

# MINING

## WHEN IS ENOUGH, ENOUGH?

Earth is home to over 4,600 recognised mineral species, a unique diversity that has evolved over 4.5 billion years. No other planet in our solar system hosts such a diversity.<sup>1</sup>

Two thirds of these mineral species exist because, as far as we know, Earth is the only planet where complex organic life systems have emerged, connecting everything from microscopic algae to blue whales. Over billions of years, organic and inorganic (mineral) life forms have co-evolved to create the extraordinary diversity of life we see today.<sup>2</sup>

Through us, however, this ancient relationship between life and mineral has become an abusive one. The global mining industry regards minerals as inert commodities to be extracted on an ever-greater scale and at a devastating ecological and social cost to our planet. The industry claims that mining new mineral reserves is 'necessary' if we hope to meet the material needs of peoples and nations, ensuring their 'development'.

But do we really need more of everything? Or is this 'need' a manufactured one, created to fill industry coffers and sustain the global drive for economic growth that enriches few, impoverishes many and destroys Earth in the process?

Taking the example of two minerals- gold and copper- as well as non-mineral fossil fuels, this briefing argues that the continued extraction of these materials from 'virgin' deposits is unnecessary and inadvisable. It shows that we can meet our real needs by using what we have already mined responsibly. Or, in the case of fossil fuels, that we must stop extraction altogether to protect ourselves and other life forms from the existential threat of climate change.

By examining practical pathways that will prevent rather than incentivise more mining, this briefing poses a critical question for our time:

When is enough, enough?



# Gold

Few minerals have held a more enduring and destructive fascination than gold. For thousands of years societies have coveted this precious metal, but it is only relatively recently that large-scale extraction has become common.

Despite over a century of intensive prospecting and extraction, only 171,300 tonnes of gold have been mined in human history<sup>3</sup>; an amount that would fit inside a cube with sides just 20 metres long.<sup>4</sup> The destruction gold mining has wrought on ecosystems and human livelihoods is comparatively vast.

Today 2,500 tonnes of gold are mined each year<sup>5</sup> on land that is often grabbed from communities and converted from productive farmland, forests and hunting grounds into barren and toxic wasteland.

As easy-to-reach, high-quality deposits of gold run out, companies are turning their attention to more dispersed deposits which often lie beneath critical ecosystems. As a result, the amount of 'overburden' (i.e. living ecosystems) that companies remove to reach gold has increased. Today, producing a single gold ring generates 20 tonnes of mine 'waste'.<sup>6</sup>

**"Agriculture is life-sustaining for generations. Gold offers joy for a few, and no sustenance. That's why we resist mining."**

- Mariana Gomez Soto, Colombia

- On average a large gold mine will use 1,900 tonnes of cyanide per year to separate the gold from the ore. (A rice grain-sized dose of cyanide is enough to kill a human and far smaller quantities will kill fish and other animals).<sup>7</sup>
- Despite industry claims, devastating waste spills are becoming more common.<sup>8</sup> In 2000, the Baia Mare waste dam failure in Romania released 3.5 million cubic feet of cyanide-contaminated water into large European rivers such as the Tisza and the Danube. The spill contaminated the drinking water of 2.5 million people, killed 1,200 tonnes of fish and effectively wiped out all aquatic life close to the spill site.<sup>9</sup>
- Clear up of an open-pit gold mine can cost over \$250 million and issues that plague closed mines, such as Acid Mine Drainage, poison soil and water for centuries, leaving a deadly legacy to future generations.<sup>10</sup>
- Today half of all gold mined worldwide comes from the territories of indigenous peoples.<sup>11</sup> More than a quarter of mines are located in or near protected natural areas.<sup>12</sup>

When we consider gold's main uses it becomes clear that continuing to inflict this destruction has little to do with meeting real needs. Gold is highly recyclable and plenty is already available above ground - there is no need to mine more 'new' gold.

**Gold in Industry** - Just 12% of gold has tangible practical value.<sup>13</sup> For example, gold is used in the circuitry of phones and laptops and is available at far higher densities from recycling the e-waste of these products than in 'virgin' ores from new mine sites. A tonne of mobile phones will yield 150-400g of gold. A tonne of ore will yield just 0.2g.<sup>14</sup> The United Nations estimates that 20-50 million tonnes of e-waste (mobile phones, TVs, laptops) is produced each year.<sup>15</sup>

**Gold for Financial Speculation** - 28% of gold is kept in central banks or by private investors as holdings or investments.<sup>16</sup> The 76,000 tonnes of gold stockpiled in bank vaults would be enough to meet the global industrial demand for gold for the next 186 years.<sup>17</sup>

**Gold as Adornment** - 60% of gold is used as luxury products and status symbols in the form of jewellery.<sup>18</sup> Although this gold is extremely recyclable, under a third of total global supply comes from recycled sources.<sup>19</sup>

## Roşia Montană: Ground zero in the fight to stop gold mining

The campaign to save the ancient village of Roşia Montană and its historic landscape from gold mining spawned Romania's largest civil society movement has grabbed headlines worldwide. It has established itself as an emblematic success story of how mass protest, sustained community resistance and legal nous can trump corporate mining.

After years of campaigning by local groups, in 2013 over 200,000 Romanians took to the streets to protest against the plans of Canadian mining corporation, Gabriel Resources, to build Europe's largest gold mine. The mine would have levelled four mountains, razed 900 homes in the valley, displaced around 2,000 subsistence farmers and produced 196.4 million tonnes of cyanide polluted waste over a 15-year production period.<sup>20</sup>

In July 2015, more than a decade after they were first granted a mining licence, Gabriel Resources admitted defeat and announced the mine would not be built.<sup>21</sup> However, the controversy surrounding Roşia Montană continues. Exploiting a pro-corporate 'Investor State Dispute Settlement' clause in international trade law, the company began suing the Romanian Government for the losses it says it has suffered as a result of being prevented from exploiting the gold hidden beneath the Transylvanian hills of Roşia Montană.<sup>22</sup>

# Copper

Copper is essential to all living organisms. In humans, it helps our bodies to make red blood cells and keep our immune systems healthy.

Unlike much of the gold we produce, copper's uses are largely practical. It is a vital constituent of industry and electronics, due to its malleability, resistance to corrosion and ability to conduct heat and electricity efficiently.

Copper is also infinitely recyclable, retains its value and is available in great abundance above ground. This means that **if we use what we have already mined to meet our needs responsibly, we could dramatically reduce the need to mine 'new' copper reserves.**

- Copper has the highest recycling rate of all metals used in industry. In its recycled form it retains 95% of the value of new copper.<sup>23</sup> One third of all copper in use worldwide is recycled already,<sup>24</sup> but far more could be.
- Almost half the amount of copper extracted to date is no longer in use, leaving vast amounts above ground and available for re-use without further mining.<sup>25</sup>
- Globally a stockpile of 225 million tonnes of copper is estimated to sit in landfills alone.<sup>26</sup>
- In general, reserves of copper above ground are far richer than those in ores produced from 'new' deposits targeted by mining companies. 1 tonne of mobile phones will typically yield 50-150kg of copper. 1 tonne of ore would yield 3.7kg of copper.<sup>27</sup>

Despite this, **'new' copper remains the world's third most-mined mineral and commands the second largest annual mining exploration budget after gold.**

- Open cast copper mines destroy ecosystems on a vast scale. The Kennecott Bingham copper mine in Utah's Oquirrh mountains, in the USA, is a kilometre deep, covers an area equivalent to over 2,000 football pitches, and can be seen from space.<sup>28</sup>
- Copper deposits are often associated with radioactive materials, such as thorium, radium and uranium, that are unearthed during extraction. Processes used to separate the copper from the ore can cause these radioactive elements to enter and pollute groundwater, rivers and streams.<sup>29</sup>
- Worldwide the concentration of copper found in ores is declining, meaning that digging up the same amount of ore now yields less copper. For every tonne of copper extracted, several hundred tonnes of mine waste are produced, churning-up living ecosystems and transforming them into wastelands.<sup>30</sup>



## The people of Didipio say "Palayasin!" to copper-gold mining

The Indigenous Ifugao people of Didipio, a village on the island of Luzon in the Philippines, say their rivers once teemed with fish and the mountain forests were filled with wild pig, deer, birds and edible plants. The living they made from small-scale farming was a good one. Then came the mining.

In just 3 years, Australian/Canadian mining company OceanaGold has turned what was once Didipio's Dinkiday Mountain into a 371 metre-deep hole in the Earth in its effort to exploit reserves of copper and gold.

Since arriving in the area, the company has been dogged by controversy. In 2011, the Commission for Human Rights in the Philippines found that OceanaGold's Philippine subsidiary, OGPI, had violated local people's human rights to Residence, Adequate Housing and Property Rights; to Freedom of Movement; to Security of Person; and to Manifest their Culture and Identity, amongst others.<sup>31</sup>

The people have had enough of the destruction and the abuse of their rights. Forming a new organisation, known as SAPAKMMI, and adopting the rallying cry 'Palayasin!' (Get out! ) they are mobilising to prevent future mine expansion and oust the company from the area for good.<sup>32</sup>

# Fossil fuels

The abundance of already extracted deposits of copper and gold create positive opportunities. In contrast, the over-abundance of carbon dioxide (CO<sub>2</sub>) in our atmosphere - released in large part by the extraction and burning of fossil fuels - poses an existential threat to humanity and other members of the Earth community.

CO<sub>2</sub> and other greenhouse gases pumped into our atmosphere as a result of fossil fuel use are warming and de-stabilising Earth's self regulating climate system.<sup>33</sup>

As a result, we are already witnessing the **melting of polar ice caps, sea level rises and more regular, more intense extreme weather events**, such as flooding and drought, which in turn cause species extinction, crop failure, conflict, migration and more.<sup>34</sup>

These disasters are human-made and disproportionately affect the world's poorest people who use little fossil fuel energy and have done the least to cause climate change.<sup>35</sup>

Our **solutions to climate change must achieve social justice and restore a respectful relationship with Earth**, recognising her limits. One of the most urgent challenges we face in achieving these goals is to stop the continued extraction of fossil fuels and keep them in the ground.

It is internationally agreed that **to avoid catastrophic, 'runaway' climate change** we must limit Earth's average warming to below 2°C above pre-industrial levels. A growing number of civil society groups and nations, including low lying and sub-Saharan African states where small rises in average temperature will have drastic results, argue this limit should be set at 1.5°C.<sup>36</sup>

If we aim to stay below the 2°C limit, three-quarters of fossil fuels that companies have listed as reserves must remain in the ground and unburned. Because different fossil fuels have lesser or greater climate impacts, in practice this means 100% of tar sands, 82% of coal, 49% of gas and 33% of oil in these reserves must be left unexploited.<sup>37</sup> To stay below a 1.5°C rise, we are left with an even smaller 'carbon budget' of around 243 gigatonnes (billion tonnes) of fossil fuel we can 'safely' burn - a target we are likely to exceed in just six years in a business-as-usual scenario.<sup>38</sup>

Yet companies are continuing to explore for and extract fossil fuels with support from the very governments that should be acting on climate change and taking drastic measures to keep fossil fuels in the ground.

In 2015, the fossil fuel industry received direct and indirect government subsidies worth \$5.3 trillion. That's \$10million-a-minute and amounts to more than the health spending of all the world's governments put together.<sup>39</sup> The majority of these subsidies are 'invisible'. They reflect the savings companies make by not being held financially accountable for the ecological and social costs they create, and the incentives governments provide in the form of roads and infrastructure development.

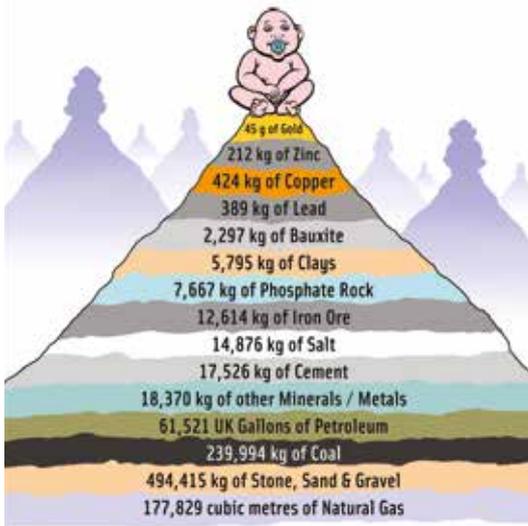
## South Africa: Fuleni Communities say 'Leave the Coal in the Hole!'

Coal mining threatens to displace local communities and cause serious damage<sup>40</sup> to the Hluhluwe-iMfolozi Wilderness area in KwaZulu Natal, a haven for White Rhino and sacred place for the Zulu People. Already surrounded by two large-scale coal mines - the Zululand Anthracite Colliery and the Somkhele Mine - a third project, Ibutho Coal's Fuleni Anthracite Mine, now threatens to encroach to within just forty metres of the park's borders and evict 16,000 local residents.<sup>41</sup>

The people of Fuleni have seen the damage the other mines have caused - constant noise, drought, sickness, cattle deaths and the disrespectful treatment of ancestral burial sites - and they are now calling for their right to say 'No' to the mine to be recognised and respected.<sup>42</sup>

With a coalition of national and international allies, the people of Fuleni are challenging Ibutho at every turn with a clear message: 'Leave the coal in the hole!' In a nation that still generates 94% of its electricity from coal,<sup>43</sup> this message is radical, bold and in tune with the latest climate science.

# Systems Change: Towards a Post-Extractive Circular Economy



The average American born today will consume 1,343 tonnes of metals, minerals and fossil fuels in their lifetime.<sup>44</sup> If every person lived a lifestyle involving this level of consumption- as the world's dominant, growth driven notion of economics and development suggests we should - we would need 3-5 Planet Earths to sustain us all.<sup>45</sup>

To meet people's real needs equitably and within ecological limits, we need a systemic transition away from a linear economy founded on the myth of infinite growth and fueled by the commodification and exploitation of nature. We must move towards a circular economy that mimics nature by working cyclically, producing little-to-no waste and abiding by ecological limits that recognise the laws of the Earth.<sup>46</sup>

The constant, efficient recycling of used minerals and metals back into this circular system could drastically curtail the demand for 'new' minerals and metals, and therefore their extraction through mining.

However, if demand for - and overconsumption of - minerals are allowed to continuously rise beyond our actual needs, a circular economy alone cannot end the unnecessary exploitation of 'new' minerals and metals. Further measures to reduce, stabilise and redistribute our demand for minerals and metals are required. These include tackling planned obsolescence, designing for longevity and recyclability, and public education programmes that popularise the true costs of minerals and metals.

## OUTLINE OF A CIRCULAR ECONOMY

### PRINCIPLE 1

# 1

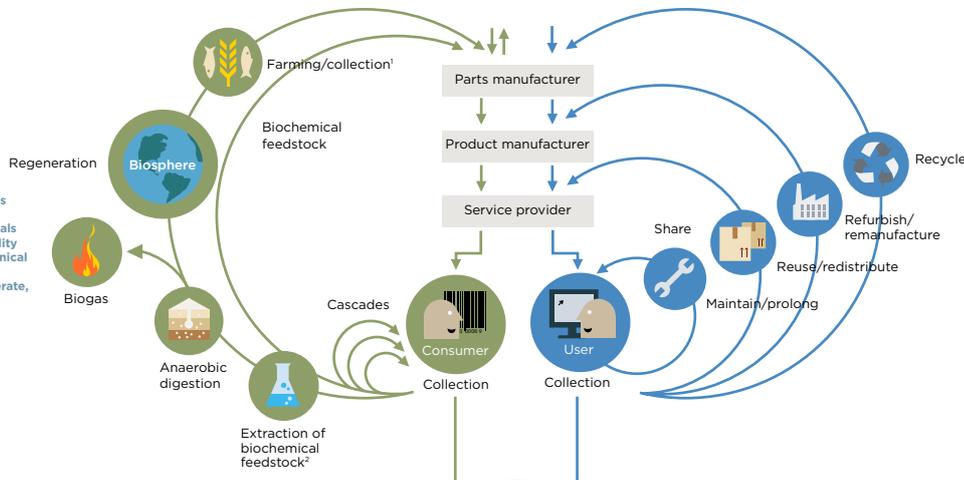
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows  
ReSOLVE levers: regenerate, virtualise, exchange



### PRINCIPLE 2

# 2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles  
ReSOLVE levers: regenerate, share, optimise, loop



### PRINCIPLE 3

# 3

Foster system effectiveness by revealing and designing out negative externalities  
All ReSOLVE levers

Minimise systematic leakage and negative externalities

1. Hunting and fishing  
2. Can take both post-harvest and post-consumer waste as an input  
Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C).

Ending government subsidies for extractive industries, making mining companies internalise the social and ecological costs of their activities, and radically strengthening social and ecological regulations can also decrease the financial incentive for companies to exploit new mineral sources.

A truly **post-extractive**<sup>47</sup> circular economy must be rooted in a yet deeper transformation of our values and consciousness as human societies embedded in the greater community of life on Earth. We must move away from a global ethic that says development and prosperity are achieved through materialistic growth, to one of 'enough-ness' that is socially just and respects Earth's laws and limits.

# Grassroots change: Resistance

Community resistance is a critical first step towards preventing more mining destruction.

Around the planet it is local, often marginalised, communities who are most affected by mining and on the frontline of resistance. In defending sustainable and regenerative livelihoods, sacred sites and beloved places from destruction or damage by mining, communities are actively protecting alternative forms of prosperity.

Recent studies have shown that grassroots resistance to mining can be extremely successful as a first line of defence for the Earth and communities, delaying operations and hitting mining company's where it hurts - their profits.

A study of 50 major planned extractive projects from the Centre for Social Responsibility in Mining<sup>48</sup> reveals the depth and breadth of resistance. It found that when communities blockade and protest, mining can frequently be suspended or abandoned. The study's author, Dan Franks, said that the findings dismiss the "popular misconception that local communities are powerless in the face of large corporations and governments."<sup>49</sup>

For a mining company, the economic costs of the delays these community actions create is huge. At one Latin American mine, a 9-month delay caused by community protest cost the mining company \$750 million. The bad publicity that companies often receive for their role in these stand-offs can also be extremely damaging.<sup>50</sup>

**So, what are the keys to success in community mining resistance?** A recent analysis of 346 mining resistance processes<sup>51</sup> found that one-fifth of projects had been stopped due to strong, well-organised community resistance. The study highlighted the following steps:

## 1) Starting Early -

Protests that take place early on, during the feasibility and exploration phases of a project, are more likely to succeed. At this early stage the company and/or the state have invested less capital, built less infrastructure and made less money (if any) from the project, leaving them with less incentive to aggressively defend it. It is also at this stage that evidence or documentation relating to land access or environmental impact assessments can be found lacking, leading to the collapse of mining applications.

## 2) Sharing Information -

In isolated rural communities especially, lack of accurate information and support to learn about the impacts of mining allows companies to spread misinformation and myths. Reaching out to such communities, disseminating facts and sharing experiences of the true costs of mining, are vital steps.

## 3) Creating a Local Network -

Developing a strong network of like-minded and committed groups is critical. The more groups that oppose a project, the more effective physical mobilisations can be. Local citizens, such as teachers, lawyers and students play key roles, connecting local struggles with broader groups and sharing information. If the community has allies in local media this can also be advantageous.

## 4) Diversifying Networks and Linking Movements -

The strongest resistance processes bring together numerous different groups to work together at local, regional, national and international levels. Where local communities, civil society groups, scientific research and law agencies, local government and economic actors, such as farmers, can find ways to work together, they can create very effective coalitions of resistance. Having this broad-based support increases the expertise within a network; reduces the chance of violence; raises the profile of the case; creates solidarity and pressure worldwide and increases the resilience of the network. The greater the interconnectivity between groups, the harder it is for a mining company to compromise the movement using divide-and-rule tactics.



# Policy Change: A Call for No-Go Areas

**“Sacred natural sites and territories should be recognised as no-go areas for any kind of destructive industrial activity, especially mining and other extractive activities, in alignment with growing international recognition and threats.”**

- Call for Legal Recognition of Sacred Natural Sites and their Customary Governance Systems, from a report to the African Commission on Human and Peoples' Rights, 2015

The rising prices of minerals, metals and fossil fuels before and for several years after the financial crash of 2008-9 incentivised the aggressive expansion of the extractive industries, especially in Africa, Latin America and areas previously protected by their geography, such as the Arctic.<sup>53</sup>

It has become clear that nowhere is safe from the extractive industries and despite slumps in commodity prices since 2011,<sup>54</sup> the situation looks set to get worse in the long-term. The United Nations Environment Programme (UNEP) reports that, under a business-as-usual scenario, global annual resource extraction will triple by 2050 - a growth that Earth simply cannot sustain.<sup>55</sup>

In response, local communities, indigenous peoples, environmental justice groups and conservation organisations are calling for the critical ecological, cultural and spiritual areas that sustain life on Earth to be recognised as no-go areas for extractive activities and destructive 'development'.<sup>56</sup>

Water systems such as aquifers, springs, rivers, lakes, estuaries and oceans; primary forests; biodiversity-rich areas; land used for food growing, gathering wild food and medicine, that helps maintain communities' food sovereignty; World Heritage Sites, protected areas such as national parks, and the sacred natural sites and territories of indigenous and traditional peoples – should all be considered off-limits for extractive industries.

As the momentum grows for no-go areas, exciting precedents have been achieved in countries such as Belize, Colombia, Ecuador, Benin, Ethiopia, South Africa, India, the USA, New Zealand and Scotland.<sup>57</sup> Many of these precedents have been won based on the recognition that ecosystems and all species have an inherent right to exist, a right to healthy habitat and a right to play their role in Earth's ever-renewing processes. In this way the call for no-go areas is connected to a global movement seeking to win legal recognition for the Rights of Nature.<sup>58</sup>

These efforts recognise that we are an inextricable part of nature; we cannot hope to meet our needs, enjoy well-being or realise our human rights if we continue to destroy nature, our source of life, our only home. They are part of a paradigm shift towards an Earth Jurisprudence, recognising that the Earth's laws and limits are primary.<sup>59</sup>

The growing call for the recognition of no-go areas reflects this shift and is influencing international policy. At the World Wilderness Congress (WILD10) in 2013, indigenous peoples and civil society formulated recommendations for the recognition and protection of sacred natural sites and a global alliance to assert no-go areas.<sup>60</sup> At the International Union for the Conservation of Nature (IUCN) World Parks Congress in 2014, their voice and proposals were included in the 'Promise of Sydney' recommendations for future policy:

*“Governments (should) implement and enforce appropriate laws, policies and programmes, with the full and effective participation of Indigenous Peoples and local communities to create No-Go areas within World Heritage Sites, Sacred Natural Sites and Territories and in other sites where Indigenous Peoples and local communities are conserving lands and resources, particularly from mining and other extractive and destructive industries.”*

- Stream 7: Respecting Indigenous & Traditional Knowledge & Culture, Recommendation to the IUCN World Parks Congress, 2014. <sup>61</sup>



# Mineral (noun)

The root meaning of the word mineral is 'substance obtained by mining', from the medieval Latin 'minerale'. The scientific definition of a mineral is of a naturally occurring inorganic substance, usually a solid.

We adhere to both definitions in this report, using the word mineral with reference to copper, gold and other minerals, all of which are also the subject of mining.

Throughout this report we use the terms 'mining' and 'extractive industries' interchangeably to refer to a broad array of extractive methods, including open pit mining, underground mining, drilling and fracking, used to extract minerals, metals and fossil fuels.

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Images: 3D rendering of the planet Earth on a starry background, mrtimmi/Adobe Stock; Kennecott Bingham Canyon Mine/ Hemera/ Thinkstock; Open Pit/Welzow/Thinkstock; photos by The Gaia Foundation; Minerals Baby by Stig: [www.shtig.net](http://www.shtig.net).

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**"Anyone who believes in infinite growth on a finite planet is either mad, or an economist."**

– David Attenborough

When we consider the facts, it becomes clear that mining industry claims about the need to exploit 'new' sources of gold, copper and fossil fuels are both misleading and dangerous.

In reality, the myth of mining to meet the 'real needs' of ordinary people is perpetuated to stimulate inequitable economic growth to bolster the profits of a few companies and feed the overconsumption of our common, natural wealth by the few.

This myth ignores the abundance of minerals and metals already in circulation above ground. It allows the mining industry to position itself as a necessity and an agent of development whilst inflicting widespread ecological, social and economic damage.

This myth is tacitly and ideologically underpinned by another; that we can achieve infinite material and economic growth on a finite planet.

Around the world, people of all walks of life are waking up to these facts and saying 'Enough is Enough!'

From communities defending sustainable livelihoods, to scientists rethinking our systems of production and consumption, the movement to meet peoples' real needs and create equitable wellbeing within ecological limits is innovative, diverse and growing.

For these efforts to truly reach their goals, we require a deep transformation. We must once again recognise that minerals and metals are Earth's precious gifts, part of her very structure.

Far from being inanimate objects to be exploited, Earth's unparalleled diversity of mineral species play a critical role in maintaining the health of Earth's systems for the wellbeing of all forms of life.

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