

ENVIRONMENT, SOCIAL, GOVERNANCE IN MINING

SATARLA WEBINAR



27th April 2021

ENVIRONMENT, SOCIAL, GOVERNANCE RISKS IN MINING

Dr Sarah Gordon & Laura Mallabone
Co-founders Satarla



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Contents

1. What is included in mining?
2. What is ESG?
3. Why is ESG increasingly important?
4. Risk management as a tool to manage ESG

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**What is included
in mining?**



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During a virtual conference in May 2020 we asked attendees what they thought a mine looked like.....

OUR MINE PERSPECTIVES

www.responsibleawmaterials.com

Our Mine Perspectives: inspired by research by Anthea Lacchia, iCRAG

RESPONSIBLE RAW MATERIALS

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Whose perspective?

geologist	No experience in mining	regulator	engineer	12-year old (with a passion for Minecraft)
		economist		

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Most people focus(ed) on the hole in the ground.... But the mining industry includes far more than this.

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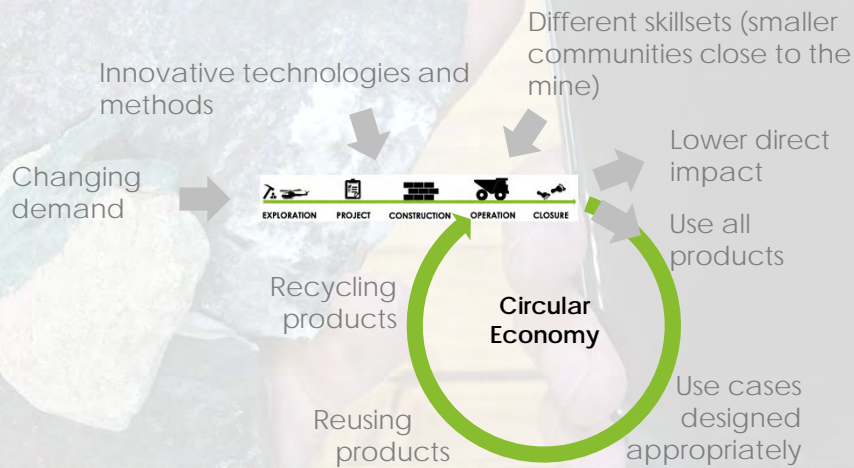


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Mining – feeding the circular economy



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Mining – the big picture

Responsible mining

Responsible finance – leverage UK expectations (Modern Human Slavery / London Stock Exchange etc)

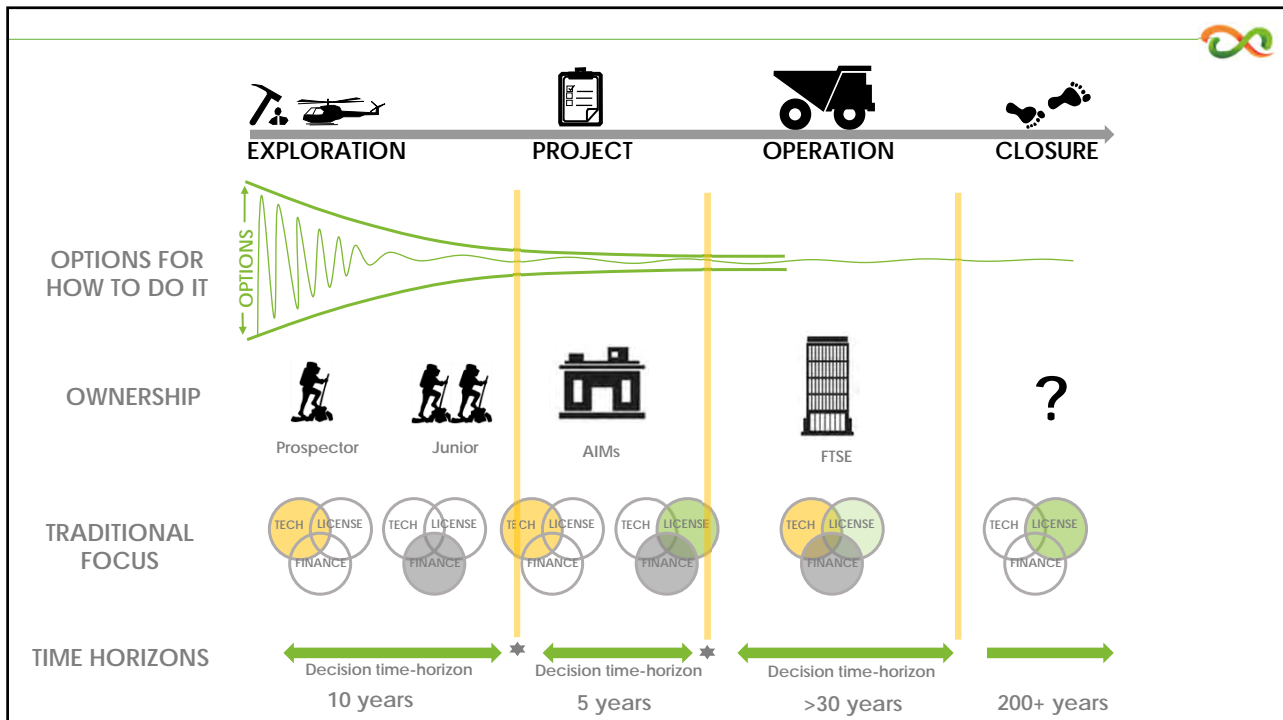
Regulation and policy – focus on e.g. energy transition



Design and innovation of e.g. new batteries – be cognisant of materials required AND design to be reused / recycled

Mine our human landscape / waste. The “easiest” mine is that which we have already mined...

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INTRODUCTION TO MINING FACTSHEET
IF YOU CAN'T GROW IT YOU HAVE TO MINE IT

GEOLGY ROCKS - MINERALS - ELEMENTS
Earth was formed 4.56 billion years ago and continues to evolve today. Chemical elements are concentrated in very specific areas through processes such as plate tectonics and volcanism. Rocks are formed of minerals which in turn are composed of chemical elements.

THE ROCK CYCLE
Igneous Rocks, Sedimentary Rocks, Metamorphic Rocks, and Quaternary Rocks are shown in a cycle.

EVERY SUCCESSFUL MINE NEEDS:
ORE (technical skills to mine), LICENSE TO OPERATE (Permitting to mine), FINANCE (Money to finance finding, construction and ramp up).

RISK PROFILE
As well as ore, a mine has to operate and finance, mining requires a large number of inputs, and generates numerous outputs. Any successful mine must manage these risks to the advantage of the owner.

MINING VALUE CHAIN
Inputs: Exploration, Development, Construction, Operation, Closure. Outputs: Products, By-products, Waste, Environmental, Social, and Governance (ESG) impacts.

VARIATION
Every commodity, ore body, and product is different and therefore requires a unique value chain.

KEY WORDS
RESOURCE: A concentration of naturally occurring solid, liquid or gas in the Earth's crust from which an extractable commodity can be obtained economically.
RESERVE (synonymous with 'One'): That part of a resource that can be economically and legally extracted under current circumstances.
GRADE: Concentration of the desired element in the rock, concentrate or leachate.
GANGUE: Unwanted (waste) minerals in rock.

RECOVERY: The fraction of the desired commodity recovered during processing.
SMELTING: A high-temperature process in which an ore is melted with fluxes to separate the desired metal from the waste material.
TAILINGS: The waste material left over after the process of separating the valuable fraction from the uneconomic fraction (gangue) of an ore. Can include tailing, mine dumps, slimes, tails, refuse, waste rock, etc.

MINING VALUE CHAIN
FIND (RESEARCH & DISCOVERY)
1. **TARGET GENERATION**: Identify where in the world you might find a resource using a regional risk tool. Incorporate elements such as geology, infrastructure and political risk.
2. **TARGET IDENTIFICATION**: Remote sensing, geophysics, geochemistry, and geology techniques used to identify anomalies. Many resources are not visible on the surface.
3. **TARGET DEFINITION**: Drilling used to prove the presence of resources underground.
PROJECT (RESERVE & BUILD)
4. **EVALUATION**: Conceptual, pre-feasibility and feasibility studies. Include metallurgists, miners and engineers to ascertain if the resource can be mined and processed economically.
5. **DEVELOPMENT**: Pre-production technical studies to fine-tune the mining and processing method, followed by mine development, construction and ramp up.
PROCESS (CONCENTRATE)
Concentrating the desired element to the state in which it can be sold. Typically takes place in a series of plants including concentrators, smelters and refineries. Every ore / product requires a different selection and configuration of the following methods:
PHYSICAL PROCESSING: Liberation techniques such as crushing, screening and grinding are used to break rocks down to their mineral components. Separation techniques such as flotation are used to separate one minerals from waste minerals (gangue).
CHEMICAL PROCESSING (Hydrometallurgy): Concentration of desired elements by chemical means. Methods include leaching, solvent extraction, electrowinning, ion exchange, precipitation and crystallisation.
THERMAL PROCESSING (Pyrometallurgy): Concentration of desired elements by heat. Methods include drying, roasting, smelting, refining and casting.
MINE (EXTRACT THE ORE)
SURFACE (open pit): An open hole in the ground where both ore and waste are moved.
UNDERGROUND: Multiple methods comprising of underground tunnels which allow ore and minimal waste to be extracted.
SHIP
Products and by-products may be produced at any stage of the value chain and sold. Shipping of products is undertaken by methods such as train, ship and helicopter.
CLOSE (MINE CLOSURE)
ENVIRONMENTAL & SOCIAL LEGACY is a major component of closing mines and plants. Budgeting and planning for this should be undertaken in the project stage.

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What is ESG?



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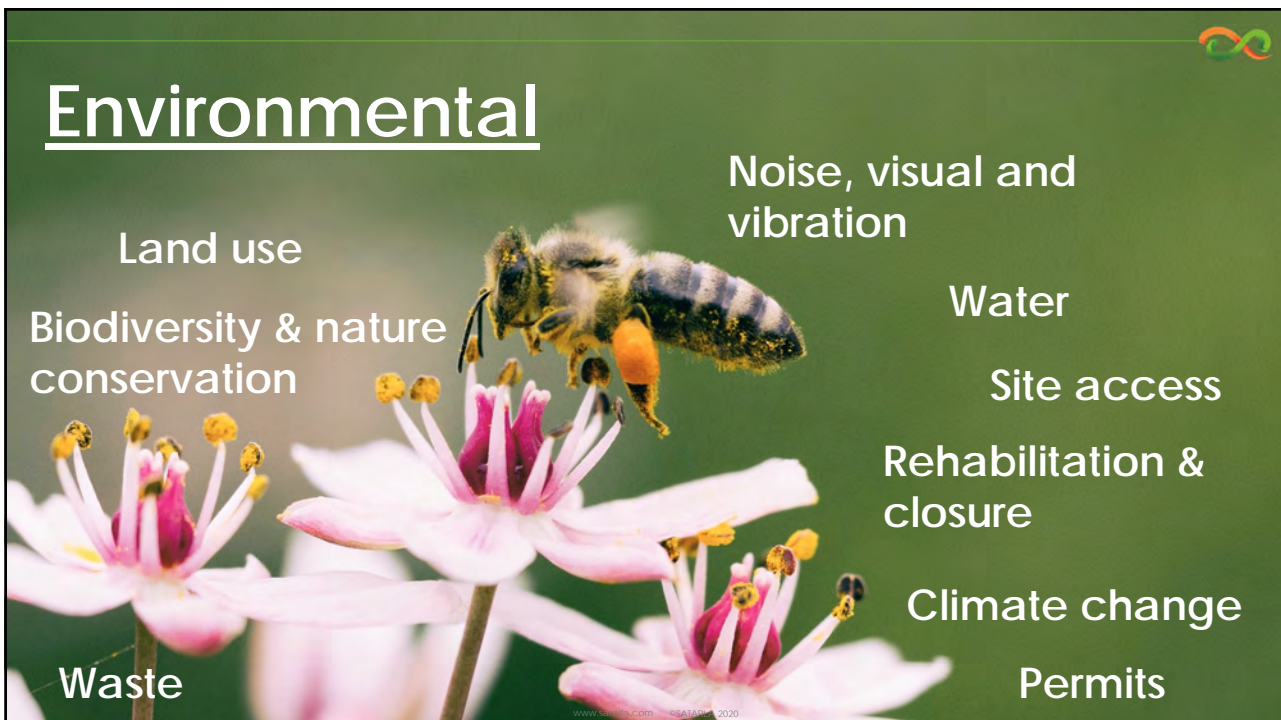


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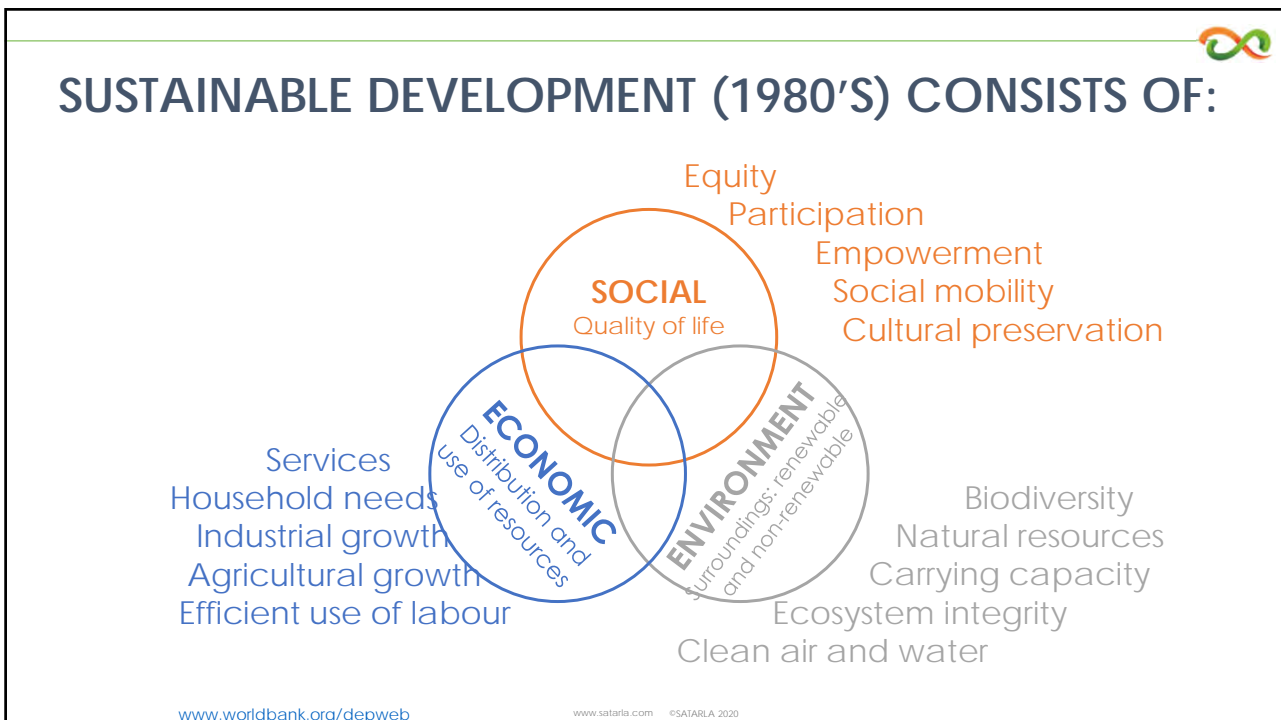
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SUSTAINABLE DEVELOPMENT GOALS (SDGs) (2015):



www.globalgoals.org/

<https://www.youtube.com/channel/UCRfuAYy7MesZmgOi1Ezy0ng/>

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SUSTAINABLE DEVELOPMENT GOALS (SDGs):

Adopted by 193 governments on the 25th September 2015 the SDGs outlines a plan to: *"end poverty, combat climate change and fight injustice and inequality"* www.globalgoals.org

17 goals
169 targets*
304 indicators*

[* likely to change].

The SDGs replaced the 8 Millennium Development Goals that were established in 2000.

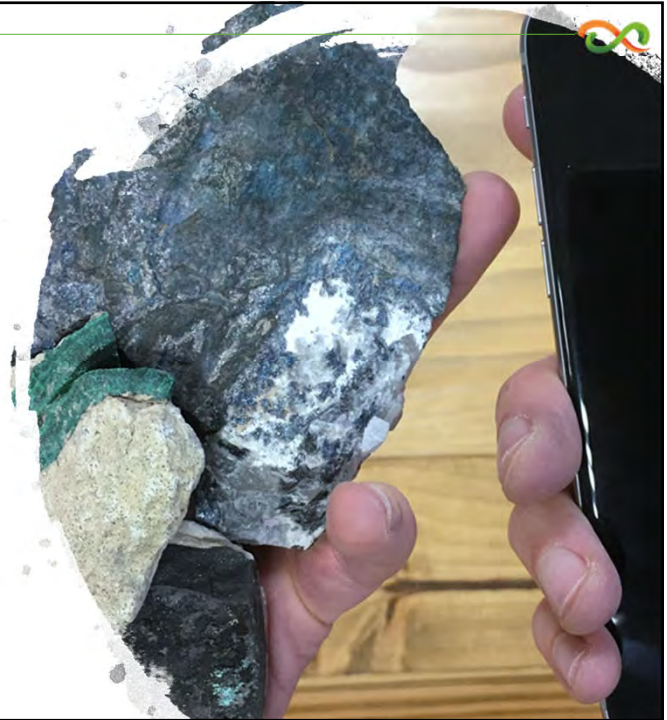
www.globalgoals.org/

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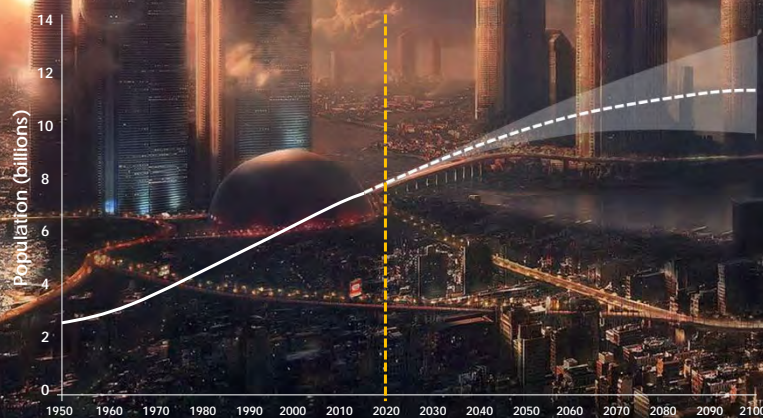
**Why is ESG
increasingly
important?**

**(In mining and all
other sectors?)**



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9.8 billion people by 2050



UN, Department of Economic and Social Affairs, Population Division (2017)

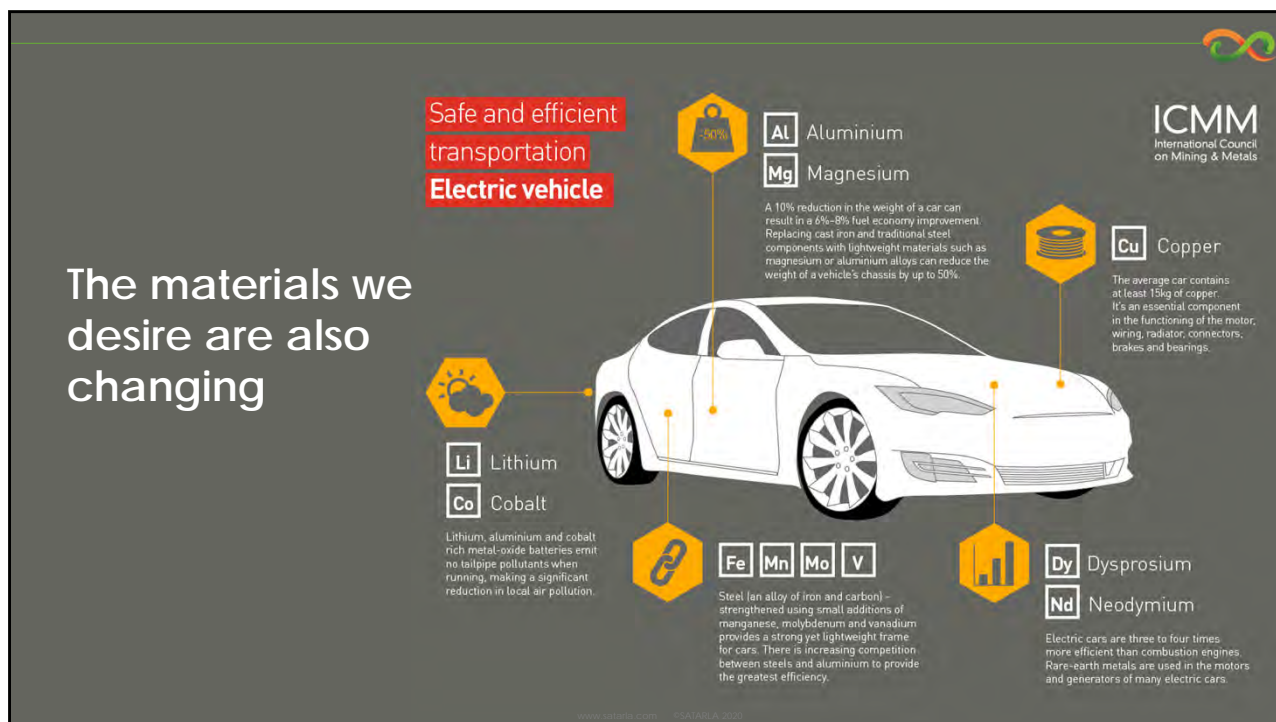
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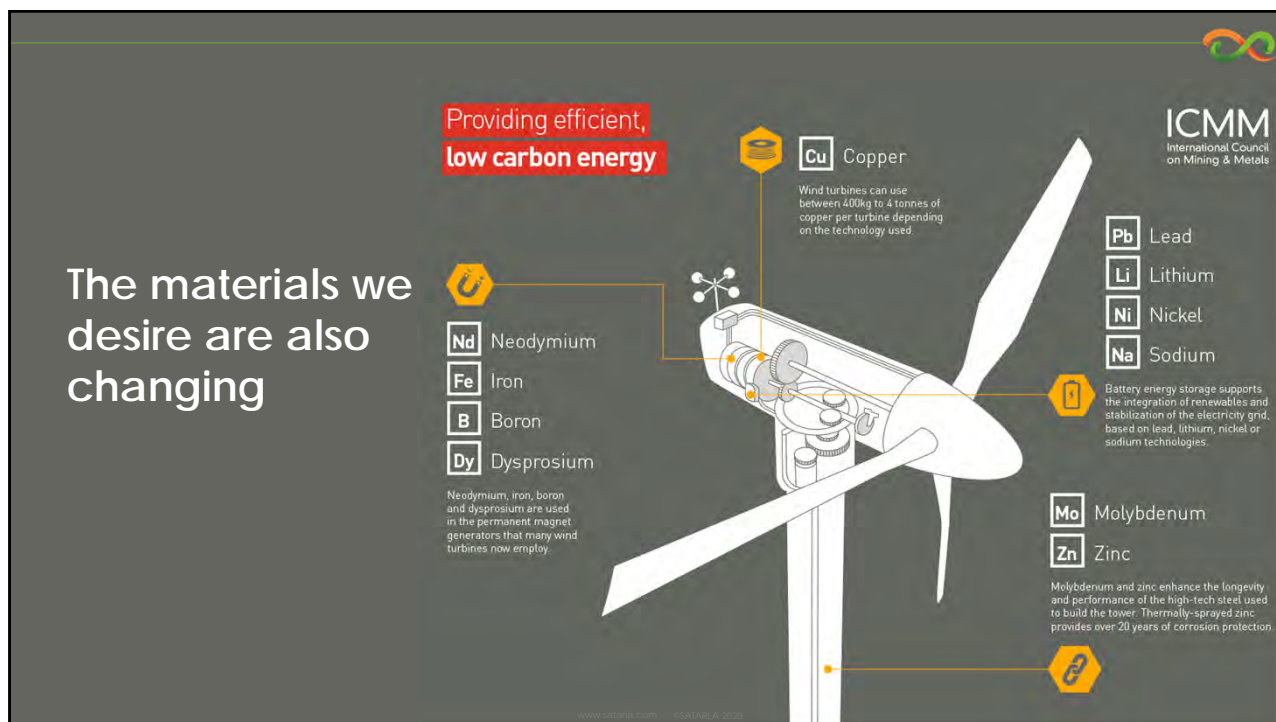
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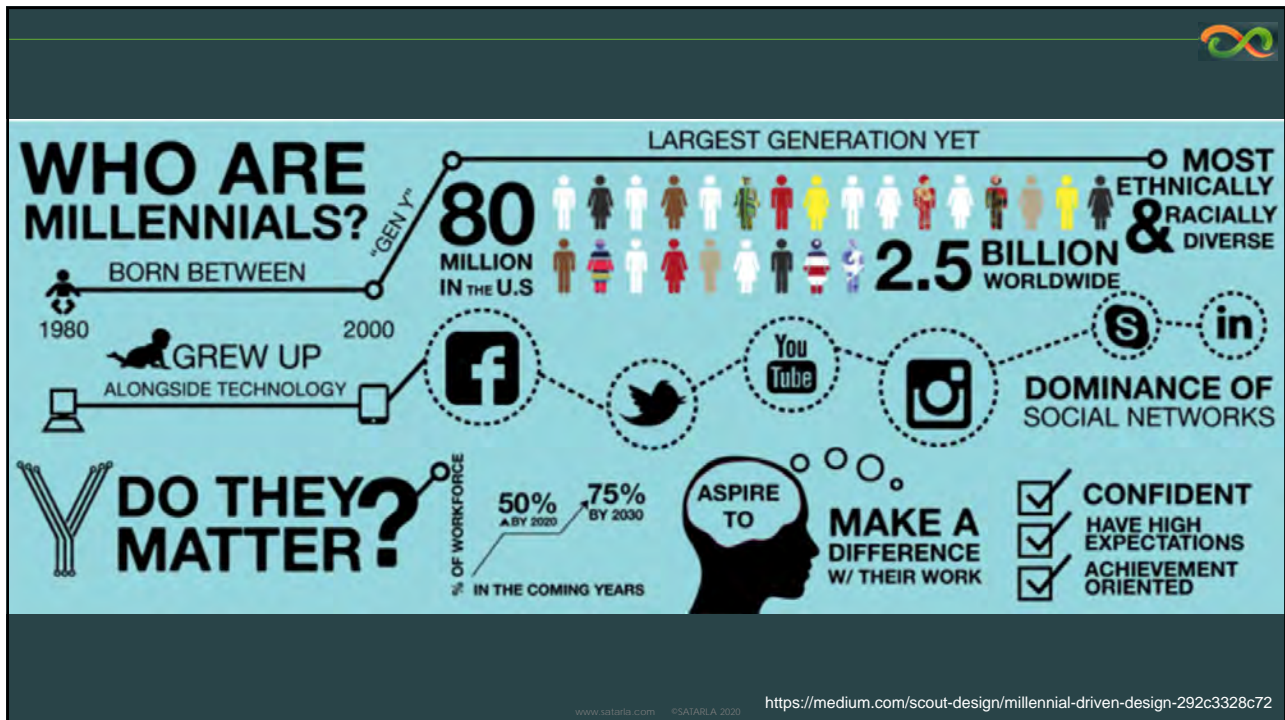
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Chocolate to Cobalt...

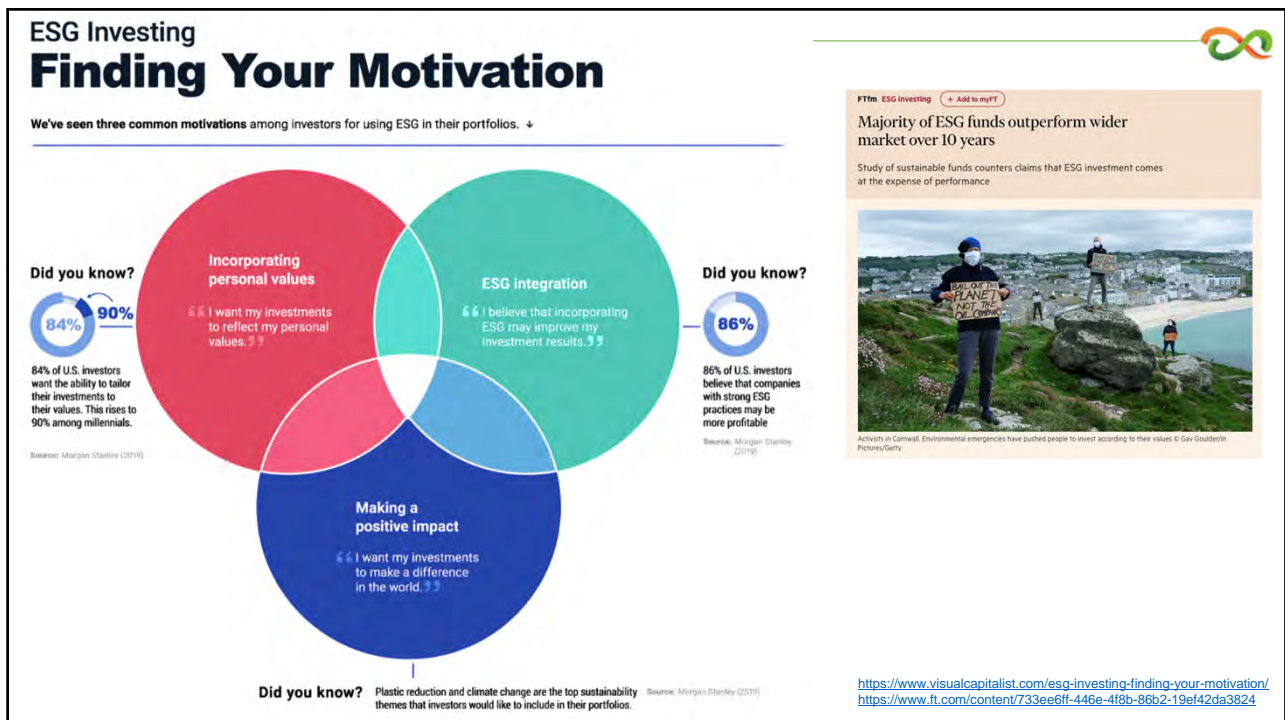
We are becoming increasingly aware and concerned of the provenance of our raw materials

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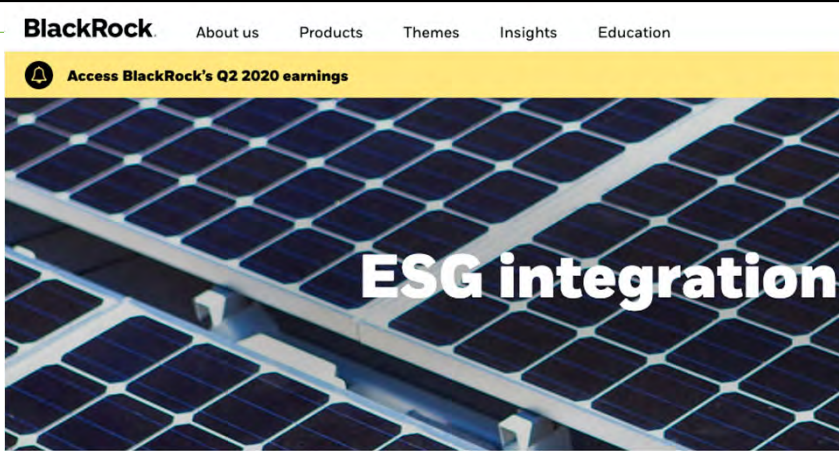


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Not just us as consumers, also investors, insurers, regulators, etc.



BlackRock About us Products Themes Insights Education

Access BlackRock's Q2 2020 earnings

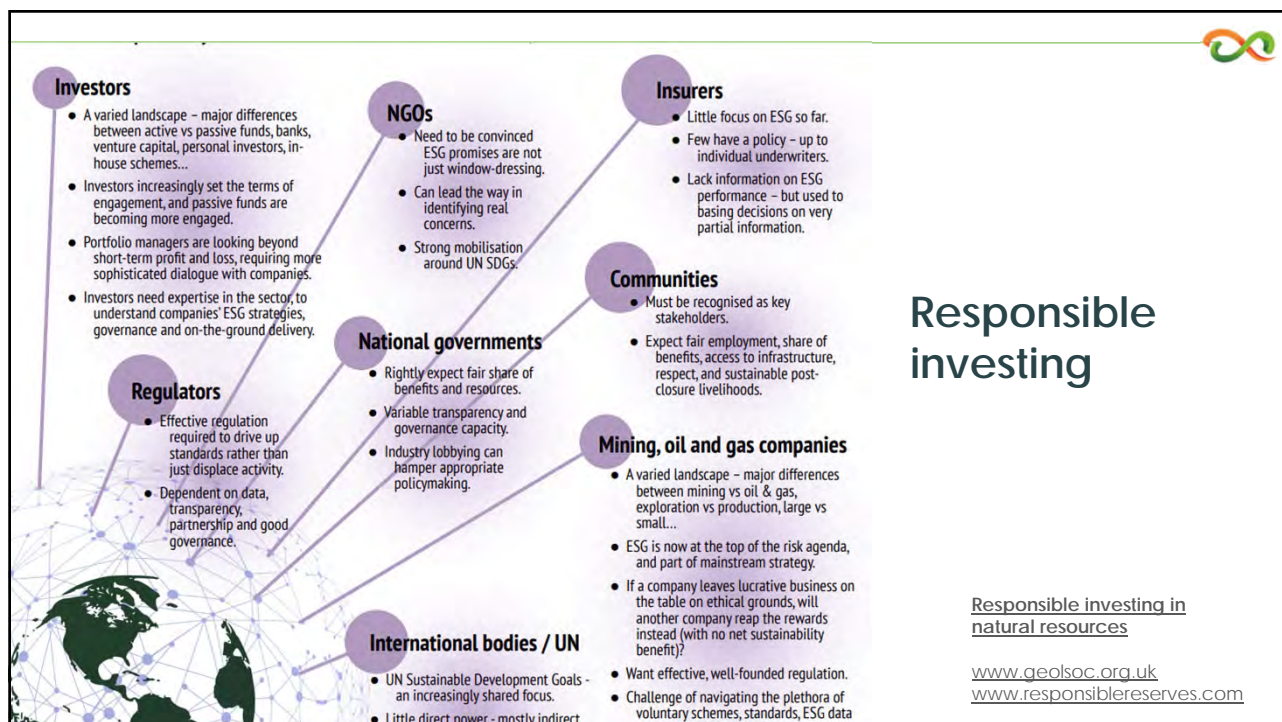
ESG integration

There is increasing awareness that material environmental, social and governance (ESG) factors can be tied to a company's long-term performance. As such, more and more investors are looking to integrate sustainability insights and data into their traditional investment processes. By expanding access to data, insights and learning on material ESG risks and opportunities in investment processes across the board, we can become better overall investors.

Capital at risk. All financial investments involve an element of risk. Therefore, the value of the investment and the income from it will vary and the initial investment amount cannot be guaranteed.

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The Green Deal – Europe's strategy

https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en



What will we do?

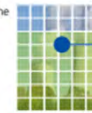
CLIMATE

The EU will be **climate neutral in 2050**. The Commission will propose a European Climate Law turning the political commitment into a legal obligation and a trigger for investment.

Reaching this target will require action by all sectors of our economy:

ENERGY

Decarbonise the energy sector



The production and use of energy account for more than **75%** of the EU's greenhouse gas emissions

BUILDINGS

Renovate buildings, to help people cut their energy bills and energy use



40% of our energy consumption is by buildings

INDUSTRY

Support industry to innovate and to become global leaders in the green economy



European industry only uses **12%** recycled materials

MOBILITY

Roll out cleaner, cheaper and healthier forms of private and public transport



Transport represents **25%** of our emissions



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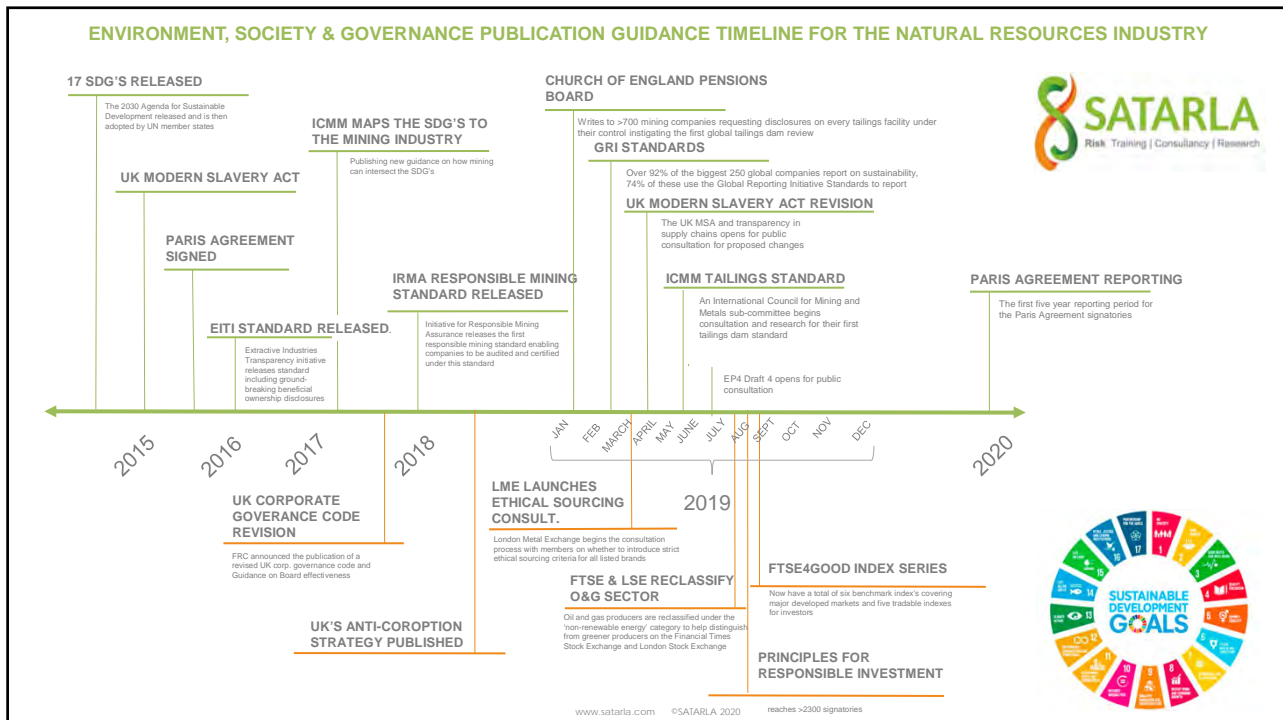
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Example frameworks / standards / principles

Focus	Organisation	Considerations	
Corporate Governance	OECD	• International standards (for 37 OECD countries)	
Project Governance	World Bank / IFC	• Project Finance	• 8 Principles
	Equator Principles	• Bank focused project finance	• 10 Principles
Framework	TCFD	• Climate specific corporate and portfolio scenario framework	• Voluntary framework with 3 disclosure metrics
Standard	GRI	• Outward looking sustainability reporting	• Focus on stakeholder issues
	SASB	• Inward looking sustainability reporting	• Focus on financial materiality
Industry Expectations	ICMM	• Performance Expectations : Major mining operator focused performance expectations – certification soon	• 10 Principles, 38 Expectations
	World Gold Council	• Responsible Gold Mining Principles : Gold mining operator and market development with required assurance	• 10 Principles, 51 Requirements
Investor specific	EBRD	• GET Framework : Development finance with regional specific ambition	• Screening tool with 11 Performance Indicators

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Impact-focused measurement and investing

Digbee ESG

A new product from Digbee – launching late 2020.

For mining companies

Digbee has partnered with leaders in the ESG world to develop a right-sized, future-looking and industry approved set of frameworks for all mining companies to assess and disclose their ESG metrics while ensuring best practice. This outcome based approach has recognised over 30 initiatives and reporting frameworks, is practical and addresses real risk. The questionnaire is accompanied with clear rationale and guidance. Submitted annually, through a Board Approval process, Digbee ESG allows comparison to peers, helps management improve their process to manage risk and will become the benchmark for engagement with capital providers and other stakeholders.

ESG Submission

Corporate Sustainability

IN PARTNERSHIP WITH **SATARLA**

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Independent measuring and monitoring

<https://www.responsible-rawmaterials.com/post/friday-15th-may-10-00-10-20-gareth-morgan>

responsible-rawmaterials.com/post/friday-15th-may-10-00-10-20-gareth-morgan

YouTube Maps https://cgr.glenco...

Gareth Morgan - Trust, but verify: reported vs. observed, keeping an objective eye on natural...

Updated: May 31

Trust, but verify: reported vs. observed, keeping an objective eye on natural resources production & supply using Earth Observing satellite data analytics



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Update to Governance e.g. raw materials

<https://www.responsible-rawmaterials.com/post/ruth-allington-teresa-steele-schober-esg-interview-hosted-by-sarah-gordon>



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Risk management as a key tool to manage ESG in a meaningful manner













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ESG trends in mining...

<https://www2.deloitte.com/global/en/pages/energy-and-resources/articles/tracking-the-trends.html>

Deloitte. Services ▾ Industries ▾ Insights ▾ Careers ▾

2021 mining industry trends

 <p>Trend 1: Building resilience amid volatility <i>Scenarios for strategic leaders</i></p>	 <p>Trend 6: Creating an agile supply chain <i>Overcoming the vulnerabilities exposed by global shocks</i></p>
 <p>Trend 2: M&A in an altered world <i>Winning back investor trust</i></p>	 <p>Trend 7: The path towards integrated operations <i>Positioning miners to pivot in the face of change</i></p>
 <p>Trend 3: ESG—Getting serious about decarbonization <i>From strategy to execution</i></p>	 <p>Trend 8: Advancing the future of work <i>Redefining leadership and adapting the workplace culture</i></p>
 <p>Trend 4: ESG—Overcoming the social trust deficit <i>Linking social investments to sustainable outcomes</i></p>	 <p>Trend 9: On the road to zero harm <i>Creating the next generation of integrated predictive safety systems</i></p>
 <p>Trend 5: ESG—Corporate governance adding to competitive advantage <i>Emerging risks mandate greater oversight</i></p>	 <p>Trend 10: Meeting demand for green and critical minerals <i>Mining's role in the transition to a clean energy future</i></p>

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Risk management

- *Iterative*
- *Context specific*
- *Results in risk-intelligent decision making at all levels of the organisation*
- *ERM = taking this normal decision making process into business decisions*



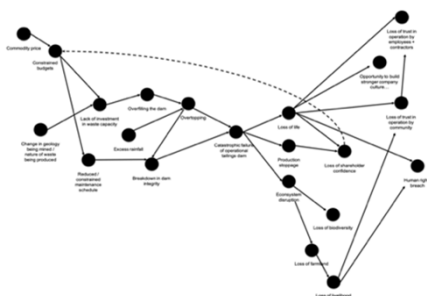
<https://www.satarla.com/post/risk-management-4-step-process>



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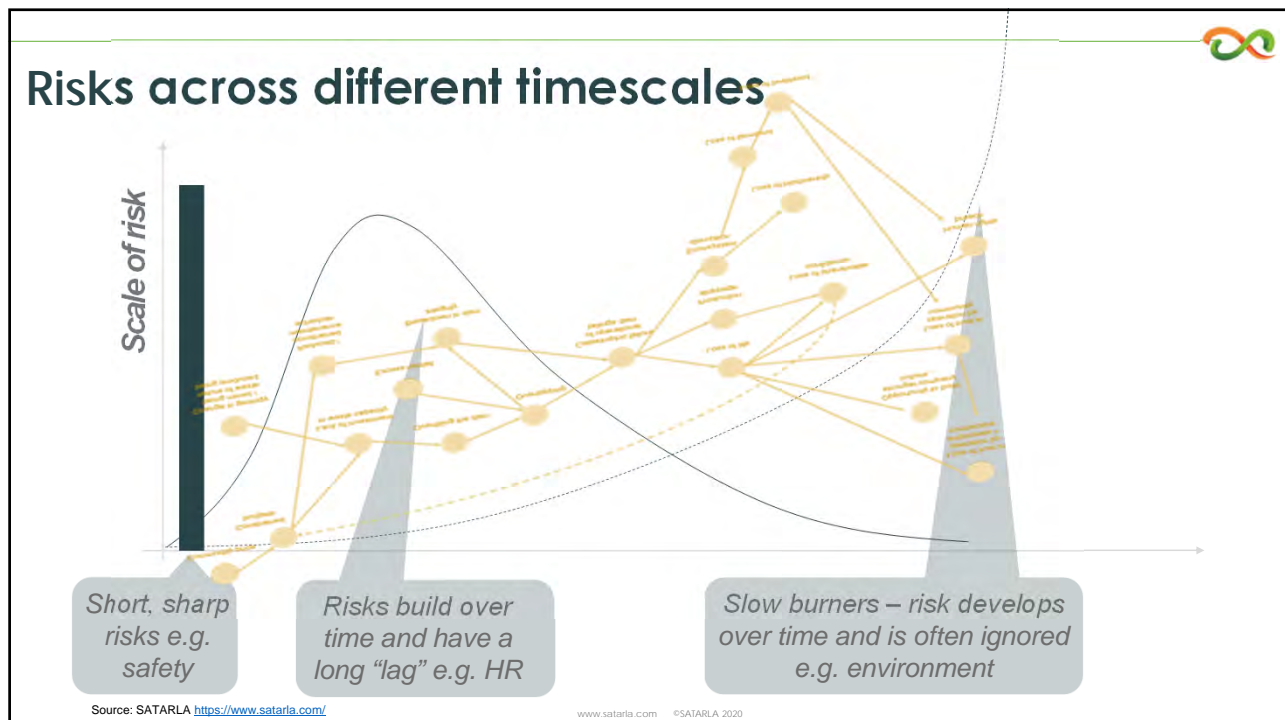
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Risk management as the integrator of ESG into decision making.

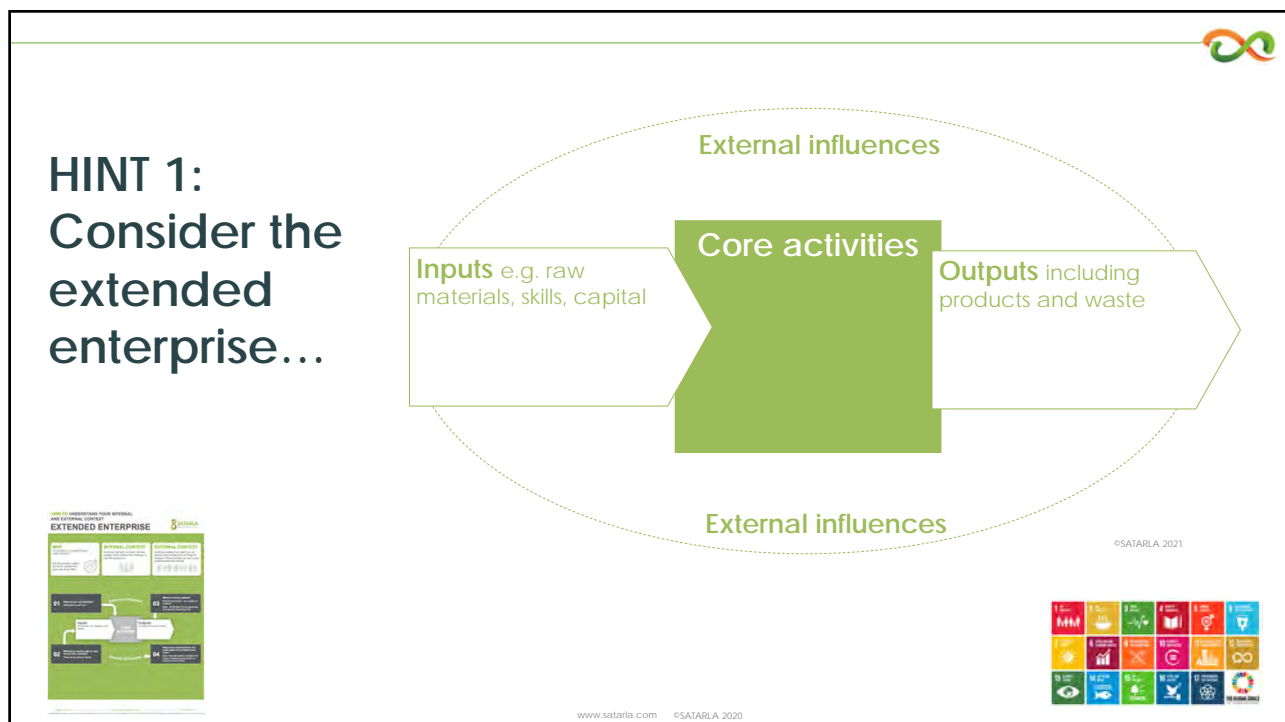


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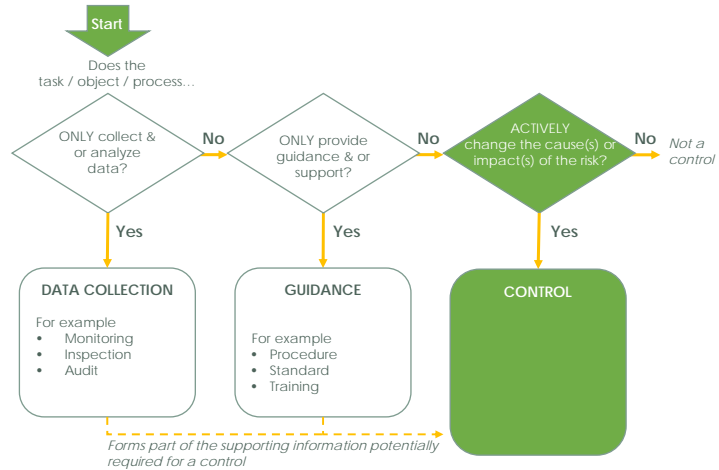


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HINT 2: Focus on REAL controls that lead to impact and action.



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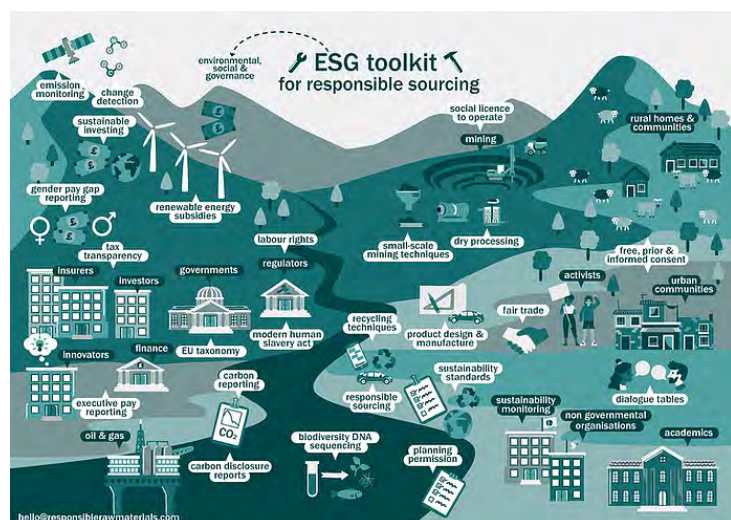
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HINT 3: Keep your eyes and ears open – new approaches every day.

RESPONSIBLE RAW MATERIALS

Free online conference during week of 10th May.

ESG toolkit for Responsible Sourcing

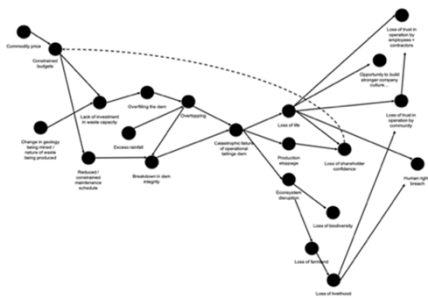


<https://www.responsiblerawmaterials.com/esgtoolbox-conference-may21>

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REMEMBER: If you don't have ESG in your risk profile... you are not doing ERM.



ERM = Enterprise Risk Management

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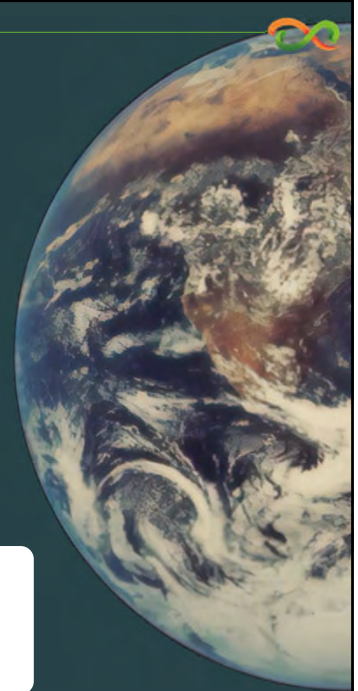
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HOW TO UNDERSTAND YOUR INTERNAL AND EXTERNAL CONTEXT

EXTENDED ENTERPRISE

WHY

DO WE NEED TO UNDERSTAND OUR CONTEXT?

It is the context in which we aim to operate that gives rise to our risks.



INTERNAL CONTEXT

Anything internal to our team. We can usually control most of this, however, it can still surprise us.



EXTERNAL CONTEXT

Anything outside of our team, we can typically only monitor most of these for changes. When possible, we can try and increase proactive controls.



01

What are our main activities?
What does our team do?

External influences

03

What are our key outputs?

What do we produce – be it positive or negative?

[note: we will often find our aspirations and objectives appearing here]

Inputs

(for example, raw materials, skills, capital)

CORE ACTIVITIES

Outputs

(including products and waste)

02

What do we need in order to carry out our main activities?
These can be direct or indirect.

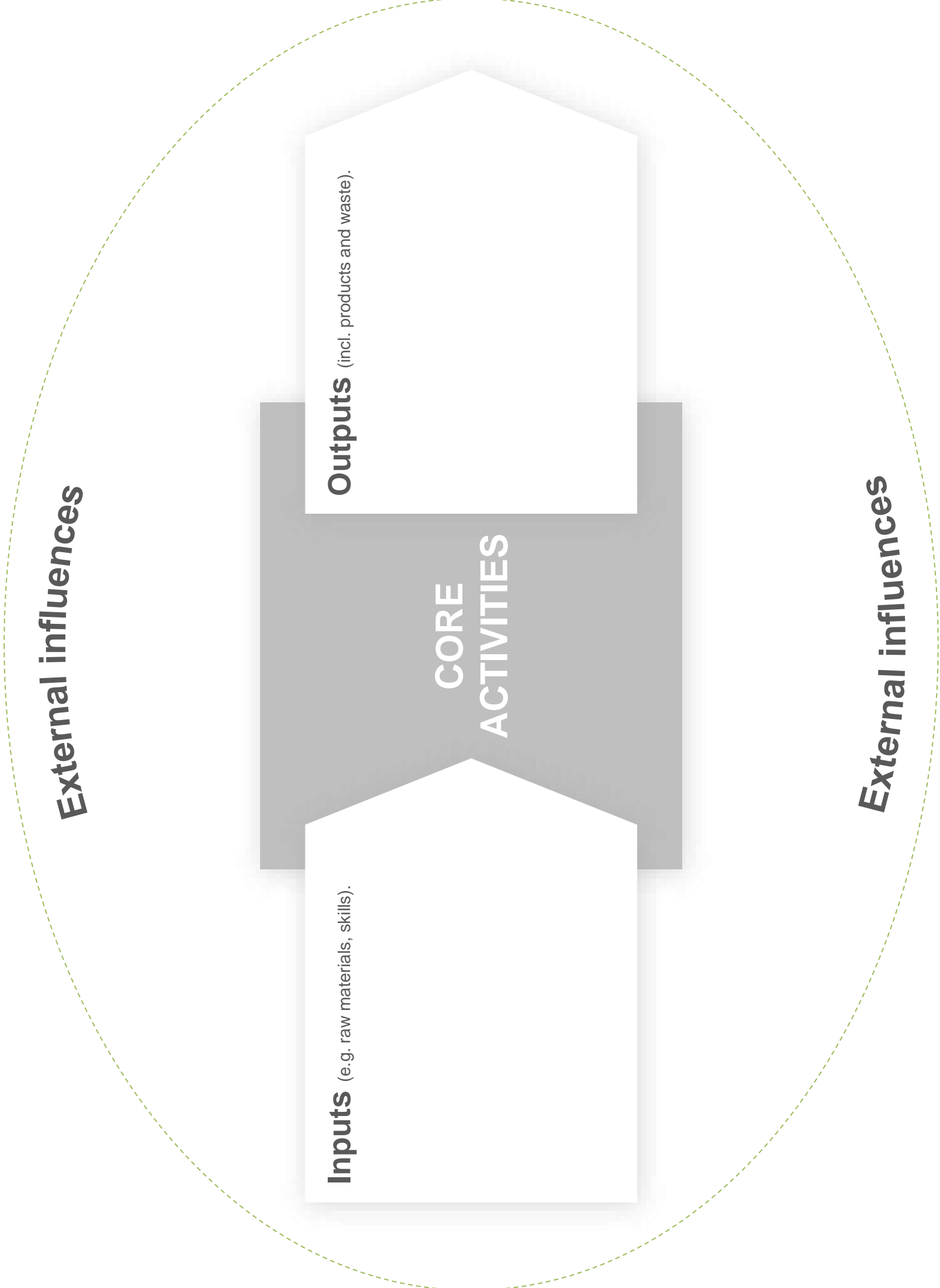
External influences

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What are the external factors that could impact on our simple value chain?

[note: these are typically outside of our control, however we may be able to influence some of them]

EXTENDED ENTERPRISE TEMPLATE

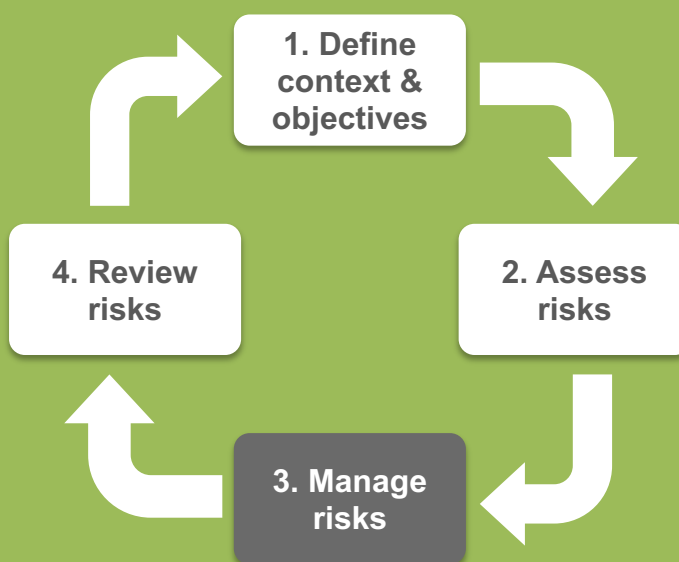
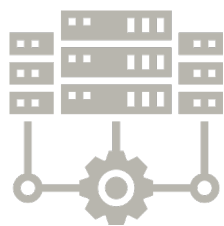


CONTROL

WHAT

IS A CONTROL?

An act, object or system that actively modifies a risk. It takes charge of the uncertainty.

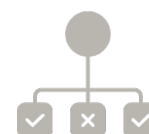


WHEN & WHERE

ARE THEY USED?

Controls are used to help manage our risks.

Controls are typically tailored to the risk for which they are designed to manage.



HOW

ARE THEY BUILT?

START

Does the task/object/process...

ONLY collect & or analyse data?

No

ONLY provide guidance & or support?

No

ACTIVELY change the cause(s) or impact(s) of the risk?

No

Not a control

Yes

Yes

Yes

DATA COLLECTION

For example:

- Monitoring
- Inspection
- Audit

GUIDANCE

For example:

- Procedure / Standard
- Training
- Alarm

CONTROL

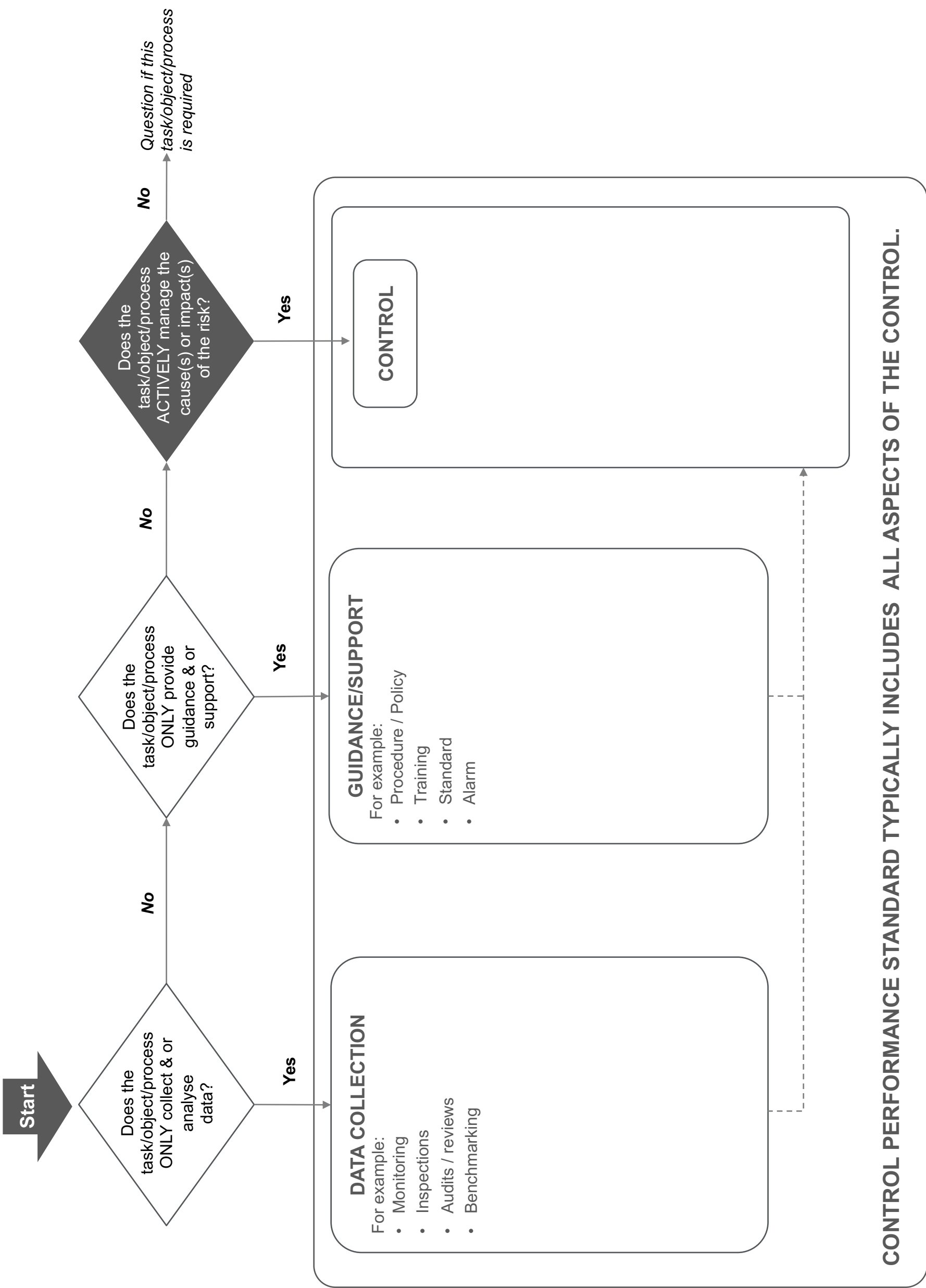
An act, object or system that actively modifies a risk.

Forms part of the supporting information potentially required for a control / control performance standard

Checking that the control works and is effective:

The check (sometimes called test, verification, review) needs to ensure that the active control is working in line with expectations and the design, thereby moving the risk to the desired level of risk.

COMPONENTS OF A REAL CONTROL





SATARLA is a risk management consultancy. Our diverse team has hands-on experience in implementing integrated and sustainable risk management from site to board level across multiple geographies and industries.

RISK | TRAINING

RISK | CONSULTANCY

RISK | RESEARCH

