

Sustainable IT Awareness for Teratec

Emmanuel Laroche (Sopra Steria)
Parc Floral – Vincennes - 2024, May the 29th

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



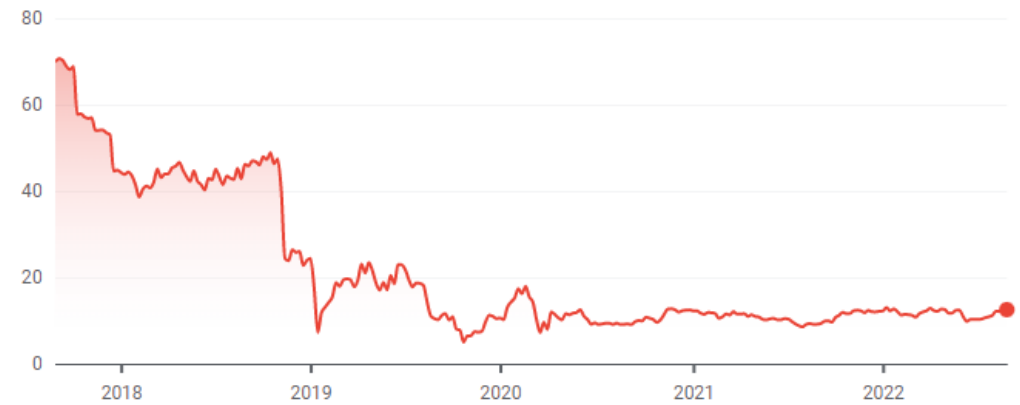
PG&E Corporation

\$12.52 ↓ 82.08% -57.35 5Y

After Hours: \$12.64 (↑ 0.96%) +0.12

Closed: Aug 29, 6:48:00 PM UTC-4 · USD · NYSE · Disclaimer

1D 5D 1M 6M YTD 1Y 5Y MAX



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

Overall context:



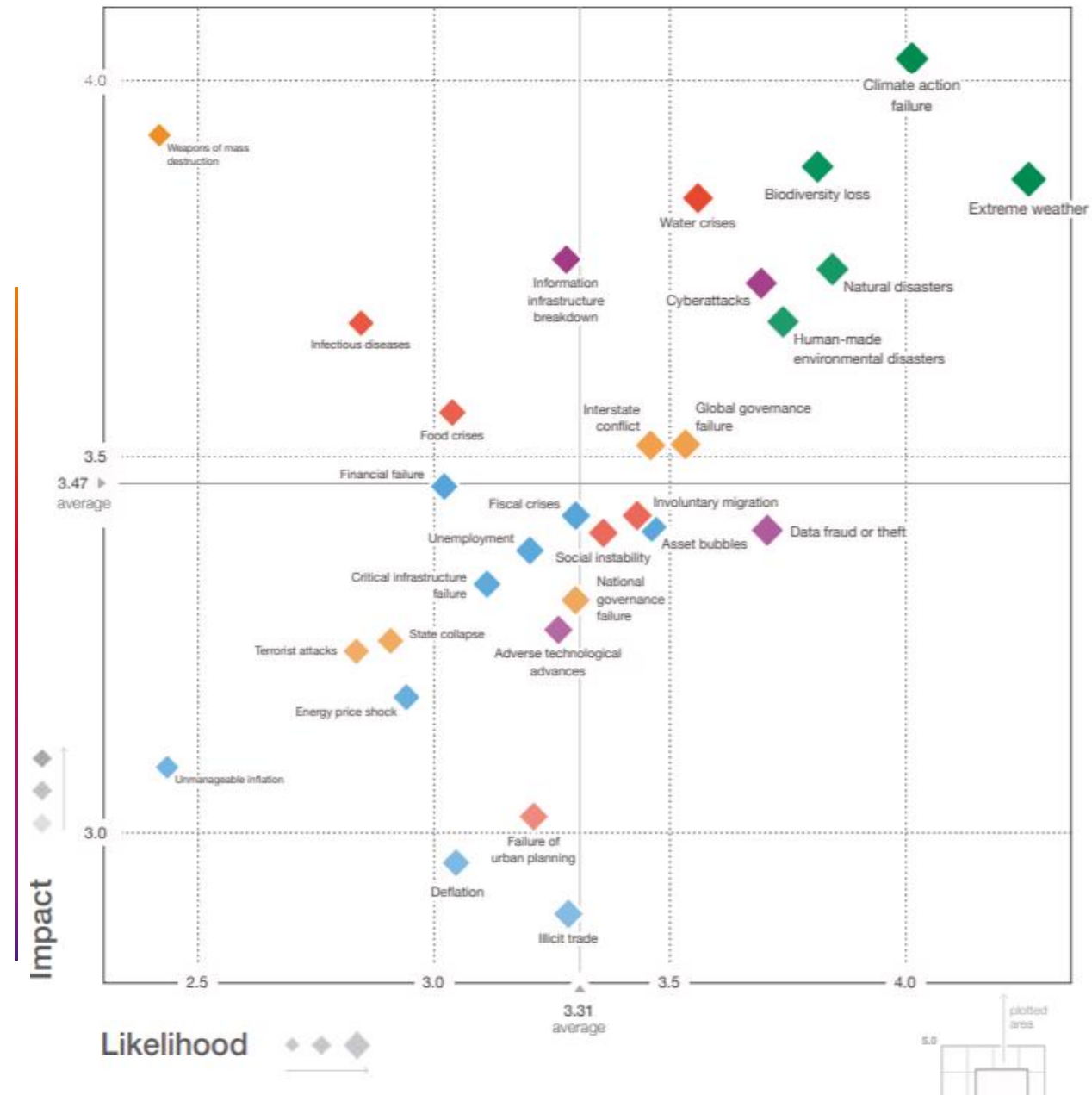
Top risks for Global Economy

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:

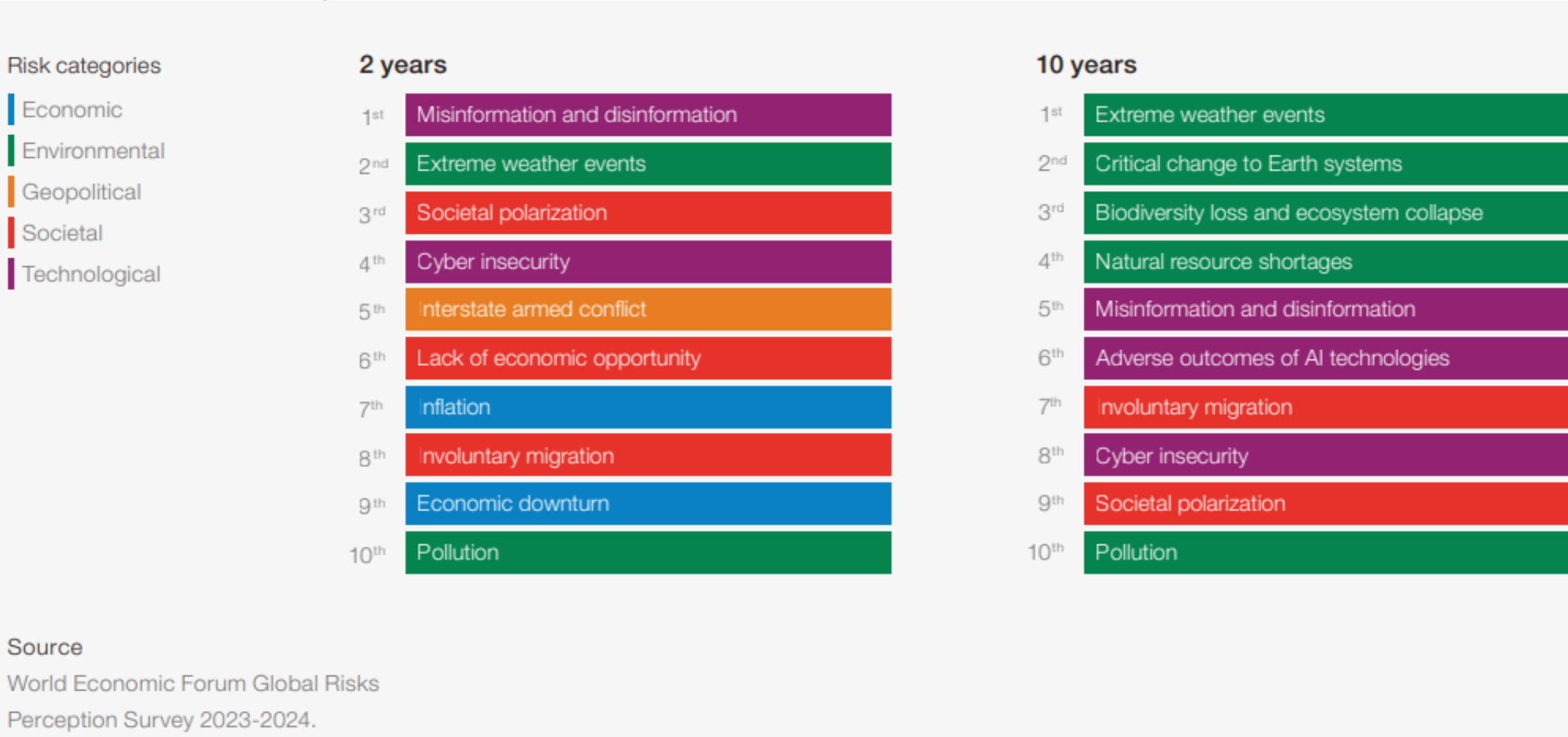
FIGURE C

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."



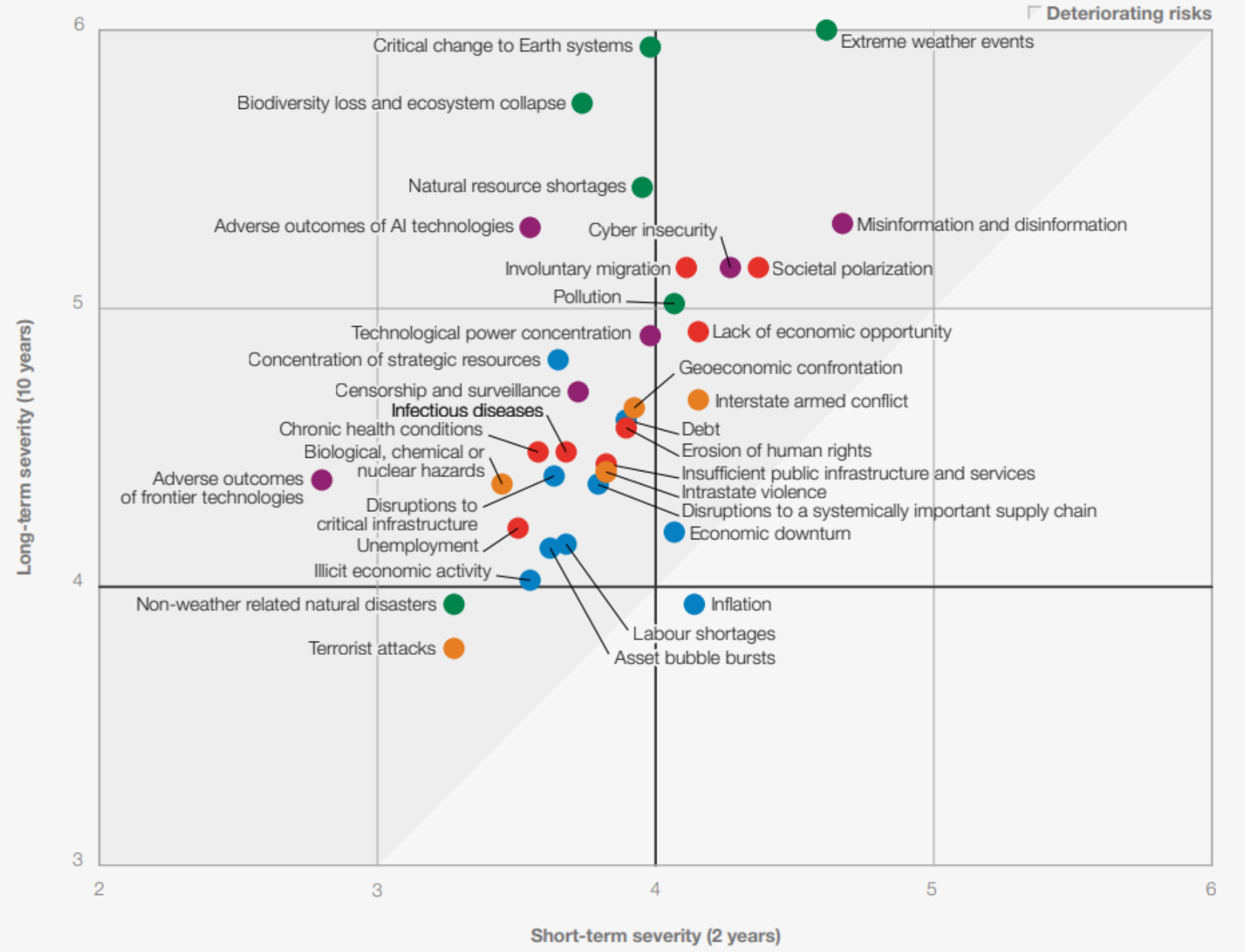
2024 update



Overall context:



2024 update



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 DXZS¹³



The devastated Le'an River; photo by Jiangxi Jxnews²¹

Source: INRIA / CNRS EcolInfo

<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:

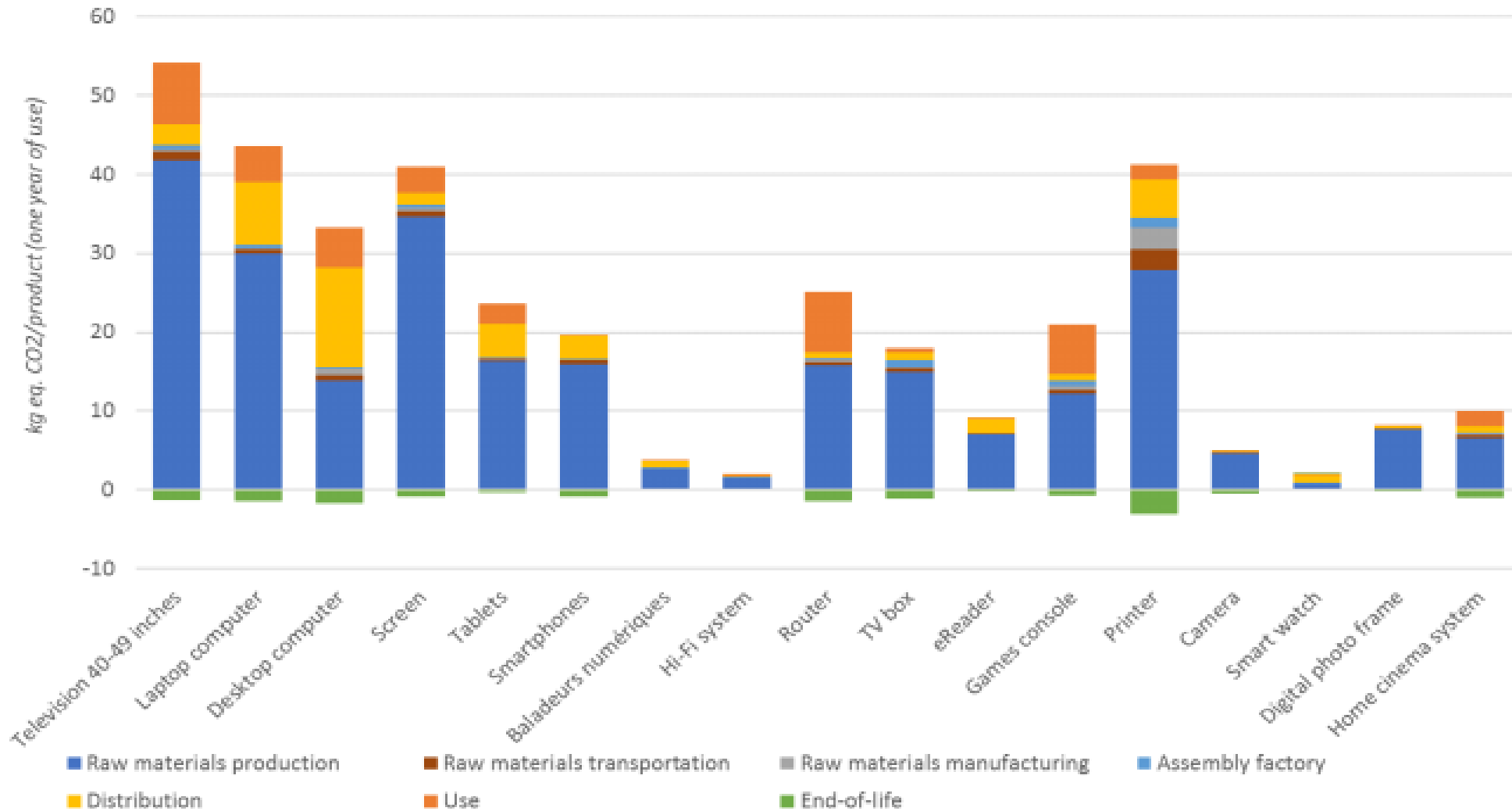
<https://www.interpol.int/content/download/5173/file/Countering%20WEEE%20Illegal%20Trade%20-%20Summary%20Report.pdf>

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

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

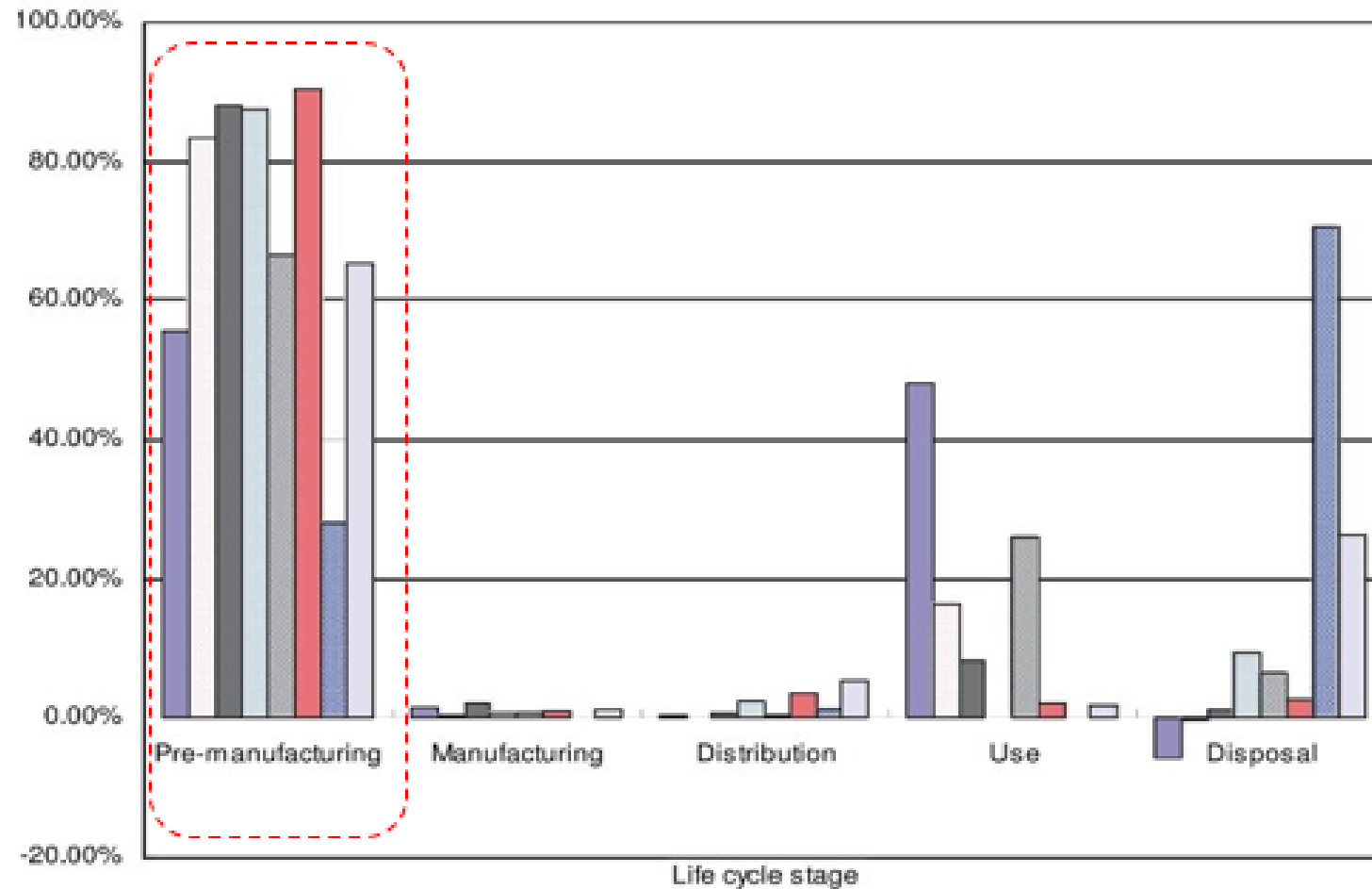
sopra  steria

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*
- *Eutrophication*
- *Photochemical oxidation*
- *Human toxicity*
- *Ecotoxicity*

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

New challenges



Environmental & Energetic Transition



Digital Transition

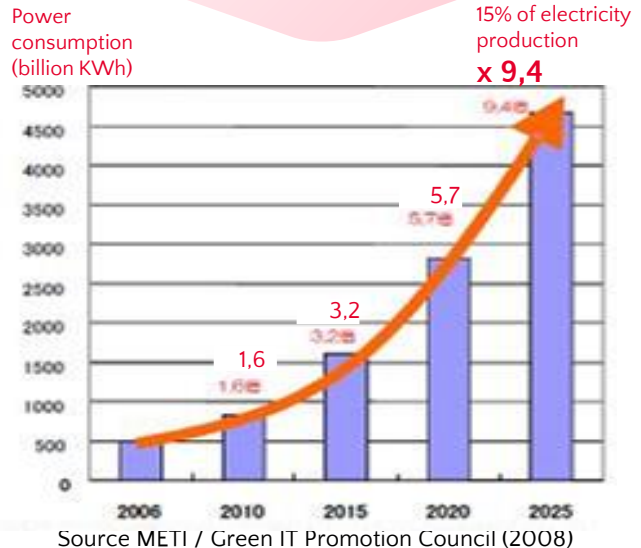
21st Century challenges

Conflicts of usage

Rare-earth metals



Metals depletion



Electricity consumption



Water

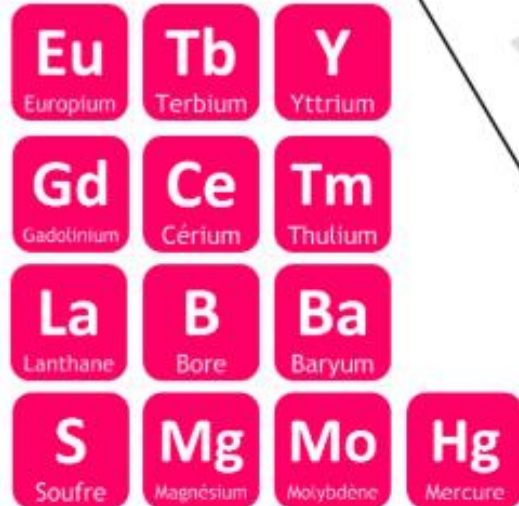
sopra  steria

IN A SMARTPHONE: $\frac{2}{3}$ of the elements of the Universe

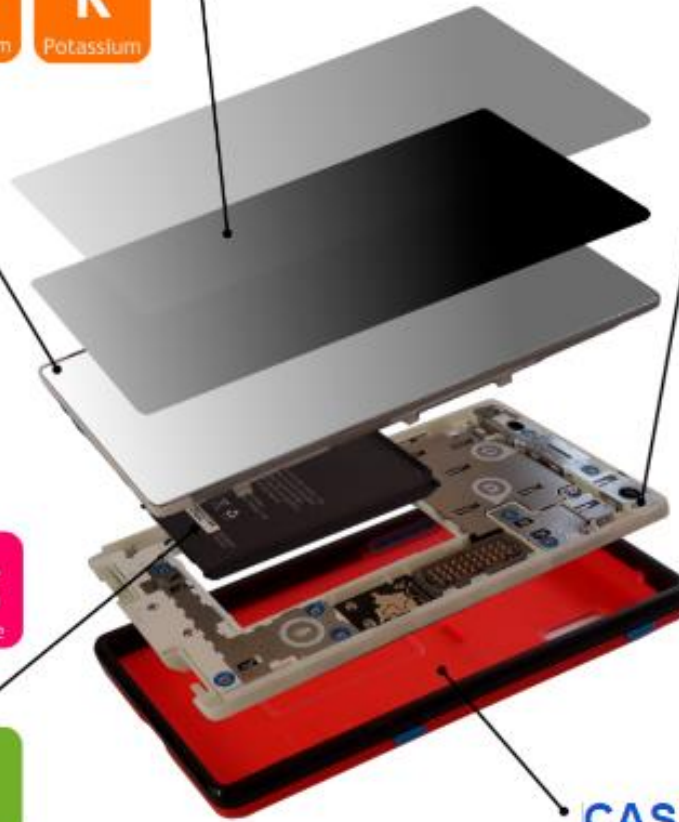
GLASS & TOUCHSCREEN



SCREEN



BATTERY



CASE



CARD & COMPONENTS



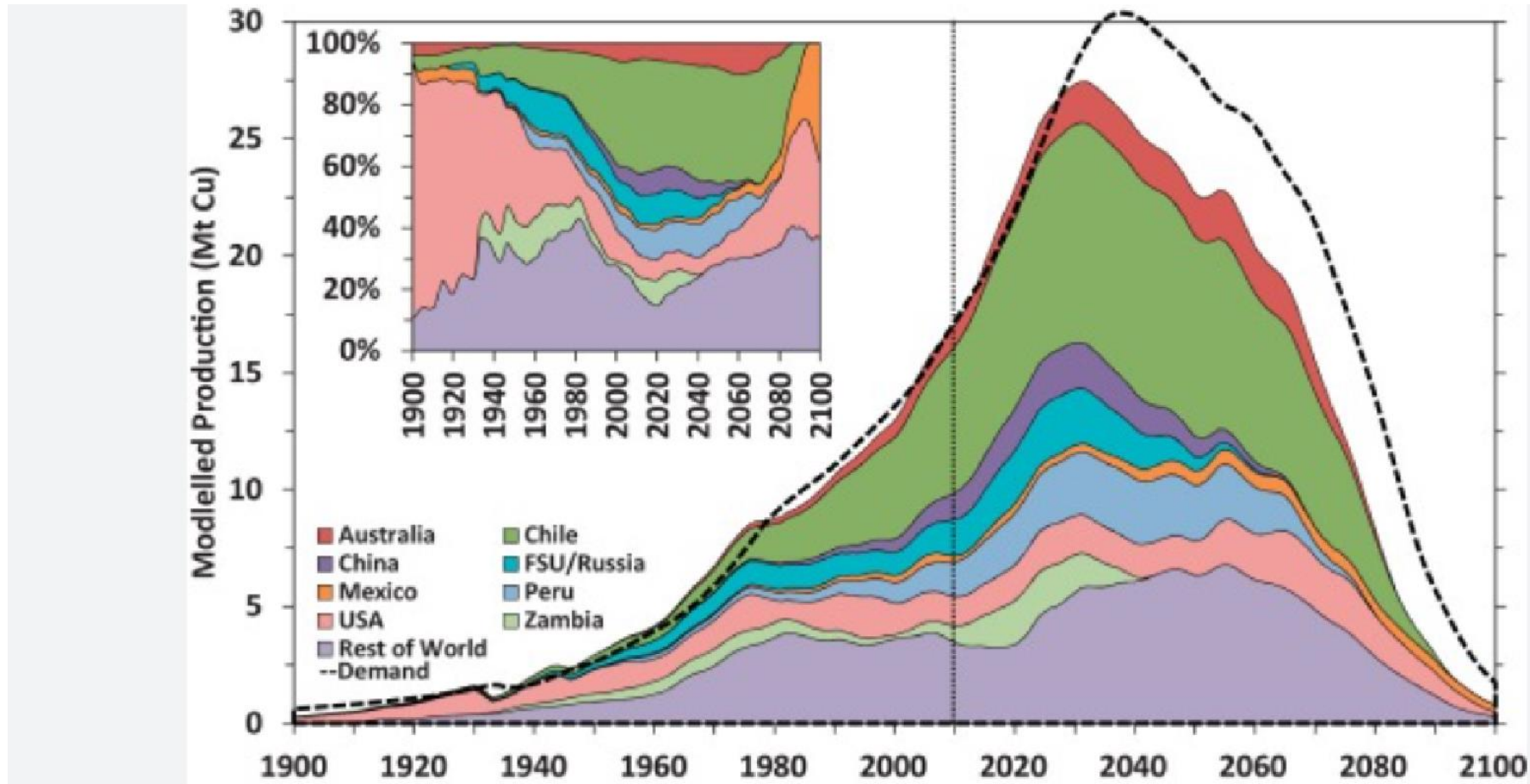
Resources depletion

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

H																	He 1%
Li 0%	Be 0%											B* 0.6%	C	N	O	F* 1%	Ne
Na	Mg 13%											Al 12%	Si 0%	P* 17%	S 5%	Cl	Ar
K* 0%	Ca	Sc 0%	Ti 19%	V 44%	Cr 21%	Mn 12%	Fe 31%	Co 35%	Ni 34%	Cu 17%	Zn 31%	Ga 0%	Ge 2%	As	Se 1%	Br	Kr
Rb	Sr	Y 31%	Zr	Nb 0%	Mo 30%	Tc	Ru 11%	Rh 9%	Pd 9%	Ag 55%	Cd	In 0%	Sn 32%	Sb 28%	Te 1%	I	Xe
Cs	Ba 1%	La-Lu ¹	Hf 1%	Ta 1%	W 42%	Re 50%	Os	Ir 14%	Pt 11%	Au 20%	Hg	Tl	Pb 75%	Bi 1%	Po	At	Rn
Fr	Ra	Ac-Lr ²	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo

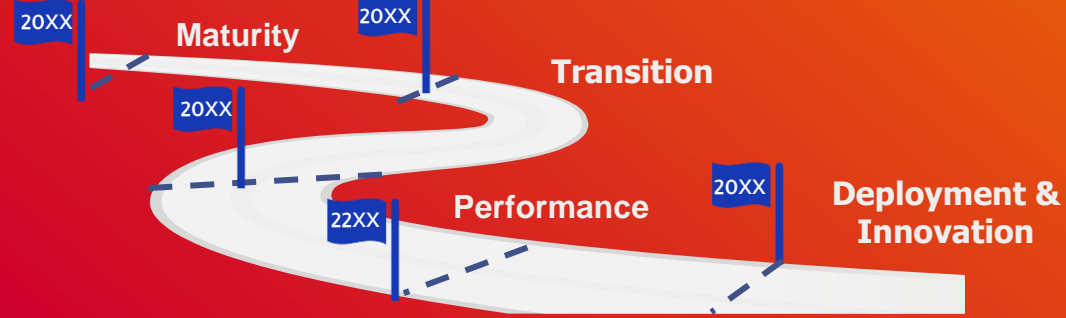
¹ Group of Lanthanide	La 1%	Ce 1%	Pr 10%	Nd 1%	Pm	Sm 1%	Eu 38%	Gd 1%	Tb 22%	Dy 0%	Ho 1%	Er 0%	Tm 1%	Yb 1%	Lu 1%
² Group of Actinide	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Resources depletion: copper example



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

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

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

Digital Services

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



- Maintenance
- Code quality
- Cost savings
- Cybersecurity

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 topics

Top recommendations

- Data governance & qualification
- Go out of best effort mode
- Synergies with UXUI & Quality & Maintenance & **Cybersecurity**

Do not hesitate ! Our future is at stake

Q&A

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

(1993 - Yoichi Kaya - Japanese economist)

$$CO_2 = \frac{CO_2}{NRJ} \times \frac{NRJ}{GDP} \times \frac{GDP}{POP} \times POP$$

CO2 emission intensity of energy

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

Technology

Energy Intensity

(= 1 / Efficiency)

Proposed action plan

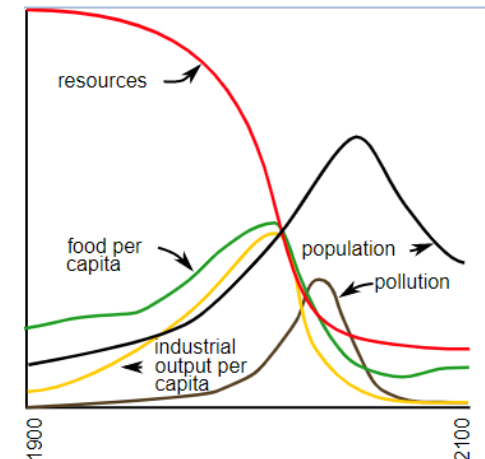
Revenues Living standard

Productivity OR consumption

Population

Employees in the value chain

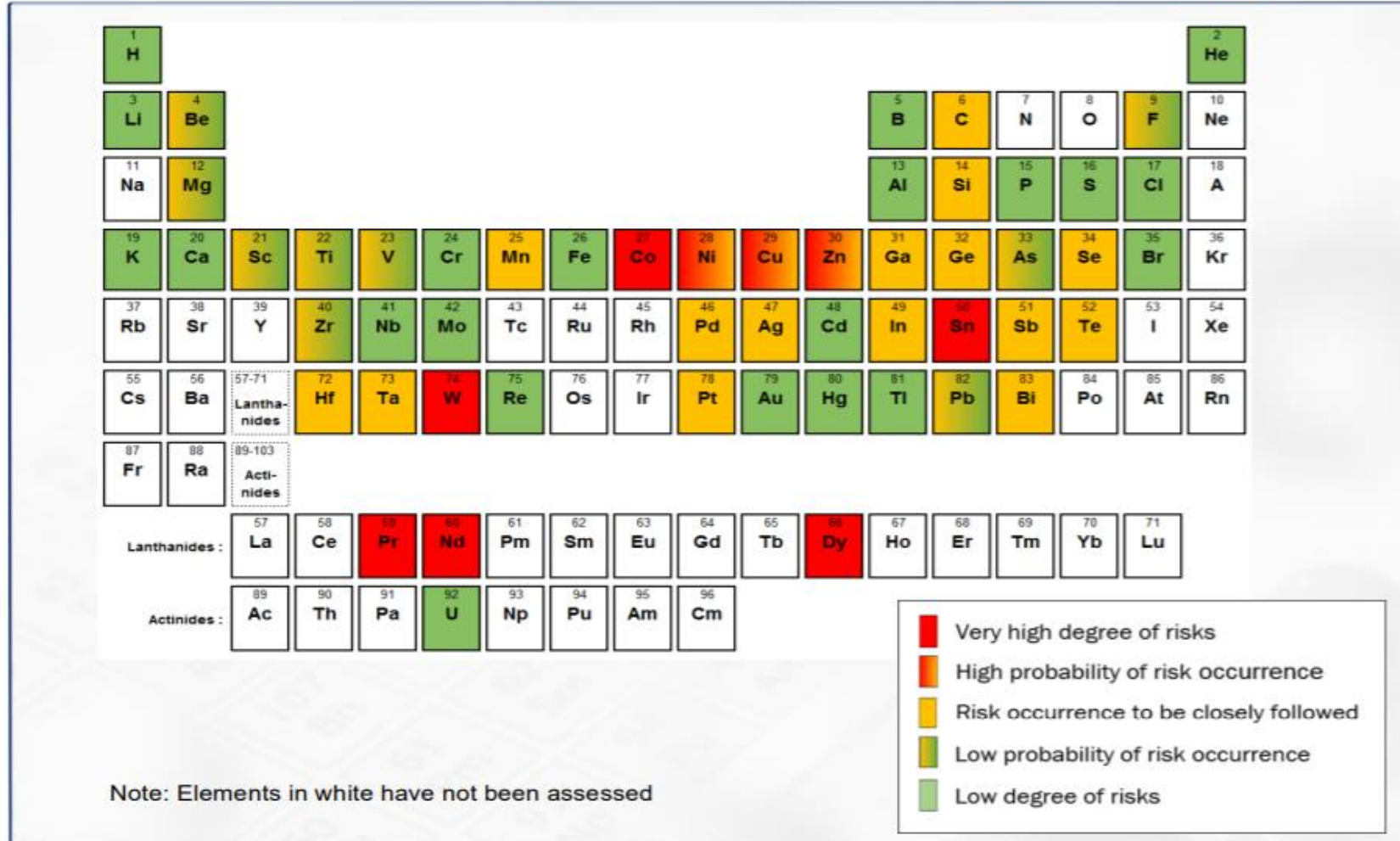
https://en.wikipedia.org/wiki/The_Limits_to_Growth



sopra  steria

CRM = Critical raw material

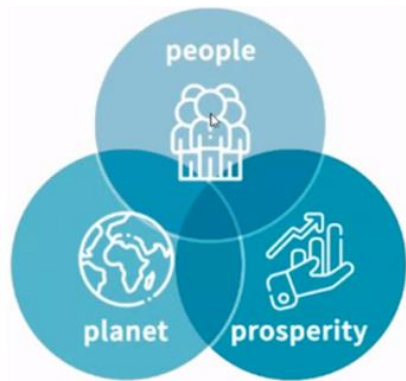
WMF Criticality assessment by BRGM, CRU & McKinsey



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

Sustainable IT formula

$$\text{Sustainable IT} \quad (\text{GDRP}) \\ = 3 \text{ P} + 17 \text{ SDGs} + 1 \text{ LCA} + 6 \text{ R} + 3 \text{ U}$$



+ Life Cycle Analysis +

Refuse
Reuse
Reduce
Repair
Reform
Recycle

+ Useful
Usable
Used