WAR ON WANT

FIGHTING GLOBAL POVERTY

A Material Transition

Exploring supply and demand solutions for renewable energy minerals

War on Want fights against the root causes of poverty and human rights violation, as part of the worldwide movement for global justice.

We do this by:

- working in partnership with grassroots social movements, trade unions and workers' organisations to empower people to fight for their rights
- running hard-hitting popular campaigns against the root causes of poverty and human rights violation
- mobilising support and building alliances for political action in support of human rights, especially workers' rights
- raising public awareness of the root causes of poverty, inequality and injustice, and empowering people to take action for change.

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Research supported by London Mining Network and Yes to Life No to Mining.

This publication was produced with the financial support of MCS Charitable Foundation.

Preface

A new 'green' industrial revolution is being lauded by many of the world's governments as the way to kick-start the global economy, following the economic turmoil generated by the Covid-19 pandemic. The drive towards a global energy system powered completely by renewable sources is being accelerated, as is the so-called 'fourth industrial revolution' which will merge the digital world with biological and physical innovation.

But this embrace of a renewable energy transition adopts a resource-intensive approach, focusing – often exclusively – on replacing fossil fuel powered cars with electric vehicles it attempts to keep the structure and scale of our current fossil fuel economy, only powered by renewables. This approach doesn't question the intense energy-use of the wealthiest societies or address unequal energy distribution: whereby 3.5 billion people do not have access to electricity or clean cooking, and billions more only have enough electricity for a single household light bulb or to charge a mobile phone.

War on Want's report, 'A Just(ice) Transition is a Post-extractive Transition', illustrated how the push to produce electric vehicle batteries, solar panels, clean energy storage, and wind turbine components, was unleashing unprecedented levels of 'transition' metal and mineral extraction. The report argued that switching from an economy powered by fossil fuels to one powered by renewable energy, while increasing energy consumption in the Global North, was simply not an option.

Each new green technology has a potential for extractivist violence and worker exploitation. From Chile to China, technological supply chains across the globe are undergoing a reconfiguration that connects mines, smelters, seaports, power stations, huge logistics hubs and renewable energy manufacturers. In this process frontline communities, factory workers and floor shop assistants are also being connected in chains of solidarity.

In 'A Material Transition', we analyse the complexity of these supply chains and propose a path to supply chain justice which marries structural, regulatory change with a transition based on equity, justice, and a reduction of harm.

For decades, War on Want has been engaged in the global struggle to challenge corporate power, guarantee justice for communities affected by extractivism and hold complicit governments to account. Communities potentially affected by a material transition, especially Indigenous communities, must have their rights to free, prior and informed consent over

whether extraction can take place protected.

Our call to the UK government is to critically question resource use. We need to transform our high-intensity, wasteful and growth-oriented economy, so that humanity can thrive within ecological limits. Human rights abuses must be abolished from mineral supply chains and issues of over-consumption must be urgently addressed.

That is why we are calling for a Global Green New Deal, to fight for public policies that guarantee energy as a public good, reduce the number of road vehicles and create state of the art, free public transit systems; and focus our technological innovation on mineral recycling and circular production to reduce extraction, and generate abundant green jobs.

Asad Rehman
Executive Director
War on Want

Glossary

Artisanal or small-scale mining: Individual miners working independently, or in small collectives, rather than for a mining company.

Blockchain: A system to distribute data across a network of computers via the internet.

Chain of custody: Documentation of the list of all organisations that take custody, i.e. ownership or control, of a product in a supply chain.

Circular economy: An economy where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised.

Circular society: A holistic social transformation in which not only waste is minimised, but consumption itself is questioned.

Conflict minerals: Minerals that are mined in conditions of armed conflict and human rights abuses, or which are sold or traded by armed groups.

Corporate social responsibility: A type of voluntary business self-regulation with the aim of being socially accountable.

Critical minerals: Metals and non-metals that are considered vital for the economic well-being of specific economies, yet whose supply may be at risk and for which there is not existing or commercially viable substitutes.

Decoupling: The separation of the material basis and environmental impact of productive activities from economic growth.

Degrowth: A set of theories that critique the concept of economic growth, emphasising the need to reduce global consumption and production while advocating a socially just and ecologically sustainable society

Due diligence: The investigation or exercise of care that a reasonable person or business exercises to avoid harm.

Energy transition: A pathway toward transformation of the global energy sector from fossil-based systems of energy production and consumption to zero-carbon systems.

Extractivism: High-intensity, export-oriented extraction of common ecological goods rooted in colonialism and the notion that humans are separate from, and superior to, the rest of the living world.

Green conflict minerals: Conflict minerals that are particularly associated with the energy transition.

Green energy technologies: Technology that converts energy from renewable, natural sources, or processes that are constantly replenished.

Green extractivism: Human rights and ecosystems sacrificed to endless extraction in the name of "solving" climate change.

Green growth: Fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.

Gross Domestic Product: GDP is the monetary value of all finished goods and services made within a country during a specific period, it is used to estimate the size of an economy and growth rate.

Just Transition: A contested term, but essentially a framework to encompass

continued

Glossary *continued*

a range of social interventions needed to secure workers' rights and livelihoods when economies are shifting from harmful production. Increasingly refers in climate terms to a shift from an extractive economy to a sustainable economy.

Rare Earth Elements: A group of chemically similar metallic elements often occurring together, specifically the fifteen lanthanides, as well as scandium and yttrium.

Rights-holder: Individuals or social groups who have entitlements in relation to specific duty-bearers. In general terms, all human beings are rights-holders under the Universal Declaration of Human Rights.

Strategic minerals: *See critical minerals.*

Supply chain: The sequence of processes involved in the production and distribution of a commodity.

Tailings: Mining waste. Tailings are the materials left over after the process of separating the valuable fraction from the uneconomic fraction of an ore.

Transition minerals: In the context of the energy transition, those minerals which are vital to renewable energy replacing fossil-fuels, either for extracting, storing or transmitting that energy.

Urban mining: A term for metal recycling, particularly when focused on recycling high-cost metals and electronic and electrical waste.

Acronyms

3TG: Tin, tantalum, tungsten and gold (often defined as specific conflict minerals)

CSR: Corporate social responsibility

CTIP: Chinese Circular Transformation of Industrial Parks

DRC: Democratic Republic of the Congo

DSTP: Deep Sea Tailings Placement

EITI: Extractive Industries Transparency Initiative

EU: European Union

EV: Electric vehicle

GDP: Gross Domestic Product

ICMM: International Council of Mining and Metals

IGF: Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development

ILO: International Labour Organisations

IRMA: Initiative for Responsible Mining Assurance

IWIP: Indonesia Weda Bay Industrial Park

OECD: Organisation for Economic Cooperation and Development

REE: Rare earth elements

SDGs: Sustainable development goals

SEC: US Securities and Exchange Commission

UK: United Kingdom of Great Britain and Northern Ireland

UN: United Nations

UNEA: United Nations Environment Assembly

UNEP: United Nations Environment Programme

US: United States of America

Contents

1. Executive summary

There is an urgent need to deal with the potential widespread destruction and human rights abuses that could be unleashed by the extraction of transition minerals: the materials needed at high volumes for the production of renewable energy technologies. Although it is crucial to tackle the climate crisis, and rapidly transition away from fossil fuels, this transition cannot be achieved by expanding our reliance on other materials. The voices arguing for 'digging our way out of the climate crisis', particularly those that make up the global mining industry, are powerful but self-serving and must be rejected. We need carefully planned, low-carbon and non-resource-intensive solutions for people and planet.

Academics, communities and organisations have labelled this new mining frontier, 'green extractivism': the idea that human rights and ecosystems can be sacrificed to mining in the name of "solving" climate change, while at the same time mining companies profit from an unjust, arbitrary and volatile transition.[1] There are multiple environmental, social, governance and human rights concerns associated with this expansion, and threats to communities on the frontlines of conflicts arising from mining for transition minerals are set to increase in the future. However, these threats are happening now. From the deserts of Argentina to the forests of West Papua, impacted communities are resisting the rise of 'green extractivism' everywhere it is occurring. They embody the many ways we need to transform our energy-intense societies to ones based on democratic and fair access to the essential elements for a dignified life. We must act in solidarity with impacted communities across the globe.

This report includes in-depth studies written by frontline organisations in Indonesia and Philippines directly resisting nickel mining in both countries respectively. These exclusive case studies highlight the threats, potential impacts and worrying trends associated with nickel mining and illustrate, in detail, the landscape for mining expansion in the region.

Supply-side and demand-side solutions are both necessary to mitigate harm caused from the mining of transition minerals. There is hope in the form of different initiatives that aim to apply due diligence along the supply chain. However, the sheer number of these laws and schemes means that consolidation and coordination are desperately required.

> ***"Conversations around a renewable energy transition can't take for granted that these harms are necessary for 'the greater good'. As we enter a world increasingly ravaged by floods, food shortages, and pandemics, we must continue to collectively fight for a green future. But in doing so, we must adopt an internationalist perspective which actively involves those who would bear the material costs of the transition."*** [2]
>
> **Francis Tseng**

> ***Decarbonizing, decolonizing, democratizing and de-commodifying our carbon-intensive material world is going to require programmatic thinking. It is also going to necessitate the unleashing of enormous amounts of creative labour and inventive praxis to build public institutions, a public ecology and a public culture to allow us to survive and flourish on a warming planet. This will require spaces where very different kinds of technical, cultural, political and economic knowledge, labour and practice can meet and develop new modes of collaboration.***[3]
>
> **Damian White**

Suppliers and manufacturers must work with civil society, especially impacted communities, to ensure the effectiveness and legitimacy of these due diligence initiatives. Even more importantly, we need to ensure there is a level of mandatory compliance if the schemes are to have any credibility. We must address the lack of effective and binding mechanisms that ensure respect for human rights, by applying international legal norms which hold transnational corporations accountable for their abuses. A just transition must be a justice transition.

On the demand side, there are a number of practical solutions which could be initiated or accelerated to enable better-informed choices about our energy and resource consumption. These changes should lead to a circular economy, reducing the need for new resource extraction. However, it is not enough to switch to green growth (such as increasing the production of electric vehicles). A radical reduction of unsustainable consumption is the most effective solution, based on a fundamental change to Global North economies and lifestyles. Such a change could be considered the creation of a circular society.

What is needed first and foremost is a global effort to bringing together those most affected by the problems at the heart of transition minerals. Such a process should focus on those three key areas; international solidarity with those impacted by transition minerals; advancing initiatives needed to ensure fair and just global supply chains for renewable energy technologies; and pushing for the fundamental societal changes needed to reduce unsustainable material consumption. These three actions would be a key stepping stone towards the transformation needed, in the UK, Europe, and globally.

2. Introduction

The world is currently facing multiple crises, the most obvious and pressing of which is the climate crisis. The Paris Agreement stresses the need to keep a global temperature rise below 1.5 degrees Celsius (C) in order to avoid catastrophic climate change. It is estimated that to prevent global heating from exceeding 1.5 degrees C, 80% zero-emissions energy will need to be reached by 2030, and 100% of all emissions reached by 2050. Critically, this would result in a 42.5% reduction of overall energy demand compared to a Business as Usual Scenario for 2050.[4] Further studies have shown that we can reduce overall energy use by 60% in 2050 compared to energy use today and still provide a decent living for everyone.[5]

In order to achieve this, there must be a rapid transition away from fossil fuels and towards renewable energy. While some claim that the transition is already underway, with renewable energy counting for nearly 28% of all global energy in the first quarter of 2020, compared to 26% in the first quarter of 2019,[6] – here we argue that any transition that focuses only on switching fossil fuels with renewable energies, without addressing the undemocratic and unequal ways energy is produced and accessed, will do little to address the structural issues at the heart of the climate crisis.

That's because the climate crisis is part of a deeper ecological crisis: the loss of biodiversity, widespread pollution, land and water shortages. These environmental crises, combined with social injustices and inequalities, and compounded by the pandemic, have intensified political volatility and ongoing human rights violations, with a significant impact on human health.

© Mark Kerrison

Frontline human rights defenders from Chile, Brazil and Colombia join climate justice activists to protest outside the AGM of BHP, the world's biggest mining company.

All of these environmental crises can be linked to humankind's increased use of natural resources, which has more than tripled since 1970.[7] This dynamic is accelerating, with material consumption projected to double by 2060 from 2011 levels.[8] As the International Resource Panel notes: "90% of biodiversity loss and water stress are caused by resource extraction and processing. These same activities contribute to about half of global greenhouse gas emissions."[9] On top of this, the use of these resources and their benefits are unevenly distributed across countries and regions globally. Material consumption in high-income countries is around 27 tons per person, which is 13 times that of low-income countries.[10]

Annually, the extraction of metals and minerals has risen significantly, from 11.6 billion tons in 1970 to 53.1 billion tons in 2017, accounting for 20% of climate impacts.[11] The World Bank points out that "the mining industry consumes up to 11% of global energy use, while 70% of mining projects from the six largest mining companies operate in water-stressed regions".[12]

> ***"A successful response to the climate crisis will have multiple benefits… such as cleaner air and oceans and forest reclamation. Less obvious, but also important, is the economic impact of climate policy. Climate protection requires a massive new wave of investment, reinventing energy and other carbon-emitting sectors. New low-carbon technologies must be created, installed and maintained on a global scale."***[13]
>
> **United Nations Conference on Trade and Development**

Therefore we need to be mindful of not just reducing carbon, but of the latent effects of extracting other resources required for the energy transition. Renewable energy technologies, electric vehicles and battery storage require high volumes of transition minerals. It is vital that we address how a rapid, unplanned and unjust transition towards renewable energy could enable a new wave of intensive extraction of minerals, resulting in widespread ecological destruction and human right abuses.

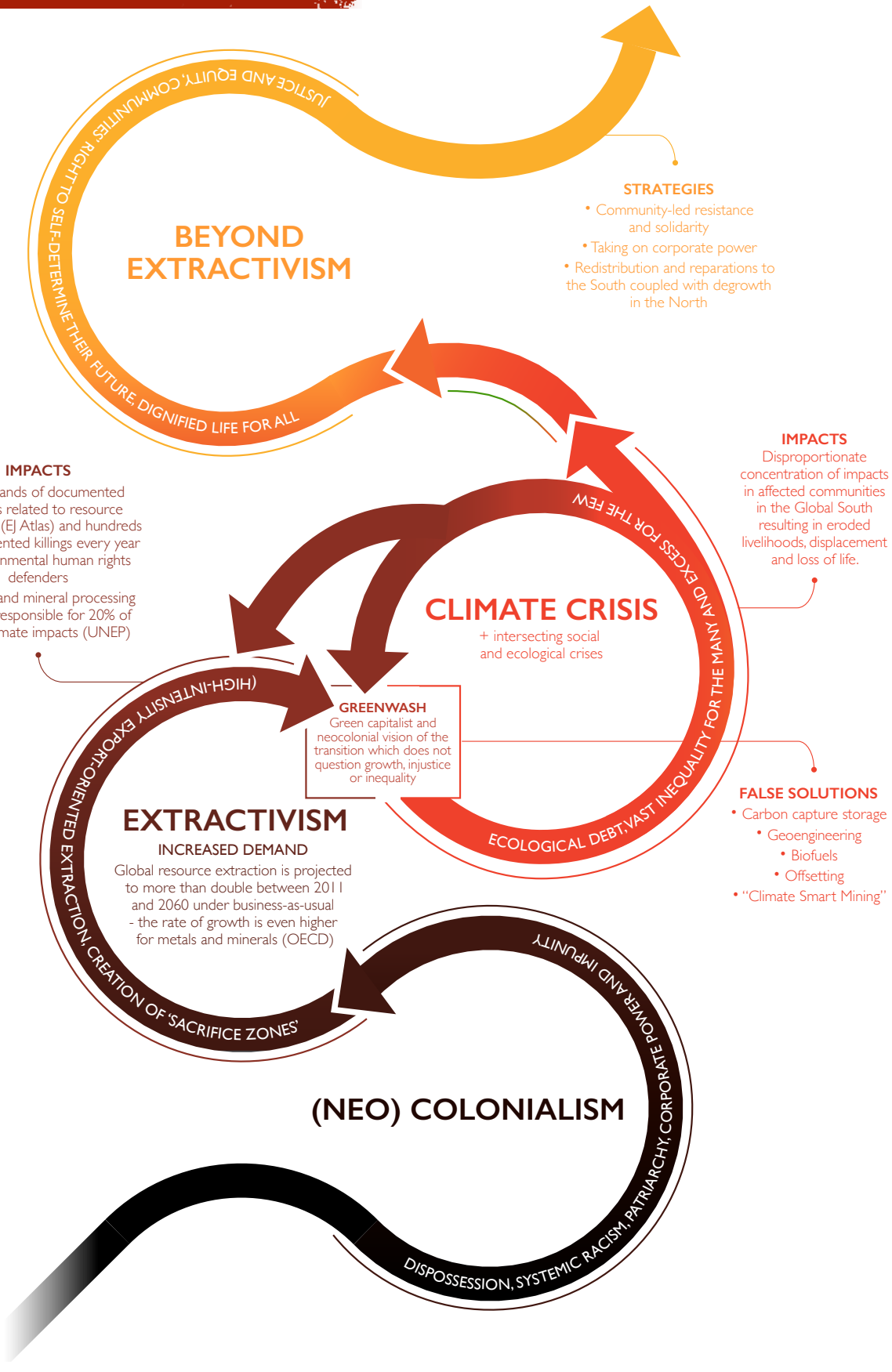
There are three key considerations to ensure that carbon reduction does not come at the expense of climate-critical ecosystems, communities, or respect for human rights:

1. The transition must include a 'Just Transition' for workers as well as communities.[14]
2. Supply chains for these materials must be appropriately managed to avoid negative social and environmental issues occurring. Deeper understanding of criteria, standards and technologies is needed to ensure fair and just global supply chains for renewable energy technologies, as well as the ethical procurement of these energies.
3. The consumption of these minerals needs to be carefully considered and reduced where possible, to lessen the predicted impacts.

What the report is addressing and why

This report aims to critically examine these issues. In considering the environmental and social impacts of the global supply chain of transition minerals, it seeks to develop key policy proposals and innovative criteria for industry and governments, to ensure that renewable energy is procured ethically and fairly. Its purpose is to inform and educate

Post-extractive transition



the public – especially downstream users of renewable energy – and help shift the wider climate debate, pushing for more scrutiny of the mining industry and the consumption of energy.

This report places community voices centre-stage, ensuring that their demands are heard while recognising that they are at the heart of grassroots-led solutions, which can help us mitigate climate change impacts, protect climate-critical ecosystems and create fairer, more just and caring societies.

It is important to stress that this is not a rejection of the need for a transition towards a system of sustainable, renewable energy provision. The issues raised should not deter the replacement of fossil fuels with renewables. Instead, they should alert us to potential dangers, create ways to mitigate any damage, and question the scale and nature of the renewable energy transition. This report is designed to encourage and support the deployment of renewable technologies in a truly sustainable manner, by arguing that a circular approach is more positively effective. A circular approach critically reduces overall material use, where maintaining the status quo will only seek to replace the scale of the fossil fuel economy with renewables, to devastating effect.

As a UK-based organisation War on Want feels a particular responsibility towards the role that London plays financing and sponsoring the mining industry. Most of the big mining companies, and many of the smaller mining companies, have London offices or are listed on the London Stock Exchange. The mining industry's key lobbying organisation, the International Council on Mining and Metals (ICMM), is based in London, as is the world's most important metals price-fixing mechanism, the London Metal Exchange. The UK government, and those with a financial stake in the UK money markets, thus carry a specific moral and historical responsibility regarding the mining industry. As such, this report focuses on the UK's role as a hub for the global mining industry's power – and on the transformations needed here to guarantee a just transition.

Transition minerals and the mining industry

Section 3 of this report looks in greater detail at the different transition minerals and their impacts. However, it is worth making a few introductory comments on transition minerals, the mining industry and the predictions being made about the amount of minerals required for the energy transition.

The concept of transition minerals covers a range of different metals in different technologies including the generation of energy (particularly solar and wind), its storage in batteries, and its transmission. The diagram from a recent report by the Institute for Sustainable Futures, University of Australia, conveys a sense of the metals used in renewable energy technologies, their application and relative importance to these technologies.[15]

The mining industry has profited from the growing demand for resources, including from mining coal. While it is being forced to divest from coal, as the threats of climate change threatens have turned the polluting fossil fuel into stranded asset with rapidly diminishing economic value, mining companies are now seeking to develop production to cash in on transition minerals. The mining entrepreneur Robert Friedland recently addressed a conference: "If we get a Green New Deal where bankers just hit the zero keys … it would make our day, all of us in this audience. It would be quite phenomenal."[16]

The concern with this is twofold. Firstly, profits would drive the transition agenda, and with it green extractivism, rather than a desire to ensure the safest and most just energy transition. Secondly, and equally problematic is that mining companies will be able to claim that their expansion is justified by the energy transition and will attempt to 'green-wash' their reputations by claiming green credentials.[17]

There are two other points worth stressing about the global mining industry. The first is scale. The majority of minerals are extracted by large-scale, mechanised industrial mining. The size of these mines, and their impacts, are growing as miners chase lower quality grades of minerals. However, small-scale or artisanal mining – where individual miners work independently or in small collectives – still exists, and indeed flourishes. The World Bank estimates that approximately 100 million people (including workers and their families) depend on artisanal mining, compared to about seven million people worldwide who depend on industrial mining.[18]

Small-scale mining is frequently accused of being primitive and dangerous, while industrial mining is considered safe and progressive.[19] Although artisanal mining can be vulnerable to a number of risks – including forced labour and exploitation, and can collectively cause environmental damage, it can be socially and economically beneficial. Whereas large-scale mining, as we will see in section 3, is often responsible for significant social and environmental damage.

Secondly, the exploitation of artisanal miners, and the developing countries they are working in, happens along the supply chain almost unnoticed. Bolivia is internationally recognised as one of the top producers of indium, which is recovered as a by-product of smelting zinc and tin ore, supplied by cooperatives from the Bolivian highlands. The concentrations of indium are small, but the price is high. However, research by Make ICT Fair and CATAPA has uncovered zero income from indium is recorded as going to the Bolivian cooperatives, who are only being paid for the zinc, silver, lead or tin in the ore. The profits

Battery and EV material intensity and recycling

Materials	Al Aluminium	Cu Copper	Li Lithium	Co Cobalt	Ni Nickel	Mn Manganese	Dy Dysprosium	Nd Neodymium
Current materials intensity [t/GWh]	220	220	113	124	415	406	0.083 kg/ vehicle	0.695 kg/ vehicle
Future technology [t/GWh]	220	220	411	0	0	0	0.083 kg/ vehicle	0.695 kg/ vehicle
Current recycling rate [%]	70%	70%	0%	90%	90%	0%	0%	0%
Potential recycling rate [%]	95%	95%	95%	95%	95%	95%	95%	95%

Note: Current materials intensity based on an assumed market share of a range of LIB technologies: NMC (60%), LMO (20%), NCA (15%), and LFP (5%)46. Future technology based on introduction of Li-S batteries.47 Current recycling rate based on a collection efficiency of 100% and recovery rates from various studies. Potential recycling rate based on assumption of 95%.

Source: Dominish, E., Florin, N. and Teske, S., 2019, Responsible Minerals Sourcing for Renewable Energy, Earthworks, Institute for Sustainable Futures, University of Technology Sydney

Child miners as young as 11 in Kaji, eastern Congo.

are instead being accrued by the smelting companies, including Korea Zinc and Nyrstar.[20]

Future demand for transition minerals

There is no shortage in predictions of the demand for transition minerals, and many – especially from financiers – make sizeable forecasts. A 2018 study by André Månbergera and Björn Stenqvistb projected vast increases in demand for materials between 2015 and 2060: 87,000% for EV batteries, 1,000% for wind power, and 3,000% for solar cells and photovoltaics.[21]

> ***Each mineral carries a different demand risk depending on whether it is cross-cutting (needed across a range of low-carbon technologies) or concentrated (needed in one specific technology). Absolute production numbers and relative increases in demand for each mineral may also play a role in their ability to meet supply as well as have climate and environmental implications.***[22]
>
> **World Bank Group**

However, forecasting future demand is difficult, and these are only predictions. The uncertainty surrounding the demand for transition minerals is due to a number of factors, including levels of demand for energy, which is highly political and hotly contested; the quantity of energy produced by renewables (including which technologies are used); and the specific material requirements for these renewable technologies.

Technological and economic changes must also be anticipated, such as increases in material efficiency and the substitution of expensive metals with cheaper ones. Likewise, estimated reserves of a given mineral can vary over time depending on new discoveries, new technologies, and the market price. As technology improves and demand increases, pushing up prices, commercially viable reserves will increase. It is important to stress that there are a number of complex factors which produce widely different results, depending on the initial assumptions used. In an industry notorious for boom-and-bust cycles, this becomes all the more problematic.

The time frame used in estimates also varies, as many results concern themselves with the next 10 to 30 years in order to comply with deadlines in the Paris Agreement or the Sustainable Development Goals. Others consider, with more difficulty, the next 50 to 100 years. To add a further layer of complexity, the term 'strategic' (or critical) minerals is used, sometimes synonymously, with transition minerals. However, the term strategic minerals generally refers to country-specific concerns around supply shortages, either for economic or defence reasons; which tend to be of a narrower focus and more short-term than the global sustainable resource concerns around transition minerals.[23]

Two separate World Bank reports on climate-smart mining illustrate why caution is necessary. The World Bank argues for the

economic benefits of transition minerals. Its 2017 report, supported by the ICMM, projected a 965% increase in the global demand for lithium by 2050, and a six-fold increase in demand for cobalt during the same period for a 2 degree C climate scenario, i.e. the upper limit of temperature growth to avoid significant and potentially catastrophic changes to the planet.[24] Its 2020 report uses a similar methodology, yet estimates smaller figures for cobalt, and estimates demand for lithium will increase by approximately 500% by 2050.[25] The 2020 report appears more cautious primarily because The World Bank factored recycling and reuse into its estimated numbers, which it had not done in 2017.

> ***We urge the World Bank Group to prioritize recycling, efficiency, circular economy, public transit, and other non-mining solutions as the primary components of its "Climate-Smart" agenda … We are alarmed to note that the World Bank has closely partnered with mining companies in developing and launching its new Climate-Smart Mining Facility, putting mining company agendas and interests before protections to safeguard and benefit workers, communities and the environment.***[26]
>
> **Civil society letter to the World Bank**

It is worth bearing these problems in mind for two reasons. Firstly, because predictions are sometimes stated as fact, such as in the recent Science Journal article which argues that in order to mitigate climate change, "between 2015 and 2050, the global EV [electric vehicle] stock needs to jump from 1.2 million light-duty passenger cars to 965 million passenger cars".[27] The assumption is that there should be a direct swap from combustion engine vehicles to electric vehicles, rather than any consideration of other transportation options. The second reason is because far too often predictions typically rest on optimistic forecasts, or only focus on business-as-usual scenarios, i.e., economic growth with some recycling measures added. By using business-as-usual predictions, the mining industry is attempting to justify its expansion. We will examine these justifications in section 6.

> ***Building hopes on the anticipated boom in demand for the so-called critical minerals poses risks because nobody knows with certainty what the future of technology has in store – particularly affecting the uncertain demand for minor metals with few and specific, mostly high-tech, applications. Today's technology – and its associated mining requirements – can become yesterday's news at a speed that far outpaces the adaptability of mines, threatening to leave these resource-intensive investments obsolete and economically stranded.***[28]
>
> **Columbia Center on Sustainable Investment**

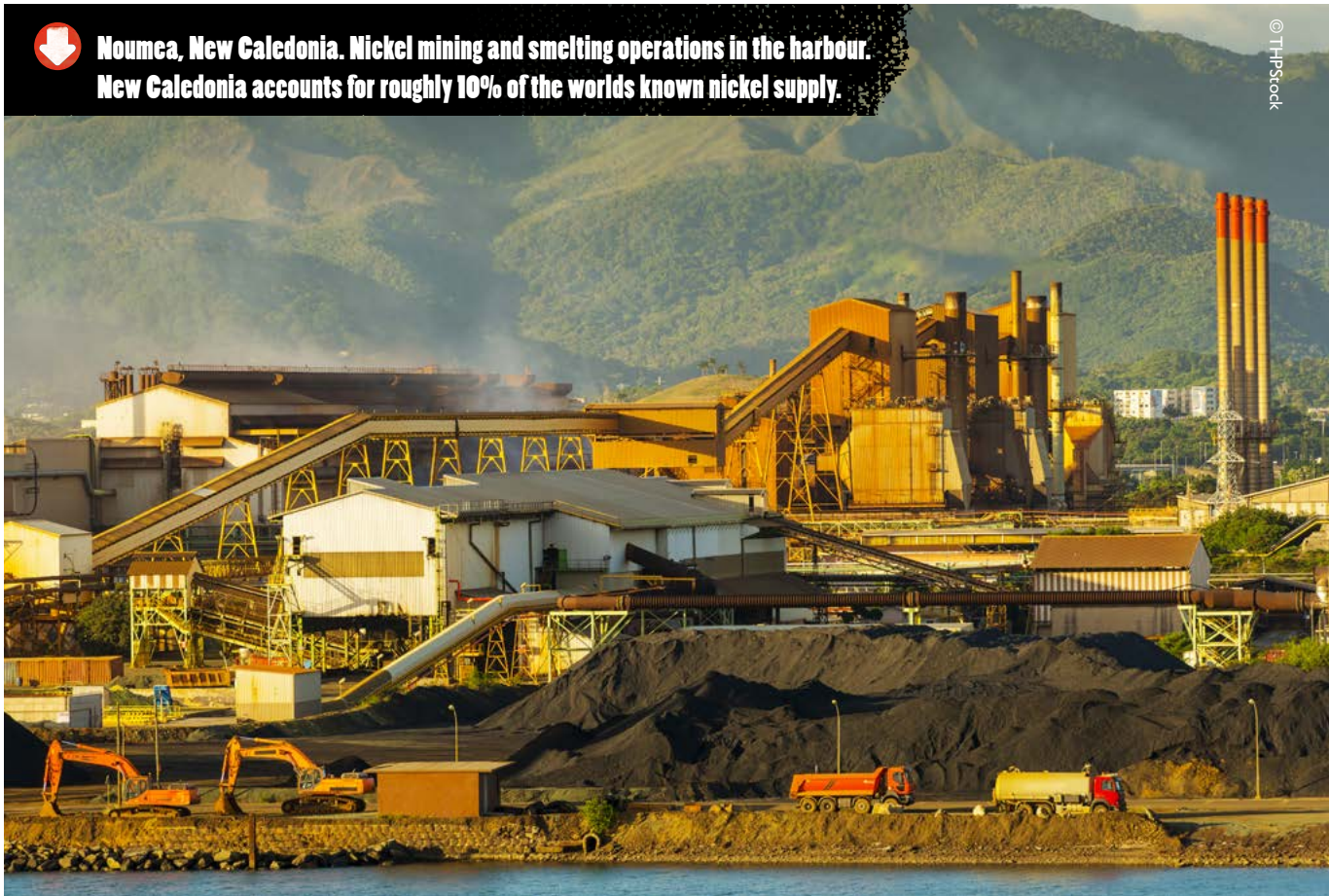
3. Global conflicts and transition minerals

Green and red all over

The mining and processing of metals has long been associated with conflict for affected communities. The Global Environmental Justice Atlas lists 3,303 cases of socio-environmental conflict, as of 27 October 2020. The mining of mineral ores and building materials represents 646 of these cases, more than any other category listed in the Global Environmental Justice Atlas. At least 273 conflicts are related to the extraction of transition minerals, which is just under one tenth of the total number of cases.[29]

Green extractivism is threatening communities around the world, however, although there is ample documentation of conflicts in Africa and Latin America, detailed research is lacking regarding the serious situation of increased mineral mining in Asia. As such, this report includes two in-depth case studies, written directly by movements and communities in Indonesia and the Philippines on the frontlines of conflicts surrounding nickel mining. These can be accessed at the end of this report.

There are a number of factors that cement the relationship between mining and conflict.



Noumea, New Caledonia. Nickel mining and smelting operations in the harbour. New Caledonia accounts for roughly 10% of the worlds known nickel supply.

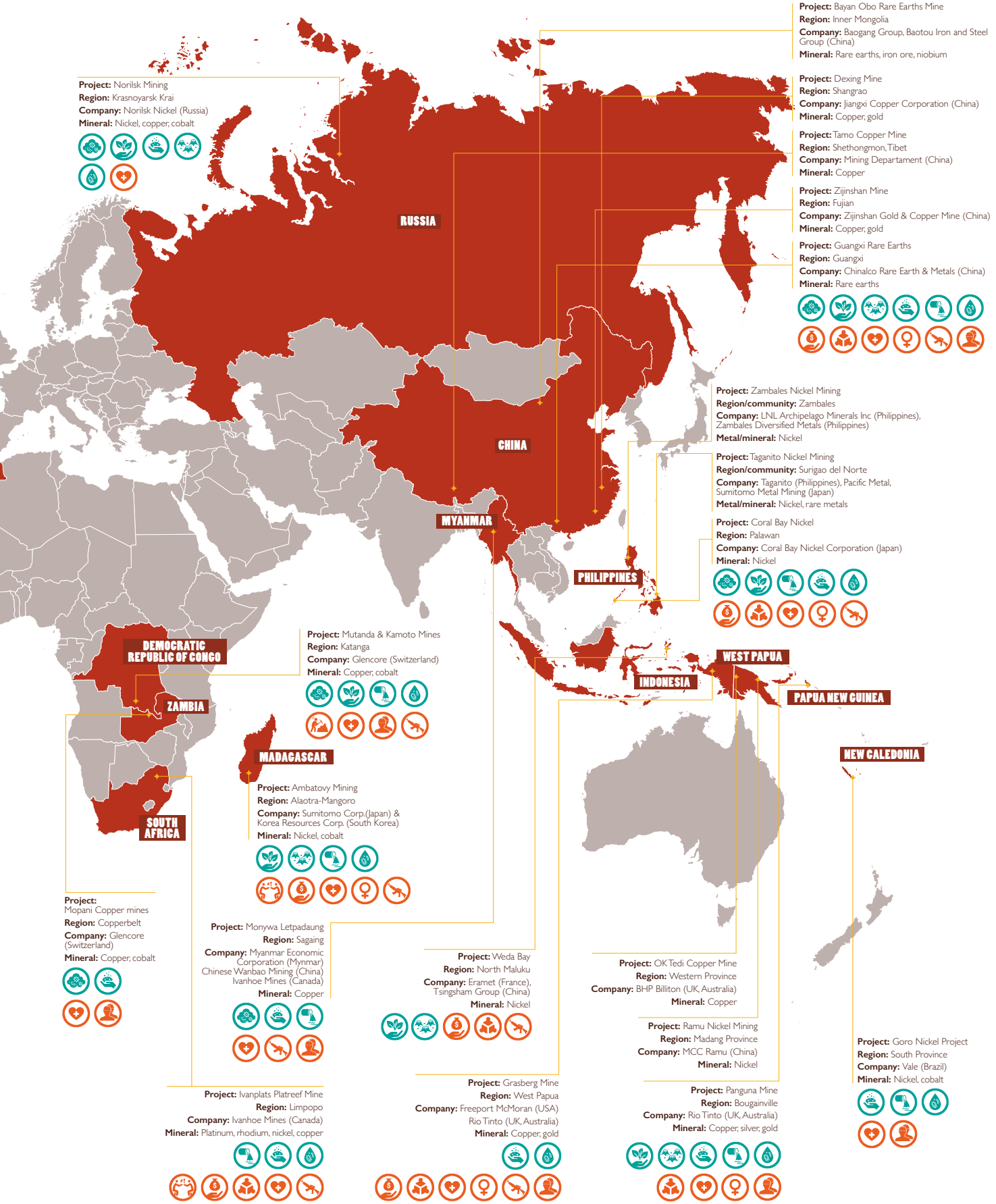
Selected sites of struggle associated with transition materials

ENVIRONMENT ISSUES

- AIR POLLUTION
- BIODIVERSITY LOSS
- DEFORESTATION
- MINE WASTE
- SOIL EROSION
- WATER ISSUES

SOCIAL & ECONOMIC ISSUES

- CHILD & FORCED LABOUR
- COMMUNITY CONFLICT
- CORRUPTION
- CULTURAL LOSS
- HEALTH ISSUES
- IMPACTS OF WOMEN
- MILITARISATION
- WORKERS ISSUES


RUSSIA
CHINA
MYANMAR
PHILIPPINES
INDONESIA
WEST PAPUA
PAPUA NEW GUINEA
NEW CALEDONIA
DEMOCRATIC REPUBLIC OF CONGO
ZAMBIA
SOUTH AFRICA
MADAGASCAR
Project: Norilsk Mining
Region: Krasnoyarsk Krai
Company: Norilsk Nickel (Russia)
Mineral: Nickel, copper, cobalt
Project: Bayan Obo Rare Earths Mine
Region: Inner Mongolia
Company: Baogang Group, Baotou Iron and Steel Group (China)
Mineral: Rare earths, iron ore, niobium
Project: Dexing Mine
Region: Shangrao
Company: Jiangxi Copper Corporation (China)
Mineral: Copper, gold
Project: Tamo Copper Mine
Region: Shethongmon, Tibet
Company: Mining Departament (China)
Mineral: Copper
Project: Zijinshan Mine
Region: Fujian
Company: Zijinshan Gold & Copper Mine (China)
Mineral: Copper, gold
Project: Guangxi Rare Earths
Region: Guangxi
Company: Chinalco Rare Earth & Metals (China)
Mineral: Rare earths
Project: Zambales Nickel Mining
Region/community: Zambales
Company: LNL Archipelago Minerals Inc (Philippines), Zambales Diversified Metals (Philippines)
Metal/mineral: Nickel
Project: Taganito Nickel Mining
Region/community: Surigao del Norte
Company: Taganito (Philippines), Pacific Metal, Sumitomo Metal Mining (Japan)
Metal/mineral: Nickel, rare metals
Project: Coral Bay Nickel
Region: Palawan
Company: Coral Bay Nickel Corporation (Japan)
Mineral: Nickel
Project: Mutanda & Kamoto Mines
Region: Katanga
Company: Glencore (Switzerland)
Mineral: Copper, cobalt
Project: Ambatovy Mining
Region: Alaotra-Mangoro
Company: Sumitomo Corp.(Japan) & Korea Resources Corp. (South Korea)
Mineral: Nickel, cobalt
Project: Mopani Copper mines
Region: Copperbelt
Company: Glencore (Switzerland)
Mineral: Copper, cobalt
Project: Monywa Letpadaung
Region: Sagaing
Company: Myanmar Economic Corporation (Mynmar) Chinese Wanbao Mining (China) Ivanhoe Mines (Canada)
Mineral: Copper
Project: Weda Bay
Region: North Maluku
Company: Eramet (France), Tsingsham Group (China)
Mineral: Nickel
Project: OK Tedi Copper Mine
Region: Western Province
Company: BHP Billiton (UK, Australia)
Mineral: Copper
Project: Ramu Nickel Mining
Region: Madang Province
Company: MCC Ramu (China)
Mineral: Nickel
Project: Goro Nickel Project
Region: South Province
Company: Vale (Brazil)
Mineral: Nickel, cobalt
Project: Ivanplats Platreef Mine
Region: Limpopo
Company: Ivanhoe Mines (Canada)
Mineral: Platinum, rhodium, nickel, copper
Project: Grasberg Mine
Region: West Papua
Company: Freeport McMoran (USA) Rio Tinto (UK, Australia)
Mineral: Copper, gold
Project: Panguna Mine
Region: Bougainville
Company: Rio Tinto (UK, Australia)
Mineral: Copper, silver, gold

The prime reason being that a commercially recoverable mineral resource is located in a fixed place. Any mining company seeking to extract the mineral must therefore respect the rights of any communities living on or nearby the deposit if it wants to mine. Adding to this tension is the significant scale of potential disruption.

Specific environmental and social issues, which can apply to ore smelting and/or processing, as well as mining, are:

- loss of land and displacement of communities, without adequate compensation
- destruction of habitat and impact on local biodiversity
- potential impact from the building of infrastructure
- soil erosion, lack of access to farming land and water
- dumping of waste, with potential accidents, and pollution of air, soil, ground and surface water
- loss of livelihoods and food insecurity
- micro and macro-economic dependence, with corruption, tax avoidance and money laundering
- health impacts from water or air pollution
- health and safety issues for workers, and child labour
- gender-specific impacts, particularly around livelihoods and food security
- cultural and spiritual impacts, particularly for indigenous peoples

The types of conflict vary, but include:

- conflict over the issues above, particularly access to land, water or pollution issues
- internal conflict within communities, featuring local bribery and corruption
- conflict from influx of workers and potentially settlers
- conflict between small-scale miners and communities, or between small-scale miners and mining companies
- gross human rights abuses, including murder, torture, forced labour and slavery
- threats and killings of human rights, environmental or land defenders, and social leaders
- gender violence, including rape and increased domestic violence
- militarisation and the risk of armed conflict, including the struggle to control the mineral resources

Although responsible mineral sourcing initiatives have tended to focus on armed conflict, increasingly, interest is being shown in all of the issues listed above.

The International Institute for Sustainable Development has mapped the link between minerals for the energy transition (what they call "green conflict minerals") and states that are both fragile and corrupt. A picture emerges of potential hotspots of increased fragility, conflict and violence resulting from growing mineral extraction. Regionally, they highlight hotspots which are concentrated in South America, Sub-Saharan Africa and Southeast Asia.[30] A separate 2017 review of mining and conflict by the Canadian International Resources and Development Institute, unrelated to the energy transition, noted that conflict was focused in Latin American countries (46%), followed by Africa (24%), and Asia (17%). These regions comprise more than 87% of all reported conflicts.[31]

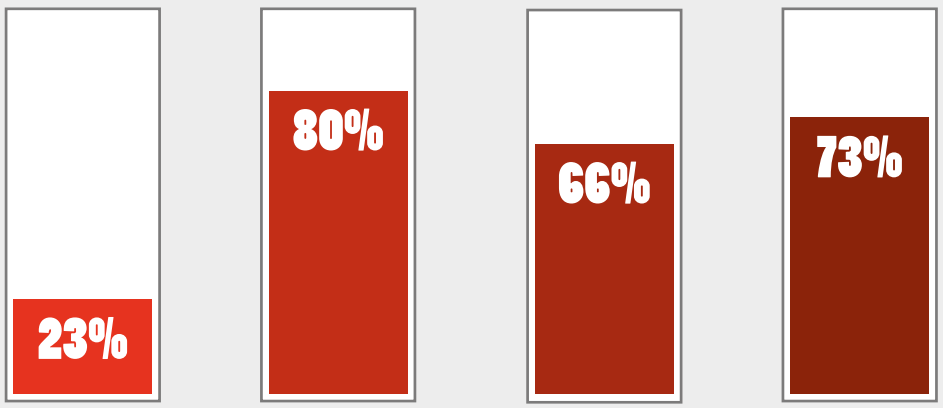
The World Bank considers Latin America as the primary potential supplier of transition minerals.[32] It describes a shift in energy power from oil and gas producing countries – for instance in the Middle East – to those able to supply materials for renewable energy, particularly in Latin America. The World Bank lists notable Latin American reserves including aluminium, copper, iron ore, lithium, manganese, nickel, silver and zinc. It also considers Africa – with its reserves of aluminium, chromium, cobalt, manganese, and chromium – as a major supplier of these resources.

It is worth noting that there may be less overall change, given China's continued dominance over many of the metals – especially rare earth elements, which we discuss below – required to supply technologies in a carbon-constrained future, and the ample reserves in 'traditional' mining countries including the USA, Canada and Australia. However, it is highly likely that there will be significant impact at the regional or community level where projects move from, for instance, coal or gas, to cobalt, lithium or nickel.

> ***"Huge conflict potential ... lies behind the sudden and rapidly growing surge in demand for certain raw materials. United Nations studies have shown that over 40% of all armed internal conflicts in the past 60 years have involved violent clashes over natural resources (including minerals)."***[33]
>
> **Professor Raimund Bleischwitz, University College London**

Where does China's dominance lie in the lithium ion battery to EV supply chain?

China's share of production % in full year 2019*



* Lithium, Cobalt, Nickel, Graphite, Manganese, Cathode, Anode, Cells accounted for in calculations

Source: Benchmark Mineral Intelligence

Mapping conflict and transition minerals

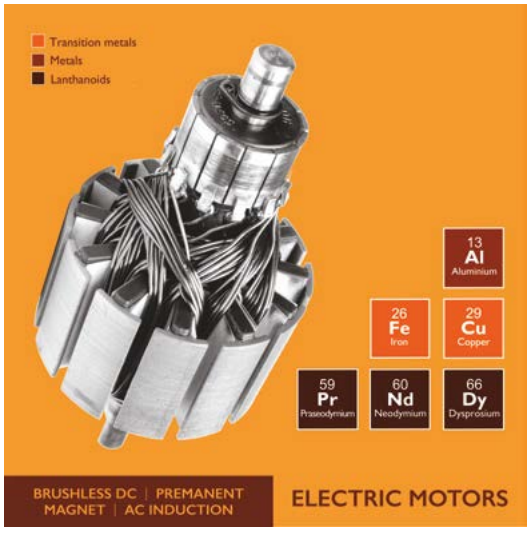
Section 2 introduced the link between minerals and the energy transition, and this section seeks to explore the potential problems associated with each of them. Transition minerals are related to a number of different products, including those designed to convert energy such as photovoltaic solar panels and wind turbines, to storage devices such as batteries, to products which transmit electricity.

Cobalt, lithium, nickel and 'rare earth elements' are the most commonly considered transition minerals. The following are brief summaries of the impacts associated with those transition minerals. But more information on them, as well as on other lesser-known minerals, can be viewed in the 'Conflict and Transition Mineral' Annex on page 64.

Cobalt

Cobalt has become the mineral most associated in people's minds with the problems of transition minerals; so much so that the phrase 'blood diamonds' or 'conflict minerals' is giving way to the concept of 'blood batteries'.[34] Although cobalt alloys are widely used in aerospace, electricity generation, aircraft, medical, automotive, and military related industries, it is its chemical use in lithium ion batteries which has driven up demand from 38,000 tonnes per annum over the period 1970-2009 to around 145,000 tonnes per annum over 2010-19.[35] Batteries for electric vehicles accounted for 55% of total cobalt consumption in 2019.[36] Artisanal mining in the DRC is associated with appalling health and safety conditions, child labour, and accusations of modern slavery. Artisanal miners are proposing solutions to these issues – including increased access to credit and technology – as well as calling for the formalisation of the sector. Such initiatives, combined with supply chain due diligence, appear to be a better solution than avoiding DRC cobalt.

> ***"The accidents are common. They put a red cross on the pits where there has been an accident to show that it is dangerous. But some people still mine in those ones already declared dangerous."***[37]
>
> **An artisanal cobalt miner in Kambove**



Lithium

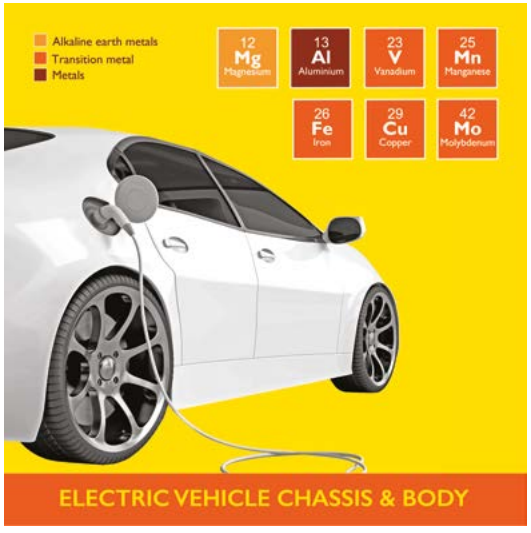
Thanks to its impressive capacity to store energy, lithium is increasingly used in rechargeable batteries, and as with cobalt, is increasingly considered essential for modern batteries. In 2019, batteries made up an estimated 65% of the global end-use for lithium (with ceramics and glass constituting the second most popular, and more traditional, end-use).[38] This is a 42% increase compared to 23% battery end-use in 2010,[39] with a potential to grow up to an estimated 18% further per annum.[40] Interest in lithium's potential has led to it being marketed as 'white gold', with the EU adding lithium to its list of critical minerals, encouraging companies to open proposed lithium mines in Europe, in Portugal, Serbia and Cornwall.[41]

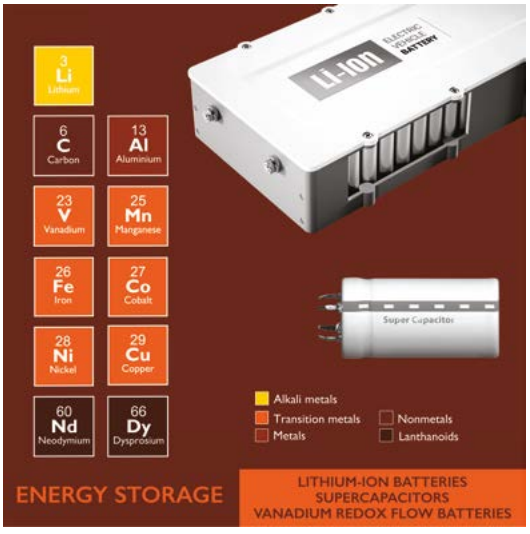
Lithium deposits are mined either by hard-rock mining from spodumene, a mineral, or from salts, largely from lithium-rich brines (concentrated salt-water solution) in salt lakes. Australia was the biggest lithium producer in 2019, with just over 54% of global production, and is primarily a hard-rock miner.[42] However, collectively in terms of known reserves, brine, notably in the so-called lithium triangle on the borders of Argentina, Bolivia and Chile, has the majority of reserves.[43] Within the arid lithium triangle there have been rising community conflicts, primarily over water usage, but also livelihoods, culture and the right to consent.[44]

> ***"To say that we need the mining companies is a lie, because the community is the same, it does not grow. I'm worried about the environment and the diseases."***[45]
>
> **Atacama community member, Argentina Pía Marchegiani *et al*.**

Nickel

Nickel has become an important metal in modern living, used in stainless steel and alloys, as well as electroplating, and increasingly in rechargeable batteries – where it could potentially substitute for the more expensive cobalt. Whereas cobalt and lithium tend to dominate debates over battery minerals, base metals like nickel have received less attention, partly because they are not exclusively linked with green energy technologies. Elon Musk has highlighted this by promising a "giant contract" to companies mining nickel in an environmentally sensitive way.[46]





40% of global nickel reserves are located in protected areas with high biodiversity, and 35% are found in areas with high water stress.[47] 38% of global reserves are found in countries given an "elevated warning" or worse on the Fragile States Index, while 54% are located in states perceived to be corrupt or very corrupt on the Corruption Perceptions Index.[48]

Nickel is usually found in either sulphide or laterite-type ores; global reserves are approximately 60% in laterites and 40% in sulphide deposits.[49] Historically, the majority of nickel mining has been derived from sulphide ores. Lateritic soils, which tend to occur in the tropics, require strip mining and more complex processing to remove large amounts of water.[50] Both sulphide and laterite nickel mining are associated with pollution and human rights abuses, especially for indigenous peoples, from Russia to New Caledonia.[51] See the case studies from the Philippines and Indonesia in section 8.

> ***"The mining of nickel-rich ores themselves, combined with their crushing and transportation by conveyor belt, truck or train, can generate high loadings of dust in the air, dust that itself contains high concentrations of potentially toxic metals, including nickel itself, copper, cobalt and chromium ... We have to get smarter at recovering and reusing the vast quantities that we have already extracted from the earth, rather than relying on continued pursuit of new reserves of ever poorer quality."***[52]
>
> **Dr David Santillo, Greenpeace Research Laboratories**

Copper

Copper and copper alloys have a wide range of uses including in building construction, electronic products, transportation equipment, electrical and industrial goods. Demand for copper has almost doubled in the last 20 years to 20 million tonnes in 2019.[53] Thanks to its conductive properties, it is used in power generation and transmission, including in wind turbines. Wood MacKenzie predict that the building of wind turbines between 2018 and 2028 will use 5.5 million tons of copper.[54]

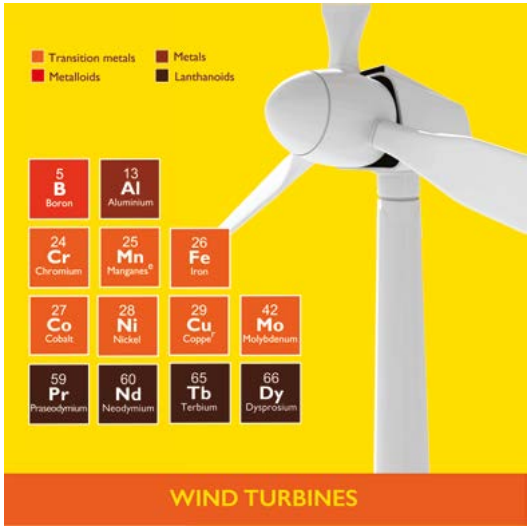
The potential for impact from copper mining is great. The Grasberg copper and gold mine in West Papua has been pouring waste, estimated to be up to 280,000 tonnes per day, into the local river system for almost half a century,[55] and has caused or exacerbated conflict with the local Amungme population, leading to the deadly militarisation of the area, which the company has partly paid for.[56]

The International Institute for Sustainable Development observes "that of all the metals, the aggregate potential for damage to human and environmental health is the greatest for copper."[57]

> ***Mama Yosepha Alomang described the [Grasberg] mine as being a serpent that is living beneath the earth and devouring the land on which she and her people live. More than that, she talks of Nemangkawi, the traditional name for the mountain where the Grasberg mine is operating, as her own body, a mother to her community.***[58]
>
> **Mama Yosepha Alomang**

Rare Earth Elements

The term rare earths, or rare earth elements (REEs) covers 17 chemical elements often occurring together, with neodymium (as well as dysprosium and praseodymium) being of particular importance for green energy technologies. These metals are essential for specialized magnets used in energy storage technologies, electric vehicles and wind turbines.



Despite their name, rare earth elements (with the exception of the radioactive element promethium) are relatively plentiful in the Earth's crust but are more difficult to find in economically viable concentrations. This is because the process of extraction is expensive, given that it requires separating multiple different metals from a single deposit.

> ***[China's] rare earth reserves are much depleted; environmental costs in the trillions of yuan have not been factored into market prices; and a rampant black market in rare earths ... has exacerbated environmental damage and the loss of resources.***[59]
>
> **Liu Hongqiao in China Dialogue**

REEs are often associated with critical or strategic minerals, because they are connected with the near monopoly that China has exerted over them. China currently mines about 63% of global production, although a decade ago that figure was at 97%.[60] This REE ascendency has come at a high environmental cost for China, which also explains why so many countries were previously content for China to be the global source of REEs. The mining and processing has caused extensive ecological damage. Producing one tonne of REEs leads to an estimated "60,000m3 of waste gas that contains hydrochloric acid, 200m3 of acid-containing sewage water, and 1-1.4 tonnes of radioactive waste."[61] Dalahe village in the REE Baotou region is known as a 'cancer village' because of the health impacts on local residents.[62]

4. Supply chain governance

Transition supply chains

There is not a globally accepted human rights standard covering transition minerals, and the supply chains for transition technology are highly complex. Supply chains extend to numerous tiers and to thousands of suppliers, for components containing multiple metals mined across the globe. As such, monitoring an entire supply chain remains a major challenge. The risks associated with supply chains include a wide range of issues covering human rights, conflict, the environment, health and safety, transparency and corruption. The gravity of these concerns has meant responsible sourcing has gained momentum over recent years, with increasing interest driving both public awareness and investor and consumer demand for assurances. For example, in 2019, the Investor Alliance for Human Rights called for enhanced investor due diligence to address environmental, social and governance risks throughout supply chains.[63] The response is an expanding patchwork of interlocking legislation, norms and standards. Due diligence is becoming more ubiquitous, but the sheer complexity of the current landscape is raising as many potential problems as it solves.

The issue of due diligence in mineral supply chains covers more than just technologies focused on the energy transition. However, it is a key, and growing, sector of concern. According to research by the Business & Human Rights Resource Centre, since 2010 there have been "197 allegations of human

The Indigenous community of 3 Pozos carry a banner saying, "Water is worth more than lithium."

© Richard Bauer

Flow chart of generic supply chain

Source: Benchmark Mineral Intelligence

rights abuses related to renewable energy projects, [Business & Human Rights Resource Centre] asked 127 companies to respond to these allegations… include[ing]: killings, threats, and intimidation; land grabs; dangerous working conditions and poverty wages; and harm to indigenous peoples' lives and livelihoods. Allegations have been made in every region and across each of the five sub-sectors of renewable energy development: wind, solar, bioenergy, geothermal, and hydropower."[64] A report by Action Aid and SOMO concludes that wind turbine manufacturers are not meeting the expectations for human rights due diligence.[65]

The focus of this report is principally on upstream issues and governance, namely the impact of mining and mined metals within the supply chain. There are numerous concerns further down the supply chain, particularly in terms of manufacturing. Issues include health and safety, regarding exposure to toxicity in the metals, as well as communities opposed to the construction of battery plants, wind turbines or solar panels.[66] These concerns are equally valid and there are other organisations who are dealing more directly with them.[67]

This section seeks to review the current situation, first reviewing what is meant by due diligence, then listing the current initiatives – broken down into international frameworks, national legislation and then voluntary assurance schemes and standards – before considering future initiatives, then reviewing the problems, and potential solutions to the current state of play.

The basics of due diligence

The standard starting point for due diligence is the six-point step-by-step guide laid out in the 2018 OECD Due Diligence Guidance for Responsible Business Conduct.[68] These steps focus on identifying, preventing, mitigating and accounting for human rights impacts, and require a company to do the following:

- Embed responsible business conduct into their policies and management systems
- Identify and assess actual and potential adverse impacts associated with their operations, products or services
- Cease, prevent and mitigate adverse impacts
- Track implementation and results
- Communicate how impacts are addressed
- Provide for, or cooperate in, remediation when appropriate

All of the above requires open transparency, good communication and engagement – especially with those at risk of human rights impacts, and clear and effective outcomes, i.e. if impacts are not addressed, then companies should disengage from their business relations.

It is worth noting that mineral supply chains can be particularly difficult to monitor. The transition minerals covered here – similar to commodities such as palm oil or sugar – are materials that require processing. They are all easily mixed at the point of processing (unlike for instance diamonds or timber). In attempting to trace the source to the point of origin (be it a mine or recycling plant), this is a difficulty that must be overcome. It means that smelters and refineries are frequently the focus of attempts to verify the source minerals and provide a chain of custody – in order to verify a mineral's passage through the supply chain.

Initiatives and standards

There is a dizzying array of different, and sometimes competing, due diligence initiatives. The accompanying tables attempt to list all of those that are relevant to transition minerals. The tables group and categorise due diligence initiatives, although as some have overlapping characteristics, and there is interplay between a number of them, this is somewhat difficult to present conclusively.

The initiatives listed focus on traceability and transparency of supply chains, and human rights due diligence. However, wider frameworks and interlocking standards and initiatives have been included to give context, and to highlight new opportunities. Greater detail on the information in those charts is provided in the 'Supply chains initiatives and standards' Annex on page 71, which covers a review of the international frameworks, the national and regional legislation, the voluntary assurance schemes, standards and guidelines that are relevant to transition minerals.

a) Future initiatives

The principles of responsible mining are not fixed, and standards are likely to develop and expand in the future. They will no doubt encompass new concerns, and merge or consider new definitions, such as what constitutes a conflict mineral and why. A number of varied initiatives regarding due diligence and transition are visible just beyond the horizon and are likely to impact future due diligence.

The most important initiative is the ongoing negotiation for an international legally binding instrument on transnational corporations and other business enterprises with respect to human rights.[69] Formal sessions have been ongoing since 2014 and are likely to last for some time before reaching a conclusion. However, they offer the hope of binding international norms to accompany the UN Guiding Principles.

With specific reference to minerals governance, UNEP is leading a consultation process reviewing governance of extractive industries in order to ensure they can better contribute to sustainable development, following a resolution at the United Nations Environment Assembly (UNEA) 2018. This will be debated again at the UNEA in 2022, leading to a further resolution which may seek to create new governance mechanisms.[70] With that in mind, the International Resource Panel is proposing a global governance model centred on the concept of the Sustainable Development License to Operate.[71] The problem is that such agreements take time and require political willingness to engage in multilateral cooperation at the international level.

Regulations and standards relevant to transition metals

a) International frameworks relevant to transition metals

Name	Organisation	Focus / scope	Geography	Source
African Mining Vision (AMV)	African Union	Mining	Africa	http://www.africaminingvision.org
International Labour Organisation (ILO) Convention 169	ILO	Indigenous Peoples	Global (implementing countries)	https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169
Natural Resource Governance Institute (NRGI)'s Natural Resource Charter & Benchmark Framework	NRGI	Extractive Industries	Global	https://resourcegovernance.org/approach/natural-resource-charter
OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions	OECD	Bribery & corruption	Global	http://www.oecd.org/corruption/oecdantibriberyconvention.htm
OECD Guidelines on Multinational Enterprises	OECD	Business conduct	Global	http://www.oecd.org/corporate/mne/
Regional Initiative against the Illegal Exploitation of Natural Resources	International Conference on the Great Lakes Region	Conflict Minerals	Great Lakes Region, Africa	http://www.icglr.org/index.php/en/rinr
UN Convention against Corruption	United Nations	Bribery & corruption	Global	https://www.unodc.org/unodc/en/treaties/CAC/
UN Declaration on the Rights of Indigenous Peoples (UNDRIP)	United Nations	Indigenous Peoples	Global	https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html
UN Framework Convention on Climate Change (UNFCCC)	United Nations	Climate Change	Global	https://unfccc.int/resource/docs/convkp/conveng.pdf
UN Global Compact Principles	United Nations	Business conduct	Global	https://www.unglobalcompact.org/what-is-gc/mission/principles
UN Guiding Principles on Business and Human Rights	United Nations	Human rights	Global	https://www.business-humanrights.org/en/un-guiding-principles
UN Human Rights Instruments, including Core Conventions and ILO Core Labour Standards	United Nations / ILO	Human rights	Global	https://www.un.org/en/sections/issues-depth/human-rights/
UN Sustainable Development Goals	United Nations	Sustainable Development	Global	https://www.un.org/sustainabledevelopment/sustainable-development-goals/

b) Legal regimes and regulations relevant to transition metals

Name	Country	Focus	Scope	Source
Bribery Act (2010)	United Kingdom	Bribery & corruption	UK companies	https://www.legislation.gov.uk/ukpga/2010/23/contents
Canadian Ombudsperson for Responsible Enterprise (CORE) (Order in Council 2019)	Canada	Human rights (due diligence)	Canadian companies	https://www.canada.ca/en/global-affairs/news/2019/04/minister-carr-announces-appointment-of-first-canadian-ombudsperson-for-responsible-enterprise.html?fbclid=IwAR3g9osoVQLtsq3grGnvJTnfbiN132QO0vCXFO7CVWdAbooMWOaeXgf3cjQ
Child Labour Due Diligence Act (Wet zorgplicht kinderarbeid) (2019)	Netherlands	Child Labour	Dutch companies	https://www.ropesgray.com/en/newsroom/alerts/2019/06/Dutch-Child-Labor-Due-Diligence-Act-Approved-by-Senate-Implications-for-Global-Companies
Conflict Minerals Regulation 2017/821/EU (2017)	European Union	Conflict minerals	Global	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2017:130:TOC
Corruption of Foreign Public Officials Act (1998)	Canada	Bribery & corruption	Corrupt parties	https://laws-lois.justice.gc.ca/eng/acts/C-45.2/index.html
Devoir de Vigilance (Duty of Vigilance of corporations and main contractors) (2017)	France	Human rights (due diligence)	French companies	https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000034290626&categorieLien=id
Dodd-Frank Wall Street Reform and Consumer Protection Act, Section 1502 & 1504 (2010)	USA	Conflict minerals (1502) & corruption (1504)	Great Lakes Region, Africa	https://www.govinfo.gov/content/pkg/COMPS-9515/pdf/COMPS-9515.pdf
Foreign Corrupt Practices Act (1977)	USA	Bribery & corruption	Corrupt parties	https://www.justice.gov/criminal-fraud/foreign-corrupt-practices-act
Global Magnitsky Human Rights Accountability Act (2016)	USA	Human rights & corruption	Corrupt parties	https://www.congress.gov/bill/114th-congress/senate-bill/284
Law 231/2001 on the administrative liability of legal entities (2001)	Italy	Includes human rights violations	Italian companies	https://www.lexology.com/library/detail.aspx?g=7bdb939a-11a5-48bb-9c87-ebf2fff7fc50
Loi Sapin II pour la transparence de la vie économique (2017)	France	Bribery & corruption	Corrupt parties	https://www.economie.gouv.fr/transparence-lutte-contre-corruption-modernisation
Mining Ministry Circular 6 September (2011)	Democratic Republic of Congo	Conflict Minerals	Great Lakes Region, Africa	https://www.undocs.org/pdf?symbol=en/S/2011/738 (p.268)
Modern Slavery Act (2015)	United Kingdom	Slavery and forced labour	UK companies	https://www.legislation.gov.uk/ukpga/2015/30/contents/enacted
Modern Slavery Act (2018)	Australia	Slavery and forced labour	Australian companies	https://www.legislation.gov.au/Details/C2018A00153
Non-Financial Reporting Directive (NFRD) 2014/95/EU (2014)	European Union	Transparency, human rights (due diligence)	EU companies	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0095
Transparency in Supply Chains Act 2010 (California state senate Bill 657)	USA (California)	Slavery and forced labour	Californian companies	https://oag.ca.gov/SB657

c) Voluntary standards and initiatives relevant to transition metals

i) Assurance standards / certification scheme

Name	Organisation	Focus	Scope	Source
Alliance for Responsible Mining (ARM) Fairmined Standard for Gold from Artisanal and Small Scale Mining	ARM	Gold and associated precious metals	Global (Latin America)	https://www.fairmined.org/the-fairmined-standard/
Aluminium Stewardship Initiative (ASI) Performance Standard / Chain of Custody Standard	ASI	Aluminium	Global	https://aluminium-stewardship.org/
Better Gold Initiative	Better Gold	Gold	Latin America	https://bettergold.org/
Certification of Raw Materials (CERA)	CERA	All raw materials	Global (EU initiative)	https://www.cera-standard.org/about/our-mission
Certified Trading Chains (CTC) Standards Certification	Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)	3TG	Great Lakes Region, Africa	https://www.bgr.bund.de/EN/Themen/Min_rohstoffe/CTC/Concept_MC/CTC-Standards-Principles/ctc_standards-principles_node_en.html
Conflict-Free Gold Standard (CFGS)	World Gold Council	Gold	Global	https://www.gold.org/about-gold/gold-supply/responsible-gold/conflict-free-gold-standard
The Copper Mark	Copper Mark company (was International Copper Association)	Copper	Global	https://coppermark.org/
Extractive Industries Transparency Initiative (EITI)	EITI – Multi-stakeholder initiative	Revenue transparency	Global (implementing countries)	https://eiti.org/
Fair Cobalt Alliance	The Impact Facility	Cobalt	Great Lakes Region, Africa	https://impactfacility.com/commodities/cobalt/fair-cobalt-alliance/
Fairtrade Standard for Gold from Artisanal and Small Scale Mining	Fairtrade	Gold and associated precious metals	Global	https://www.fairtrade.net/standard/gold
Initiative for Responsible Mining Assurance (IRMA) Standard for Responsible Mining	IRMA – Multi-stakeholder initiative	All minerals (except energy)	Global	https://responsiblemining.net/
International Council on Mining and Metals (ICMM)'s Mining Principles / Performance Expectations	ICMM	Mining	Global	https://www.icmm.com/mining-principles/1
International Tin Supply Chain Initiative (ITSCI)	ITSCI	Tin	Great Lakes Region, Africa	https://www.itsci.org/
ISO 14001 Environmental Management Systems Certification	International Organisation for Standardisation (ISO)	Environment	Global	https://www.iso.org/standard/60857.html

continued

c) Voluntary standards and initiatives relevant to transition metals *continued*

i) Assurance standards / certification scheme *continued*

Name	Organisation	Focus	Scope	Source
London Bullion Market Association (LBMA)'s Responsible Gold Guidance	LBMA	Gold and silver	Global	http://www.lbma.org.uk/responsible-sourcing
London Metal Exchange's Responsible Sourcing Requirements	London Metal Exchange	Metals	Global	https://www.lme.com/en-GB/About/Responsibility/Responsible-sourcing
Responsible Cobalt Initiative (RCI)	CCCMC & OECD	Cobalt	Global (Great Lakes)	http://www.respect.international/responsible-cobalt-initiative-rci/
Responsible Jewellery Council (RJC) Code of Practices	RJC	Gold (precious metals)	Global	https://www.responsiblejewellery.com/wp-content/uploads/RJC-COP-April-2019.pdf
Responsible Minerals Assurance Process (RMAP)	Responsible Minerals Initiative	Conflict Minerals	Global	http://www.responsibleminerals initiative.org/responsible-minerals-assurance-process/
Responsible Gold Mining Principles	World Gold Council	Gold	Global	https://www.gold.org/about-gold/gold-supply/responsible-gold/responsible-gold-mining-principles
Responsible Steel Certification	Responsible Steel	Steel (& iron)	Global	https://www.responsiblesteel.org/about/
SA 8000 Social Accountability Certification	Social Accountability International	Social issues	Global	https://sa-intl.org/programs/sa8000/
Towards Sustainable Mining (TSM)	Mining Association of Canada	Mining	Global (implementing countries)	

continued

c) Voluntary standards and initiatives relevant to transition metals *continued*

ii) Standards

Name	Organisation	Focus	Scope	Source
CCCMC Guidelines for Social Responsibility in Outbound Mining Investments (GSRM)	CCCMC	Mining	Chinese companies (outside China)	http://114.251.77.36/docs/2017-08/20170804141709355235.pdf
Drive Sustainability Guiding Principles	Drive Sustainability	Metals for vehicles	Global	https://www.drivesustainability.org/guiding-principles/
Equator Principles	Equator Banks	Investment	Global	https://equator-principles.com/
Global Battery Alliance Principles	World Economic Forum	Cobalt/battery metals	Global	https://www.weforum.org/global-battery-alliance/home
Global Reporting Initiative environmental, social, sustainability standards (Mining and Metals Sector Supplement)	Global Reporting Initiative	General	Global	https://www.globalreporting.org/Pages/default.aspx
Global Tailings Review	GTR – Multi-stakeholder initiative	Mining waste	Global	https://globaltailingsreview.org/
ISO 26000 Guidance on Social Responsibility	International Organisation for Standardisation	Social issues	Global	https://www.iso.org/iso-26000-social-responsibility.html
Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) Mining Policy Framework	IGF	Mining	Global	http://igfmining.org/mining-policy-framework/
International Finance Corporation (IFC) Environmental and Social Performance Standards	IFC (World Bank)	Investment	Global	https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards
Voluntary Principles on Security and Human Rights	Voluntary Principles Initiative – Multi-stakeholder initiative	Human rights (security)	Global	https://www.voluntaryprinciples.org/

continued

c) Voluntary standards and initiatives relevant to transition metals *continued*

iii) Guidelines/ best practice

Name	Organisation	Focus	Scope	Source
Akwé: Kon Voluntary Guidelines	Convention on Biological Diversity	Sacred sites	Global	https://www.cbd.int/doc/publications/akwe-brochure-en.pdf
CCCMC Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains	CCCMC & OECD	Conflict Minerals	Chinese companies (outside China)	https://mneguidelines.oecd.org/chinese-due-diligence-guidelines-for-responsible-mineral-supply-chains.htm
Cobalt Industry Responsible Assessment Framework (CIRAF)	Cobalt Institute	Cobalt	Global	https://www.cobaltinstitute.org/the-cobalt-industry-responsible-assessment-framework-(ciraf).html
OECD Due Diligence Guidance for Meaningful Stakeholder Engagement in the Extractive Sector	OECD	Stakeholder engagement	Global	https://www.oecd.org/publications/oecd-due-diligence-guidance-for-meaningful-stakeholder-engagement-in-the-extractive-sector-9789264252462-en.htm
OECD Due Diligence Guidance for Responsible Business Conduct	OECD	Due diligence	Global	https://www.oecd.org/investment/due-diligence-guidance-for-responsible-business-conduct.htm
OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas	OECD	Conflict Minerals	Global	https://www.oecd.org/corporate/mne/mining.htm
OECD Practical actions for companies to identify and address the worst forms of child labour in mineral supply chains	OECD	Child Labour	Global	https://mneguidelines.oecd.org/child-labour-risks-in-the-minerals-supply-chain.htm

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https://www.fidh.org/IMG/pdf/corporate_accountability_guide_version_web.pdf

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https://faraday.ac.uk/wp-content/uploads/2020/05/Insight-cobalt-supply-chain1.pdf

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https://www.iisd.org/sites/default/files/publications/igf-ssi-review-extractive-economy.pdf

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http://www.undp.org/content/dam/undp/library/Sustainable%20Development/Environmental-Governance-Project/Extracting_Good_Practices_Report.pdf

Renzo Mori Junior et al, Centre for Social Responsibility in Mining, 'Leveraging greater impact of mineral sustainability initiatives: An assessment of interoperability', 2017 p.17-20
https://www.csrm.uq.edu.au/publications/leveraging-greater-impact-of-mineral-sustainability-initiatives-an-assessment-of-interoperability

Sebastian Smart, CATAPA and War on Want, Living under risk: Copper, Information and Communication Technologies (ICT) and Human Rights in Chile, 2019 p.9-10
https://drive.google.com/file/d/16KrE-huUwavHLIjADa0PIGZPrsvZV-EG/view

Johanna Sydow and Antonia Reichwein – GermanwatcheV – Study Governance of Mineral Supply Chains of Electronic Devices – 2018
https://germanwatch.org/sites/germanwatch.org/files/Study%20Governance%20of%20Mineral%20Supply%20Chains%20of%20Electronic%20Devices.pdf

IUTC – Towards mandatory due diligence in global supply chains p.8-10
https://www.ituc-csi.org/towards_mandatory_due_diligence

> ***Although there may be treaty fatigue among policy-makers, an inter-treaty protocol on mineral supply chains to ensure that the goals of existing treaties are met could enhance effective governance.***[72]
>
> **Benjamin K. Sovacool *et al***

In the absence of an international treaty or governance mechanism, countries continue to develop their own human rights due diligence laws. For example, the European Commissioner for Justice, Didier Reynders, announced that the EU Commission will address mandatory, due diligence legislation with possible sectoral guidelines, which – subject to the results of consultations with stakeholders – will be tabled in 2021, as a contribution to the European Green Deal and in the context of the EU's post Covid-19 recovery plan.[73]

In terms of assurance schemes, the London Metal Exchange's Responsible Sourcing Requirements are due to be introduced after a consultation exercise with full engagement expected in 2022 and 2023, based on "four core principles: the combination of transparency and standards; non-discrimination between large-scale mining and artisanal / small-scale mining; adherence to well-established work in the sector; and a pragmatic and clear process."[74] Separately, the Cobalt Institute is drafting the Cobalt Industry Responsible Assessment Framework (CIRAF) through which companies can use existing standards and certifications to demonstrate compliance with responsible sourcing principles.[75]

Issues with due diligence

Despite this plethora of initiatives, clear guidance – particularly from the OECD – and a large number of companies publicly expressing their commitment to due diligence, there still seems to be a lack of quantifiable results.

The Corporate Human Rights Benchmark, which relies on public reports of companies with regard to their human rights practices, found that almost half of the companies reviewed did not fulfil any of the steps outlined in the UN Guiding Principles and the OECD's Due Diligence Guidelines, as part of an effective due diligence process. Nine out of ten companies were found to have carried out only half the necessary steps required for due diligence.[76] So the question becomes what is going wrong, and what can be done about it?

a) Voluntarism vs mandatory

Although there are some relevant mandatory due diligence laws in certain jurisdictions (often coming with caveats, particularly over the type or size of the relevant company), the majority of relevant schemes are voluntary. While the emergence of consumer-focused certification schemes in recent years has been a positive development in general – and allowed a wide scope of issues to be covered that might not have otherwise been – it is not clear whether certification provides sufficient information and incentives to change business practices.

The solution to this seems apparently simple, which is to ensure that the OECD Due Diligence Guidelines should be made mandatory for all companies operating

globally. This is to some extent starting to happen, as different governments debate laws covering aspects of human rights due diligence. While some businesses are promoting voluntary initiatives, and more genuinely multistakeholder processes such as IRMA are emerging, the growing complexity and gaps in the field makes some overall levelling of the playing field advantageous.

b) Lack of compliance

One of the major problems with voluntary due diligence is a potential lack of compliance. The work can be time-consuming and expensive, and when immediate and direct consequences do not present themselves, it may be difficult to justify the costs internally. This is a separate argument as to why clear mandatory standards are needed. Where there is compliance, it tends to be with the initial earlier stages of due diligence, with much less adherence to the more complex and committed stages, such as implementing an effective mechanism for remedy.[77]

Comprehensive research conducted by the Institute for Multi-Stakeholder Initiative Integrity notes a number of concerns around the types of voluntary certification standards.[78] The report argues for a radical re-think of multi-stakeholder initiatives, noting that they may be useful for dialogue and relationship-building, but should not be used as tools for accountability, remedy or human rights protection.[79]

The more supply chain due diligence is primarily considered a compliance risk, the more it will concern box ticking, and the more it is likely to involve legal teams instead of being embedded throughout all relevant functions in companies. There is mounting evidence that auditing on the ground is not able to adequately investigate and document human rights abuses – either through a lack of expertise, or a lack of independence from the companies paying for the verification.[80]

A final issue regarding compliance is a potential lack of reliable data. This is particularly important given the complexity

Atacama Desert in Chile, where copper and lithium mining threaten local communities and ecosystems.

of transition minerals supply chains. It is a gap that NGOs have been trying to fill, particularly in passing on information from the ground. Ideally this would require compiling verified, detailed data at each level of the supply chain, and agreement on protocols for sharing the data throughout the supply chain.

c) Overlap and confusion

The number of different laws and initiatives, with different thematic or geographical priorities, creates the potential not only for duplication and confusion, but for issues to fall between the gaps.[81] Although there is some compatibility, and an attempt at shared analysis, coordination and data-sharing across multiple supply chain standards is weak – and different terms can be used for the same concerns.

Researchers at Berkeley Law and NRGI suggest that in order to bring greater cohesion there should be the "development of a readily understood classification or taxonomy of the many standards' requirements and applications. This is necessary both to allow participants to readily define and compare commitments across the supply chain, and to allow observers to review individual supply chain players' participation and commitments to determine where substantive gaps exist."[82] They note the importance of ensuring that standards meet certain criteria, including their level of current acceptance, transparency, independent verification and how multi-stakeholder they are. Likewise, the International Institute for Sustainable Development recommends a so-called CARE analysis of standards, reviewing Coverage, Assurance, Responsiveness and Engagement.[83] Part of the problem is that the many actors within a supply chain have different motivations and perspectives. These contrasting priorities can create misplaced expectations, information and communication gaps, as well as impede compliance. The same Berkeley Law and NRGI researchers proposed the need to thoroughly document and disseminate a complete picture of what the supply chain actually constitutes, to create stronger mechanisms for neutral and reliable information sharing.[84]

d) Spot the missing pieces

Despite the abundance of mineral-related initiatives, there are still significant limitations, whether analysed individually or collectively. In some cases, this is caused by prioritising certain issues over others. Historically, conflict and certain gross human rights abuses, and even supply security, have shaped supply chain due diligence approaches; much of it driven by consumers considering ethical alternatives, particularly in the jewellery industry. Issues related to the environment and development have been under-emphasised.[85] Amnesty International were critical in their 2017 report that a focus on 3TG (tin, tantalum, tungsten and gold) in the Democratic Republic of the Congo (DRC) meant that many downstream users, i.e. all involved in the processing and manufacturing parts of the value chain, were not conducting the due diligence they should have been with regard to cobalt.[86]

In a 2019 report on the cobalt (and copper) supply chain from the DRC, Resource Matters reviewed 14 likely customers of the multinational miner Glencore, noting that many refused to admit Glencore was part of their supply chain, but those that did may have considered issues such as child miners. Yet only two firms contacted raised the issue of corruption, and then failed to adequately deal with it.[87] Those corruption issues have since been linked in the press to Tesla, demonstrating the importance of effective due diligence.[88]

A crucial issue often lacking in due diligence processes is the direct participation of the rights-holders themselves, particularly affected communities. Both upstream and downstream companies in the supply chain need to engage with impacted communities if they want to effectively address on the ground human rights challenges. Research on company human rights disclosures by Article 30 reveals that 16% of 250 companies had conducted stakeholder engagement, which is even less meaningful than consultation with rights-holders.[89]

The persecution of human rights defenders is one of several emerging issues yet to be fully integrated into many standards. The link between mining and the persecution of environmental rights defenders is well noted, with Global Witness reporting that the industry leads all other sectors in the number of environmental rights activist killings in 2019.[90] Two separate initiatives have sought to bridge this gap. The first joint initiative has both made the business case for taking environmental rights defenders into account, and produced a practical guide for investors on safeguarding human rights defenders.[91] The second has called for zero tolerance on rights abuses, particularly against human rights defenders within commodity supply chains.[92]

e) Law and unintended consequences

Another serious problem to consider is the potential for unintended consequences. The aim of the original conflict minerals legislation in the DRC was to improve the situation in the country by promoting the responsible sourcing of minerals. However, some companies have chosen to leave instead, such as BMW avoiding DRC because of conflicts related to cobalt.[93] While leaving a country may ensure the company is initially distanced from the original problems, it does not necessarily improve the situation; with no oversight over large companies like BMW, there is the potential for greater abuse, especially if valuable minerals can be smuggled over borders.

As the London Metals Exchange (LME) notes in its paper on due diligence; "There is a clear need to respect the rights of the "artisanal mining" sector ... Artisanal mining may, if appropriately organised, act as a force for social good, allowing local cooperatives, individuals and mining communities to benefit from the natural resources to be found in their local area."[94] As a result the LME has prioritised 'non-discrimination' – effectively, no differentiation – between large-scale mining and artisanal mining.[95] We need to acknowledge "that traceability schemes offer a largely technical solution to profoundly political problems and that these political issues cannot be circumvented or ignored if meaningful solutions for workers are to be found."[96]

Conclusion

The field of minerals supply chain due diligence has taken huge leaps forward in a relatively short period. The perceived need for action has been a key factor in the rapid creation of the many different schemes and standards. Consolidation is rapidly required, along with ensuring more effective compliance, and embracing emerging areas of concern. Solutions are possible but given that these are political processes dealing with political problems, they require something beyond technocratic or business responses to ensure there is compliance and therefore credibility.

5. Towards a circular society

Although supply chain due diligence can solve some of the issues resulting from increased production of transition minerals, it is primarily a mitigation measure. If we are to avoid a severe rise in pollution and community conflict, particularly in the Global South, then we need to consider demand. A shift to renewables is necessary, but there are many ways in which that shift could play out. This section seeks to review those options from the standpoint of making any energy transition truly just.

The circular economy and society

The phrase most often associated with the range of activities needed to create a more sustainable mode of living is the circular economy. The United Nations defines it as "an economy where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized".[97] This is in contrast to a 'linear economy', which is based on the "extract, make and dispose" model of production and consumption. Unfortunately, we have some way to go to achieve a circular economy. The 2020 Circularity Gap Report noted that the global economy is only 8.6% circular, and that this level is actually a reduction on what it was just two years ago (at 9.1%).[98]

However, research has stressed how this supposedly straightforward concept has very much become a contested and co-opted term.[99] There are two broad movements in circular economic thinking; the first is reformist and seeks to operate within the bounds of

Indigenous woman from San Jose de Jujuy, Argentina, holds sign saying, "We don't eat batteries, if you take our water, you take our lives."

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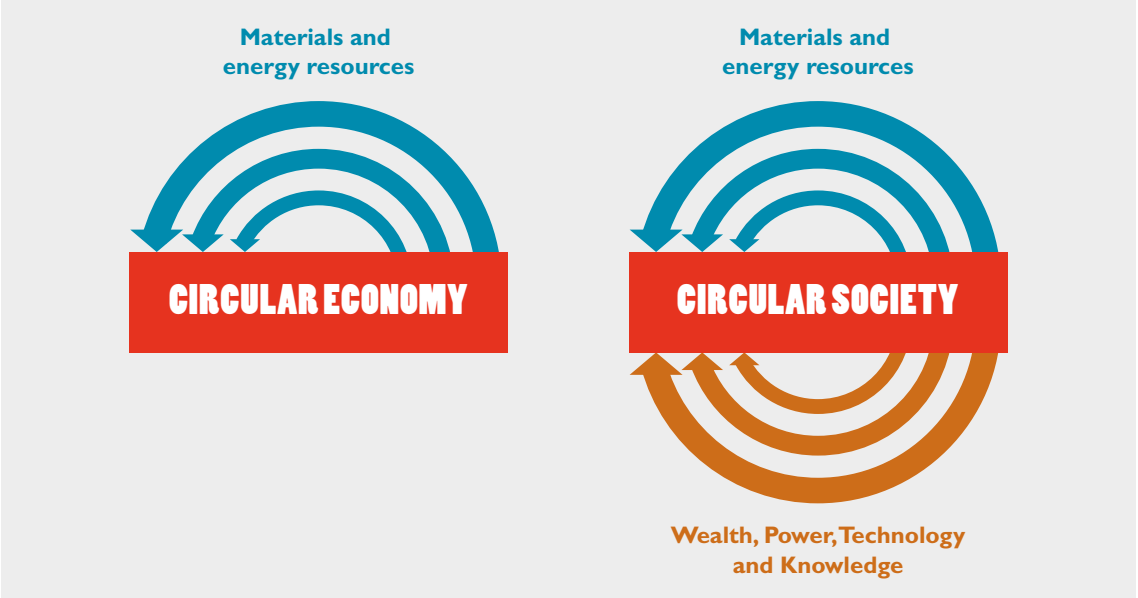
Conceptual differentiation between circular economy and circular society



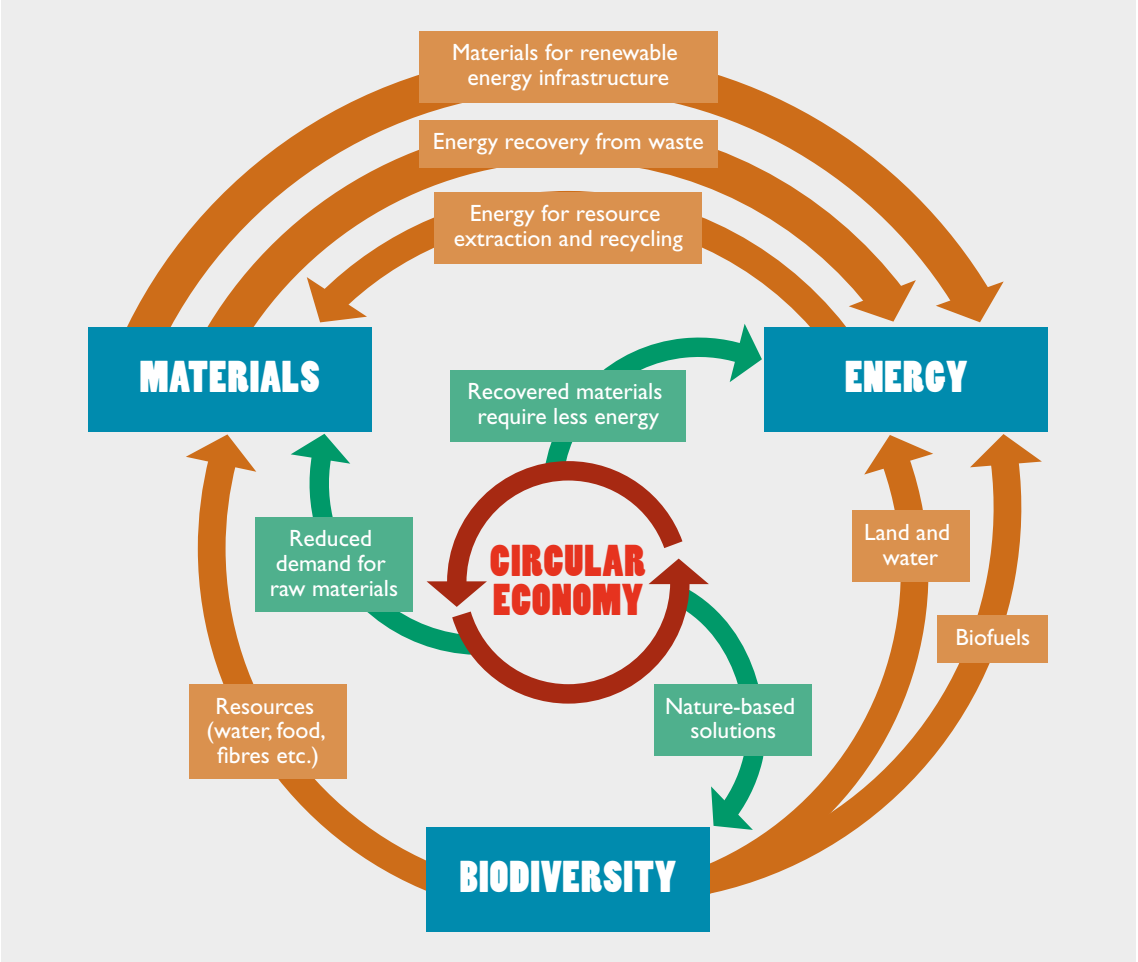
Source: Science Direct

current economic thinking, while the second seeks a fundamental transformation of the socio-economic order. Friant *et al* see this as a disagreement over the capability of capitalism to overcome resource limits and decouple ecological degradation from economic growth. They note that the reformist view is really only talking about the economy, but because the latter goes "beyond economic considerations and see[s] circularity as a holistic social transformation" they propose the term circular society.[100]

This report embraces that definition of a circular society, but before these issues are further discussed in detail it is worth considering the different practical elements that make up the circular economy or society. Recycling is the action most immediately associated with creating a circular economy. Obviously, metal recycling is important to replace the need for mining, but also because recycling metal requires much lower energy costs than mining. Metals recycling is often referred to as urban mining, particularly when focused on recycling high-cost metals and electronic and electrical waste. Linked to this is the concept of mining old landfill sites (enhanced landfill mining), where discarded metals can be recovered while conducting environmental remediation work.

Another critical piece of the circular economy focusses on questions surrounding manufacturing. One set of proposals centre on increased resource efficiency: maximising the use of resources to minimise waste; and the potential for substituting key minerals, where scarce minerals would be substituted by materials with similar characteristics that are more readily available. A second set of proposals argue that the life-cycle of renewable energy products could be extended through responsible end-of-life production, curbing planned obsolesce and aiming for a "cradle-to-cradle" manufacturing cycle, i.e., product design that is cyclically designed to ensure it can be re-absorbed into the circular economy.[101] One way to make sure this happens is to ensure manufacturers take responsibility for the entire life-cycle of their products, and especially for the return,

Interactions of the energy, materials, biodiversity nexus



Source: Science Direct

recycling and final disposal of them. Product design can allow for the re-use, refurbishing and repair of items rather than their disposal, although there still need to be incentives to ensure that this happens.

A final part of the circular puzzle concerns reducing consumption, and ownership issues. Communal ownership, sharing or renting, could extend the use of products, particularly in regard to transport. Although some of the proposed solutions already mentioned touch on reducing consumption, radically reconsidering levels of consumption challenges both capitalism and a corporate controlled worldview.

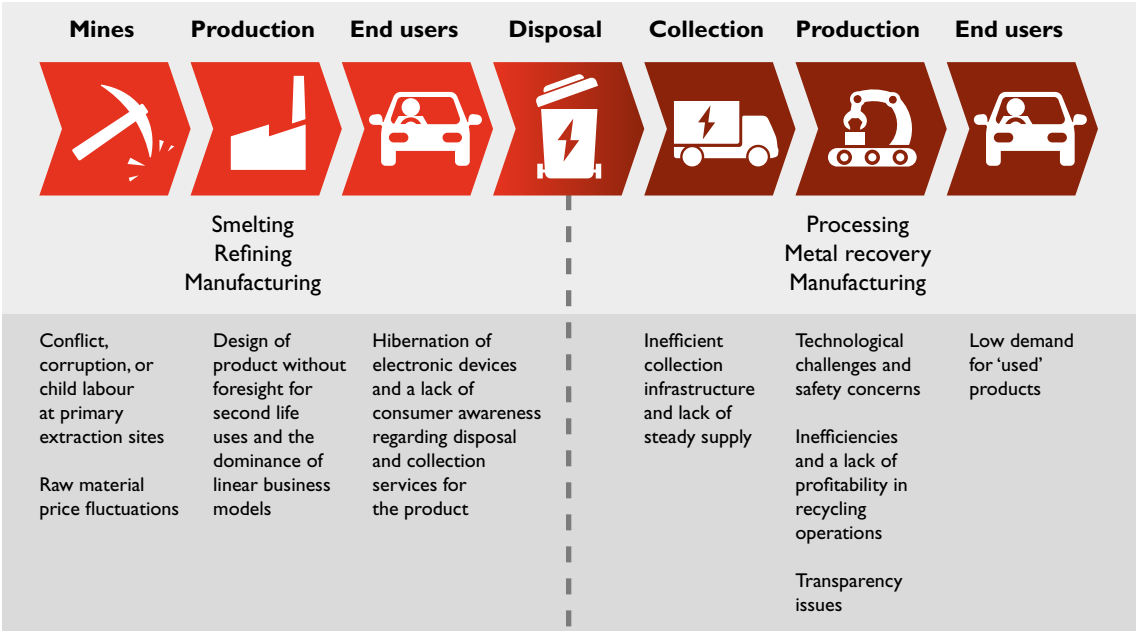
Green growth or degrowth?

The Organisation for Economic Cooperation and Development (OECD) describes green growth as "fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies."[102] The idea was popularised at the Rio+20 Conference on Sustainable Development in 2012 which, in the context of the Sustainable Development Goals, called for both a 'green economy' and 'sustained and inclusive economic growth'.[103]

The concept is appealing, apparently answering the needs of the present without sacrificing the future. As such, it has tended to become the orthodox framework of sustainable development, championed by the OECD, the United Nations Environment Program (UNEP), and the World Bank.[104] It has become the bedrock of the European Union's plans for a European Green Deal, which includes promotion of the circular economy. The European Commission considers that circular economy measures in Europe can increase the EU's Gross Domestic Product (GDP) by an additional 0.5% by 2030, creating around 700,000 new jobs.[105] The European Battery Alliance's Strategic plan requests approximately 6 billion US dollars to support 'responsible growth' of European battery supply.[106] The Global Battery Alliance's 'Vision for a Sustainable Value Chain' hopes to achieve a 35% growth in battery demand over base predictions by 2030.[107] This alone would constitute a nineteen-fold increase on current levels and would require a massive increase in battery minerals.

Despite its ready appeal, the question is whether green growth is actually possible? It is based on the promise that technological change and substitution will improve the ecological efficiency of the economy to the point where growth can be 'decoupled' from environmental impact. However, Jason Hickel and Giorgos Kallis conclude that "absolute decoupling of GDP from resource use:

Barriers to lithium and cobalt recycling along the supply chains*



*The stages of the supply chain have been simplified

Source: International Institute for Sustainable Development

a. may be possible in the short term in some rich nations with strong abatement policy, but only assuming theoretical efficiency gains that may be impossible to achieve in reality.

b. is not feasible on a global scale, even under best-case scenario policy conditions; and

c. is physically impossible to maintain in the longer term."[108]

They argue that although it is theoretically possible to have decoupling in practice, there is no evidence it can be permanently achieved at the global scale required by people and planet, particularly in terms of preventing runaway climate change.

If green growth is simply not possible, what are the alternatives? There is a growing body of work on how we can prosper without a fixation on GDP growth.[109] Hickel argues for the concept of 'degrowth', which he describes as "a theory of radical abundance".[110] He asserts that whereas people tend to think of the concept of degrowth negatively (because it is not about infinite expansion), it is capitalism which has created scarcity by privatising the commons, effectively making us compete for goods we once freely used.

> ***Proponents of degrowth argue that a planned reduction of throughput can be accomplished in high-income nations while at the same time maintaining and even improving people's standards of living. Policy proposals focus on redistributing existing income, shortening the working week, and introducing a job guarantee and a living wage, while expanding access to public goods.***[111]
>
> **Jason Hickel**

© Nicolas Palacios

"We may be wearing masks, but our eyes are wide open - NO to Megamining" woman holds sign in Esquel, Argentina.

One version of this degrowth vision is a so-called 'steady state economy', a vision that aims to develop an economy to a stable size, within ecological limits, and with the aim of a balanced, stabilised population and per capita consumption.[112]

Degrowth advocates an act of balancing; scaling down the material and energy use of the global economy, with a focus on high-income nations with high levels of per capita consumption. It proposes reducing waste and shrinking sectors of economic activity that are ecologically destructive and offer little if any social benefit. That shrinking can be balanced by growth in other socially and environmentally benign areas. The theory is based on the concept of a good life, noting that when a certain level of development is reached that more GDP growth does not necessarily correlate to greater well-being.[113]

Degrowth theories could be accused of being utopian, but aspects are being seriously discussed and included in political manifestos, in particular as a response to the threat of the climate crisis.[114] Kate Raworth proposes a similar viewpoint in her theory of 'doughnut

economics'. She stresses that the goal of the economy should be to balance our social needs and our environmental limits.[115] Our planetary limits mandate that we must not overshoot our resources and must live in the sweet spot ("the safe and just space for humanity"), i.e., within the doughnut ring she uses to illustrate the concept. Raworth has been working hard to apply her concept practically, both on the global policy level, and at a local city level. In April 2020, Amsterdam published the Amsterdam City Doughnut and adopted it as a vision and model for shaping the future of the city.[116]

> ***"Renewables can only help us to mitigate the climate crisis if we significantly reduce our usage of energy instead of increasing it, for instance through the mass production of electric cars."***[117]
>
> **Nora Rathzel and David Uzzell**

> ***"Relying on eco-efficiency to save the environment will in fact achieve the opposite; it will let industry finish off everything, quietly, persistently, and completely."***[118]
>
> **William McDonough and Michael Braungart**

Applying the circular economy

Amsterdam's experiment in becoming a 'doughnut city' points to where the circular economy or society are being applied. To quote an article in the National Geographic "the circular economy idea is catching on, particularly in Europe, that small, crowded, rich but resource-poor continent. The European Union is investing billions in the strategy. The Netherlands has pledged to go fully circular by 2050. Amsterdam, Paris, and London all have plans."[119]

One of the most notable initiatives is the European Commission's Circular Economy Action Plan (COM/2020/98 final), which is central to the European Green Deal.[120] The Plan seeks to make sustainable products the norm in the EU, with a focus on consumer education and specific industries with particular potential.

The EU is a world leader when it comes to recovering metals from scrap from industrial production processes as well as post-consumer waste. The end-of-life metals recovery rates are extremely high in the construction and building industry with over 95% of metals recovered. Over 90% of metals in scrapped vehicles are recovered in Europe when the appropriate facilities are used.[121]

This places the EU way ahead of the UK on the issue of promoting a circular economy. Despite some impressive initiatives arguing for radical thinking, for instance the work of UK-based Ellen MacArthur Foundation or the Waste and Resources Action Programme (WRAP), there has been little concrete action.[122] The UK government has created a fund to deal with waste as part of its 25 Year Environment Plan, but the focus is on food waste and household recycling, with only a £15 million grant.[123]

Other countries are also promoting their own initiatives, including the Chinese Circular Transformation of Industrial Parks (CTIP) Programme, a policy which aims to ensure industrial parks follow circular economy principles. China started implementing CTIP in 2011, to promote resource efficiency during production, with a goal that by 2020, CTIP will be implemented in 75% of all national industrial parks and 50% of all provincial industrial parks.[124] Japan's Sound Material-Cycle Society policy sets out five steps:

reduce, reuse, recycle, energy recovery and final disposal.[125]

However, despite these efforts to realise resource efficiency, a circular economy, and a just climate transition in the EU, these efforts are fundamentally flawed as they are built on the premise of green growth.

Squaring the circular economy

Having reviewed what is being done, it is time to consider what is possible across the different elements of the circular economy, and the wider circular society.

a) Reuse and recycling

Recycling for metals is so important because in theory metals are 100% recyclable, and thus are truly a circular commodity. However, there is a question as to whether we currently have enough transition minerals, or whether new mining will be necessary before we can have a completely circular loop. The UN International Resource Panel has engaged with this issue in a recent report

Indigenous communities of the Salinas Grandes protest against lithium mining on their territory.

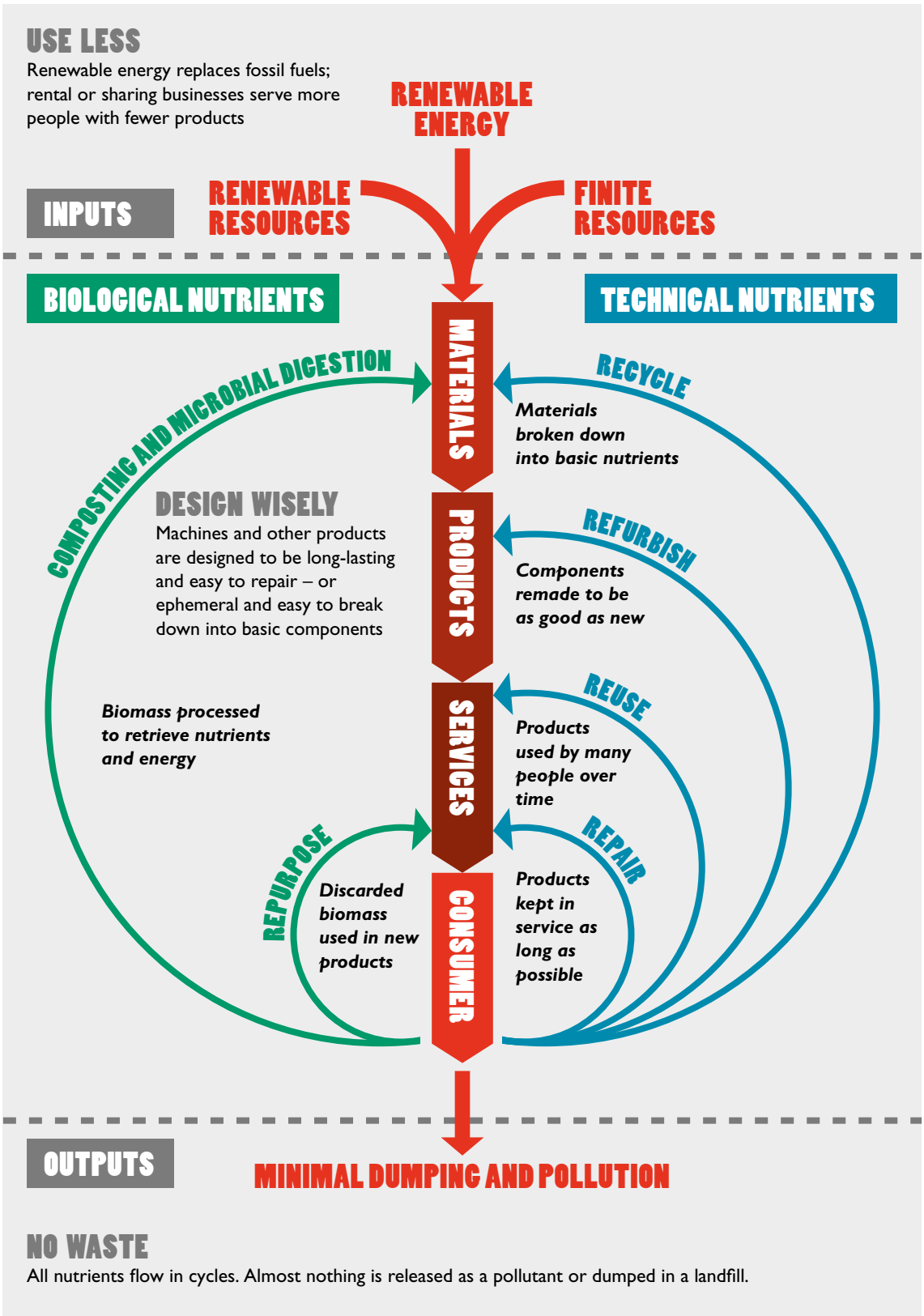
on mineral resource governance and concluded that although recycling would increase considerably over the next 30 years, it would be inadequate to meet the future need for transition materials.[126] However, these predictions are arguable, as – for instance – Xianlai Zeng *et al* reason that the recycling of metals has the potential for meeting China's future critical metals demand based on its circular economy goals.[127]

According to the UN, at least 10 billion US dollars' worth of precious metals are dumped every year forming a growing mountain of electronic waste, with only 17% of this mountain recycled in 2019.[128] As the market grows, battery metals are becoming an increasing recycling priority. Batteries can be modified or repaired for extended life, possibly re-purposed for use in a "second life" application (such as energy storage on the grid) or recycled to harvest their raw materials for reuse in a new battery.

There is huge potential for recycling considering existing supply issues, the impacts associated with mining and current recycling rates – the latter being relatively low for cobalt and historically insignificant for lithium. There are notable existing or perceived barriers, particularly around product design and end-of-life collection, which if addressed could create a whole new industry to promote and ensure circularity.[129]

It is finally worth noting that although more recycling is necessary to reduce primary extraction, it can also be associated with its own health and safety concerns, given the potentially toxic nature of the materials involved.[130] This is not an excuse for inaction, but does mean that the highest standards – including the concept of free, prior, informed consent – need to be applied globally to protect both workers, the environment and local communities.

Closing the circle



Source: National Geographic / Ellen MacArthur Foundation

b) Design and substitution

We have already looked at how design can facilitate recycling, but there are also specific design changes which make goods easier to repair and re-use and reduce the need for new mineral extraction. One example is the proposed million-mile electric vehicle battery, where the battery may be designed and guaranteed to last a million miles; the battery would in theory outlast the rest of the vehicle.[131] Batteries could be swapped between vehicles, and when finally no longer fit for commercial vehicle use, could provide storage for the electric grid. Long life batteries should mean less need for minerals, although they may face opposition from consumers and manufacturers – consumers are used to buying new automobiles, rather than a 'car for life', and manufacturers are used to selling them.[132]

Although a great deal of innovation is being driven by commercial need, significant changes will require policy shifts, such as the example of consumer inertia over the million-mile battery. Changes could include innovative policies and actions around resource efficiency, such as public research programmes; incentives for private research and development; changes to regulations, technical standards and planning; and public procurement policies; all of which can help reduce the demand for minerals.

c) Landfill mining

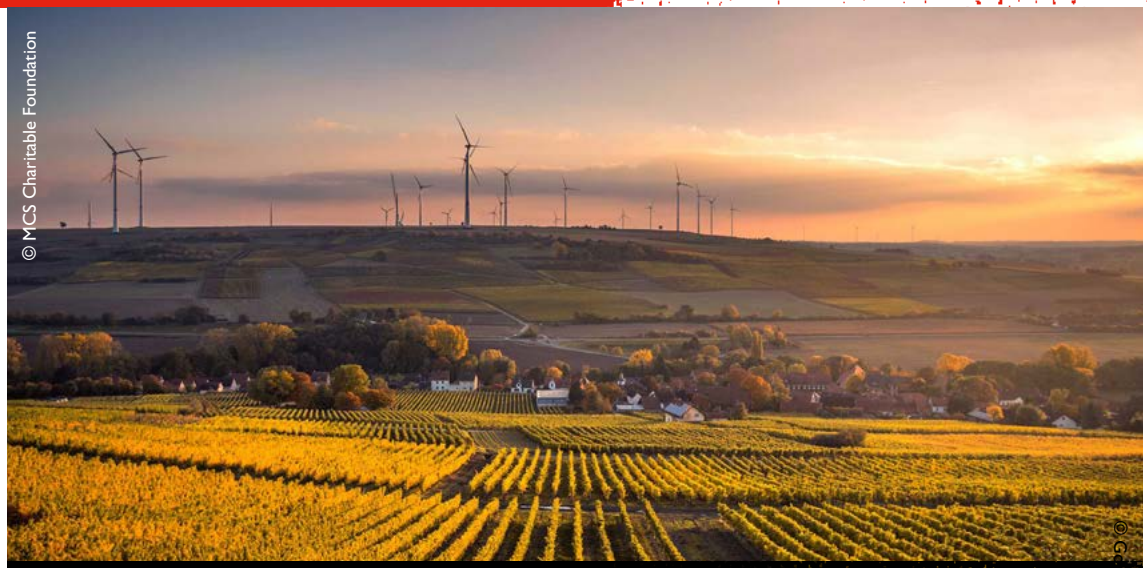
Another potential solution is mining the waste we have produced, literally, in the case of landfill. Europe has over 500,000 current and historical landfill sites, many of which already need environmental remediation work.[133] Mining waste from landfills to recover materials or remove pollutants has been happening in Europe since at least 1953. The EU has supported pilots of enhanced landfill mining using plasma gasification to heat waste to high temperatures, turning it into a renewable gas and a likely building material, while prospectively releasing millions of euro's worth of metals for recycling.[134] Four sites in the UK have been identified which contain significant amounts of aluminium, copper and lithium.[135] Although the process should in theory work with minimal impacts to local communities and the environment – and some of the landfill will be in need of environmental remediation anyway – any movement forward on this would require the full, prior, informed consent of potentially impacted communities.

d) New frontiers of mining

Another response to the question of shortage has been to expand experimental forms of mining. Mining in space has been proposed, which caught the eye of journalists and investors, but is extremely unlikely to happen in a timescale useful for the energy transition.[136]

Other experimental mining enterprises include agromining and biomining. Agromining, or phytomining, relies on 'hyperaccumulators', which are plant species that absorb and concentrate minerals at high levels. Biomining uses bacteria and other microorganisms to extract certain minerals from their ores. It has possible cost and environmental advantages over conventional mining, and could be used to extract metals from tailings.[137] It is unclear how far either of these can significantly substitute conventional mining in the time frame required, or indeed what their impacts will be at a commercial scale, but either could possibly play a role in meeting mineral demands.[138]

Deep sea mining is the main form of unconventional mining currently being considered. Commercial mining has not yet taken place, but exploration has been licensed in both territorial and international waters, with negotiations for international exploitation



MCS Charitable Foundation vision: A world where everyone has access to reliable renewable energy.

ongoing at the International Seabed Authority.[139] The only project nearing completion, Nautilus Minerals' Solwara 1 project in Papua New Guinean waters, stalled after the company's bankruptcy, partly as a result of the opposition from potentially affected communities.[140]

Proponents of deep-sea mining, primarily the companies involved and their sponsoring states, argue that it has the potential to bridge the supposed gap for key transition minerals, particularly cobalt.[141] Opponents counter that the economic case is far from proven and, more importantly, that there is mounting evidence of the potential damage that could be done to the mainly unexplored ocean environment. Crucially, as so little is actually known about the level of potential damage caused, and how it could be mitigated, there are growing calls for a moratorium, or precautionary pause, until there is a firmer knowledge base.[142] Even without such a pause it is not clear how long it will take to complete regulations and progress to commercial production, and the speed of innovation may be too late to make a meaningful difference.

e) Societal transformations

So far many of the scenarios have focused on the circular economy, so it is time to consider how a deeper societal transition, routed in the well-being of the planet and people, and on sufficiency, could make a significant difference. This implies scenarios that go beyond current circular economy actions and look, for example, at the potential to reduce our material consumption.

The first scenario is a greater consideration of sharing economies. This could include a shift to sustainable urban planning, moving from product ownership to product rental schemes. Such a shift implies a reduction in consumption as well as ownership. Shared transport, which could involve public transport and/or the sharing or rental of vehicles, is crucial to such a vision. As the International Resource Panel notes: "the largest reductions of life-cycle emissions could be attained by changing patterns of vehicle use (ridesharing, car-sharing) and shifting towards trip-appropriate smaller vehicles. This is mainly because they reduce not only the demand for materials but also the energy use during the operation of the vehicles."[143] However, this requires a fundamental rethinking of the increasingly global consumer culture.

Such changes will not necessarily come easily, although arguably some countries – particularly some key European countries – are already ahead in terms of urban planning and shared transport. The

International Resource Panel, in a 2019 report, argued for societal shifts to reduce our material consumption, stressing ways that societal behaviour can be shifted, and suggesting practical policy changes.[144] Amongst other features, the report includes targets based on domestic material consumption and categories based on the national material footprint.[145]

There is also an opportunity for some countries in the Global South to skip fossil fuel-driven growth and leapfrog into decentralized, renewable energy and more efficient agriculture and construction technologies. A recent US survey noted that the concept of generous fair-trade policies in green technologies, in solidarity with low-income countries, are popular with the US public, perhaps opening up policy opportunities.[146]

Perhaps more importantly such a societal shift, as envisaged in degrowth, would include a shift from jobs which are unproductive or damaging for society to jobs that would support the energy transition. The Just Transition movement has focused on ensuring that those who worked in a disappearing extractive economy are at least as well off, if not more so. Although it has a green growth focus, the International Labour Organisation (ILO) has estimated that transitioning to clean energy alone will create an estimated net increase of 18 million jobs globally through renewable energy, growth in electric vehicles, and increases in the energy efficiency of buildings. Shifting from an economy focused on consumption to a circular economy underpinned by reuse, recycling and re-manufacturing is projected to create another six million jobs and a shift to sustainable agriculture presents additional job opportunities.[147]

However, such a transformation will require robust policies at the local level to support displaced workers, facilitate their transition to secure and good-quality alternative employment. Those policies should include unemployment protection, placement support and relocation grants. If understood as part of wider transformation to the economy, this would include a universal job guarantee programmes to provide dignified work for all – creating products, services and infrastructure needed for a green transition and the mitigation of inevitable climate impacts. The ILO notes that if the transition to a sustainable economy is well managed, it could create new and better jobs, move workers into the formal sector, provide education and training, reduce poverty, protect economic well-being and address discrimination and inequality.[148]

Finally, in terms of inspiration for creating a circular society we should look to guidance from community-based activism. Some of those communities may be in the Global North, such as Transition Towns who are strengthening local economics and reducing consumption[149] or villagers from Galicia, who are re-planting forests and asserting their commons-based forms of land and water care in response to the threat of tungsten mining.[150] However, many more are in the Global South, where front-line communities are exploring new ways of resisting mines, such as in Cajamarca, Colombia, where a local sustainable economy has been created to counter a proposed gold mine,[151] or the Karen people who have declared the Salween Peace Park as a space to practice their indigenous culture and as a strategy to block developmental threats, including mining.[152]

Post-pandemic opportunities

Given this report is being written during the Covid-19 global pandemic, it is essential to consider the opportunity that comes with the virus-related economic slow-down. While the pandemic has already claimed many lives, and it is uncertain how it will develop in the future, the world is hoping for better times in its post-pandemic recovery.

> ***A profound social and economic crisis is looming and for most of the world, business as usual does not fit into the new reality. The priority should be keeping all people afloat, including the most vulnerable, while not losing sight of the need to maintain planetary health and sustainable resource management.***[153]
>
> **International Resource Panel**

While the mining industry is eyeing increased profits from a rebound in mineral demand, many consider that a successful recovery should create a new era of social and economic prosperity for all, within the planet's natural limits. After the lockdowns and slow-down that brought many closer to nature, there is an opportunity for a new relationship with nature, and a more efficient use of natural resources. It is a time to be ambitious. It is a time to promote a circular society, and not just the circular economy.

> ***Climate justice must be the principle guiding a rapid social-ecological transformation. As long as we have an economic system that is dependent on growth, a recession will be devastating. What the world needs instead is Degrowth – a planned yet adaptive, sustainable, and equitable downscaling of the economy, leading to a future where we can live better with less.***[154]
>
> **Letter by 1,100 experts calling for Degrowth as post-Covid-19 path**

Conclusion

A resource-intensive energy transition, as it is envisaged now, is likely to lead to severe impacts on the environment, including irreversible biodiversity loss, and impacts on potentially affected communities, unless we can reduce our consumption of raw materials, in-line with planetary boundaries.

There are a number of ways we can do this involving technical fixes, most of which can be bundled up into the concept of the circular economy. However, we also need a clearer, transformative change in the design of economies and lifestyles, which would lead to a circular society. While ethical sourcing for renewable energy technology will help, it is a radical reduction of our unsustainable consumption of materials which will being the greatest benefits to people and planet.

A number of international bodies – including the International Resource Panel, UNEP and the International Renewable Energy Authority – have mapped out how we can achieve true ecological sustainability in our material use, with equitable consumption within planetary boundaries.

6. Recommendations to different actors

1) Supporting front-line communities

Overarching

Ensure international solidarity with those impacted by transition minerals.

a) State actors (including UK Government & European Union)

- Respect customary and indigenous land rights, particularly the right to free, prior and informed consent. All state funded programmes, projects, and initiatives must recognise communities' rights to free prior and informed consent, including the right to say no to new mining projects.
- Avoid militarisation and an increased presence of armed security forces in mining areas.
- Harmonisation of international conventions and national laws in order to respect, protect and fulfil the rights of environmental and human rights defenders who are being threatened or killed for their opposition to extractive projects; ensure increased support to prevention and protection measures, with dedicated national protection programmes; strengthen the independence of investigative and judicial bodies.

Latin American community activists, trade union leaders and human rights defenders protest outside the BHP AGM in London.

© Mark Kerrison

b) Corporate actors (including miners, downstream users, financiers)

- Downstream companies: Implement meaningful human rights due diligence, as required by the UN Guiding Principles on Business and Human Rights; implement robust infrastructure and sufficient management and monitoring systems that will safeguard against pollution of water, soil and air associated with mining operations; share test results from sampling of water, air and soil, audit reports and identified risks and impacts with affected stakeholders.
- Enact a 'zero tolerance' policy within supply chains for violations involving environmental and human rights defenders, and investors or upstream companies should integrate independent risk assessment and risk management tools to enable reviews of their exposure to risks.

c) Civil Society

- Build links of solidarity with those most directly affected, allowing the demands and vision of those on the front-line to lead strategies and agendas.
- Directly support, and learn from, front-line communities who are seeking to strengthen local economies and reduce consumption.

2) Improving supply chain governance

Overarching

Global supply chains for renewable energy technologies must be grounded in principles of environmental and social justice.

a) State actors (including UK government & European Union)

- Ensure there is national or regional overarching mandatory human rights due diligence legislation, ideally incorporating the OECD Due Diligence Guidance on all mineral supply chains, aimed at stopping all human rights and environmental violations; improve transparency on supply chain sustainability through product passports and consumer laws.
- Ensure respect for human rights, via international legal norms which will hold transnational corporations accountable for their abuses, particularly to support and not hinder the advancement and adoption of the UN Binding Treaty on Transnational Corporations and Human Rights.
- Ensure all public procurement sets the criteria for social responsibility as laid out in the recommendations for corporate actors.
- Trade and development policy should ensure the sustainable extraction of raw materials is a precondition to trade and investment in those materials, ensure companies source materials sustainably via smart investment aid, and ensure improved safety, health and working conditions in the artisanal mining sector.
- Ensure that public development or climate-related finance should not be used to expand resource extraction without effective human rights due diligence and protections for affected communities.

b) Corporate actors (including miners, downstream users, financiers)

- Make a public commitment to respecting human rights and the environment in the supply chain and develop and implement policies that reflect this commitment,

including conducting risk-based due diligence in line with the OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights. This involves establishing a process to identify, prevent, mitigate and remediate adverse impacts on human rights and the environment, to the best practices laid out in this report; ensure there are prevention and mitigation measures, such as effective grievance mechanisms, in place to address any potential or actual adverse social and environmental impacts. This process should be developed through meaningful engagement with stakeholders and should involve public accounting for how risks are identified and addressed.

- In order to improve due diligence meaningfully engage with all rights-holders directly, particularly affected communities, and accept evidence from them and local NGOs, including primary or secondary sources independent of companies in the supply chain; ensure participation of the rights-holders themselves, particularly affected communities in order to make schemes truly multi-stakeholder.
- Improve weak compliance by embedding the concept of supply chain due diligence beyond legal teams to all relevant functions in business enterprises.
- Improve audits and the training of auditors, especially on social sciences, whistle-blower protection, and human rights.
- Provide resources to allow on-the-ground evidence to be shared and verified, ideally via an independent and secure data-sharing platform.
- Create greater cohesion between the different initiatives with the development of a readily understood classification or taxonomy of the many standards' requirements and applications, encourage shared processes and mechanisms, as well as generic models for monitoring and evaluation.
- Ensure non-discrimination between large-scale mining and artisanal or small-scale mining.
- Financiers: Ensure that any definitions of the taxonomy of sustainable finance reflects the potential environmental and social impacts of transition minerals.

c) Civil Society

- Ensure impacted communities work directly with suppliers and manufacturers to guarantee the effectiveness and legitimacy of key multi-stakeholder initiatives.
- Advocate for a meaningful Binding Treaty on Transnational Corporations and Human Rights at the UN to create binding and enforceable mechanisms to hold transnational corporations to account for corporate crimes and rights violations.

3) Demand-side solutions

Overarching

- Embrace the concept of the circular society rather than just the circular economy. This concept entails a significant rethinking and transformation of raw materials consumption, not just energy.
- Use the opportunities provided by the recent Covid-19 pandemic to ensure a recovery is a green recovery, respecting planetary boundaries, focused on a circular society.

a) State actors (including UK government & European Union)

- Develop economic models which promote a just economic recovery from the Covid-19 pandemic within ecological limits, abandoning GDP growth as the primary measure of progress, prioritising well-being and the environment, and reinventing the idea of community to serve people and planet.
- Establish national or regional plans to create a feasible pathway for the sustainable use of natural resources, which should research and set natural resource-efficiency targets and consider the following:
  - Create policies to support workers impacted by changes caused by the energy transition and ensure that new jobs are of good quality. Policies should include cash transfers, unemployment protection, placement support and relocation grants.
  - Ensure manufacturers have a responsibility for the entire life cycle of their products – particularly products involving metals – and especially for the take-back, recycling and final disposal of them.
  - Create strong incentives and regulations for responsible metal recycling programmes, including exploring enhanced landfill mining, with the full, prior and informed consent of any impacted communities.
  - Ensure public research programmes, regulations, technical standards and public procurement policies focus on high material efficiency and where appropriate substitution of materials.
  - Encourage sharing economies, including a shift to sustainable urban planning, moving from product ownership to product rental schemes, improved public transport and/or the sharing or rental of vehicles to reduce the need for private, even electric, vehicles.

b) Corporate actors (including miners, downstream users, financiers)

- Manufacturers: Design products that allow for the re-use, refurbishing, repair, and eventual recycling of items, rather than assuming disposal. Ensure products can be designed to minimise metal use, where less harmful alternatives are possible.
- Financiers: re-orient investments towards more sustainable technologies and businesses with circular business models and applying circularity in your financial institution's risk policies and product development.

c) Civil Society

- Publicly advocate for a global campaign to shift to a circular society, rejecting a throw-away and runaway consumer culture.
- Act in solidarity with front-line communities who are seeking to strengthen local economies and build alternatives to extractive industries.

7. Case studies

Nickel mining in the Philippines

By Caryl Pillora and Jaybee Garganera, Alyansa Tigil Mina, with input from Philippine Misereor Partnership Inc.

The Philippines ranks fifth largest in terms of nickel reserves, with about 783 million metric tons or about 6.4% of world's reserves.[i] In early 2020, 29 of the Philippines 50 operating metallic mines were nickel projects.[ii] As the accompanying map demonstrates the majority of these are located in the CARAGA region of Mindanao, with the others mainly on Luzon or Palawan.

These operating mines are distributed across a total of 81 mining contracts, in various stages of operations. Of these 81 nickel mines, 28 are commercially operating, 31 are in the exploration stage, four are undergoing development while five have expired but have pending applications for renewal. Two projects have had their licenses cancelled, while 11 more are in some form of suspension. Table 1 summarises these nickel mining contracts and their status.

In the first quarter of 2020, the Philippine Government reported the total production of nickel was 2,186 metric tons, valued at Php 2.54 billion (US$52 million).[iii] This is a significant reduction compared to the same period in 2019, with 2,967 metric tons.[iv]

The Philippines was the world's second-largest producer of nickel in 2019, behind Indonesia, and accounted for nearly 16% of global production. In 2015 it was the global leader,[v] but output fell sharply, when the country's Department of Environment and Natural Resources (DENR) launched an audit process that shutdown 27 mines, including 19 nickel mines.

Since then, production has been reliant on a small number of larger operations. The majority of these larger mines are located in the CARAGA region, including Nickel Asia Corporation's Taganito mine and the Cagdianao, Carrascal and Adlay-Cagdianao-Tandawa mines. The other key operating project is Rio Tuba in Palawan, also owned by Nickel Asia, which is the Philippines' top nickel ore producer.

Figure 1 presents the historical production of nickel in the Philippines. A spike in 2014 nickel output can be explained by the closure of Indonesian mines, when it implemented a ban on nickel exports. Indonesia has been ramping up shipments to China after lifting a ban on metal exports in 2017, with Chinese buyers preferring the higher-grade Indonesian ore.

Solid growth in output from the Philippines is still expected as the country's miners take advantage of rising demand from China. The demand for nickel in China is expected to grow from an estimated 1.6 million tonnes in 2019 to over 2.1 million tonnes in 2023.[vi] This will be supported by the commencement of the Acoje and Mindoro projects, which are expected to start operating in 2021 and 2023, respectively.[vii]

Nickel mining in the Philippines

Status	No. of projects
Commercial operation	28
Exploration	31
Development	4
Expired with application for renewal	5
Cancelled MPSA/FTAA	2
Suspended	5
Under care and maintenance	5
For registration	1

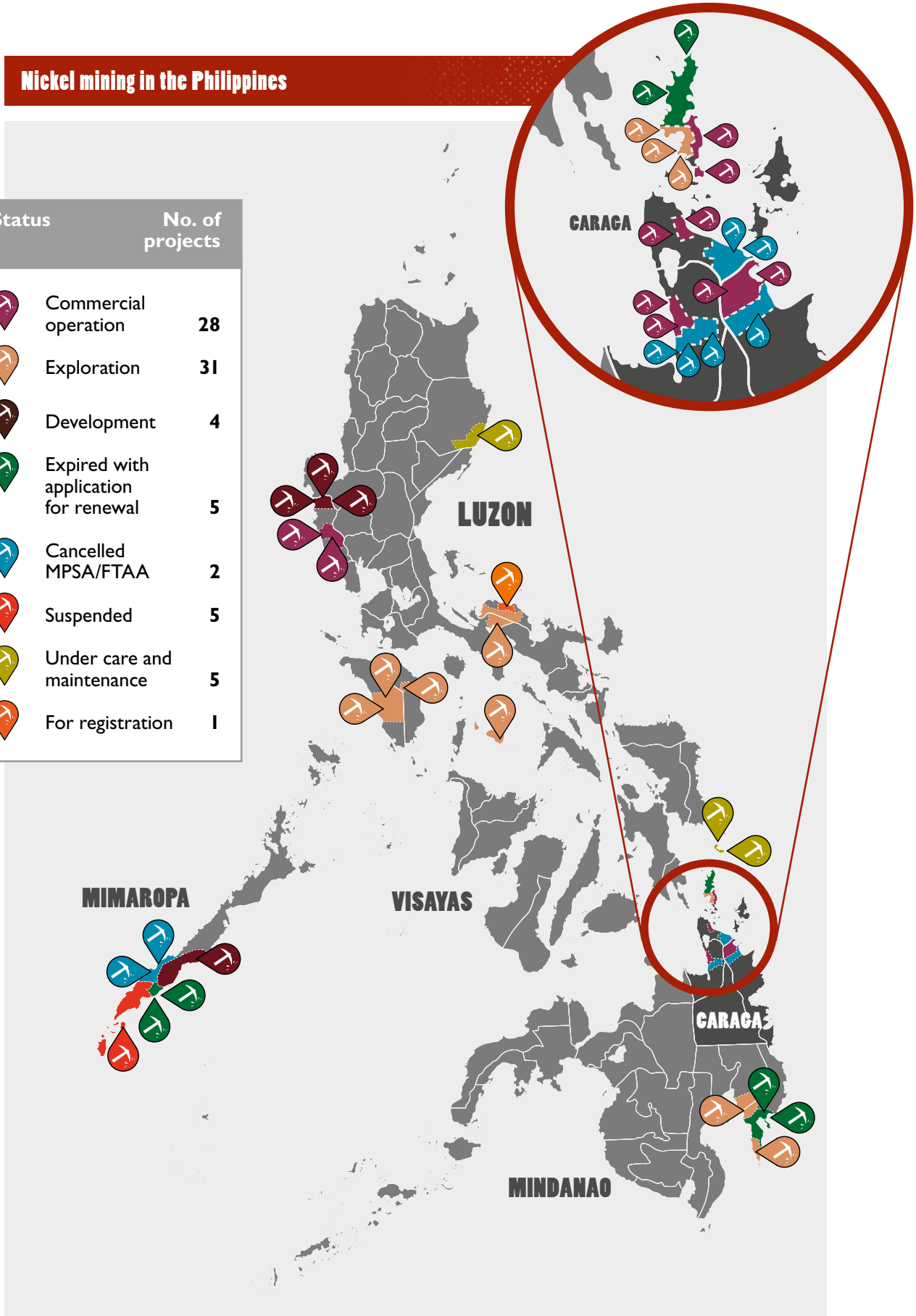
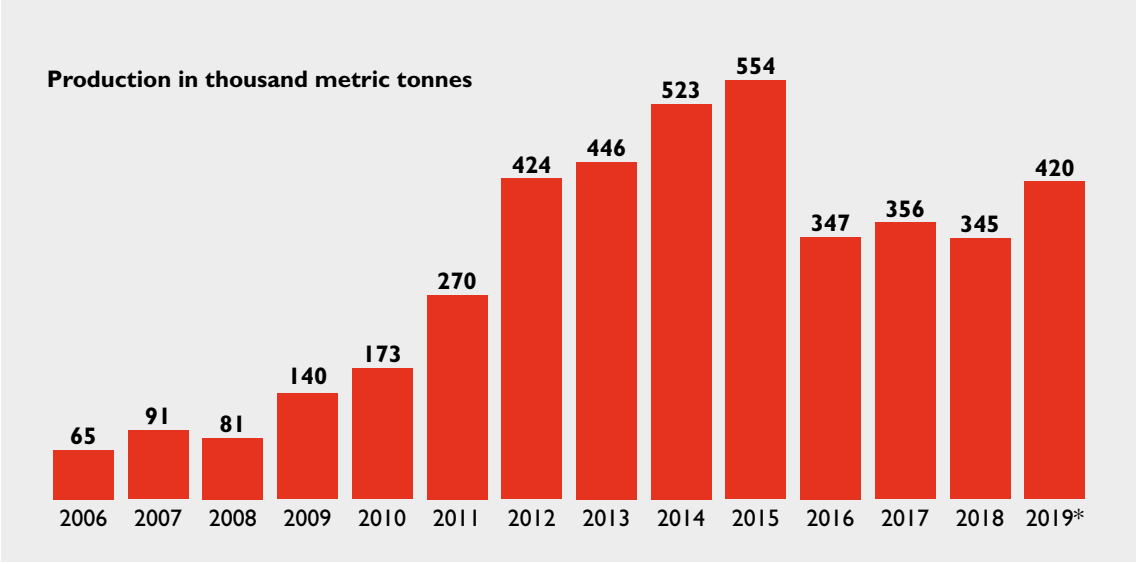


Figure 1. Mine production of nickel in the Philippines from 2006 to 2019 in 1,000 metric tons



Source: US Geological Survey, Statista, 2020

Nickel processing and smelting

The Philippines is mining laterite deposits, which are high volume low-grade deposits located close to the surface. The standard method of mining is surface strip mining.

There are two nickel Hydrometallurgical Processing Plants in the country adjacent to Nickel Asia's Rio Tuba mine in Palawan and Taganito mine in Surigao del Norte. Both are owned and operated by subsidiaries of Sumitomo Metal Mining Co., Ltd. Both plants use High Pressure Acid Leaching (HPAL) and their output is then sent to Japan for further processing into "Class 1" nickel.

The Philippine Nickel Industry Association is undertaking preparations to gain investment priority status for more domestic processing plants. Stakeholders are working on setting up a technical working group to finalize the Nickel Industry Road Map, which aims to make processing plants eligible for priority status, with incentives for establishing such facilities.

Philippine nickel in the global supply chain

Historically, all or nearly all of nickel has been exported for processing, with a handful of countries – including China, Japan, Australia and Korea – accounting for more than 90% of the total. Table 2 presents the destination countries of Philippine nickel for the period 2015-2017. Most of the ore over roughly 1.5% nickel is shipped to various locations, mainly China and Japan.[viii] The lower grade ore (0.8-1.5%) is processed with HPAL into mixed sulfides which are shipped to Sumitomo Metal Mining's nickel refining facilities in Japan, for the battery market.[ix] In 2017 Sumitomo aimed to increase their capacity to produce lithium nickel oxide, for lithium ion batteries, in collaboration with Panasonic Corporation from 3,550 to 4,550 tons.[x] Panasonic negotiated agreements with Tesla and Toyota Motors to supply lithium ion batteries for electric vehicles.[xi]

Table 1. Summary of nickel mining contracts

Status	No. of projects	Area (Has.)
Commercial operation	28	63,446
Exploration	31	90,090
Development	4	8477
Expired w/ application for renewal	5	9,542
Cancelled license	2	12,816
Suspended	5	13,258.00
Under care and maintenance	5	8,8732.80
Awaiting registration	1	1543.7478
TOTAL	**81**	**206,6554.95**

Table 2. Summary of Philippine nickel exports, per ore and destination, 2015-2017 (US$)

Destination	2015	2016	2017
Australia	12,181,594	1,882,400	
Australia, China	45,348,228		
China	662,093,221	547,337,730	373,638,765
China, Japan			221,385,442
Japan	87,191,161	55,037,934	
Hong Kong, Japan, Singapore			10,692,319
South Korea	6,578,355		
TOTAL	**813,392,561**	**604,258,064**	**605,716,527**
Percentage (over total metallic minerals export)	**38%**	**32%**	**32%**

Environmental, social and human rights impacts on local communities

Decades of nickel mining operations have caused irreversible damage to environment and human life – loss of livelihood, food insecurity, denuded forests and biodiversity, contamination of watersheds, displacement, broken family ties, health problems and human rights abuses.

The town of Santa Cruz, Zambales, is surrounded by four large-scale nickel mines. In October 2015, Typhoon Lando made landfall in Zambales and caused heavy flooding involving abnormally red mud slides. Seven residents died in those "head-high floods," numerous farm animals were killed, and hundreds of hectares of farmlands were destroyed. This was the second time that Santa Cruz had experienced this. The first time was in July 2015 when some of the dams of mining companies were allegedly destroyed and flooded the rivers.[xii]

In the Rio Tuba nickel mine – located in Bataraza, Palawan – Coral Bay Nickel Corp. operate the processing plant. The facilities have been accused of emitting a strong smell that violates the safety of the company's own employees for hazardous and toxic substances. One employee has been injured by sulphuric acid, while another died from inhaling hydrogen sulphide. The same company also disposes of its liquid waste directly into the sea, although the company claims it has been treated.[xiii]

Anti-mining activists, particularly in the grassroots, suffer human rights abuses – harassment, criminalisation, forced displacement and cyber-attacks. Mining in the Philippines is linked to a consistently high number of human rights defenders being killed. The Philippines was the deadliest country in the world for environmental and land rights defenders in 2018 with at least 30 people killed. It had the most defenders killed in Asia and was second to Colombia as the deadliest country in the world in 2019.[xiv]

Case study: Manicani Island

Manicani is a biodiversity rich island, which is part of Guiuan municipality in Eastern Samar province. In 1994 Guiuan and its coastal areas and islands – including all Manicani Island – was declared a Protected Landscape and Seascape, with most inhabitants reliant on fishing and agriculture for their livelihoods.[xv]

Hinatuan Mining Corporation, which is a subsidiary of Nickel Asia Corporation, controls a nickel mining lease covering all Manicani since 1992. The company was able to conduct some mining, and shipping of ore, despite concerted opposition to the project from local communities meaning that the company never complied with its legal social acceptability requirements. In November 2002, the DENR ordered a stoppage of mining in the island based on environmental and human rights complaints, particularly regarding siltation and pollution from the mine. Yet the same department then issued applications to ship ore from stockpiles between 2004 and 2016. Eastern Samar issued a provincial ordinance prohibiting large-scale mining activity in 2005.[xvi]

Internal conflict has continued over the mine. An anti-mining protestor was killed when a mining truck rammed a picket line in 2001. In 2014, two islanders were injured attempting to stop company boats delivering equipment. A libel action was taken out by the company against four support staff from Philippine Misereor Partnership Inc.[xvii]

The company failed in its attempt to renew its 25 year mining lease when it expired in 2017 because of its protected status. Community representatives filed their objections to the renewal. From November that year 30 local protestors camped outside the DENR offices for 38 days, and eventually passed on their concerns around the renewal. Nickel Asia stated that they were not willing to let go of the mine on the island because it is part of their mining development plan, and there are still ore stockpiles on the island.[xviii]

> ***"Mining has brought not only negative ecological effects to our home but has also caused great divide among community members and between families, even as far as inflicting harm and death between Manicani Islanders."***
>
> **Marcial Somooc, Manicani resident**[xix]

Impacts of Covid-19

On 9 March 2020, President Rodrigo Duterte declared a National State of Public Emergency because of the growing Covid-19 cases. The ensuing lockdown has severely constrained the capacities of mining-affected communities to respond to the problems associated with nickel mining. The limited mobility of activists under the lock-down has been taken advantage of by companies to operate unchallenged.

Covid-19 transmission had been reported in operating mine sites.[xx] Mining companies have continued to operate, neglecting the health and safety of their workers, and affected communities. Examples include Homonhon Island, where the local community has resisted ore ships docking and the CARAGA Region, while the resumption of mine construction has impacted on Brooke's Point, Palawan.[xxi]

A further problem for mining-affected communities is the recommendation of the DENR to include mining and river dredging within the proposed Covid-19 economic recovery program. The Department of Finance has proposed lifting the ban on new mining contracts to assist the country's economic recovery.[xxii]

Weda, Central Halmatera, Indonesia – The voice of a community impacted by nickel

By Pius Ginting and Muhammad Rushdi, AEER

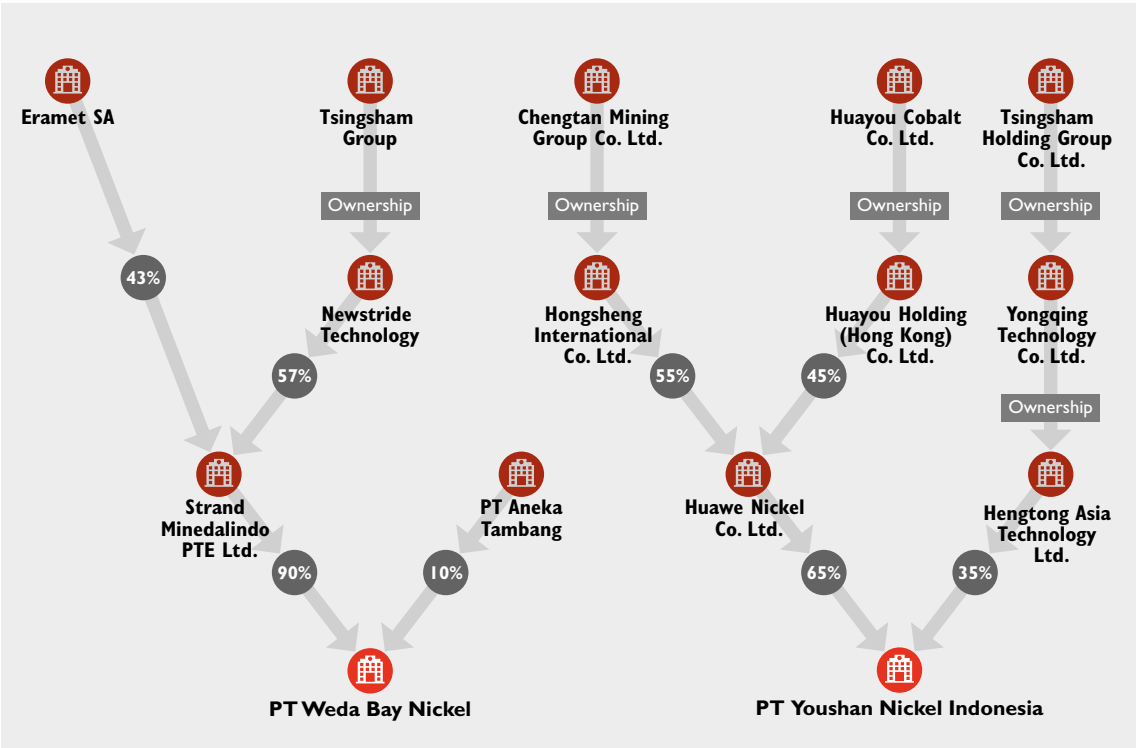
The Weda Bay Project

Indonesia was the world's largest producer of nickel in 2019.[xxiii] In order to promote domestic industrialisation, the government has passed legislation banning the export of unprocessed nickel ore. The idea is to create industrial hubs where mining, smelting, processing and then manufacturing can all take place in close proximity.

Weda Bay in Central Halmahera District, North Maluku Province, is one of the areas chosen for one of these mining and downstream industry hubs, specifically an electric vehicle (EV) battery industrial park, which will be known as the Indonesia Weda Bay Industrial Park (IWIP). Construction on IWIP started in 2018, as a Priority Industrial Area in the Government's National Midterm Development Plan 2020-2024.

Three Chinese companies make up IWIP's shareholders Tsingshan, Huayou, and Zhenshi, with a total investment of nearly 10 billion US dollars. This joint-venture acts as a manager of the industrial area which will have several tenants. IWIP's development is divided into three segments. The first phase is focussed on ferronickel production. The second phase will

Figure 2. Shareholders structure of WBN and Youshan (AEER 2020)



Source: AEER 2020

build a hydrometallurgy smelter to produce nickel-cobalt hydroxide, an EV battery component, and the last phase will focus on EV battery production.

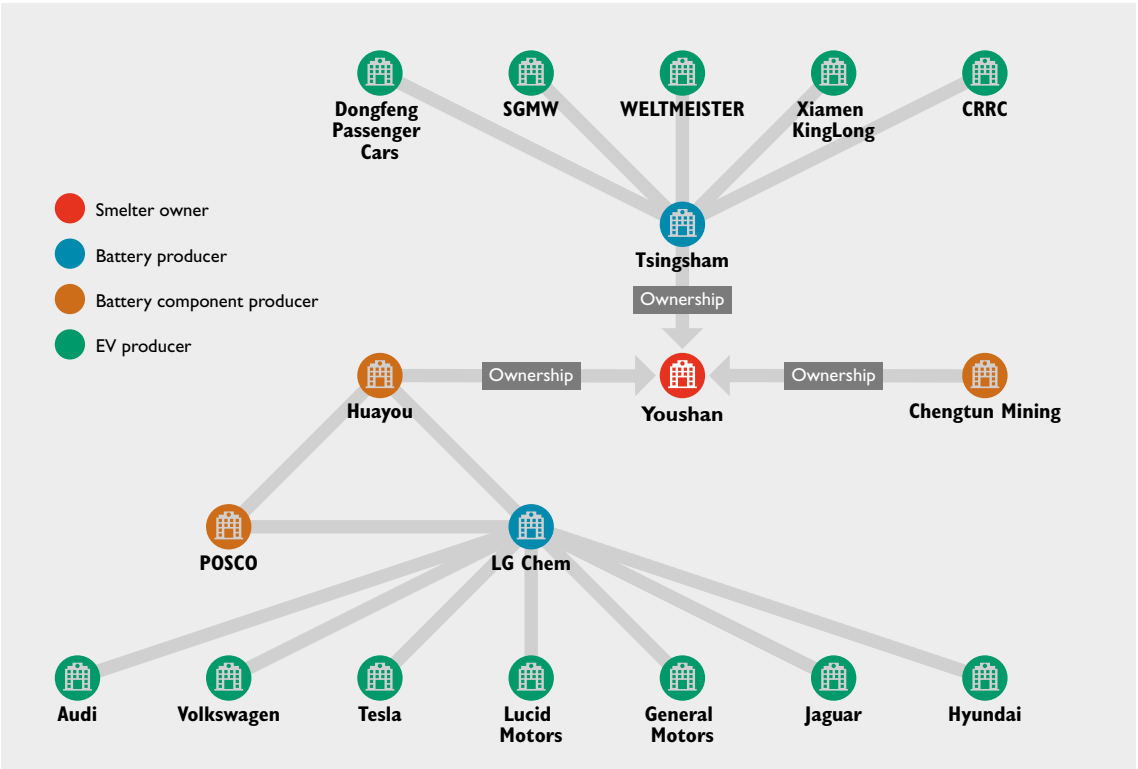
Two IWIP tenants, PT Weda Bay Nickel and PT Yashi Indonesia Investment (Yashi), started producing ferronickel in June 2020. Weda Bay Nickel is a joint-venture company between Eramet (France), Tsingshan (China), and PT Aneka Tambang (an Indonesian mining state-owned enterprise). Meanwhile Yashi is owned by three Chinese metal companies: Zhenshi, Tsingshan, and Zhejiang Huajun Investment Co., Ltd.

Another tenant, PT Youshan Nickel Indonesia (Youshan), plans to build a smelter to produce battery-grade nickel through a different process using nickel matte. Youshan is owned by Tsingshan, Huayou, and Chengtun Mining Group It was predicted to start production in June 2020, though it is believed to be delayed due to the Covid-19 pandemic.

In terms of where these products will go, Tsingshan Group is breaking into the EV battery industry through its subsidiary, Ruipu Energy Co. Ltd. The company supplies batteries to some of China's main EV producers, such as Dongfeng Passenger Cars, WELTMEISTER, SGMW, CRRC, and Xiamen KingLong.[xxiv]

Meanwhile Huayou, another Youshan shareholder, has supply contracts with POSCO and LG Chem, both based in South Korea.[xxv] Many big EV companies, such as Tesla, Audi, Jaguar, Volkswagen, and Hyundai receive their battery supply from LG Chem.[xxvi]

Figure 3. Youshan supply contracts



Source: AEER 2020

Potential impacts on local communities

There are a number of concerns over the project. The first is that the proposed nickel mine is in a formerly protected forest, under Indonesia's 1999 Forestry Act. The Government has allowed this exception because it says that Weda Bay Mining has its license before the area was categorized as protected forest.

IWIP's environmental impact assessment, released in 2018, says the hydrometallurgy smelter will use high-pressure acid leaching (HPAL), producing about 120,000 tonnes/year of nickel and cobalt hydroxide. However, it is still unclear what technology will be used. The waste will be stored in a temporary waste stockpile at an expected rate of 10,350,000 tonnes/year, making it the highest waste producer in IWIP. The waste will be managed by a third party, and it is still unclear what method the company will use to dispose of the tailings from processing the nickel processing plant.

A battery-grade nickel project owned by Tsingshan Group, Huayou, and partners at Morowali initially plans to deposit the waste from a similar unit using deep sea tailings placement (DSTP). However, PT Hua Pioneer Indonesia, a company established by four battery-grade nickel producers at Morowali, has withdrawn their request for a DSTP permit. Hua Pioneer's position should be standard for other companies in Indonesia, especially battery-grade nickel producers, to protect Indonesia's marine ecosystems.[xxvii]

Eramet have stated that they are not in favour of DSTP. The justification for DSTP is that it is safer than land-based storage, because of high seismic activity and rainfall, and it is also in general a cheaper method than terrestrial storage. Proponents of DSTP claim that piping waste directly into deep waters has minimal impact, but opponents note that the impact is not fully understood.[xxviii]

> ***"For new nickel supply, Elon [Musk of Tesla] and the battery industry look to HPAL in Indonesia. Yet deep water disposal methods are increasingly putting these mines on the same blacklist as illegal artisanal cobalt from the DRC."***
>
> **Simon Moores, Benchmark Minerals consultancy**[xxix]

If used DSTP would threaten the marine ecosystem and local community's subsistence. Most Weda locals are fishermen and still fish in the bay. The waste could contaminate the sea with toxic metals, polluting marine habitats, and eventually affecting the coastal community's economy. When recently interviewed local communities were neither informed nor consulted about any plans for DSTP.

IWIP will be powered by three thermal coal power plants with a capacity of 250 MW (mega watt) each by end 2020. The plant size will gradually increase to 2,000 MW, using 248,000 tonnes of coal per day. Pollution from coal power is associated with respiratory health issues for local communities. Villagers from the three villages closest to IWIP – Lelilef Sawai, Lelilef Waibulan, and Gemaf – claim that more locals are suffering from upper respiratory infections because of air pollution from the company's coal power plant. The community have complained that coal dust is also affecting their crops, with banana trees dying and clove, nutmeg, and chocolate plants covered in thick dust. Coal barges are also polluting the sea with oil and coal dust.

IWIP's operations are also negatively affecting the flow of some local rivers. The Sake River has been blocked and diverted to build a smelter. The local river system has been polluted by IWIP, turning a brownish colour. Today locals must buy bottled water.

> ***"Now we have to spend up to 200,000 rupiah every month just for clean water while it was free back then."***
>
> **Marsolina Kokene, Gemaf villager**

Local fishermen have already been impacted by the IWIP complex. The catch is decreasing and becoming less varied. A popular fishing spot, Tanjung Ulie, has been reclaimed and is being guarded by company security. Today fishermen must go 1-2km further offshore, and spend more time at sea to complete their daily catch.

> ***"Yesterday I left at seven in the morning to go fishing nearshore and only caught two fish, despite returning home at night!"***
>
> **Hengki Burnama, fisherman from Lelilef Sawai**

Land conflict

Land conflicts are afflicting Weda Bay. Locals report that they were forced to sell their land to the company. The local government have supported the company in forcing them to sell their land at very low prices of Rp 8,000–9,000 per m^2 (US dollars 0.50-0.62 per m^2).[xxx] Most landowners have sold up, although five locals in Gemaf are reportedly still refusing to sell their land. It is alleged the company has seized land without any advanced notice or prior negotiation, and in some cases has not yet paid for it.

In July 2020 about 450 people from Southern Wasile marched for two days to IWIP's mining site, Kao Rahai, to protest the lack of land payments by IWIP.[xxxi] They set up tents on the mine access road, stopping mining activity. Only 80 out of 200 hectares of the local community's land have been paid for by the company. The protest ended peacefully, with both parties agreeing to re-examine the land areas to be purchased.[xxxii] At a later meeting attended by local communities and district government, IWIP's management admitted they had dealt with the head of sub-districts about purchasing land for Rp 2,500 (US dollars 0.17) per m^2.[xxxiii]

Support from the companies and the government

Local communities did initially receive some communal support from the mining company, Weda Bay Nickel, including wells for clean water and fishing gear, as well as some material support from the local government. However, they complain that IWIP has not offered any support or compensation for the problems they have caused, although they have not yet filed any official complaints. They have not done so as they have no faith that the company will deal with them in a fair manner. Neither do they trust the local government to support them as it is seen to exclusively support the company.

Covid-19 impact

Construction at the IWIP site progressed as usual, apparently disregarding worker health and safety. A former IWIP worker, Patra Alam, claims that during the pandemic the company would not permit sick workers to miss work; workers were not allowed paid leave before completing five months of consecutive work; and discrimination happened between foreign and local workers

where local workers were forced to work for 12 hours without a break. Also, the high density of workers on the site have it impossible to implement physical distancing. Patra Alam was dismissed in April 2020 after uploading a video to his Facebook account complaining about these conditions.

8. Annex 1

Conflict and transition minerals

Cobalt

Cobalt has become the mineral that is most associated in peoples' minds with the problems of transition minerals; so much so that the phrase 'blood diamonds' or 'conflict minerals' is giving way to the concept of 'blood batteries'.[i] Although cobalt has metallurgical applications, primarily in high temperature alloys, it is its chemical use in lithium ion batteries which has driven up demand from 38,000 tonnes per annum over the period 1970-2009 to around 145,000 tonnes per annum over 2010-19.[ii] Batteries for electric vehicles accounted for 55% of total cobalt consumption in 2019.[iii] Most cobalt is mined as a by-product of other minerals, particularly nickel and copper, and is therefore also associated with problems in the production of these metals.

The majority of the world's cobalt production (71%) and estimated reserves (51%), as of 2019, are situated in the Democratic Republic of the Congo (DRC).[iv] Most DRC-mined cobalt is produced by major mining companies, primarily Glencore, which has interests in the Katanga and Mutanda mines, and China Molybdenum, which partially owns the Tenke Fungurume copper-cobalt mine. However cobalt mining in the DRC is popularly associated with artisanal, or small-scale mining. The amount of artisanal mining sourced cobalt entering the supply chain is disputed, with the DRC Government estimating it may be up to 20%, and many supply chain links between the big miners and the small-scale miners making distinction difficult.[v]

Artisanal mining in the DRC is associated with appalling health and safety conditions, child labour, and accusations of modern slavery.[vi] A civil law case was filed in the USA in 2019 against major technology companies over their use of cobalt associated with child labour in the DRC.[vii] The toxic nature of cobalt in dust or water has been linked to respiratory and dermatological issues in small-scale miners, including a serious lung disease called 'hard metal lung disease.[viii] (The name of the metal itself derives from *kobald*, a German word meaning goblin, or devil, after medieval miners associated it with deadly gasses in processing). Artisanal miners are proposing solutions to these issues – including increased access to credit and technology – as well as calling for the formalisation of the sector. Such initiatives, combined with supply chain due diligence, appear to be a better solution than avoiding DRC cobalt.[ix]

The problems are not just associated with small-scale miners. A 2018 fact-finding mission 'uncovered alarming mistreatment' of workers by Glencore,[x] with more recent accusations that DRC workers have been locked into their mines during the Covid-19 pandemic and told by their managers "to either stay and work or lose their jobs."[xi]

Finally, an estimated 90% of DRC sourced cobalt is further refined and processed in China, which controls the majority of refined global cobalt output.[xii] Workers, and to an extent communities, there are also potentially exposed to contamination issues, which have prompted some suspension of production and a country-wide implementation of more stringent policies and procedures, particularly regarding emissions.[xiii]

> ***"The accidents are common. They put a red cross on the pits where there has been an accident to show that it is dangerous. But some people still mine in those ones already declared dangerous."***
>
> **An artisanal cobalt miner in Kambove**[xiv]

Lithium

Thanks to its impressive capacity to store energy, lithium is increasingly used in rechargeable batteries, and so, like cobalt, is increasingly being considered essential for modern battery storage. In 2019 batteries made up an estimated 65% of the global end-use for lithium (with ceramics and glass constituting the second most popular, and more traditional, end-use).[xv] This is a rise of only 23% battery end-use in 2010,[xvi] with an estimated potential to grow up to 18% per annum.[xvii] Interest in lithium's potential has led to it being marketed as so-called 'white gold', with the EU adding lithium to its list of critical minerals encouraging companies to open proposed lithiums mines in Europe: in Portugal, Serbia and even Cornwall.[xviii]

Lithium deposits take the form of hard-rock mining from the mineral spodumene, and from salts, largely from lithium-rich brines in salt lakes. The biggest producer in 2019, Australia,[xix] with just over 54% of global production is primarily a hard-rock miner (largely from Western Australia). However, collectively in terms of known reserves brine, notably in the so-called lithium triangle on the borders of Argentina, Bolivia and Chile, has the majority of reserves.[xx] The lithium triangle has been described as the 'Saudi Arabia of lithium'.[xxi]

These salt flats are in very arid regions with limited precipitation, and the process of extracting the brines is water intensive, using up to 500,000 gallons per tonne of lithium.[xxii] In Chile's Salar de Atacama, mining activities are said to have consumed 65% of the region's water.[xxiii] There have been increasing clashes with communities primarily over water usage, but also livelihoods and culture: in Argentina 33 indigenous communities have resisted the advance of lithium mining with disputes over their consent and decreased water for humans, livestock and crop irrigation[xxiv]; in Chile there have been ongoing protests and court cases from the indigenous peoples of the Atacama Salt Flats over access to water and a lack of consent;[xxv] and in Bolivia, although the proposed industrial production of the Uyuni salt flat has yet to materialise, there are arguments over whether the 2019 coup against then President Morales concerned the control over lithium.[xxvi]

> ***To say that we need the mining companies is a lie, because the community is the same, it does not grow. I'm worried about the environment and the diseases.***
>
> **Atacama community member, Argentina**[xxvii]

Nickel

Nickel has become an important metal in modern living, primarily used in stainless steel and alloys, as well as electroplating, but is being increasingly used in rechargeable batteries – where it could potentially substitute for the more expensive cobalt. Whereas cobalt and lithium tend to dominate debates over battery minerals, because base metals like nickel are not exclusively linked with green energy technologies, they deserve more attention. Elon Musk has highlighted this by promising a "giant contract" to companies mining nickel in an environmentally sensitive way.[xxviii]

40% of global nickel reserves are in locations with high biodiversity and protected areas, and 35% in areas with high water stress. Of those countries with reserves, 38% are found in states given an "elevated warning" or worse on the Fragile States Index, while 54% are located in states perceived to be corrupt or very corrupt on the Corruption Perceptions Index.[xxx]

Nickel is usually found in either sulphide or laterite-type ores; global reserves are about 60% in laterites and 40% in sulphide deposits.[xxxi] Historically, the majority of nickel mining has been derived from sulphide ores because lateritic soils, which tend to occur in the tropics, require strip mining and more complex processing to remove large amounts of water,[xxxii] with the use of High Pressure Acid Leaching (HPAL) to produce battery quality nickel causing specific problems.[xxxiii] However, hard rock sulphide resources are declining, so interest in laterites are increasing.

The mining and smelting of sulphide ores have been associated with serious pollution and health impacts in Canada, and particularly in Russia. The city of Norilsk in Russia has been placed on the Blacksmith Institute's top 10 world's most toxic places, with sulphur dioxide emissions that are associated with acid rain and heavy-metal contamination in the soil and water systems. In June 2016 the company Norilsk Nickel had to shut down one of its factories there in an attempt to clean up the notoriously polluted city following a waste spillage into the local river that turned the river red.[xxxiv] The Russian indigenous Aborigen Forum has lobbied Elon Musk not to source nickel from Norilsk noting "The lands of indigenous people appropriated by the company for industrial production now resemble a lunar landscape."[xxxv]

Laterite mining brings its own issues. The top two nickel producers in 2019, Indonesia and the Philippines respectively,[xxxvi] feature as case studies in this report (see section 8). But there are other egregious examples of problems with lateritic nickel. In Kanaky/New Caledonia, nickel mining has caused historic pollution across the island, and significant conflict with the local Kanak population, not least over the Goro mine where there were waste spills into the local environment in 2010 and 2014.[xxxvii] The Fenix mine in Guatemala has been associated with allegations of forced displacement, sexual violence and murder involving the local indigenous Mayan community.[xxxviii] The Ambatovy nickel and cobalt mine in Madagascar has been criticised for causing divisions in the community, poor rehabilitation, ambient pollution and toxic spills.[xxxix] In Papua New Guinea, the battery nickel plant of Ramu NiCo has been dumping

millions of tons of mine waste directly into the ocean since 2012, and is being sued by locals after a waste spill in August 2019 turned the local seas bright red.[xl]

> ***"The mining of nickel-rich ores themselves, combined with their crushing and transportation by conveyor belt, truck or train, can generate high loadings of dust in the air, dust that itself contains high concentrations of potentially toxic metals, including nickel itself, copper, cobalt and chromium ... We have to get smarter at recovering and reusing the vast quantities that we have already extracted from the earth, rather than relying on continued pursuit of new reserves of ever poorer quality."***
>
> **Dr David Santillo, Greenpeace Research Laboratories**[xli]

Copper

Copper, and copper alloys, have a wide range of uses including building construction, electronic products, transportation equipment, electrical and industrial goods. Its ubiquitous nature means copper has gained a reputation as a bellwether for economic activity and thus been nicknamed Doctor Copper, "the metal with a PhD in Economics."[xlii] As such demand for copper has almost doubled in the last 20 years to 20 million metric tons in 2019.[xliii] Thanks to its conductivity it is particularly important in power generation and transmission, including in wind turbines (with Wood MacKenzie predicting that the building of wind turbines between 2018 and 2028 will use 5.5 million tons of copper).[xliv]

The potential for impact from copper mining is great. The largest man-made excavation on Earth, and deepest open-pit mine, Bingham Canyon in the USA, is a copper mine.[xlv] Its owner, UK mining multinational Rio Tinto was sued by local community representatives over air pollution in 2013 (although the company eventually won the case).[xlvi] Rio Tinto was also a partner in the huge Grasberg Mine, located in occupied West Papua, Indonesia. The influential Norwegian Government Pension Fund divested from Rio Tinto, and excluded the main mine owner Freeport McMoRan, owing to criticism over the terrible environmental damages caused by the Grasberg copper and gold mine.[xlvii] The mine has been pouring waste, estimated to be up to 280,000 tonnes per day, into the local river system for almost half a century,[xlviii] and has caused or exacerbated conflict with the local Amungme population, leading to the deadly militarisation of the area, which the company has partly paid for.[xlix]

In Bougainville, a Rio Tinto subsidiary was also forced to abandon its Panguna mine in 1990 after it led to a separatist insurgency where an estimated 20,000 Bougainvilleans lost their lives.[l] In Burma/Myanmar, protests over land confiscations for the Letpadaung Copper Mine have led to a string of violent actions by state forces against peaceful protests; the most serious incident taking place on 29 November 2012, with police destroying six protest camps housing up to 500 monks and 50 farmers.[li]

There are many other examples of pollution and community conflict associated with copper mining and smelting, particularly in the top two copper producers in 2019, Chile and Peru, as well as Africa's top two producers, the DRC and Zambia.[lii] These include issues of water shortages (particularly in Chile's Atacama desert), water and air pollution, economic dependency (especially for Chile and Zambia), and often violent conflicts

associated with displacement, livelihood and social impacts.[liii]

Given all of this, the International Institute for Sustainable Development observes "that of all the metals, the aggregate potential for damage to human and environmental health is the greatest for copper"[liv], while SOMO notes that copper is the mineral most widely associated with conflict globally that is not covered by conflict mineral legislation.[lv]

> ***Mama Yosepha Alomang described the [Grasberg] mine as being a serpent that is living beneath the earth and devouring the land on which she and her people live. More than that, she talks of Nemangkawi, the traditional name for the mountain where the Grasberg mine is operating, as her own body, a mother to her community.***
>
> **Mama Yosepha Alomang**[lvi]

Rare Earth Elements

The term rare earths, or rare earth elements (REEs) covers 17 chemical elements often occurring together, with neodymium (as well as dysprosium and praseodymium) being of particular importance for green energy technologies. These metals are particularly necessary for specialized magnets used in energy storage technologies, electric vehicles and wind turbines.

Despite their name, rare earth elements (with the exception of the radioactive element promethium) are relatively plentiful in the Earth's crust, but are more difficult to find in economically viable concentrations, particularly because the process of extraction is expensive given it requires separating multiple different metals from a single deposit.

REEs are often associated with the notions of critical or strategic minerals, because they are connected with the near monopoly that China exerted over them. China currently mines about 63% of global production, although a decade ago that figure was at 97%.[lvii] The Chinese Government was able to achieve this by targeting the mining and processing of REEs, aiming to attract numerous downstream industries needing the metals. It only entered the REE market in the late 1980s, but drove prices down through scale of production to the point in 2002 when the massive Mountain Pass mine in the USA closed, six years after a major tailings disaster there. Although it is worth noting that it has since re-opened as part of recent efforts to counter China's REE dominance.[lviii]

This REE ascendency has come at a high environmental cost for China, which also explains why so many countries were previously content for China to be the global source of REEs. The mining and processing has caused extensive ecological damage where it is taking place. Producing one tonne of REEs leads to an estimated "60,000m3 of waste gas that contains hydrochloric acid, 200m3 of acid-containing sewage water, and 1-1.4 tonnes of radioactive waste".[lix] The processing of REEs involves uranium and thorium, and in the northern Baotou region of Inner Mongolia these have been dumped together with other toxic chemicals into a huge man-made lake, impacting on soil, water and human health. Dalahe village, located close to it is known as a "cancer village" because of the health impacts on local residents.[lx] Another Chinese REE site Ganzhou, in Jiangxi province to the south, has been described as a "site of devastation",[lxi] with the potential for toxic contamination of some of China's mega-cities

further downstream like Guangzhou, Shenzhen and Hong Kong.[lxii] All of this creates the potential for environmental conflict. The Chinese Government has been attempting to deal with the inherent pollution and illegal mining, as well as black-market smuggling, but these are still issues that the consuming countries, including China itself, are doing too little to address in terms of supply chain traceability.[lxiii]

> ***"[China's] rare earth reserves are much depleted; environmental costs in the trillions of yuan have not been factored into market prices; and a rampant black market in rare earths ... has exacerbated environmental damage and the loss of resources."***
>
> **Liu Hongqiao in China Dialogue**[lxiv]

Other metals

There are a number of other metals associated with the energy transition, which are associated with conflict or the potential for it. These are:-

Aluminium: Bauxite mining, for aluminium, and particularly smelting are associated with huge energy use and displacement.[lxv] Aluminium is required, to varying degrees, for solar, wind and energy storage.[lxvi] The aluminium life cycle produces 1% of global greenhouse gas emissions. It has its own voluntary standard for the entire supply chain, the Aluminium Stewardship Initiative. There has been conflict with local communities in India (particularly with indigenous Adivasi in Niyamgiri, Orissa), Guinea and Australia.[lxvii]

Gold: Although still primarily used for jewellery or a store of value, gold's conductivity and low reactivity lead to its use in electronics, particularly circuit boards. Mined in large-scale mines (often also producing copper) or by artisanal miners, gold has historically shared a high correlation with pollution – primarily mercury or cyanide – and conflict. Gold has created conflict in a range of countries including Argentina, Brazil, Colombia, Eritrea, Ghana, Papua New Guinea, Philippines, Peru, Romania, South Africa, Sudan and Tanzania.[lxviii] In El Salvador, a campaign for 'water over gold' led in 2017 to a national law banning metal mining,[lxix] while in Colombia the community of Cajamarca has stopped a gold mine through a popular referendum, creating a national movement.[lxx] Gold is often singled out in conflict mineral legislation, and has focussed campaigns seeking responsible sourcing, as well as specific fair trade attempts to create an ethical supply chain.[lxxi]

Graphite: Graphite is a good electrical and thermal conductor, and is used in vehicles but is also another potential constituent in lithium-ion batteries. In 2019, China produced more than 60% of the world's graphite,[lxxii] and like rare earth elements there have been reports of air and water pollution, damaging local crops and health, which the government is attempting to tackle.[lxxiii] In India, a synthetic graphite manufacturer in Bangalore was closed down in 2019 because of pollution concerns.[lxxiv] An increasing demand is leading to mines being developed in Madagascar, Mozambique, Namibia and Tanzania.[lxxv]

Iron and steel: Iron, mainly used in steel making for construction, accounts for 90% of all the metals mined, and is quoted as second only to copper regarding "the aggregate risk for toxicity and human health".[lxxvi] The global iron-steel production chain causes the largest climate change impacts.[lxxvii] The vast majority of a wind turbine is made up of iron and steel.[lxxviii] The sheer scale of mining has

caused issues with indigenous peoples and local communities in the Pilbara region of Australia, Brazil and India.[lxxix] In the case of Brazil two recent tailings (waste) dam failures, in 2015 and 2019, caused massive environmental damage and loss of life.[lxxx]

Silver: Silver is used in 95% of solar panels, with limited recycling to date.[lxxxi] The metal has been historically associated with colonial extraction, particularly at the Potosi mine in Peru. At its peak in the 17th century the mining complex had 160,000 people – mostly slaves – living in it, and earned a local Quechua name meaning "the mountain that eats men".[lxxxii] However, modern silver is more often obtained as a by-product from lead-zinc mines, copper mines, and gold mines, in that order.[lxxxiii] Silver has been associated with heavy metal contamination of soil and water from recent and historical mines in the US, Mexico, Peru and Bolivia.[lxxxiv] In Guatemala, opposition to the Escobal mine, owned at the time by Canadian Tahoe Resources, led to shootings of protestors by mine security in 2013.[lxxxv]

Tin, tantalum, tungsten: Although they are three separate metals, the 3 'T's as they are known are lumped together – in association with gold – as the 3TG 'conflict minerals'. They were specifically identified as fuelling violence in the DRC in the US Dodd Frank Act section 1502, and have also been associated with employing child labour and slavery.[lxxxvi] Tantalum has been directly linked to conflict, as well as poor working conditions, in the eastern DRC, Rwanda and in the Colombian Amazon.[lxxxvii] Tin particularly is associated with negligible workplace health and safety and environmental damage in Indonesia, and is linked to arming conflict in Burma/Myanmar.[lxxxviii] Local communities in Galicia, Spain and in New Brunswick, Canada have been asserting their rights to land and water in response to the threat of tungsten mining.[lxxxix]

Zinc: Zinc is a highly stable metal which has uses in both solar panels and wind technology. It often naturally occurs with other metals, particularly lead. It has been associated with conflict in Peru, and Bolivia. The Doe Run polymetallic smelter in La Oroya has become a flash-point for pollution related conflict, while locals have been struggling with the owners of the Antamina mine.[xc] In Bolivia, there have been waves of unrest associated with mining in Potosi, particularly around the San Cristobal mine.[xci]

9. Annex 2

Supply chain initiatives and standards

a) International frameworks relevant to transition minerals

The overarching framework for mineral supply chains are grounded in both sustainable development and human rights. The evolution of environmental and human rights rules and standards for mining has been linked to positioning the industry as a crucial pivot for sustainable development. This process has historically been controlled by the mining industry and governments. The starting point was Mark Moody Stuart, then chair of Anglo American, sharing a plane with Tony Blair to the 1992 World Summit on Sustainable Development, leading to the arguably multi-stakeholder Mining, Minerals and Sustainable Development and ultimately the industry body the International Council of Mining and Metals (ICMM).[i]

The 17 **Sustainable Development Goals** are the accepted articulation of our global ambitions on sustainable development. The role that mining plays in them is disputed. The United Nations Environment Programme (UNEP) state that "minerals underpin global development and are critical to the achievement of the United Nations Agenda 2030 and the SDGs"[ii], while the issues laid out in section 3 speak to the negative impacts, with critics noting that the term sustainable mining is "an inherent contradiction in terms."[iii]

One way to ensure that mining could contribute is to ensure that the international normative framework is based on human rights. The Danish Institute for Human Rights stress that as more than 90% of the SDG targets are linked to international human rights and labour standards, an important step for companies to help advance the SDGs is to respect human rights in their core operations and supply chains.[iv] The subject encompasses a large number of core UN Human Rights Instruments, but the current relevant standard for companies is the **UN Guiding Principles on Business and Human Rights**. The Principles are a set of guidelines, endorsed by the UN Human Rights Council in June 2011, to prevent, address and remedy human rights abuses committed in business operations.[v] They enshrine the duty to practice human rights due diligence for companies as a component of the responsibility of business enterprises to respect human rights. The Guiding Principles are not strictly voluntary, even for companies, as – according to UN advice – they "state that companies should

always treat the risk of causing or contributing to gross human rights abuses as a legal compliance issue."[vi]

The Guiding Principles have also been incorporated into the **OECD Guidelines for Multinational Enterprises**, alongside norms on the environment, disclosure, labour and bribery.[vii] The OECD Guidelines aim to be "a leading international instrument for the promotion of responsible business conduct"[viii] Although they are a non-binding set of principles and standards they do have an accompanying complaint mechanism which handles cases of alleged breaches of the Guidelines. The Guidelines are voluntary for companies, but the 46 signatory states – which account for 85% of foreign investment – are mandated to operate the complaint mechanism.[ix] Although there are many critical voices on how effective this complaint mechanism is, particularly as each OECD country operates their own specific National Contact Point, it does provide an avenue for company focussed complaints.[x]

b) National / regional legislation relevant to transition minerals

There are a number of national and international laws and regulations that cover overlapping areas of supply chain governance. The area of most interest for transition minerals is conflict minerals. The first national law with international implications attempting to stop natural resources financing conflict and rights abuses is the 2010 **US Dodd-Frank Wall Street Reform and Consumer Protection Act (Section 1502)**. It was enacted in response to the role of minerals in fuelling the civil war in the Democratic Republic of the Congo (DRC).[xi] The law requires US publicly-listed companies to conduct due diligence on their supply chains for tin, tungsten, tantalum and gold (3TG), if they could originate in the DRC or its neighbours, take steps to address any risks they find, and to report on their efforts every year to the US Securities and Exchange Commission (SEC). The Act has been criticised by some in civil society, both for being too restricted – either in its choice of metals or geographically – or for causing companies to simply withdraw from the DRC rather than remain engaged in a more responsible manner.[xii] It has also been criticised by companies who regard it as an unnecessary administrative burden, and under legal and political pressure from President Trump in 2017 the SEC suspended enforcement of much of the due diligence.[xiii] As a result there has been a decline in long-term compliance.[xiv]

Nonetheless the Act has been groundbreaking, and has inspired many non-legal standards as well as the 2017 **European Union (EU) Conflict Minerals Regulation** (2017/821/EU), which came into effect on 1st January 2021.[xv] The EU Regulation follows its US counterpart regarding a due-diligence focus on selected European metal importers, but is not limited in terms of where the conflict minerals are sourced even if it sticks only to 3TG minerals.[xvi]

There are a growing number of mostly recent laws focussed on human rights due diligence. Some of them are broad in scope, such as the 2017 **French Duty of Vigilance Law**, which requires French companies to adopt supply chain due diligence policies focused on human rights-related risks at supplier companies.[xvii] The 2014 **EU Non-Financial Reporting Directive** (2014/95/EU) mandates that large companies must include a non-financial statement on the impact of company activity

on environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters.[xviii] As part of the Green Deal, the European Commission has committed to reviewing the directive in 2020 to strengthen sustainability efforts.[xix]

However, the majority of these laws are focussed on specific areas of human rights or corruption, such as the **UK Modern Slavery Act** (2015)[xx], with its Australian 2018 counterpart[xxi], the **Dutch Child Labour Due Diligence Act** (2019)[xxii] or bribery and corruption such as the 2010 **UK Bribery Act**,[xxiii] the 1977 **US Foreign Corrupt Practices Act**[xxiv] and the 2017 **French Sapin II Act**.[xxv] All of these laws have a focus on businesses conducting due diligence to avoid specified harms.

Finally, companies are forced to engage with due diligence because of legal cases, more often than not using civil law to sue companies over various abuses. In late 2019 some of world's largest tech companies – including Apple, Dell, Google, Microsoft, and Tesla – were named as defendants in a US class action lawsuit brought by Congolese families over alleged human rights abuses of child cobalt miners in the DRC.[xxvi] The case is unprecedented in focussing on actors further downstream of the supply chain, and also in using the US Trafficking Victims Protection Reauthorization Act to assert its claims for forced child labour.[xxvii] Civil compensation actions are also happening in the UK, particularly after the UK Supreme Court ruled in 2019 that a case brought by almost 2,000 Zambian villagers against then UK-registered Vedanta Resources Plc over a copper mine could be heard by the English courts.[xxviii] Precedents clearly shift over time, but the potential financial losses from these types of cases help to focus corporate minds along the supply chain on the costs of inadequate due diligence.

c) Voluntary standards and initiatives relevant to transition minerals

The non-legislative response to the need for corporate due diligence has tended towards a patchwork of sometimes competing and overlapping initiatives, which can be broken down roughly into the following areas, based on how voluntary they are or whether they are enforced through certification.

Assurance standards/certification schemes

The first, and arguably most important, are assurance schemes which attempt to provide some guarantee that participants have conformed to agreed requirements. There are different types of certification: first-party, second-party, or third-party (or some combination of these). First party assurance is conducted by the producer, second party by the customer, and third-party assurance is performed by a separate actor independent of the supply chain. Those schemes listed under this section all seek some form of third-party certification. The need to gain certification may be designed to influence consumer behaviour or be a condition of membership of an association.

There are a number of general certification schemes which are relevant to these issues. The first is the International Organisation for Standardisation's ISO 14001 **Environmental Management Systems Certification**,[xxix] and the second is Social Accountability International's **SA 8000 Social Accountability Certification**,[xxx] focussing on environmental and waste management, and labour standards (including child labour) respectively. There is also **ISO 26000 Guidance on Social Responsibility**, which sets standards on

general social performance – incorporating the UN Guiding Principles on Business and Human Rights – but as it deals with a wide range of social principles unusually for the ISO it does not certify compliance.[xxxi]

The **Initiative for Responsible Mining Assurance (IRMA)**[xxxii] is a genuinely multistakeholder certification scheme to develop ambitious standards that improve the social and environmental performance of industrial mining operations, including a comprehensive list of issues featuring human rights due diligence. It has sought a high bar across a number of thematic areas, but is still in the early days of adoption.

The **Extractive Industries Transparency Initiative (EITI)** is the leading standard for global mining transparency, with – at the time of writing) 53 – implementing countries addressing among other things payments by mineral companies to governments, contracts, the beneficial ownership of companies and the allocation of revenues. The EITI's implementation includes multi-stakeholder groups involving government, industry and civil society members. Although not primarily dealing with supply chain issues, it encompasses some implementing countries that produce transition minerals, such as the DRC.[xxxiii]

The majority of certification schemes cover supply chain due diligence on conflict minerals. The two current initiatives covering 3TG are the **Certified Trading Chains (CTC)** Standards Certification[xxxiv] and the Responsible Minerals Initiative's **Responsible Minerals Assurance Process (RMAP)**.[xxxv] The former was created as a pilot for central Africa by the German Federal Institute for Geosciences and Natural Resources in 2007, but has since been updated for the DRC in 2019; the latter focuses on certifying smelters and refiners as a 'pinch point' in the minerals supply chain.

In terms of specific conflict minerals the largest number focus just on gold, although some are less relevant because they are aimed primarily for the jewellery market, particularly the fair trade gold market.[xxxvi] The others are associated with specific trade bodies and include the World Gold Council's **Conflict-Free Gold Standard** and **Responsible Gold Mining Principles**,[xxxvii] and the London Bullion Market Association's **Responsible Gold Guidance**, which also includes silver.[xxxviii] Tin (one of the 3 Ts in 3TG) also has its own specific supply governance assurance scheme, the **International Tin Supply Chain Initiative (ITSCI)**,[xxxix] as does cobalt thanks to the **Responsible Cobalt Initiative (RCI)** and the **Fair Cobalt Alliance**.[xl] The aluminium industry is the only other transition metal which has its own assurance scheme in the **Aluminium Stewardship Initiative (ASI) Performance Standard**.[xli]

Then there are two other mining industry-wide initiatives. The first is the **ICMM's Performance Expectations** on their Mining Principles.[xlii] The ICMM is an industry trade body, with a claimed focus on sustainable development, and their 10 mining principles aim to improve the sustainability performance – including human rights – within ICMM members, with assurance and validation procedures. The Mining Association of Canada has a similar scheme for members, called **Towards Sustainable Mining**.[xliii]

Finally the **Certification of Raw Materials (CERA)**[xliv] scheme seeks to bring some uniformity to all of the above, by creating a universal and comprehensive certification scheme that accommodates all minerals and all regions, but is still in a very early stage.

Standards

The next category are standards, which while they may not have the assurance of

certification have some form of expectation of compliance. Some of these are more general, such as the **Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) Mining Policy Framework**.[xlv] The IGF is made up of states who aim to achieve sustainable development objectives through good governance in the mining sector. The **Global Reporting Initiative**'s environmental, social, sustainability standards is the most widely used sustainability reporting framework in the world, and it has a Mining and Metals Sector Supplement elaborating on relevant disclosures.[xlvi]

The next thematic area is around finance, with a number of investors attempting to set down key standards for mining investment. There are a number of these around public finance, but the most influential regarding private finance (which covers the bulk of mining investment) is the **International Finance Corporation (IFC)'s Environmental and Social Performance Standards**.[xlvii] The IFC is the private sector arm of the World Bank and the standards cover a range of social and environmental issues, with an accompanying complaints mechanism. They are widely regarded as the benchmark for financial institutions, and are effectively applied by the **Equator Principles**.[xlviii] Currently 107 private financial institutions have adopted the Equator Principles, which seek to manage environmental and social risk in project financing. Although there is no independent complaints mechanism, signatories are meant to report on their compliance. The last of the financial standards is from the China Chamber of Commerce of Metals, Minerals & Chemicals Importers (CCCMC); they have produced **Guidelines for Social Responsibility in Outbound Mining Investments**.[xlix] Targeted at Chinese overseas investment in mining they reference eight social responsibility issues, including supply chain due diligence and human rights.

The next set of standards are focussed on specific industries, and include the **Drive Sustainability Guiding Principles**,[l] outlining ethical expectations for suppliers of participating auto-mobile manufacturers, while the **World Economic Forum's Global Battery Alliance Principles**[li] seek to do the same for suppliers of battery metals. The last set of standards deal with particular aspects of mining, and include the **Global Tailings Review**,[lii] covering expectations regarding mine waste, and the **Voluntary Principles on Security and Human Rights**,[liii] which seek to manage risks relating to human rights abuses by mine-related security forces.

Guidelines

In theory guidelines, and best practice handbooks, are the weakest of all, as they create theoretical guidance without necessarily expecting compliance. Yet those guidelines may propose compliance, and can be incorporated into some of the legislation and standards quoted above. An example of this is the **OECD Due Diligence Guidance for Responsible Business Conduct**,[liv] and the more specific **OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas**,[lv] which – as noted – are increasingly the key standards on which to base due diligence processes. The OECD Council has unanimously endorsed the OECD Due Diligence Guidance for Responsible Business Conduct. Together they are cited in the EU Conflict Minerals Regulation, the DRC's Mining Ministry Circular of September 2011, the Responsible Minerals Assurance Process and the World Gold Council Conflict-Free Gold Standard among others.[lvi]

The OECD Due Diligence Guidance was also adapted for a Chinese specific audience, in the CCCMC **Chinese Due Diligence**

Guidelines for Responsible Mineral Supply Chains.[lvii] The OECD also produces a number of other guides, including ones addressing child labour in mineral supply chains and covering meaningful stakeholder engagement in the extractive sector.[lviii]

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MCS Charitable Foundation

Our vision is a world where everyone has access to affordable and reliable renewable energy and zero carbon technologies – for the benefit of our environment, our communities and the general public. The drive for net zero carbon emissions to tackle the climate emergency means there is growing interest in clean energy sources and there will be increased demand for the minerals needed for renewable technologies. As a Foundation we want to see a just transition to renewable energy which ensures the protection of human rights and local environments around the world.

We have provided funding towards this War on Want report to help find practical solutions that will reduce the impacts of mining and provide a fair and equitable future for the communities impacted, and to help improve the supply chain to manufacturers. This research highlights that as part of any Green Industrial Revolution, we need strong standards and regulations on mineral extraction and we need to transform how we recycle minerals to create a new circular economy.

Published March 2021

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War on Want is grateful to Yoly Esguerra, Jaybee Garganera, Pius Ginting, Benjamin Hitchcock, Daniel Macmillen Voskoboynik, Steph O'Connell, Michael Reckordt, Tanaka Shigeru, Richard Solly and Daniel Willis for their contributions and valuable feedback.

Cover picture: Indigenous communities of the Salinas Grandes protest against lithium mining on their territory.
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Design by www.wave.coop

Conflict maps and renewable energy technologies designs by Nat Lowrey

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