Getting Ahead of the Threat:

Challenging Mining in PAs for Renewable Technologies

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apac AFRICA PROTECTED AREAS CONGRESS

A GHANA ROCHA Caring for God's Creation

IUCN | National Committee of The Netherlands

Overview of the Workshop

1

Metal Demands

How the demand for metal will increase as low carbon infrastructure expands.

2

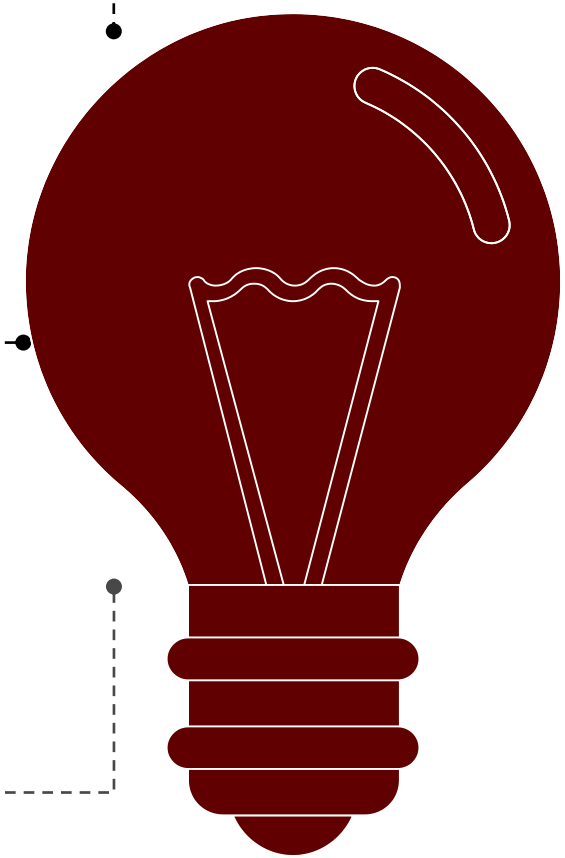
Metals Used

The metals used for renewable energy production.

3

Mining Increase

The global increases of mining in, or near to, protected areas.



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Studies

Case studies of negative environmental and health impacts..

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Curruption

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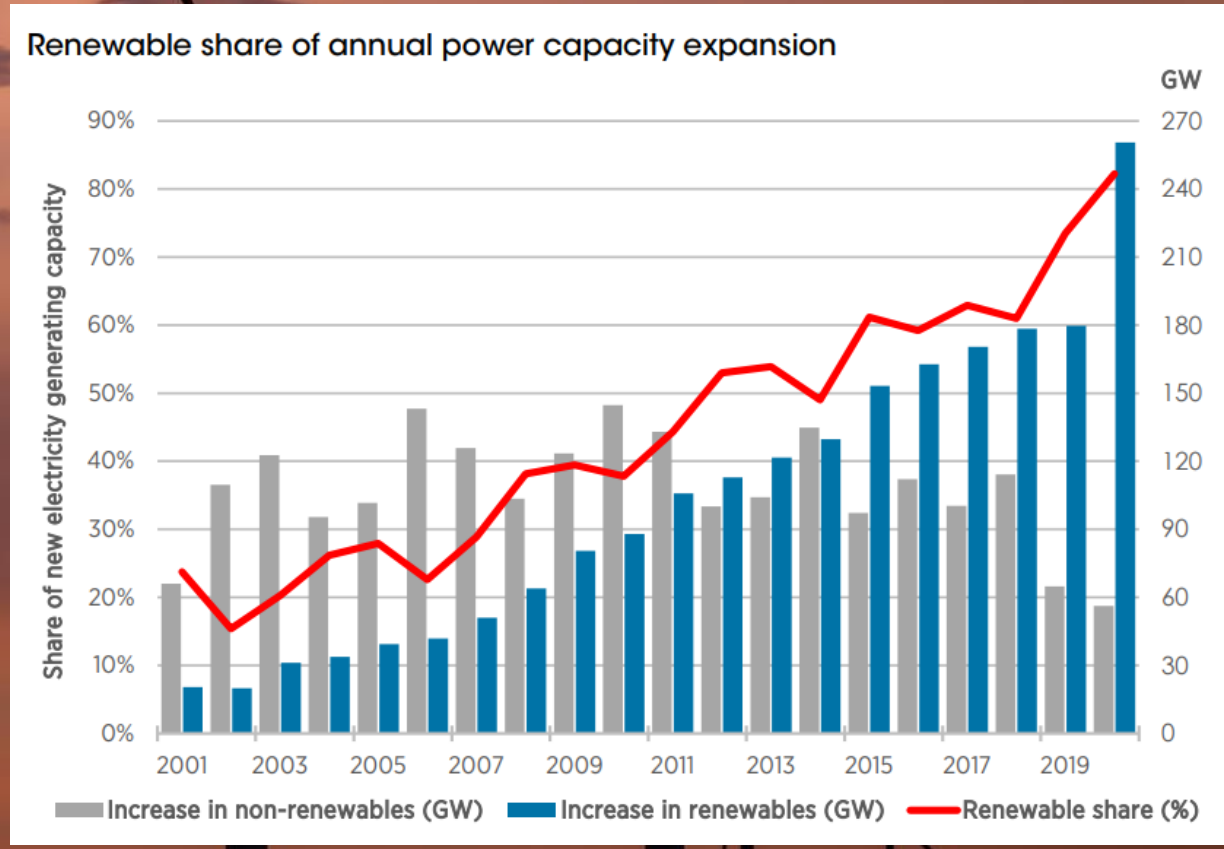
Solutions

Finding Middle Grounds Governance and Regulation - Reclamation- Recycling

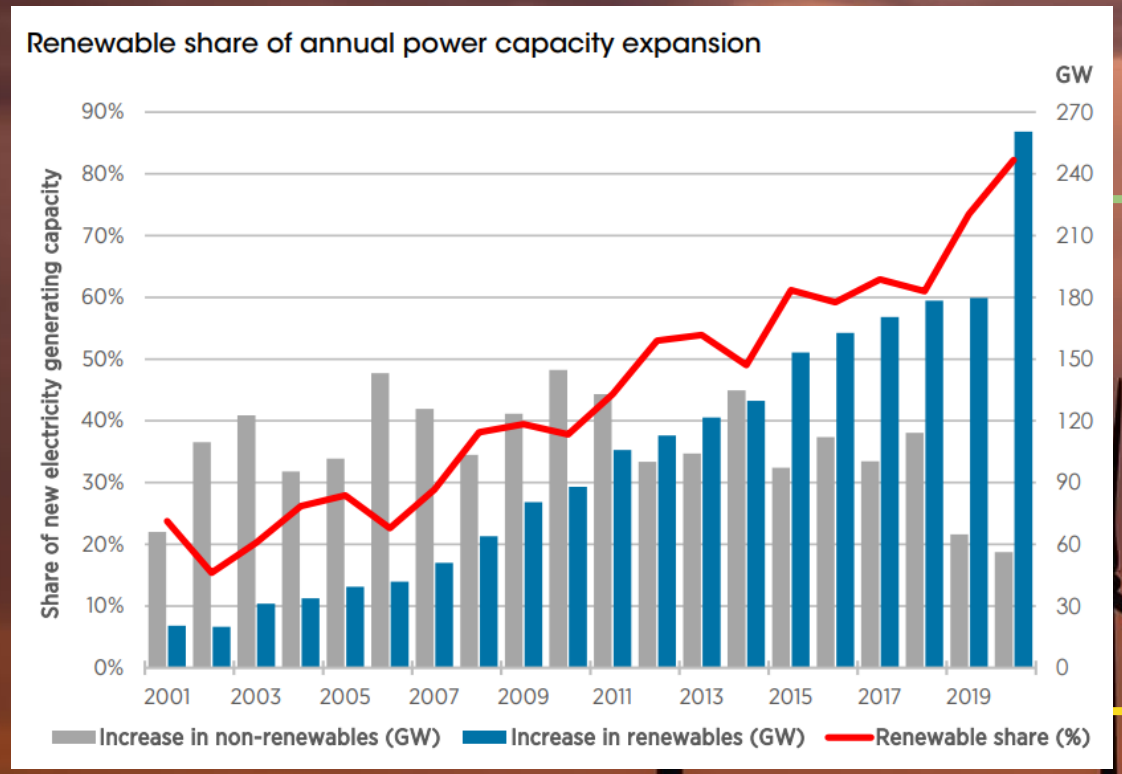
Demand for metal will increase as low carbon infrastructure expands.

- World Bank estimated the world will need more **than 3 billion tons** of minerals and metals to produce the renewable energy technologies needed to phase out fossil fuels.
- Stopping mining expansion would be in stark contrast to expected future trends.
- Expansion of low-carbon infrastructures, such as wind and solar energy and battery storage capacities.



The World Economic Forum

Demand for metal will increase as low carbon infrastructure expands.



- Renewable energy production is necessary to halt climate change and associated biodiversity loss.
- However, the required technologies and infrastructur will drive an increase in the production of many metals
  - Creating new mining threats for biodiversity.

- World Bank estimated the world will need more than 3 billion tons of minerals and metals to produce the renewable energy technologies needed to phase out fossil fuels.
- Stopping mining expansion would be in stark contrast to expected future trends.

- Expansion of low-carbon infrastructur such as wind and solar energy and battery storage capacitie

2. The metals used for renewable energy production

The World Bank names the 17 most important metals and minerals for the energy transition as: aluminium, copper, cobalt, lithium, indium, iron, lead, molybdenum, nickel, silver, zinc, manganese, iron (steel), chromium, neodymium, and titanium.

- **Iron ore – steel:**

- **Wind turbines, tidal energy systems, the base for solar panels.**

- **Bauxite- aluminium:**

- Solar panels (aluminium comprises 85% of solar panel components), wind turbines, and batteries.

- **Cobalt:**

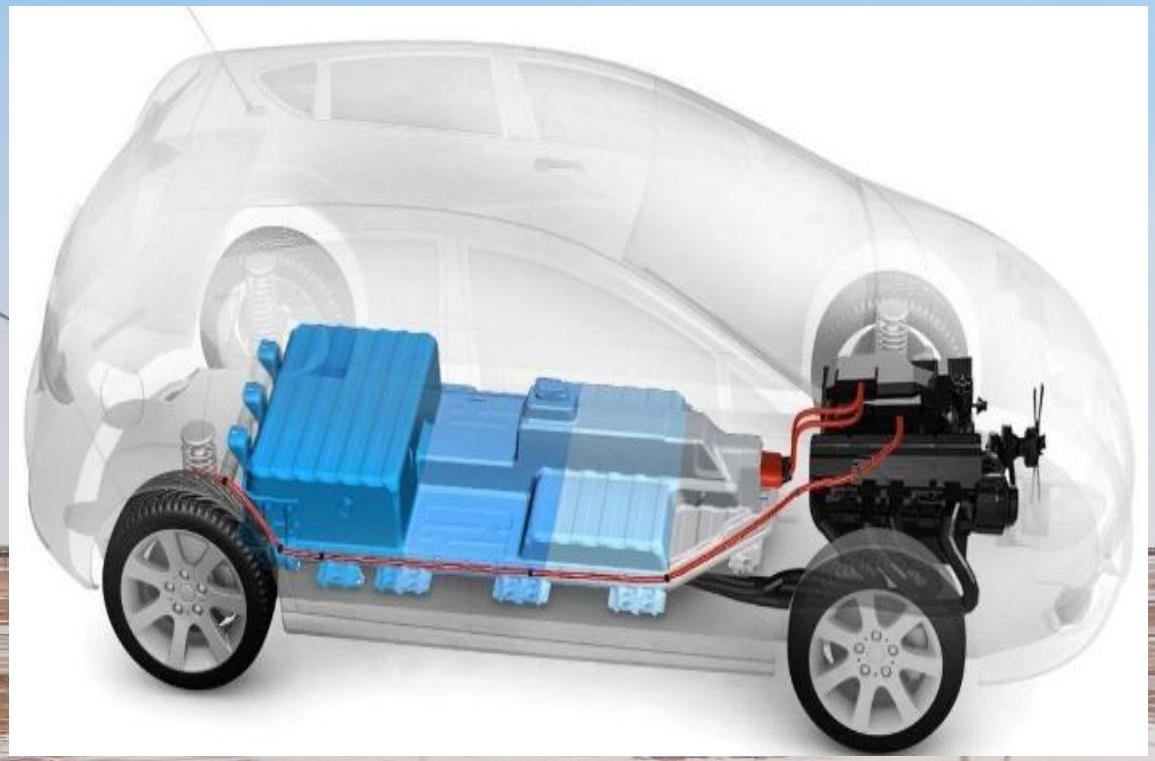
- Rechargeable batteries (50% of globally produced cobalt is used for batteries), and renewable biogas technology.

- **Copper**:

- Used to lower the amount of energy needed to produce electricity in solar panels, wind turbines, hydro power.

- **Nickel:**

- **Hydropower, batteries, and solar panels**



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- **Silver**:

- Batteries, Solar panels, Electric cars

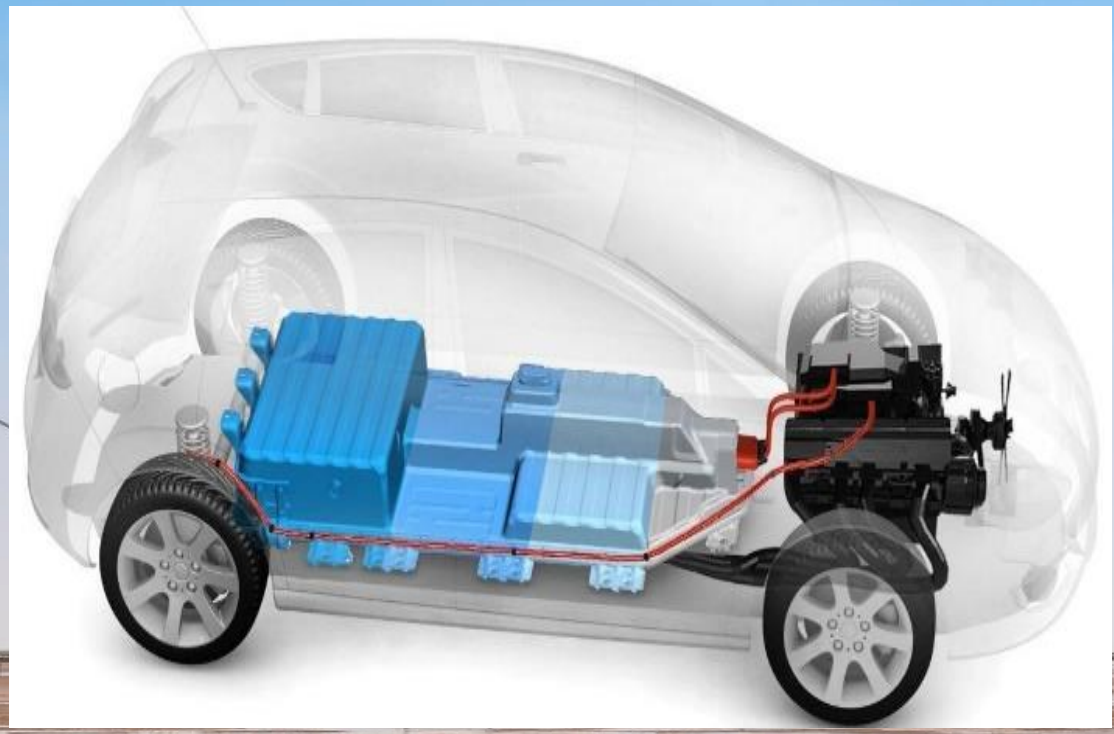
- **Manganese**:

- Electric cars, battery storage for electricity from solar, wind, tidal power.

- **Lithium**:

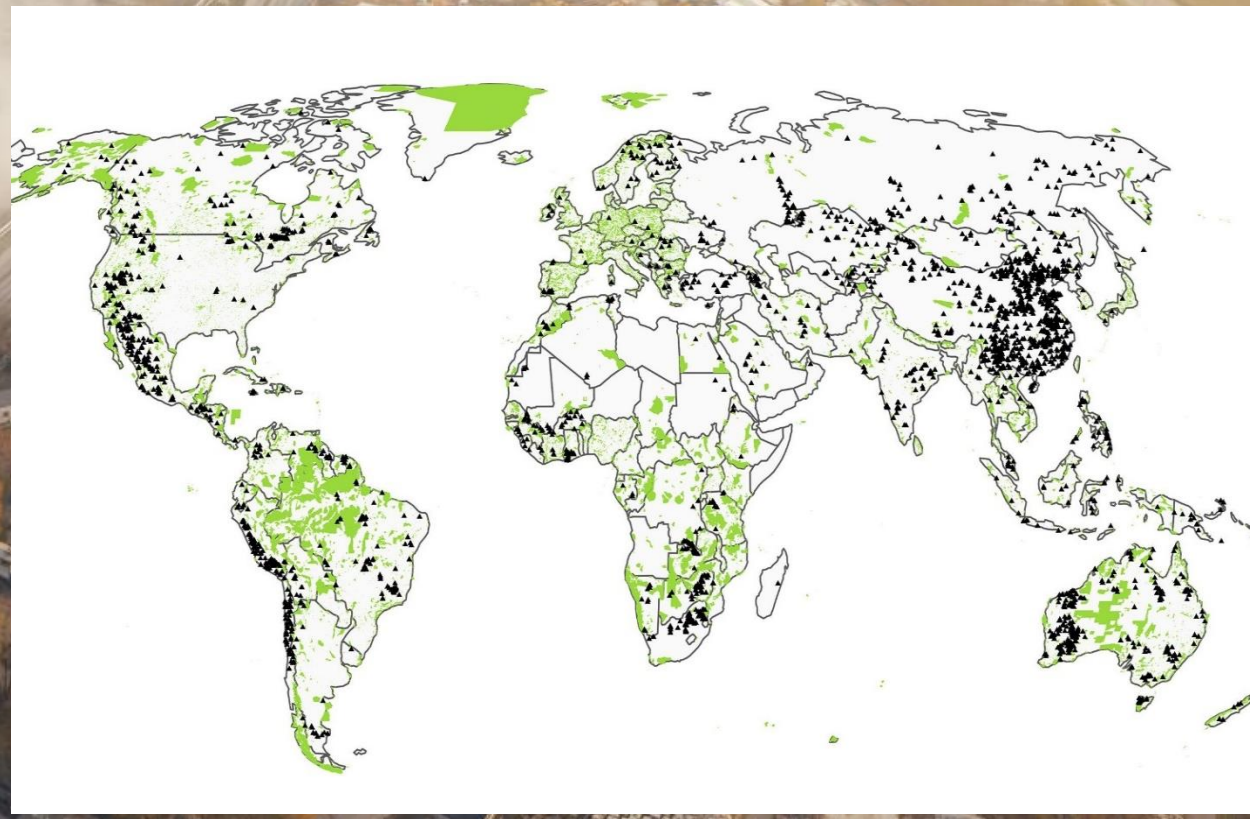
- Long lasting, high storage rechargeable batteries used in electric cars, energy grid storage, mobile phones, and laptops.

❖ A typical electric vehicle battery pack needs around 8 kilograms of lithium, 35 kg of nickel, 20 kg of manganese and 14 kg of cobalt, and charging stations require substantial amounts of copper.

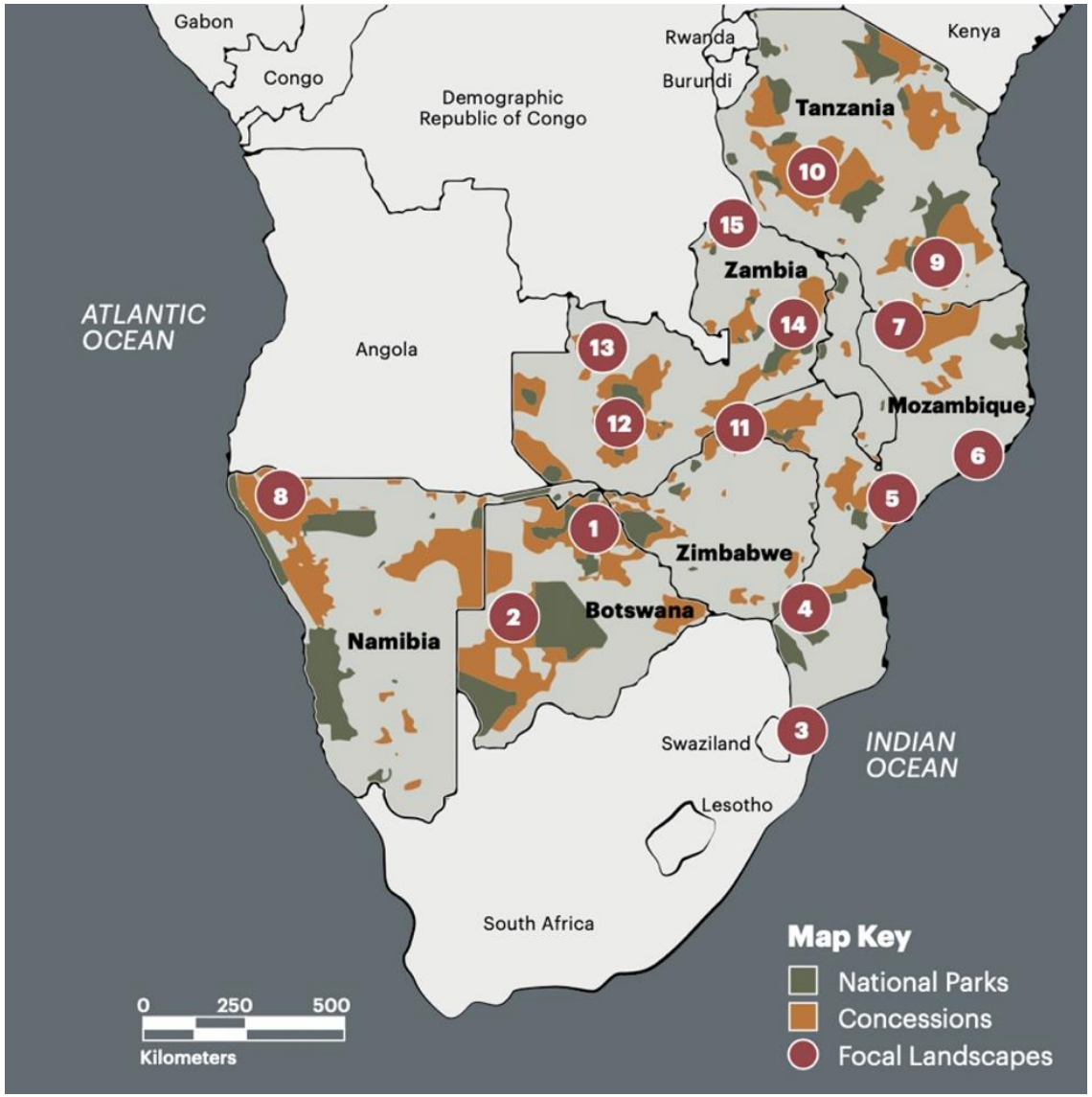


3. The global increases in mining in, or near to, protected areas.

- Global extraction of metal ores has doubled over the past two decades.
- Study of 3,000 sites of extraction worldwide between 2000 and 2019:
- 79% of global metal ore extraction in 2019 originated from species rich biomes.
- Half of global metal ore extraction takes place 20 km or less from protected areas.
- 4.2% are located within PAs.
- Mining within PAs has surged – a 113% increase in the last 20 years.
- The degree to which mining occurred in areas that should be protected, demonstrates the environmental unsustainability of the current mode of expansion.



Protected areas (green) and mining sites (black)

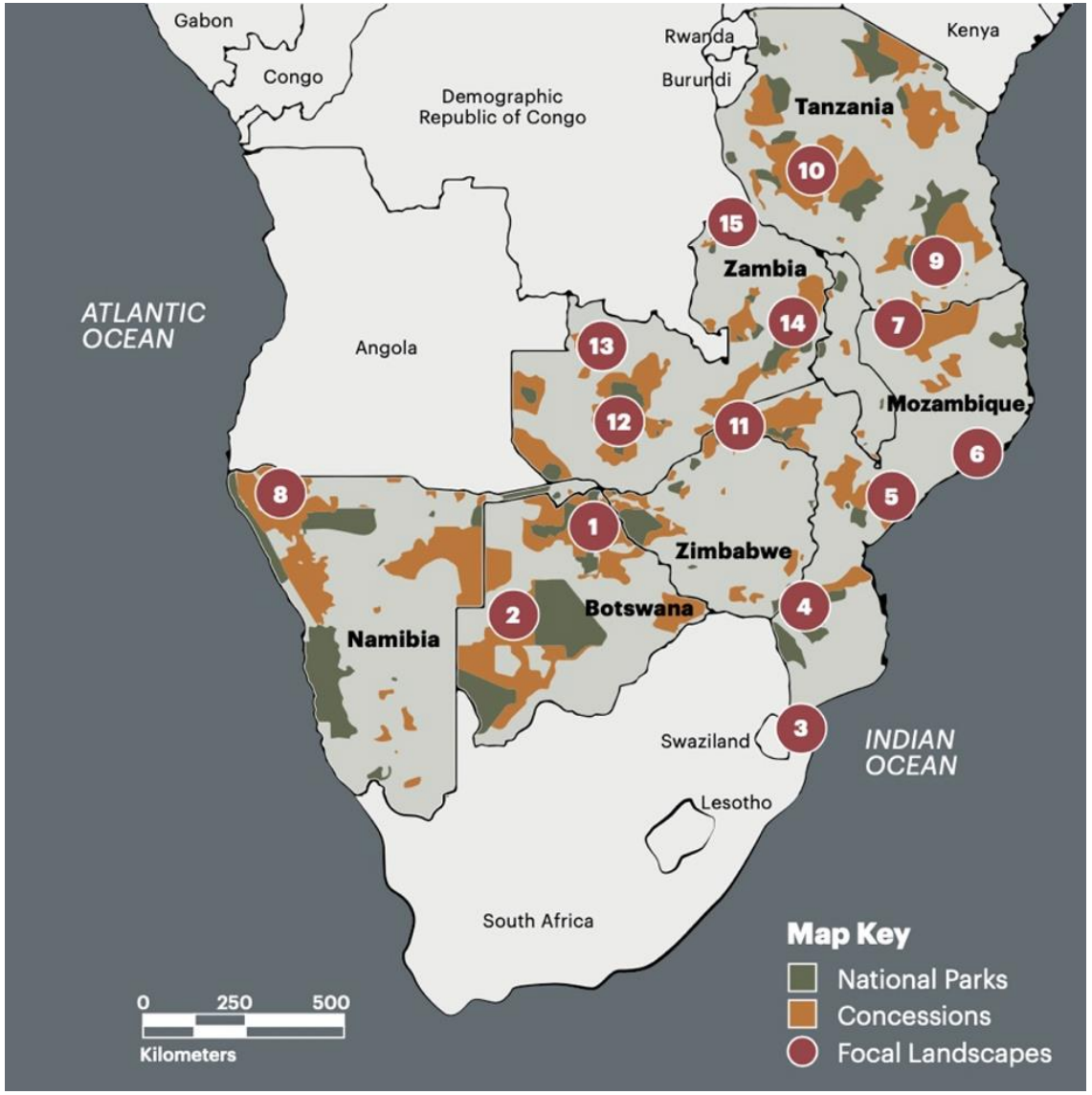


Africa

Africa is undergoing a mining boom

Africa contains 30% of the world's mineral resources – big potential for the growth of extraction.

Energy Saving Infographics



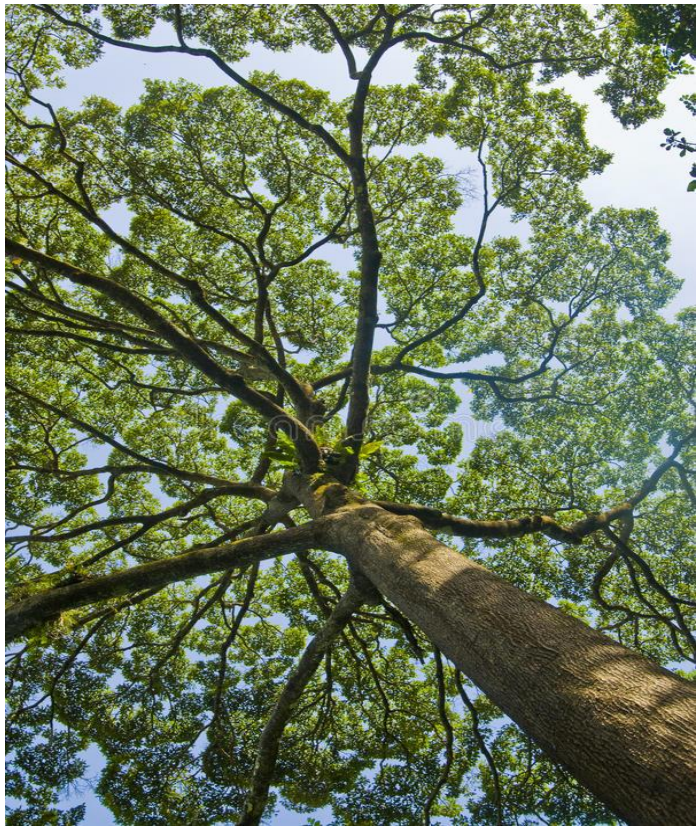
44% of Africa's major metal mines are inside or within 10km of a PA.

- This situation is threatening PAs:

- E.g. Mount Nimba Biosphere Reserve, Republic of Guinea – downsized by 1,550 ha to allow for iron-ore prospecting.

4. Case studies:

Adverse environmental and health impacts



The Kalahari Manganese Fields, South Africa

Water:

- **Manganese mining reduces water available to local communities and pollutes the water that is available.**

- **Involves 'dewatering' the natural aquifer system in the ground – so that open cast pits are not flooded.**

- **Manganese mining contaminates water supplies**

- **Excess levels of nitrates, aluminium, arsenic, barium, iron, and manganese.**

- **Manganese is mostly found and mined in South Africa – 75% of global manganese resources.**

- **Majority is exported to Europe to make steel.**

- **Steel is then used to make low carbon technologies – wind turbines, tidal turbines, and solar panels, electric cars, energy storage.**

- **Construction of a single wind turbine requires 285 tonnes of steel.**

Mamatwan Manganese Mine, South Africa

The Kalahari Manganese Fields, South Africa

Health:

- Residents living near manganese mines reported **respiratory illnesses, panic attacks/shocks from blasting, heart problems, eye problems & hearing loss, air pollution.**
- Water that contains high levels of nitrates **causes impaired concentration, lack of energy, and infant deaths.**
- High water salinity (detected in local communities) can cause **heart disease, high blood pressure, kidney failure**.
- Dust produced from mining causes **silicosis, tuberculosis, pulmonary tuberculosis, obstructive airways disease, asthma**.
- **We need to address these health and environmental issues** before we increase manganese mining.

Mamatwan Manganese Mine, South Africa

Bauxite mining in the Trombetas River Basin, Brazil

- Mineracao Rio do Norte (MRN) – the world's fourth largest producer of bauxite.
- **Batata Lake** is now a symbol of the ecosystem destruction caused by largescale mining projects.
- Fine red powder from the mine covers everything.
- The Agua Fria River was smothered in dust at first, then by muddy sludge.
- The sludge accumulated on the lake bottom as a solid layer several meters thick.
- Trace elements found in bauxite can include poisonous arsenic, beryllium, cadmium, chromium, lead, manganese, mercury, and nickel.

- People living beside the river complain of a lack of fish and also suffer from itchy skin and allergies.
- Animals such as caiman and turtles get stuck in the mud and die.

Waste from the mine

Copper and cobalt mining around Lake Tshangalele, Democratic Republic of Congo

- **Lake Tshangalele** was declared a Biosphere Reserve by UNESCO in 1982, and an Important Bird Area by BirdLife International in 2015.
- Mining of copper and cobalt has increased recently around Lake Tshangalele.
- Recent studies have found high concentrations of cobalt in plants, water and soil around Lake Tshangalele.
- People living close to the mines have significantly higher urinary concentrations **of arsenic, cadmium, cobalt, copper, and lead** compared to those living further away.
- This indicates extensive environmental pollution.
- The study investigated **contaminants in the fish** from the lake, as fish are an important part of the local diet.

Copper and cobalt mining around Lake Tshangalele, Democratic Republic of Congo

Results:

- Considering daily fish consumption, the minimum risk level of cobalt is being exceeded.
- Cobalt exposure can lead to **erythrocytosis, heart damage, thyroid disruption, and cardiomyopathy**.

- The copper content in the fish exceeded recommended doses.
- Copper exposure can lead to **liver and kidney damage, anaemia, immunotoxicity, and developmental toxicity**.

- Fish samples contained high levels of manganese
- Manganese exposure may result in **adverse neurological effects.**

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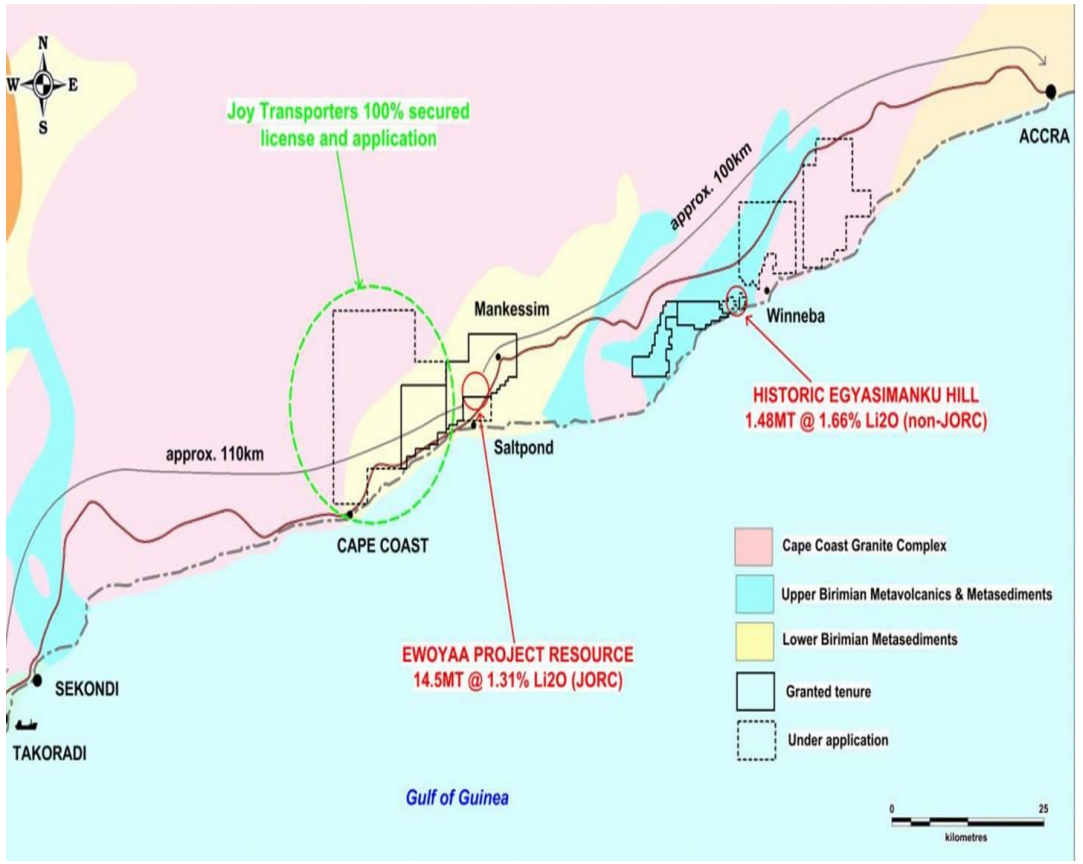
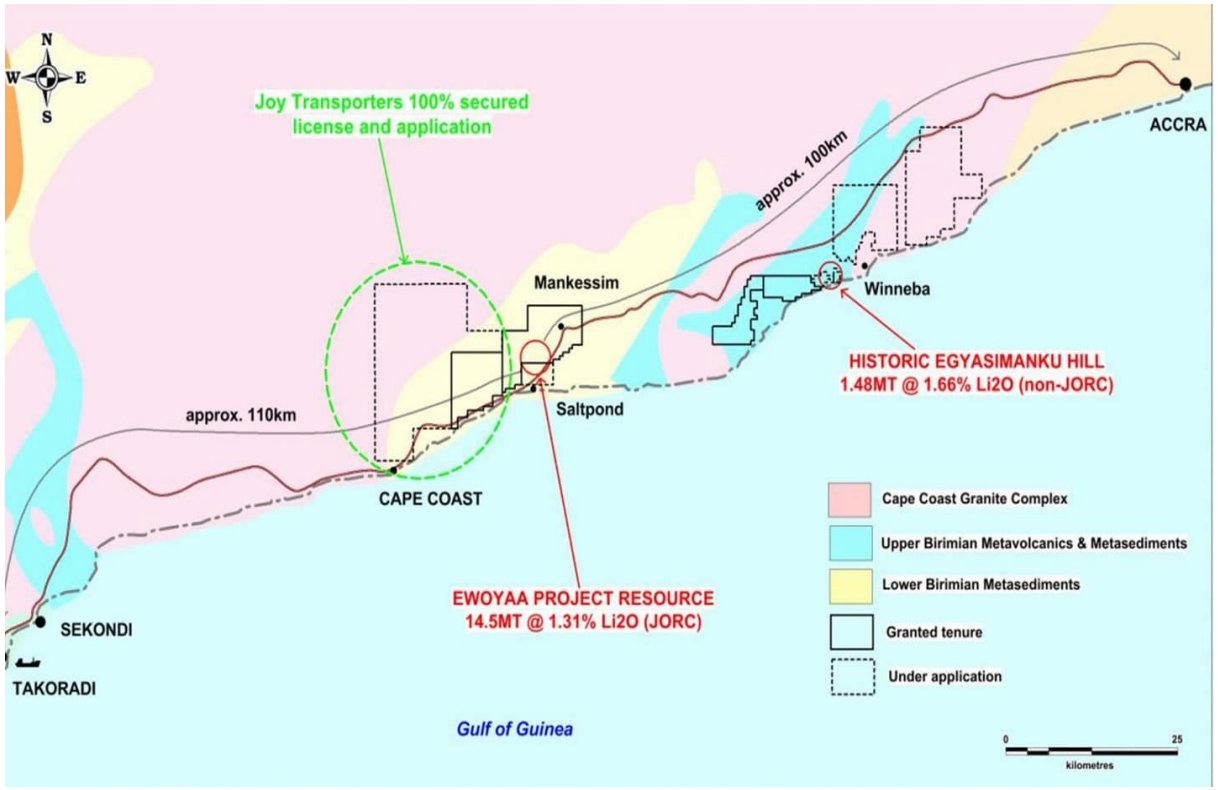
Lithium mining in Tibet and Chile, and expansion of lithium mining in Ghana

- Extraction of lithium has a high environmental impact – water and soil pollution.
- The process of **water leaching** is used in the extraction lithium
- Where lithium is treated with high concentrations of **acids** such as hydrochloric acid or sulphuric acid.
- Chinese lithium mining in **Tibet**.
- Mine waste was released into the Liqi River – causing mass fish and yack deaths.
- **Chilean Andes** – mining lithium in the salt pans.
- Wetlands – very biodiverse, are threatened ecosystems
- Brine extraction impacts water availability, thus threatening wildlife
- Decreases in water availability in negatively impacting local agriculture.



Lithium mining in Tibet and Chile, and expansion of lithium mining in Ghana



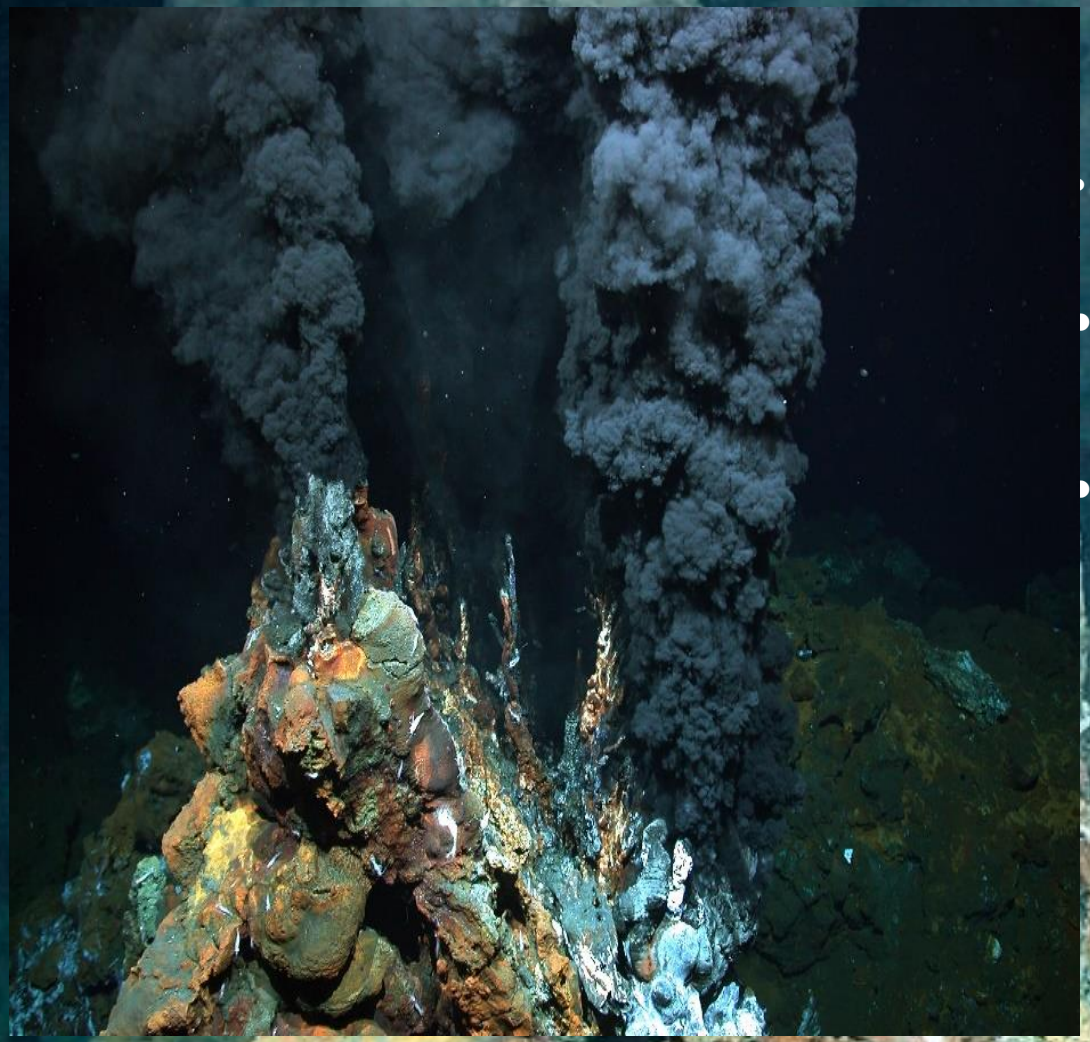
GHANA:

- Ghana will likely experience the social and environmental impacts of lithium mining.
- In **2021**, Australian mineral resources company Atlantic Lithium received an exploration licence for **its Cape Coast project in Ghana.**
- The licence provides access to **139.23km2** of highly prospective lithium tenure.
- This will be adjacent to the company's Ewoyaa Lithium Project.

Impacts of deep-sea mining on marine biodiversity

- In July 2022, countries that have ratified the UN Convention on the Law of the Sea will be meeting to discuss seabed mining of copper, manganese, cobalt, nickel.
- For deep-sea mining, minerals are mostly mined from around hydrothermal vents.
- There are 600 known hydrothermal vents worldwide – 2,000-4,000 meters deep.
- The heat from them makes them biodiversity hotspots – akin to coral reefs or tropical rainforests.
- Loss of biodiversity is inevitable and likely to be permanent if deep-sea mining goes ahead.
- Species are extremely reliant on the unique ecosystem of hydrothermal vents for survival.
- Research by Queens University in Belfast has led to 184 mollusc species living around hydrothermal vents being added to the global red list of threatened species.
- If mining occurs, these unique habitats will be destroyed – the species have nowhere else to go.

Impacts of deep-sea mining on marine biodiversity



- Deep-sea mining is potentially very harmful for marine biodiversity.
- More than 80% of the oceans remains unmapped, unobserved and unexplored.
- We don’t even know all the biodiversity we are destroying through deep sea mining.

General Impacts

- Impacts are not just local – **expansion of roads and railways** is a big threat to ecosystems – e.g. roads cutting through protected areas.
- New roads will encourage major **movements of populations** into previously sparsely populated regions – increasing land clearing and bushmeat hunting.
- Increased access may lead to increased illegal mining.
- Increased access for industrial-scale commercial agriculture – e.g. palm oil monocultures.
- Large amounts of money circulating from mining may lead to widespread corruption.

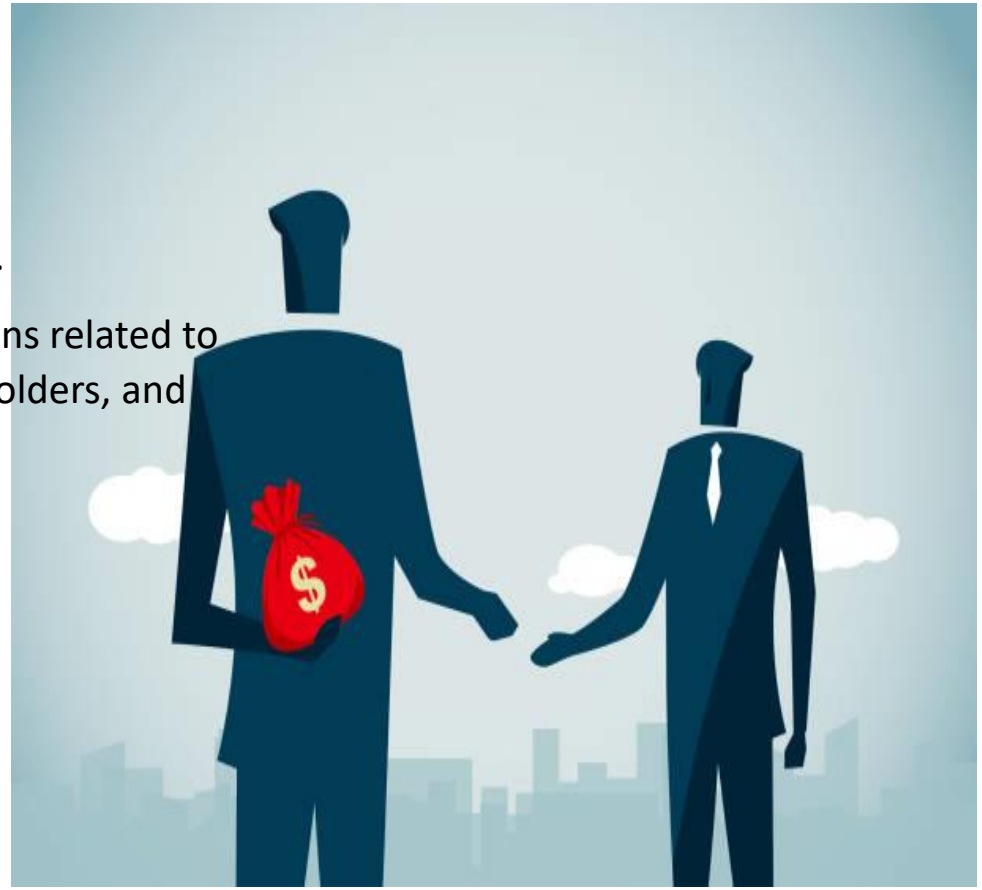
Corruption

- Many governments lack the capacity or desire to implement adequate mining-development controls.
- Legal frameworks to protect environmental resources are frequently subverted or

ignored in the pursuit of mining and self-interest.

- In many cases, mining decisions are driven by corruption

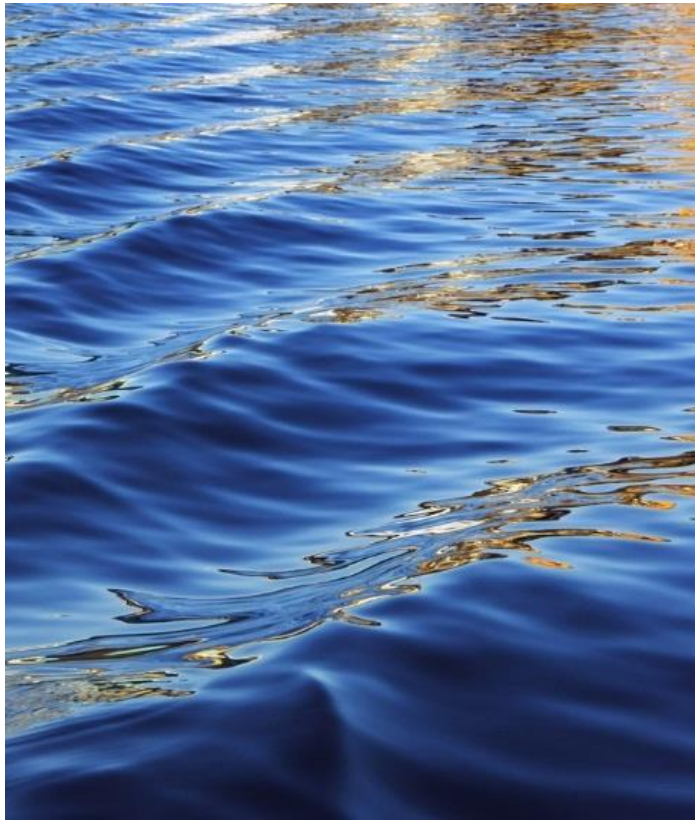
- Government officials demanding **bribes** in exchange for mining concessions
- **Collusion** between companies and governments to allow illegal mining in PAs.
- **Trading in influence**, whereby government officials modify laws and regulations related to mining and PAs by sidestepping the political process, ignoring relevant stakeholders, and circumventing transparency mechanisms.



- Governments and companies should be compelled to **make public**:
  - The **locations** of all mining concessions and mining operations.
  - How government **decisions** regarding such activity were made.
  - Which **companies** are involved.
  - Any environmental or social **consequences.**

Possible Solutions:

Finding a middle ground



Governance and Regulation

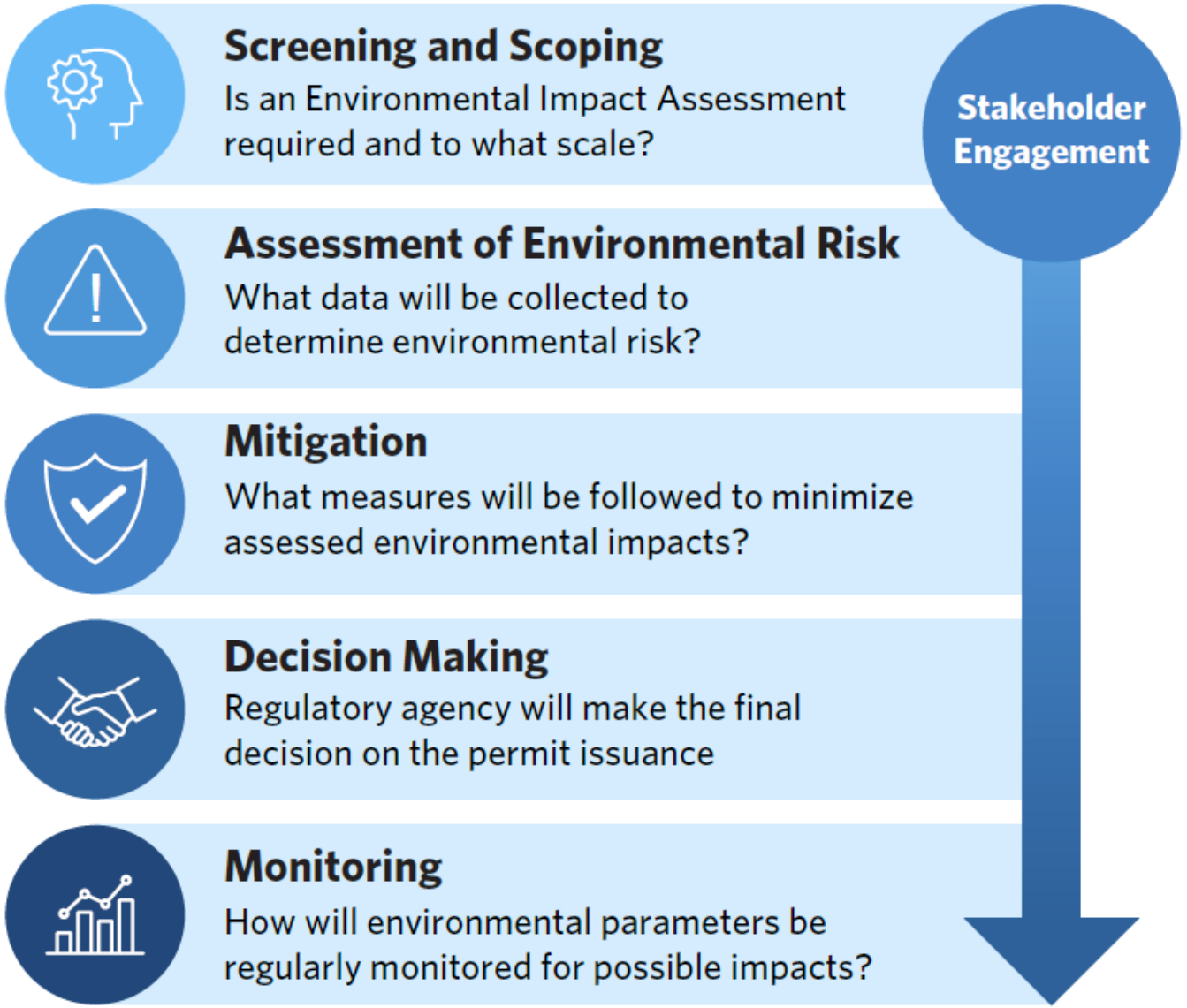
- Traditionally, the international community has taken a ‘hands-off’ approach to mining.
- Countries have sovereignty over their own natural resources.
- However, there are 3 categories of international law that can be used to regulate mining:

1. **International human rights law**
2. **Environmental conventions and treaties**
3. **International investment treaties**

The challenge of domestic regulation

- Biggest challenge is the implementation of regulations, the lack of strong penalties, or lack of political will to enforce penalties.
- Important tool to reduce environmental and social impacts of mining are **Environmental Impact Assessments (EIA)**
- Through which governments and mining companies can conduct strategic assessments to formulate plans and policies.

Environmental Impact Assessment



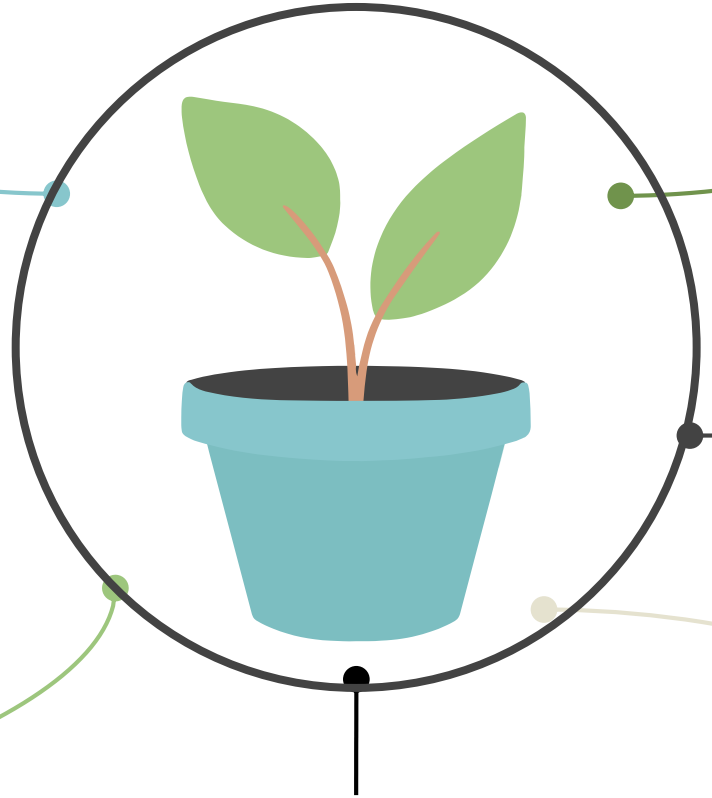
Promoting international laws, voluntary standards, and government and corporate best practices

Stronger **environmental monitoring** – remote sensing, oral history, and ethnography.

Need to help ensure that governments uphold their **environmental and social commitments**

- (Eg. publicise countries that fulfil obligations and those that do not).

Support government efforts to clarify PA laws - this helps avoid misinterpretations due to vague definitions of PA law.



Technical expertise be provided to small, junior mining companies - provide information about responsible mining and how to reduce impacts on PAs.

Prioritize indigenous knowledge and science - knowledge of local ecosystems may also help with environmental monitoring, building local food production, and safeguarding biodiversity

- **Need to optimise the mining industry's benefits and reduce its negative social an environmental impacts.**
- **One option is to recast the mining busines model as a development partnership between government, community, and m partners.**
- **These partnerships can jointly improve environmental care, infrastructure, education, health services, and capacity building for these communities.**

Reclamation

- Governments and companies need to focus on reclamation.
- **Reforestation** establishes ecosystems that are sustainable over the long term.
- The success of reforestation depends on the adaptation of tree species to reclaimed mine soils

- Highly varied chemical and physical soil properties.

- Thus, tree species for reforestation must be selected on their responses to the soil in each specific post-mine site.

- Lime or other materials can **neutralize soil acidity**
- A cover of topsoil or growth medium can promote vegetation growth.
- Grow plant species that are more tolerant of acidic conditions.

Reforestation at an old copper mine in Cyprus

Recycling

- **Energy transition waste** is going increase dramatically.
- Number of wind turbines and solar panels being installed is rising, and there are many more e-cars are on the road.
- Huge potential quantities of waste from renewable energy technologies:

- Estimated **600,000 tons** per year of waste batteries removed from electric vehicles by 2025.
- Estimated **78 million tons** of solar panel waste by 2050.
- Estimated **300,000 tons** per year of decommissioned wind turbines in Europe in the next two decades.

Recycling

What is to be done with this technology when it gets old?

Wind turbines:

- Blades can be broken down into small fibres, and then mixed with adhesives and pressed into composite panels.

Batteries:

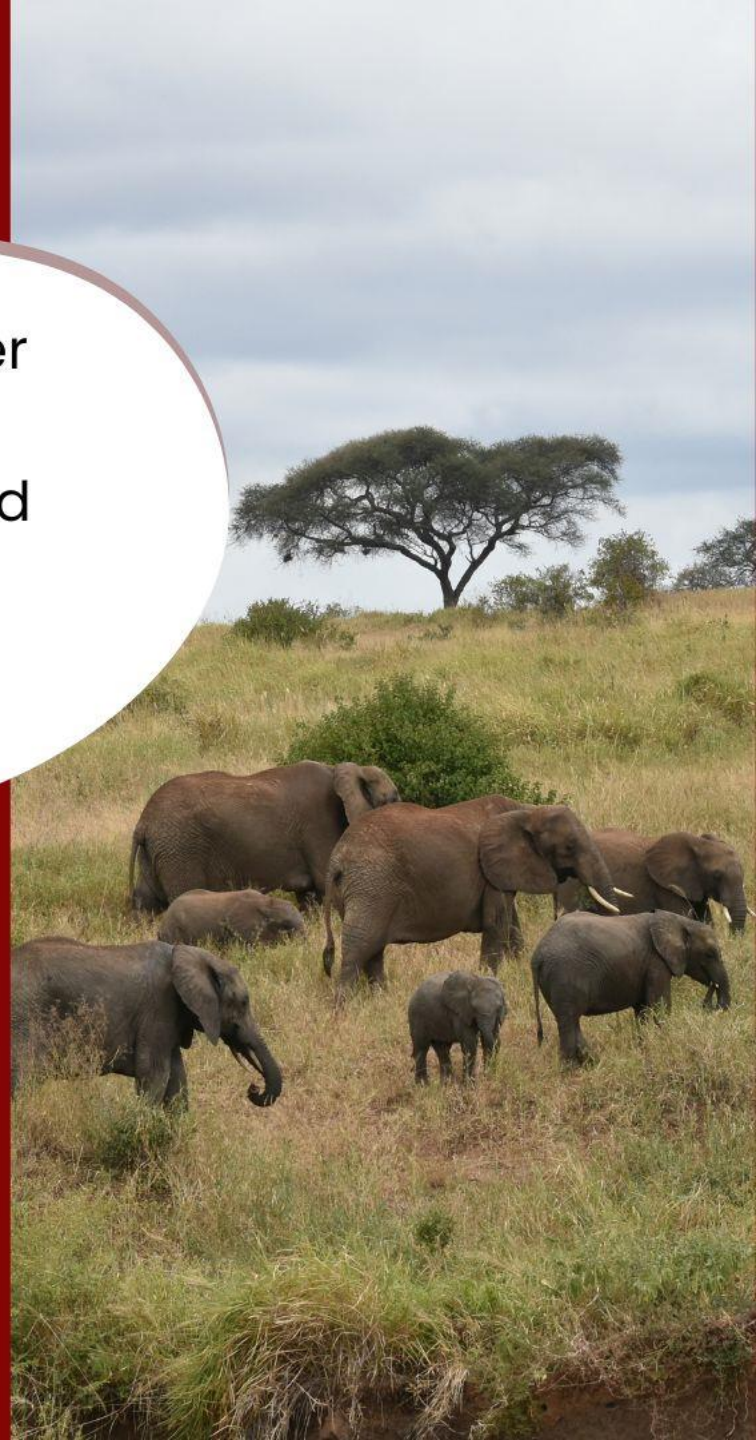
- Car batteries are used until they can charge 80% of their capacity, and then thrown away.
- It is estimated that their usefulness could continue for 15 years after that.
- Car batteries can store power for the electrical grid.
- Or can be recycled for cobalt, nickel, lithium, manganese – a costly process.

Solar panels:

- Can be recycled by heating, dissolving, and filtering out silicon. Other metals are recovered via electrolysis.
- 93% of materials in panels can be recovered.

Join the Africa network!

This network will be built on the shared ideas and experiences of all those involved. We aim to empower participants with new information for civil society at home, encourage new international partnerships, and stimulate monitoring, networking, and sharing on threats posed by mining for renewable energy materials.



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Group discussion on action – setting up a network…


THANK YOU