed action plan

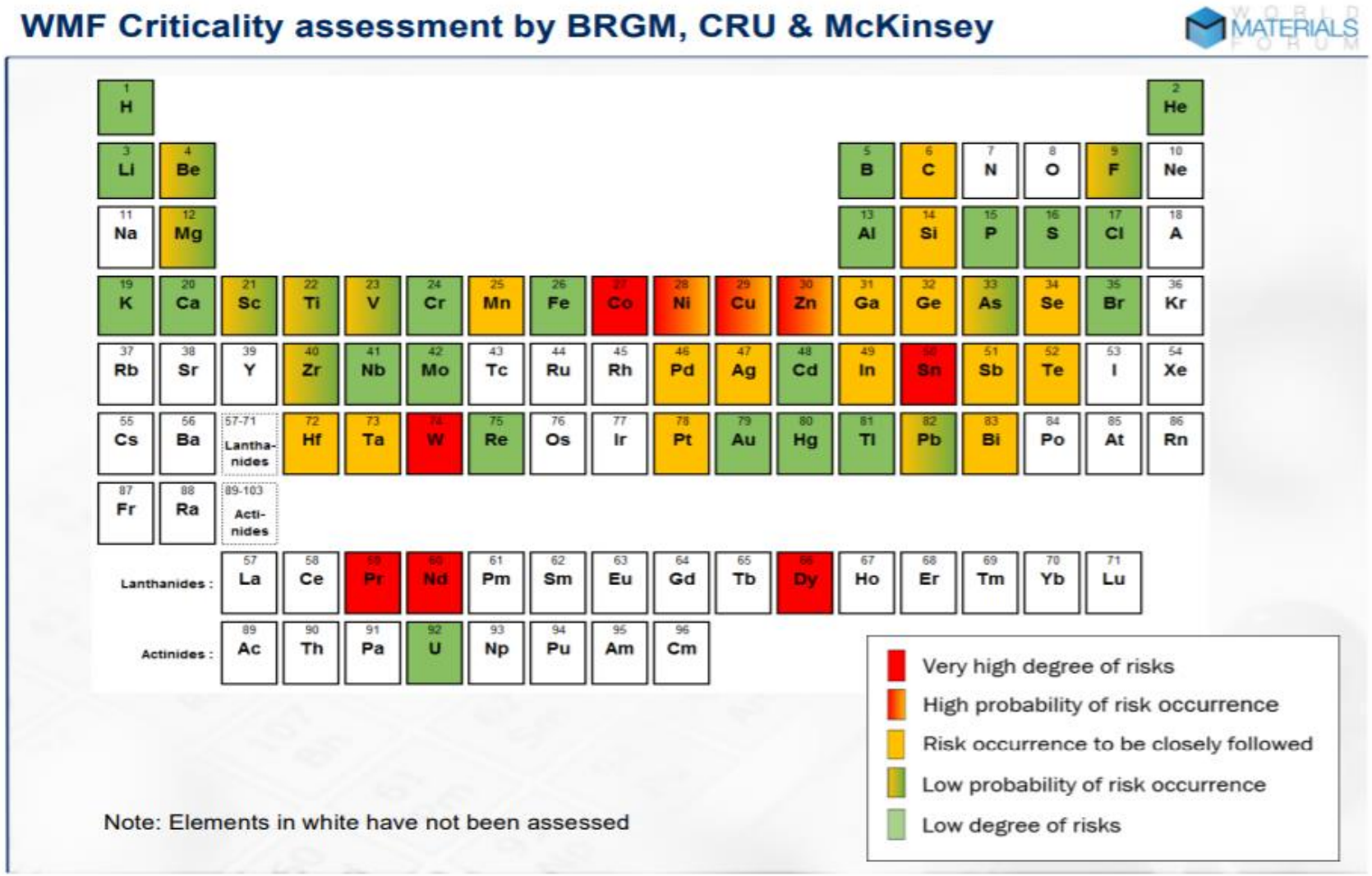
Population

Employees in the value chain

https://en.wikipedia.org/wiki/The_Limits_to_Growth



CRM = Critical raw material



https://www.brgm.fr/sites/default/files/wmf-2018-summary-findings.pdf

Sustainable IT formula

Sustainable IT
= 3 P + 17 SDGs + 1 LCA + 6 R + 3 U (GDRP)

+

+ **Life Cycle Analysis** +

Refuse
Reuse
Reduce
Repair
Reform
Recycle

+

Useful
Usable
Used