



# Introduction to Sustainable IT initiative

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AWARENESS PRESENTATION

ARISTOTE Seminar

Data Centers, IA, Cloud, High Performance Computing

Emmanuel LAROCHE

Sustainable IT Office

April 13th, 2023

**AIRBUS**

# OVERALL CONTEXT : the 3 P of Sustainability: Planet, People, Prosperity



## Environmental Impact

- **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 Airlines / 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

*Goal: increase sustainability and resiliency of our business*



# OVERALL CONTEXT

Avoid such a situation:

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



PG&E power lines were blamed for 2018's Camp Fire, the deadliest wildfire in California's history. But it was just one of 1,900 fires sparked by the utility since 2014, state investigators say. Here's the story of PG&E's missteps and why it ultimately filed for bankruptcy.

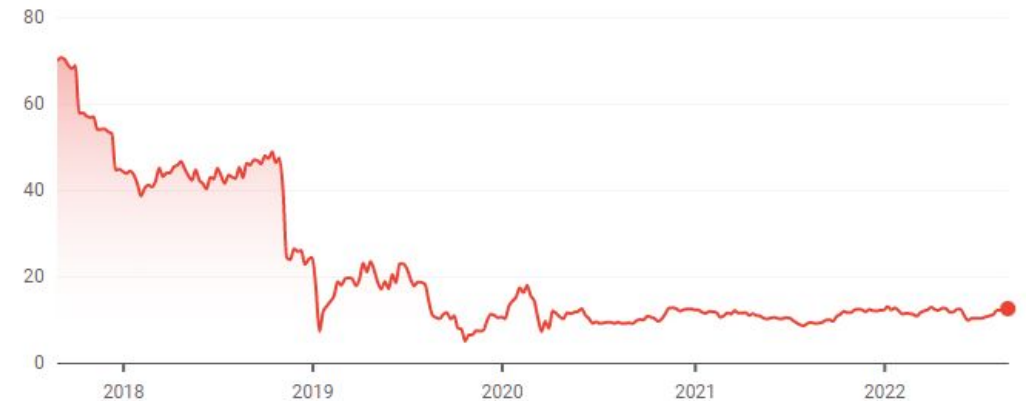
PG&E Corporation 

**\$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



# OVERALL CONTEXT



## Environmental impacts

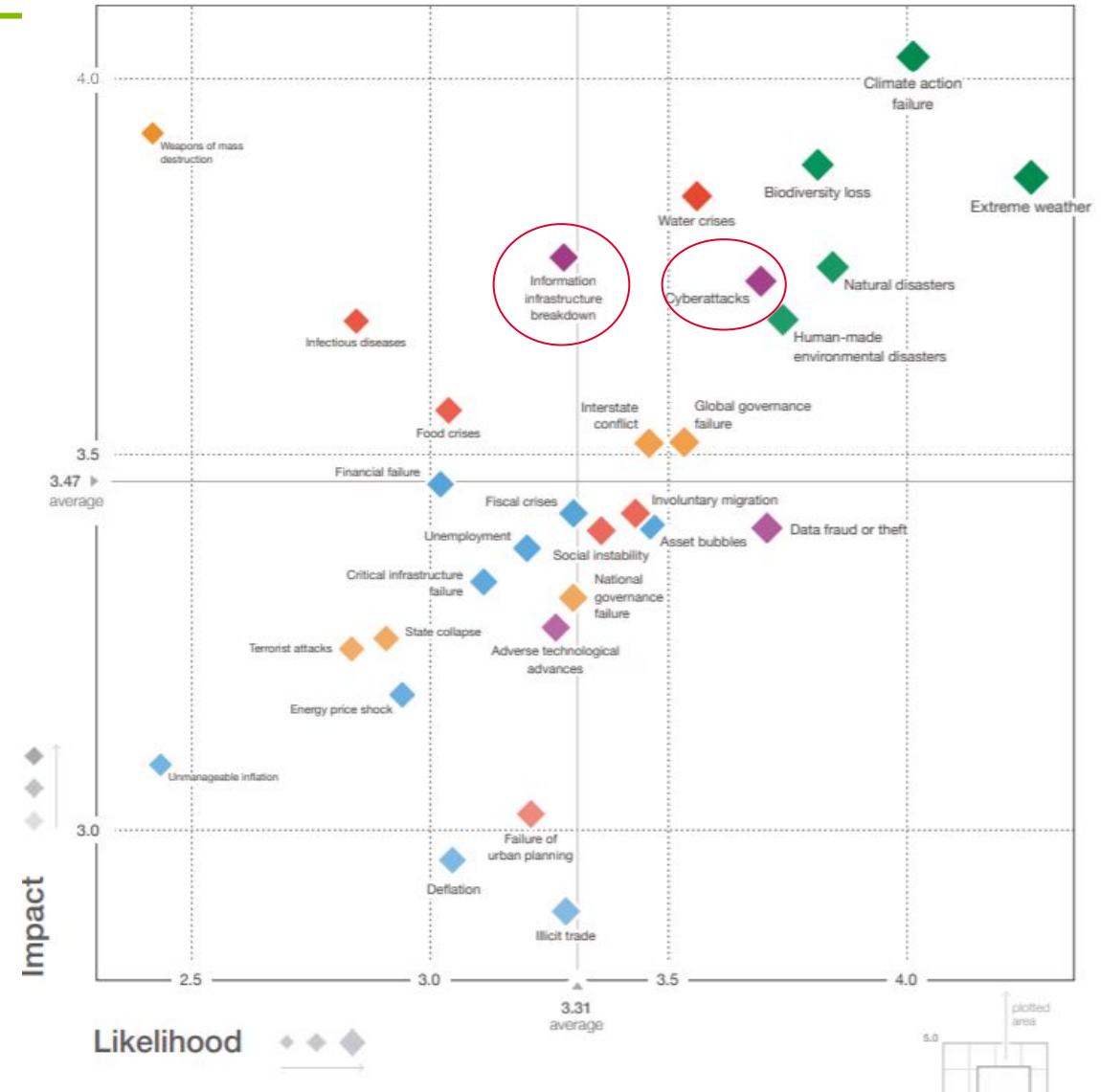
World Economic Forum: Top risks for Global Economy

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](http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf)



# OVERALL CONTEXT

## World Economic Forum: 2023 update

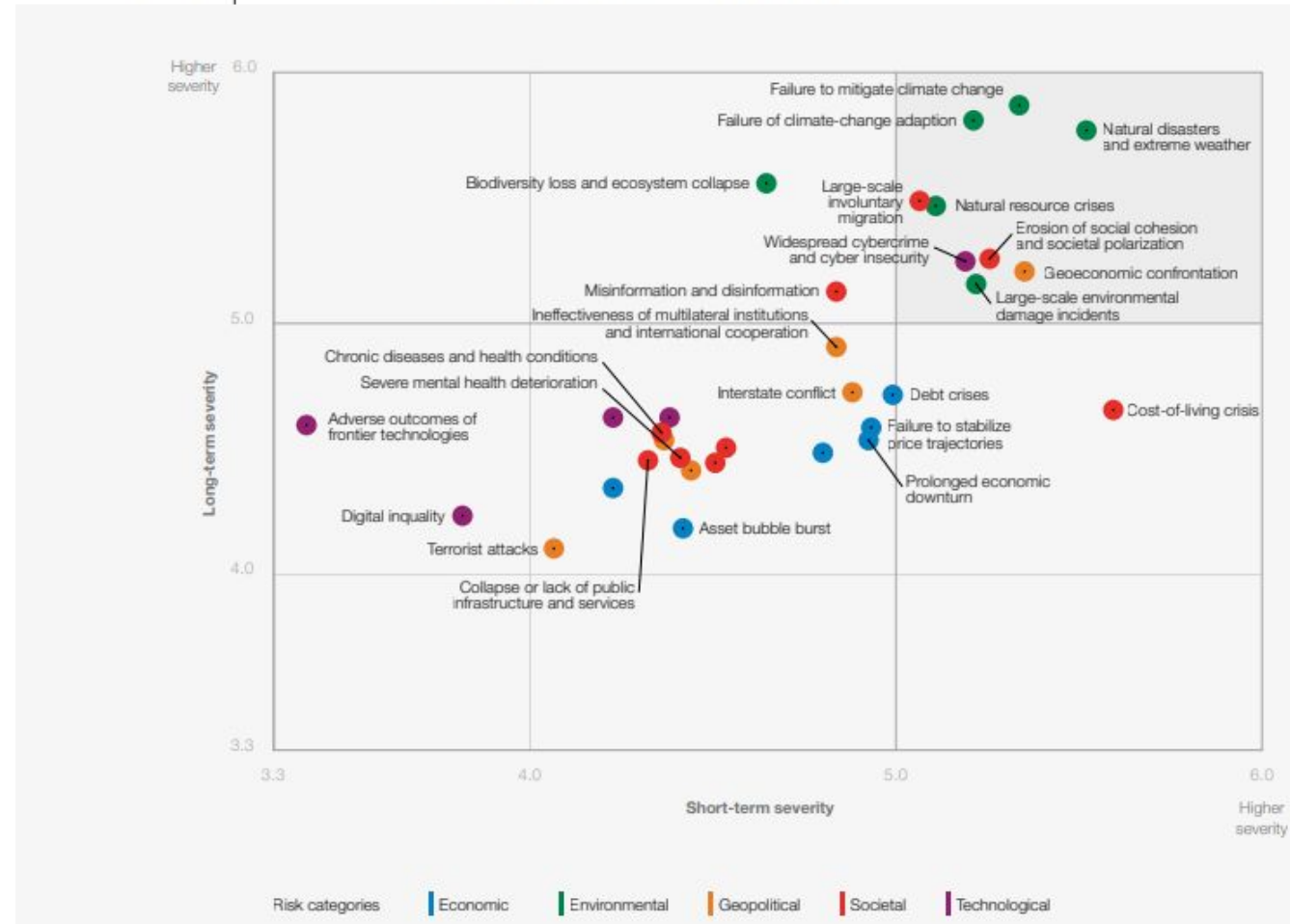
Pages 6 & 11 of

[https://www3.weforum.org/docs/WEF\\_Global\\_Risks\\_Report\\_2023.pdf](https://www3.weforum.org/docs/WEF_Global_Risks_Report_2023.pdf)



page 30

Relative severity of risks over a 2 and 10-year period



# CLIMATE FRESK



# OVERALL IT CONTEXT & INDIRECT IMPACTS



## Environmental impacts

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



Aerial view of the Dexing mine; photo by DXZSJ<sup>15</sup>



The devastated Le'an River; photo by Jiangxi Jxnews<sup>21</sup>

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)

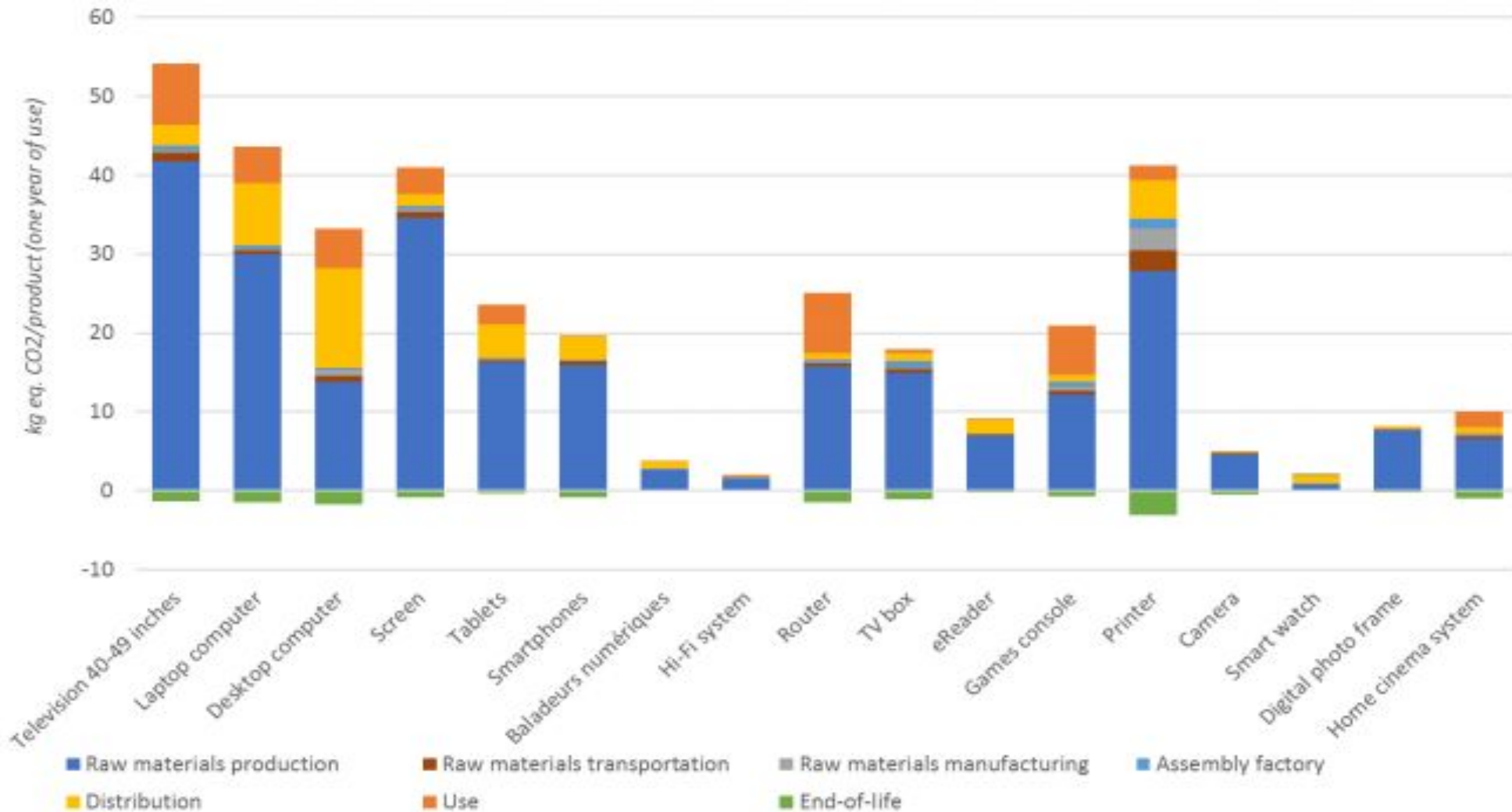
Interpol report:

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

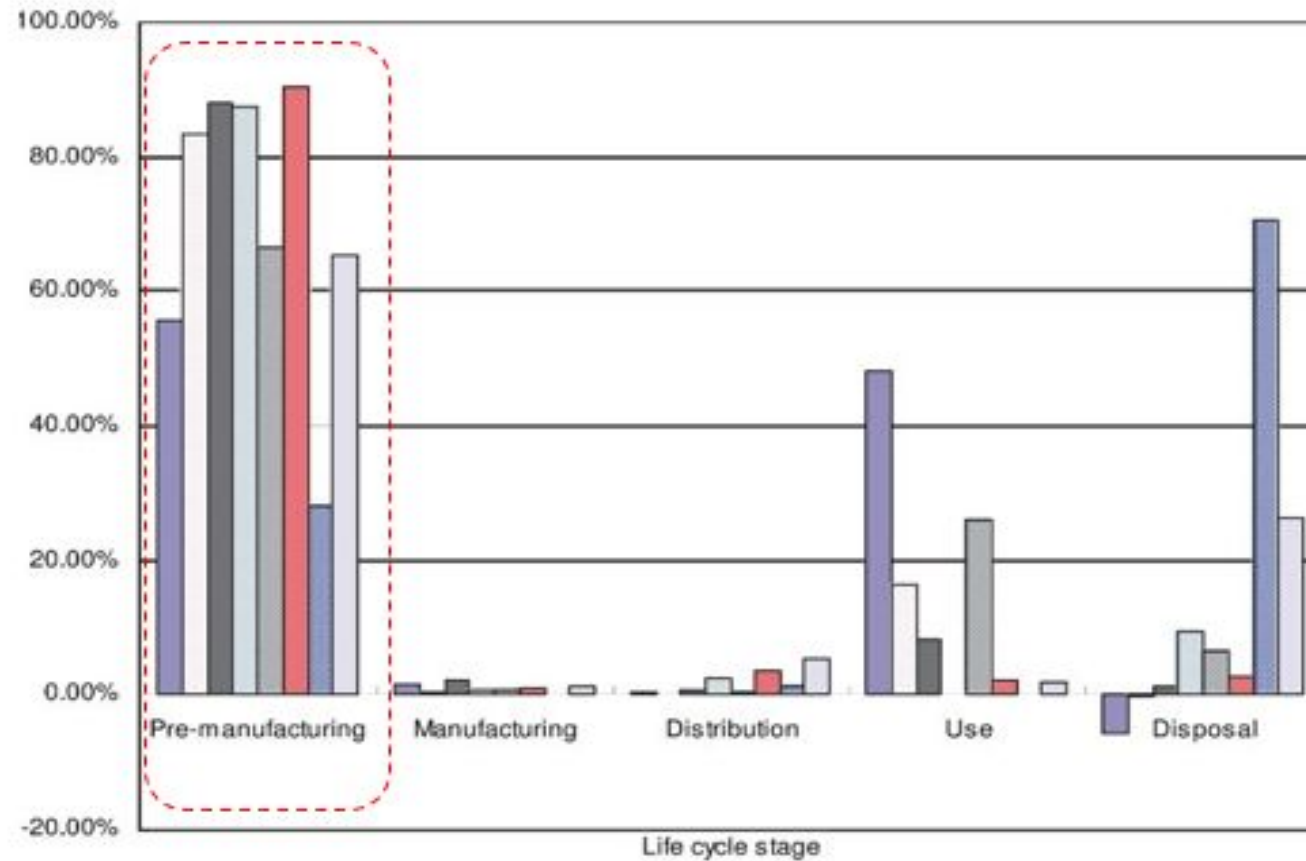
# LIFE CYCLE ASSESSMENT



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
- Eutrophication
- Photochemical oxidation
- Human toxicity
- Ecotoxicity

Sources : UC de PC coréen, taux de recyclage de 48%, Choi et al, 2006

# IT CHALLENGES



**Environmental & Energetic Transition**

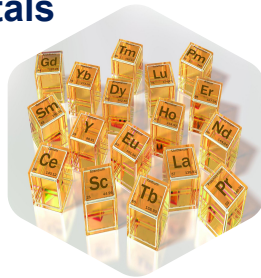


**Digital Transition**

*21<sup>st</sup> Century challenges*

**Conflicts of usage**

**Rare-earth metals**



**Metals depletion**

Power consumption (billion KWh)



15% of electricity production x 9,4



**Electricity consumption**



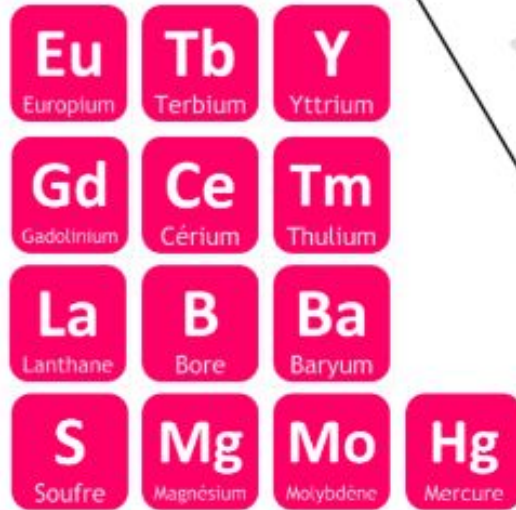
**Water**

# 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) [%]

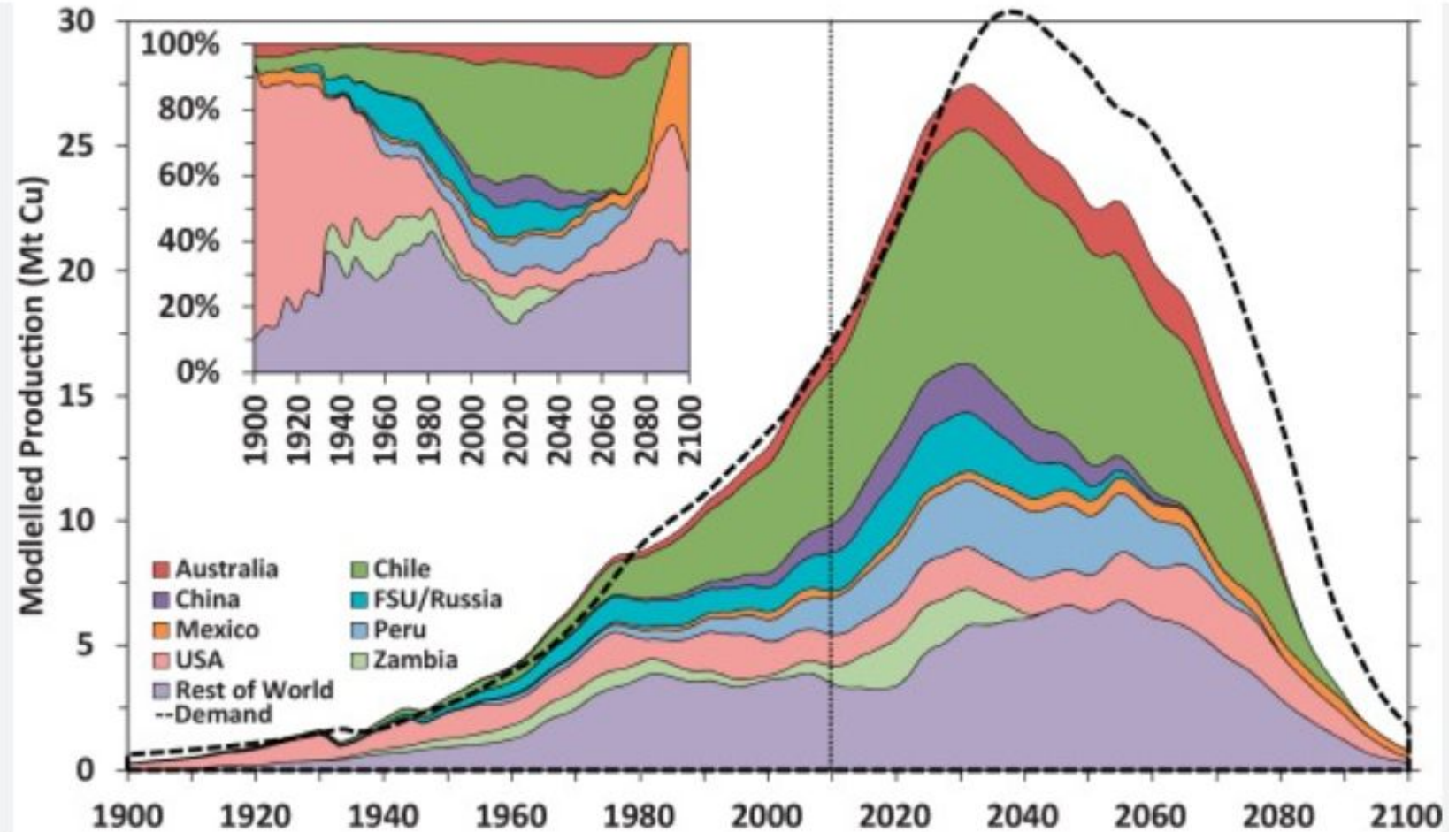
																<table border="1"> <tr> <td>&gt; 50%</td> <td>&gt; 25-50%</td> <td>&gt; 10-25%</td> <td>1-10%</td> <td>&lt; 1%</td> </tr> </table>					> 50%	> 25-50%	> 10-25%	1-10%	< 1%																
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<sup>1</sup> Group of Lanthanide	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
	1%	1%	10%	1%		1%	38%	1%	22%	0%	1%	0%	1%	1%	1%
<sup>2</sup> Group of Actinide	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

# RESOURCES DEPLETION

## Supply chain risks:

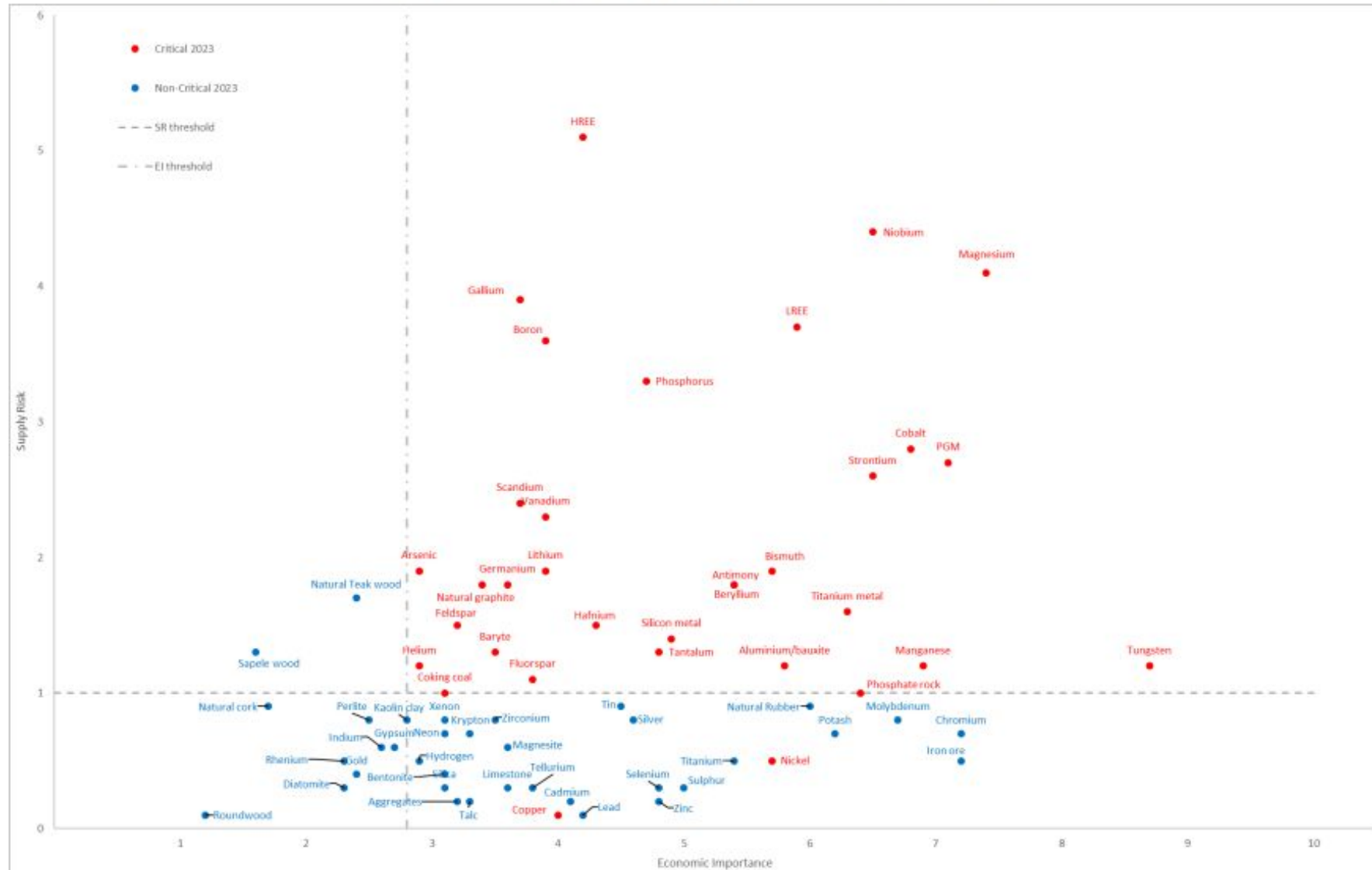
- ❖ Stability of Supply
- ❖ Price Stability
- ❖ Substitutability
- ❖ Recycling
- ❖ EU import dependency rate
- ❖ Scarcity
- ❖ Consumption (estimated future consumption vs reserves)
- ❖ Co-product



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

# CRITICAL RAW MATERIAL

Figure A: Results of the 2023 EU criticality assessment<sup>5</sup>



A synthesis  
of global risks  
of CRM from EU  
(yearly report &  
update).

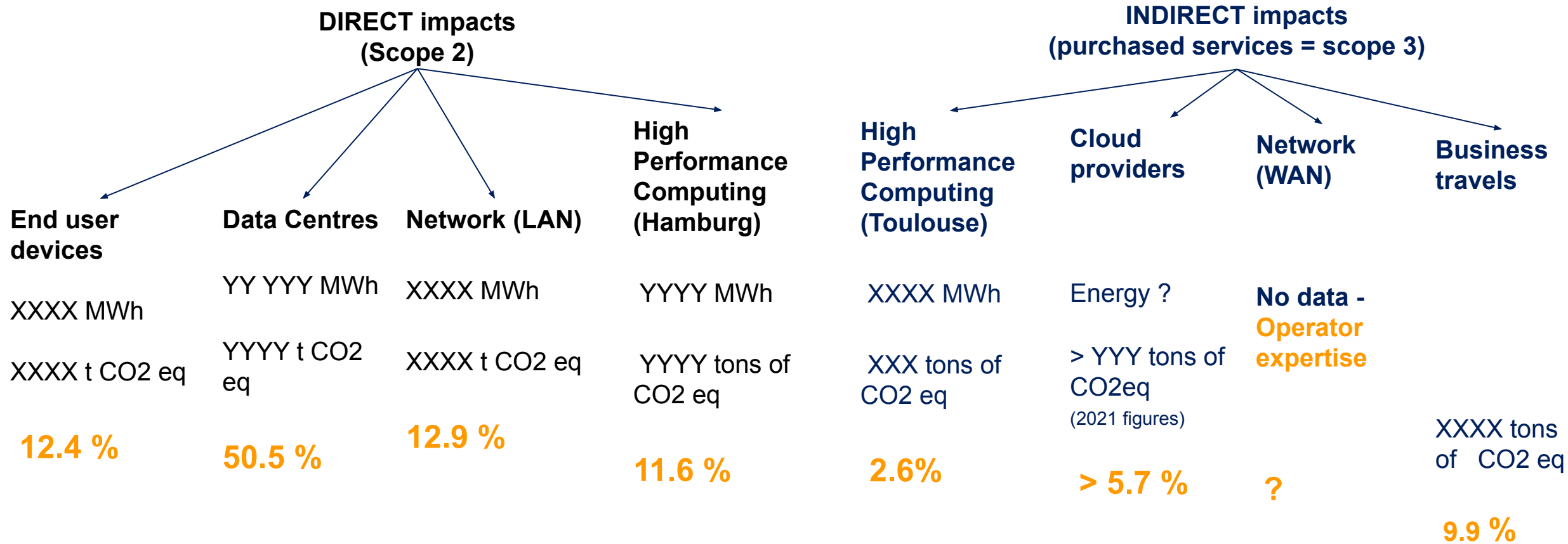
Page 5 of 2023 EU  
report:

<https://single-market-economy.ec.europa.eu/system/files/2023-03/Study%202023%20CRM%20Assessment.pdf>

# Baseline : Energy & CO2 equivalent

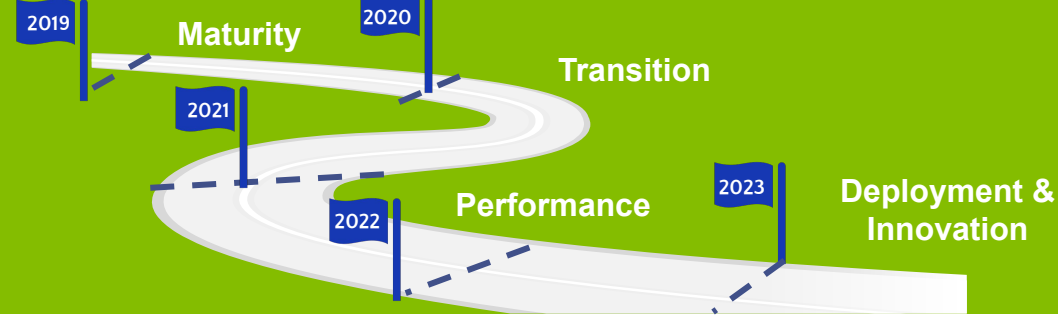


For 2022: IM consumed at least **XX XXX MWh of electricity**  
& generated at least **YY YYY tons of CO2 equivalent**



*Nota: Airbus Commercial European scope only - not a carbon balance  
Office buildings not considered - commuting not considered*

# Action plan



## Governance

- Annual targets
- Maturity & Perfo KPI
- Audit
- Benchmark
- CapEx
- Business case E / CO2



## Indirect Emission reporting

- **HPC**
- Cloud providers
- WAN (Orange, DT)

## Communication

- Internal communication
- External communication
- Websites & Accessibility
- Value chain influence: RFI for 50 suppliers

## Digital Services

- Criteria for sourcing
- **Sustainable by Design**
  - EcoDesign referential
  - Generic footprint evaluation
- Simplification and modularity of architecture (Tech Complexity Index)

## IT for Green opportunities:

- . "2nd Life" tool: reuse unused equipment instead of buying.
- . Digital signature tool to be promoted

## Competencies

- ISIT member
- Training offer in MyPulse
  - Awareness / MOOC
  - Life Cycle Assessment
  - Ecodesign
- INRIA-CNRS MOOC

## Data Centres

- Consumption & Efficiency monitoring
- Strategic study PUE
- Virtualisation & Decommissioning
- Masterplan

## IT equipment & devices

- Ecolabels
- Critical Raw Material
- e-Waste Management
- Obsolescence fighting



# SUFFICIENCY is mandatory



Cf. ADEME / ARCEP study:

<https://www.arcep.fr/la-regulation/grands-dossiers-thematiques-transverses/lempreinte-environnementale-du-numerique.html>

- What we **really need** to perform our **work efficiently** ?

*2 large screens ?*

*Bluetooth headset ?*

- HPC: % of computations that converge. Some quickwins sometimes (Ex: inverters deepsleep mode)
- How long do we store a recorded visioconference ? Camera shut down when not speaking ?
- Contribute to **decommissioning**...
- Data frugality.
- **IP fix phones removal.**
- Reuse existing tools, or modify them instead of creating additional ones from scratch
- To prevent **rebound effects**: MEASURE ! Ecodesign & LCA won't be able to do !

# Trainings

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INRIA MOOC:

<https://www.fun-mooc.fr/en/courses/environmental-impacts-of-digital-technologies/>

ISIT Academy:

<https://www.isit-academy.org/>

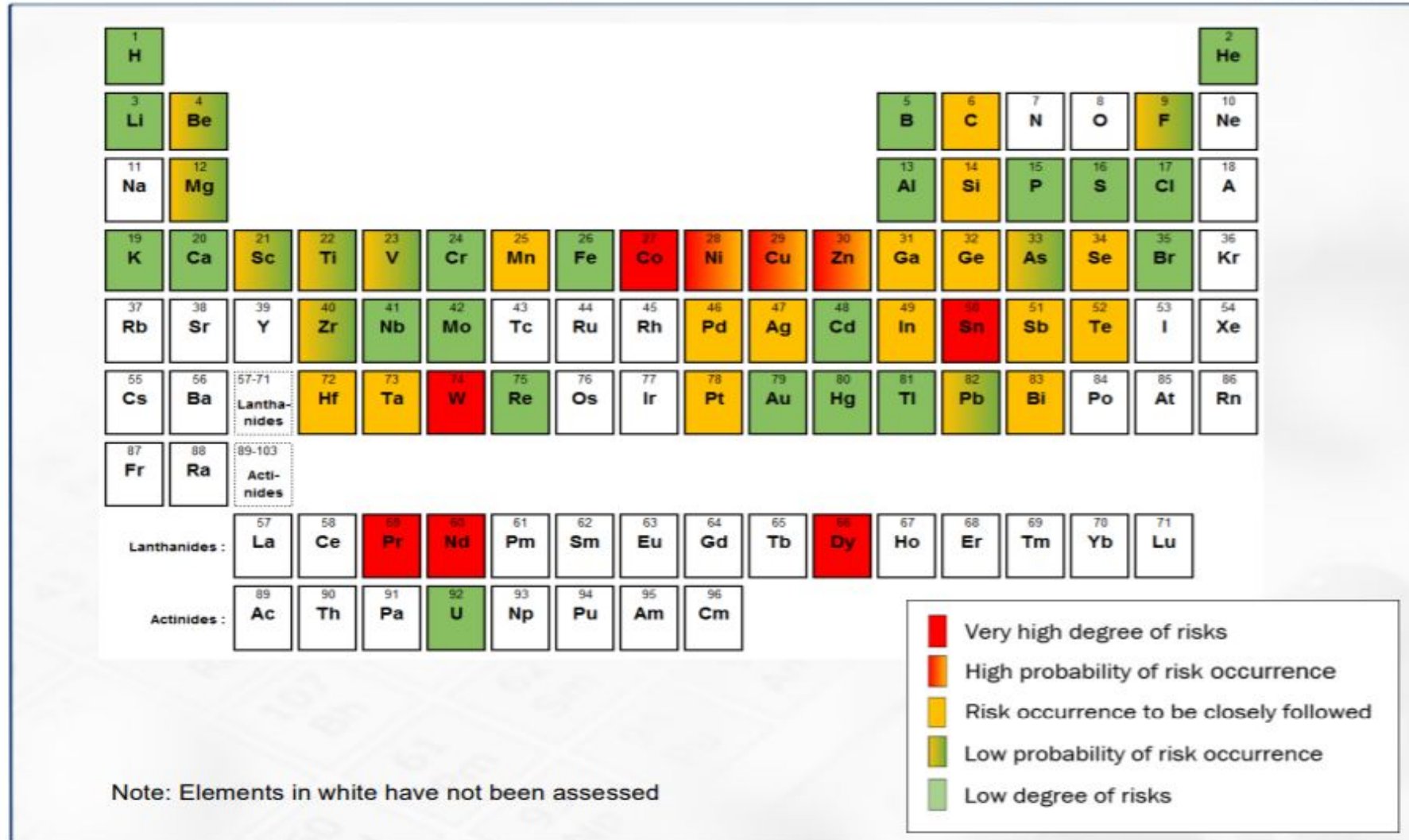


# THANK YOU

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# NON RENEWABLE RESOURCES DEPLETION

WMF Criticality assessment by BRGM, CRU & McKinsey



# GHG Protocol - Scopes 1, 2, 3; Carbon footprint

Source: PlanA, Computer Software, Berlin, GE



**CO<sub>2</sub> footprint Calculation:**

UBA

WWF

Brot für die Welt