



# Addressing environmental concerns in criticality of commodities

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## Environmental footprint - additional measure of criticality?

### Situation:

- Public perception is increasingly turning against mining but debate is not grounded in facts or the differing impact of each commodity
- Need to make best choices regarding the environmental impact of materials we are using as well as their inherent criticality

### Challenges:

- Data is hard to come by and to aggregate to anything meaningful
- Designing a new Criticality measure for WMF requires robust methodology and transparent data
- Needs to support decision making for consumers to have value

### WMF team proposal:

- Working with the WMF team we have developed a recommendation for a new criticality measure
- Using published data on narrow range of emissions and environmental impacts by commodity
- Open for discussion on the validity of this approach

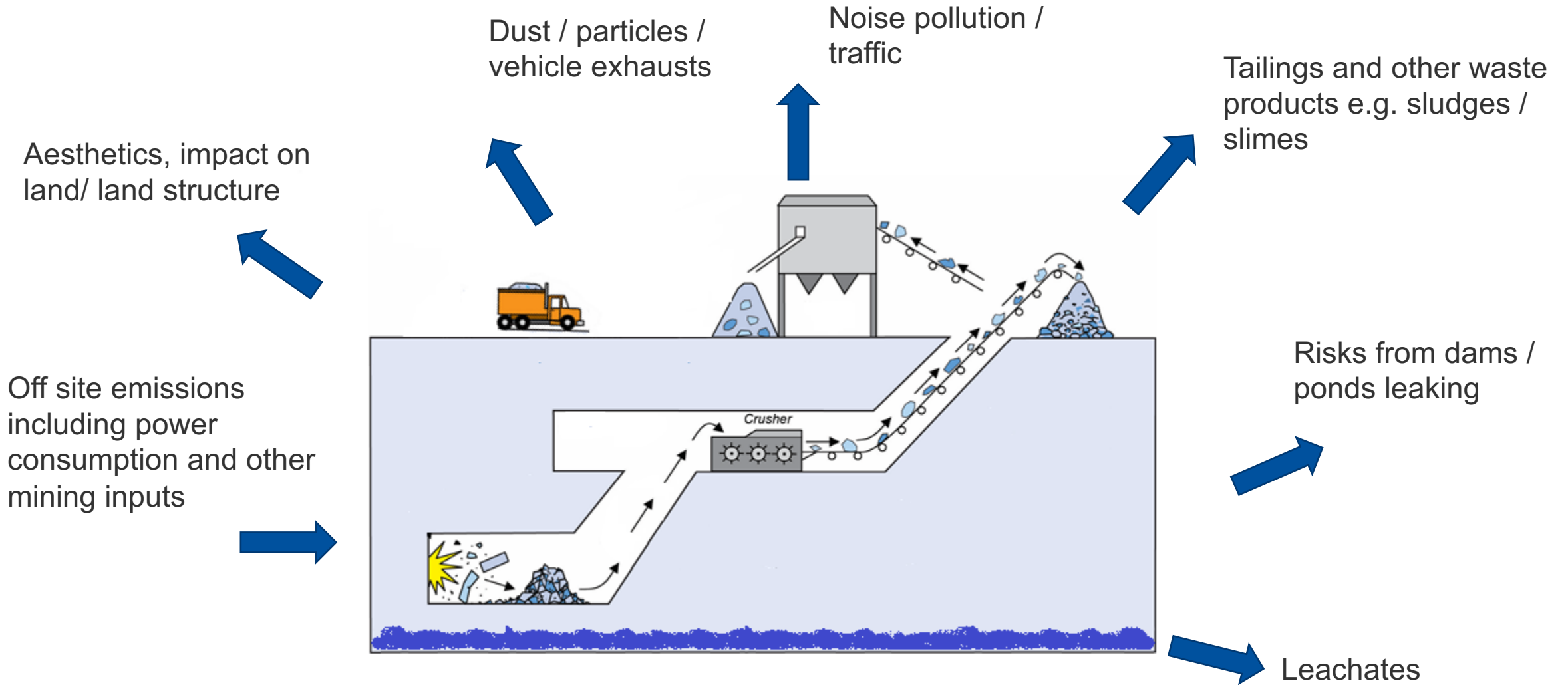
Let's look at this proposal in more detail

## SITUATION – more details

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1. Public perceptions of the mining industry can be influenced by lobby groups and coverage in the general press
2. Responsible sourcing of some commodities and environmental impact of mining are at the forefront of public consciousness
3. Both of these need to be independently and objectively reviewed
4. The role metals will play in the “green revolution” will highlight their own green credentials
5. Embedded carbon, waste, other emissions will all need to be considered
6. As consumers of metals, the need for information on their environmental credentials will become increasingly important
7. This will work to addressing public perceptions and will have important implications for the mining industry’s ability to adapt and grow

# What are the environmental impacts of mining?



## Challenges: What is realistic to measure and report on?

### **Some emissions are inherent and specific to the mining of the commodity**

- Where processes are known and are fairly homogeneous
- Where published data is available e.g. power and water consumption or CO<sub>2</sub> emissions

### **Refineries and the mixing secondary materials makes emissions per tonnes opaque**

- On the mine site emissions can be estimated with a level of accuracy
- Focus will therefore be limited to the mine site

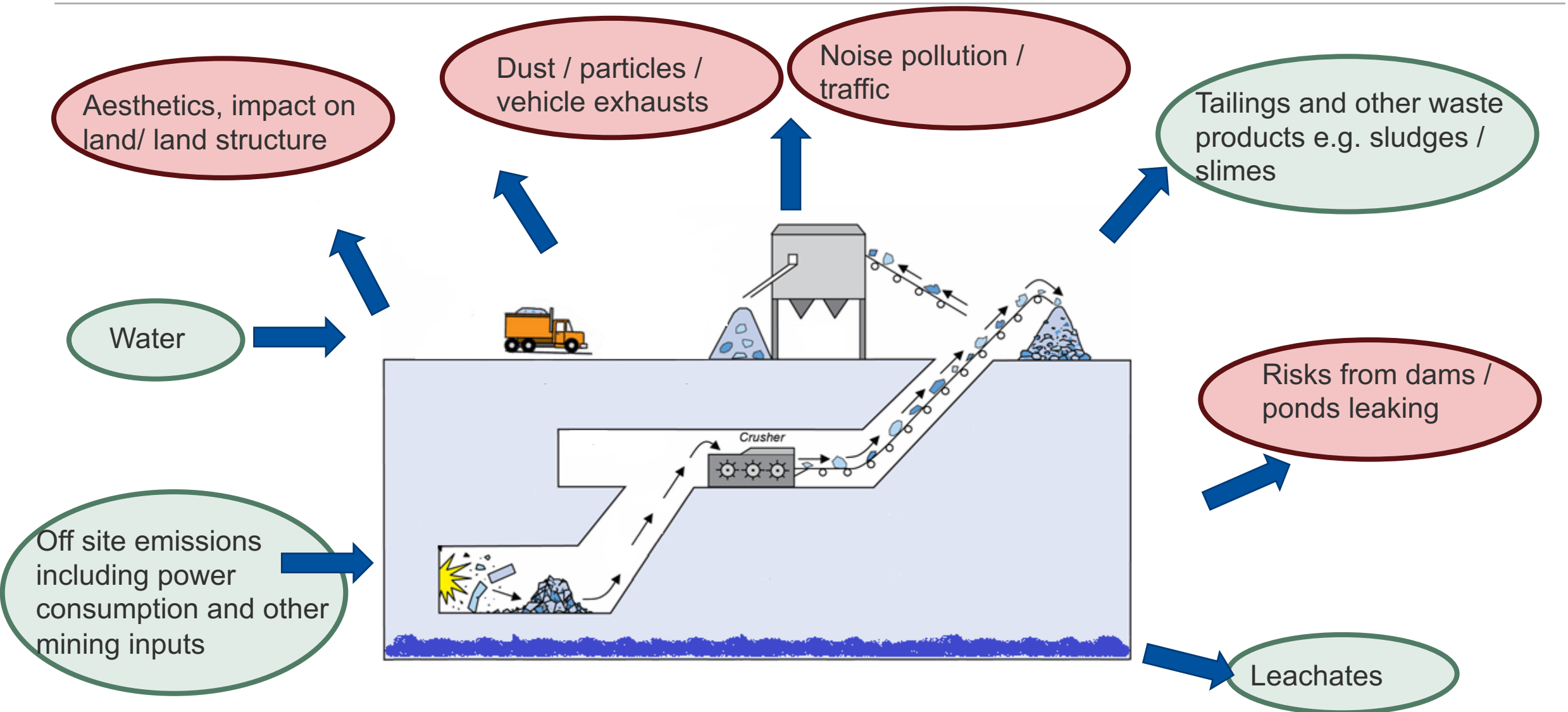
### **Some emissions are site specific and are not able to be modelled at a commodity level**

- E.g. on site solar power generation vs grid power
- SO<sub>x</sub> emissions depend on ore grades and capture technologies deployed
- Transport distances depending on distance of mine from transport infrastructure

### **Biproducts and co products can add confusions**

- Pb and Zn mined together
- Mo and Rh in Cu

# Which areas can we cover with our new measure?



## We designed new environmental-focused criteria

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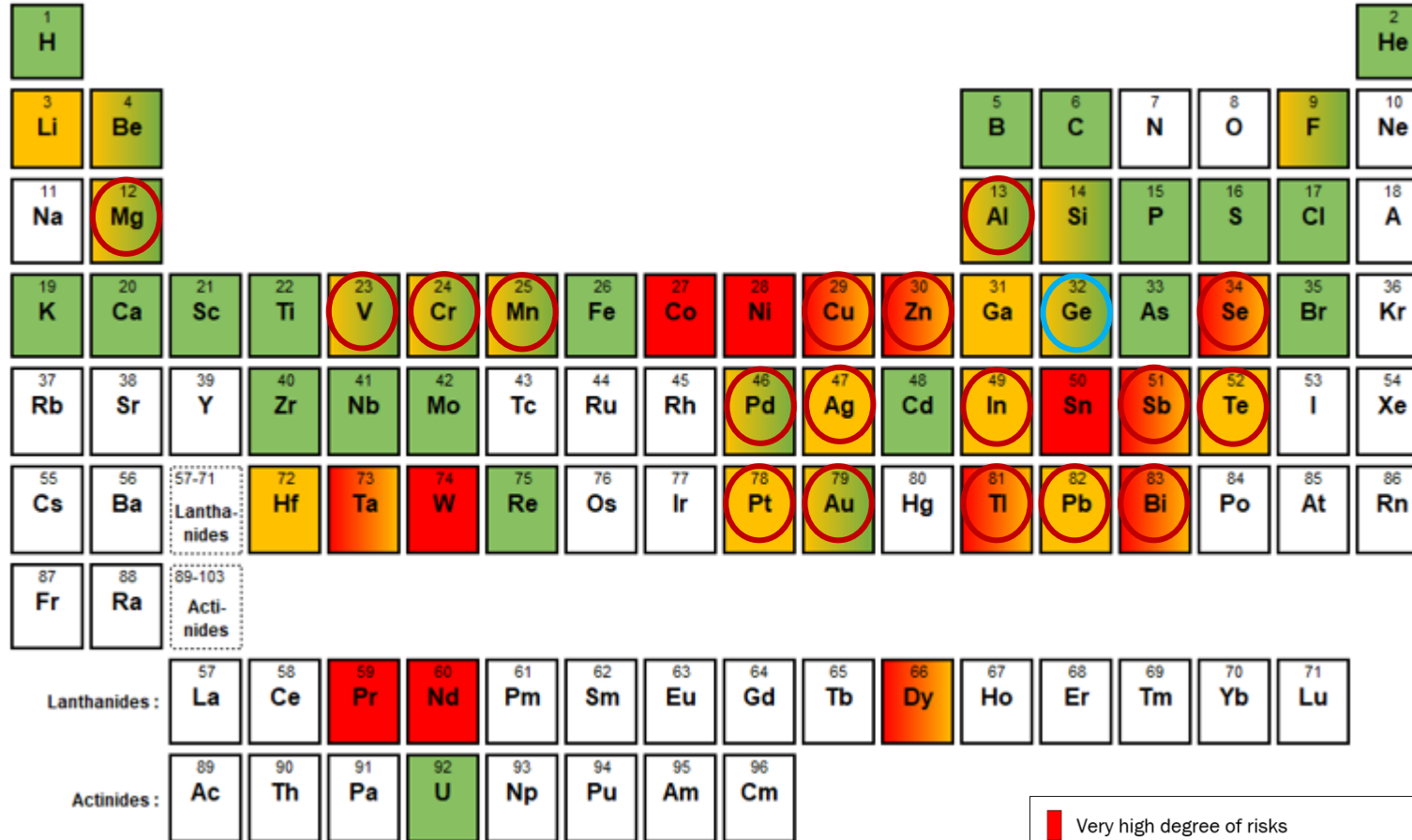
- We selected 6 new KPIs based on ifeu's Okoress academic research
- Each KPI is assigned a score from 1 to 3 by element
- They are then split into two scores in the index:
  - Average of Ifeu's KPIs 1, 4, 5 & Governance, and
  - Average of water (WSI) & energy (SEF) KPIs
- To accommodate the new criteria, colour scale for WMF KPIs is translated by +4 so the "Red" boundary continues to be set at 2 points lower than the highest score i.e. changes from 12 to 16

## Detail of the measure being proposed

Criteria	KPI Type	KPI	Score = 1	Score = 2	Score = 3
Environmental	<b>Geology (1)</b>	Pre-conditions for AMD	Geochemical preconditions for AMD do not exist	Geochemical preconditions for AMD exist in part	Geochemical preconditions for AMD exist
	<b>Technology (4)</b>	Mining method	Commonly extracted in underground mines	Commonly extracted from solid rock open pit mines	Commonly extracted from alluvial or unconsolidated sediments and/or dredging in rivers
	<b>Technology (5)</b>	Use of auxiliary substances	Standard extraction & processing methods without auxiliary chemicals	Standard extraction & processing methods using auxiliary chemicals	Standard extraction & processing methods using toxic reagents and auxiliary chemicals
	<b>Environmental governance</b>	Environmental governance	Weighted EPI according to production share of producing countries $\leq$ 25% quantile of EPI for 180 countries	Weighted EPI according to production share of producing countries $>$ 25% quantile and $\leq$ 75% quantile of EPI for 180 countries	Weighted EPI according to production share of producing countries $>$ 75% quantile of EPI for 180 countries
Energy & Water	<b>Energy</b>	Size of energy flow	$\leq$ 25% quantile of the 52 raw materials with available data	$>$ 25% quantile and $\leq$ 75% quantile of the 52 raw materials with available data	$>$ 75% quantile of the 52 raw materials with available data
	<b>Water</b>	Water Stress Index (WSI) and desert areas	$\leq$ 25% quantile of the combined assessment result of the 42 raw materials with sufficient data availability	$>$ 25% quantile and $\leq$ 75% quantile of the combined assessment result of the 42 raw materials with sufficient data availability	$>$ 75% quantile of the combined assessment result of the 42 raw materials with sufficient data availability



# Summary of changes if we include new criteria this year

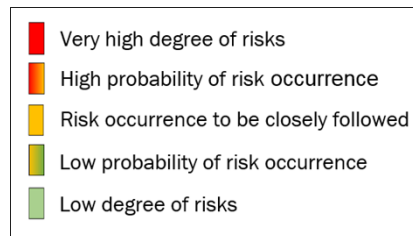


Inclusion of the proposed environmental KPI moves a number of the elements on the combined scale:

- No new red
- 2 new red/orange - Copper and Zinc

QUIZ: Should we make this change for next year?

- Less critical with new criteria: 1 element
- More critical with new criteria: 18 elements





THANK YOU

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