HOT METALS

FOR A COOLER CLIMATE?!?

How the demand for metals is contributing to the climate crisis and why we need a raw materials transition that pursues climate justice.

YESTERDAY – TODAY – TOMORROW?

THE CLIMATE CRISIS

THE GREATEST CRISIS OF OUR TIME?

Heatwaves, droughts, forest fires, typhoons and tornadoes, heavy rainfall, floods and rising sea levels due to melting ice—the climate crisis is the most pressing environmental and socio-political issue of our time. Whole regions are in danger of becoming uninhabitable or being swallowed up by rising seas. People are being driven from their villages and towns, agricultural land is being lost, and potable water is becoming scarce in many places.

So far, governments have done too little to halt the climate catastrophe. This was the conclusion reached by the German Federal Constitutional Court on 29 April 2021, in response to a lawsuit filed by climate activists (including members of Fridays for Future). Its ruling stated that the German government must immediately start taking clear measures to comply with constitutional climate protection targets. Accordingly, the increase in global average temperature must be limited to well below 2°C and, if possible, to 1.5°C above pre-industrial levels. In August 2021, the UN Intergovernmental Panel on Climate Change predicted that the 1.5°C limit could be exceeded as early as 2030.

A RAW MATERIALS TRANSITION

THAT INCORPORATES CLIMATE JUSTICE

So far, technological solutions have been the primary means of stopping climate crisis. The aim for many is to continue the current way of working and living with as few changes as possible — a "business as usual" approach that ignores questions of equity and justice. However, the consequences of the global warming and resource extraction are unequally distributed worldwide. Likewise, there is no equity in terms of how resources and energy are consumed globally.

In this publication, we look at the consequences that mining and raw materials production of metals has on the climate, environment, and society. Metals form the basis for social harmony and for so-called "green technologies". Without them, there would be no wind power or solar plants, no electric cars, and no digital transformation. Almost all studies by the International Energy Agency, the World Bank, the EU Commission, and many national governments, forecast a significant increase in metal requirements.

We also examine whether these needs are at all compatible with environmental protection goals and climate equity. And if they are not, how can a raw material transition that reduces the total consumption of metallic raw materials while enabling the transition to the post-fossil fuel age succeed?

STRIVING FOR RESOURCE AND CLIMATE JUSTICE

Before we talk about metals in detail, a discussion about how we design the mining and consumption of metals in the future should not be misunderstood: we are not advocating the use of fossil fuels. The burning of coal, natural gas, and oil has historically been the driver of global warming. The consensus within society and the scientific community is therefore to stop burning fossil fuels as soon as possible. Another often-forgotten fact is that the mining of coal and uranium and the extraction of oil and natural gas have major impacts on human rights and the environment.

The *Climate Accountability Institute* has investigated the carbon majors, that is, the companies that cause the majority of CO2 emissions. Fossil fuel companies in particular bear a major responsibility for global warming (see illustration). In May 2021, for example, a court in The Hague forced the Dutch corporation Shell to reduce its greenhouse gas emissions by 45 percent by 2030.

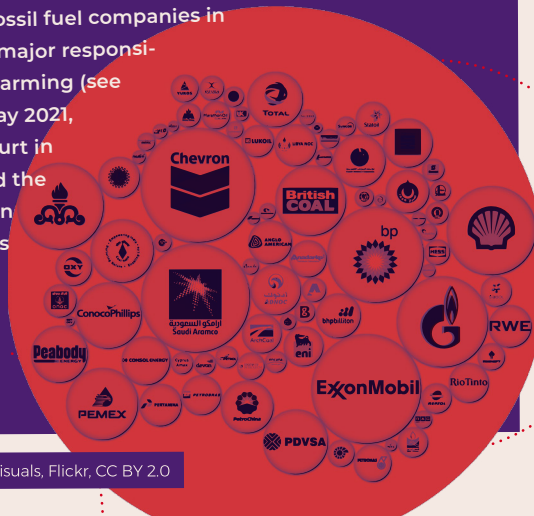


Photo: Carbon Visuals, Flickr, CC BY 2.0

HUMAN RIGHTS AND ENVIRONMENTAL PROTECTION

Photo: Arne Müseler

But it's not just greenhouse gas emissions that make the oil industry so dangerous for people and the environment. In 2015, Shell was ordered by a Dutch court to pay a fine of 70 million euros, because it was responsible for two oil disasters that spilled a total of around 600,000 barrels of oil in the Niger Delta in Nigeria. The Deepwater Horizon drilling rig owned by its competitor, BP, exploded in 2010, which resulted in the deaths of five people and in five million barrels of crude oil pouring into the Gulf of Mexico for 87 days. In the summer of 2017, Der Spiegel reported that the Islamic State may have exported oil into the EU through the Italian mafia. Time and again, wars are associated with controlling oil extraction.

The effects of fossil fuel extraction have been felt in Germany, too. Since 1945, around 300 villages in former East and West Germany have disappeared and more than 120,000 of their inhabitants resettled to make way for lignite mining alone.

WHAT DOES THE FUTURE HOLD?

It's the year 2050.

YOUR WRISTWATCH COMMUNICATES WITH THE FOOD PROCESSOR, TELLING IT TO START MAKING A SMOOTHIE, BECAUSE YOU'LL BE BACK FROM THE GYM SOON.

Objects are interconnected. Fingerprints are used to open the front door, and smartphones are used to open the windows for ventilation. People still exercise and do sport, but aside from this they get from A to B by electric vehicle, usually a self-driving one. Air quality in cities has improved, but the problem of sufficient space remains. Sensors in asphalt and car parks, as well as intelligent traffic lights, simplify driving. Vehicles are recharged at home in suburban neighbourhoods or in supermarket car parks. And if you're in a hurry, air taxis are ready and waiting. Electricity for all this comes from solar, wind, and hydroelectric power, so there's no need to be conscious about saving electricity when streaming music or 3D movies. Payment is carried out completely digitally using bitcoin and other cryptocurrencies. Robots assist with much of the care work, while drones optimize the irrigation of fields. LIFE IS DIGITALLY CONNECTED.

DIGITALIZATION = DEMATERIALIZATION?

Again and again, we read that digitization leads to dematerialization. The idea is that more digital things should ultimately mean fewer material goods, and fewer metals. But this is only partly true. Calculations by the German Mineral Resources Agency (DERA) indicate that there were up to 150 million storage media (HDD and SSD hard discs as well as magnetic tape) in use in data centres in 2018. Depending on future data usage, there could be up to 600 million storage media in 2040 in an intermediate scenario, and up to 26 billion in an extreme scenario. Even the intermediate scenario assumes an increased consumption of the raw materials platinum and ruthenium that would exceed current mining production. This does not include the raw materials necessary for constructing data centres and their cooling infrastructure.

Another example is the supposed dematerialization of the banking system through the use of bitcoin. Here as well, metal consumption is indirect. In 2020 alone, 23,000 tonnes of electronic waste were generated by bitcoin hardware. Bitcoin mining consumed as much energy as the entire country of Belgium (which has a population of more than 11 million*) that same year. More wind and solar power plants are needed to produce this amount of electricity. Rather than a trend towards dematerialization, there has actually been a shift to an increased use of metals in many sectors.

HEADING

TOWARDS A RESOURCE-INTENSIVE FUTURE

Due to the negative impact on the environment, people, and the climate, it is necessary to switch from fossil fuels to renewable energies. But wind and solar power plants themselves are not manufactured using fresh air and renewable ¬¬resources. French scientists have calculated that the global switch to 100 percent renewables by 2050 will require 3.2 billion tonnes of steel, 310 million tonnes of aluminium, and 40 million tonnes of copper. Mining and producing these raw materials consume huge amounts of energy.

Germany is already one of the five largest consumers of these raw materials. More than a quarter of the steel used in the country is used by the automotive sector, as is just under 10 percent of the copper. Aluminium is also becoming increasingly important in the transportation sector, with nearly 50 percent of this metal directed towards it. The demand for raw materials for car production alone is fuelling the climate crisis in this way. The transport sector in Germany is also one of the drivers of CO2 emissions, which it has been continuously

increasing since 1990. A shift to electric cars addresses the CO2 emission issue during a car's period of use, but not the issue of the resources needed to manufacture it. Replacing all passenger cars with electric vehicles—nearly 50 million cars were registered in Germany as of 1 January 2021—would have a huge material footprint. Copper consumption would probably quadruple, and aluminium and steel usage would also rise. In 2020, new cars registered weighed an average of 1.6 tonnes, and this figure is increasing. Electrification of vehicles such as ambulances, buses, cabs, and vehicles for care work and postal services is necessary. However, clinging to the current mode of car-centric mobility threatens to exacerbate the climate and raw materials crisis.

CURBING CLIMATE CRISIS:

WHERE DO RAW MATERIALS COME FROM?

Iron ore*
45% from Brazil
21% from South Africa
18% from Canada

Bauxite*
93% from Guinea

Copper*
29% from Peru
24% from Brazil
17% from Chile

Nickel**
30% from Indonesia
16% from Philippines
10% from Russia

Tin**
27% from China
26% from Indonesia
17% from Myanmar

For **aluminium, copper, and tin**, Germany is among the top **5** global consumers; for **nickel and steel products**, Germany ranks **7**th.

* Importing countries according to BGR (2020)
** Producing countries according to USGS (2020) — since many imports are indirect.

WHERE DOES BAUXITE COME FROM?

More than 60 percent of the bauxite that is processed into aluminium in Europe comes from the Sangarédi mine in Guinea. It is operated by the *Compagnie des Bauxites de Guinée (CBG)*, which is almost equally owned by the Guinean state and the Alcoa, Dadco, and Rio Tinto groups. CBG removes the bauxite-rich upper layers of earth in the West African country, leaving behind a barren moonscape. Human rights abuses have long been documented. In February 2019, 540 complainants from 13 affected villages filed complaints with the World Bank subsidiary *International Finance Corporation (IFC)*, which, like the German government, had provided loans for the expansion. The affected parties accuse the lenders of inadequately monitoring the mine owners' operations and the implementation of their promises, and of violating their own social and environmental standards.

Locals and journalists have reported chaotic conditions in the region. The new settlements are located on post-mining land that has not been regenerated, making agriculture impossible. There is a lack of employment opportunities, which particularly affects women, who can rarely find work outside of agriculture. New buildings for the resettled families have suffered leaks within a year, and in terms of the local water supply, things are even worse. Despite rivers and water sources becoming

polluted in many places, only six manual water pumps have been constructed for 105 households. Even new tree seedlings now have to be tended to by locals so that they survive the dry season. Although the mining company claims to have planted over 2,000 trees, local reports put the counts at a mere 211. A health centre has been built, but has not yet been staffed or equipped with medicine. In addition to polluting water, mining is also driving the destruction of West Africa's tropical forests—only about ten percent remains today of an area that was once over 1.2 million square kilometres of tropical forest.
Some of the bauxite from the mine in Sangarédi is shipped to Stade, Germany, where it is processed to make aluminium. From there, it ends up in the German automotive industry as well as other sectors.

WHERE DOES COPPER COME FROM?

Just under eleven percent of the world's copper deposits are located in Peru. With around 10 percent of imports, the South American country has the third highest import share for the EU. Copper concentrates are processed by German companies such as Hamburg-based Aurubis AG and ultimately used to a large extent in electronic and digital devices, as well as in many cars.

In Peru, the extraction sector provides an important share of government revenue, but at the same time causes great damage to people and the environment. Indigenous communities and farmers in the vicinity of mines are particularly affected by the impact of copper mining. The production of copper ore concentrate involves taking huge volumes of water from rivers, lakes, and groundwater. In drought-affected areas such as the Andean highlands, this has a negative impact on flora and fauna. Toxic residue such as sludge pollutes adjacent bodies of water and soil, making them unusable for agriculture. Some of the local population have lost their livelihoods. Protests against mining are regularly suppressed using violence against the demonstrators.

DOES NICKEL COME FROM?

The Philippines is one of the three most important nickel mining countries in the world. Mining there is violating the human rights of local fishermen and small farmers, among others. For example, the nickel sedimentation basins in the municipality of Santa Cruz (Zambales) are not sealed, meaning that the mines discharge residual material into rivers that are used for irrigating rice fields as well as for aquaculture and fishing. Heavy rains and typhoons, which are occurring more frequently in the Philippines due to climate crisis, have caused retention and sedimentation basins to burst several times in the past, further polluting rivers and the sea.

The municipality of Santa Cruz estimates that it loses the equivalent of nine million euros a year because the toxic residues from nickel mining are seriously reducing the yield of rice, mangoes, and other agricultural products. Fishers in the region report that the rivers are ecologically "dead" and have to go further and further out to sea to catch enough for themselves and their families. Some claim their right to adequate food is being violated, since they have had to reduce their number of meals and resort to lower-quality rice.

PROCESSING

NATURAL RESOURCES IS ENERGY-INTENSIVE

Mining has environmental and social impacts on every continent. The climate crisis may exacerbate these impacts, as mining in many places takes place in arid regions that already suffer from water shortages. In addition, rising sea levels, an increasing number of extreme storms, and heavy rain events threaten mines. But mining is not only affected by climate crisis —it itself contributes to it. The extraction of iron, bauxite, copper, and gold alone accounted for an estimated 0.4 to 0.7 percent of global CO2 emissions in 2016. That's equivalent to up to two percent of industrial CO2 emissions. Meanwhile, only 11 of 46 companies analysed have set reduction targets for their CO2 emissions. In some regions, such as the Philippines, coal-fired power plants are being built to power mining operations.

Scientists estimate that energy use in the mining industry will increase by at least a third by 2050. The reasons for this are decreasing ore grades and the corresponding increases in waste rock production, a higher level of water and chemicals used, and deeper deposits in more remote areas.

ORES

ARE PROCESSED IN AN ENERGY-INTENSIVE WAY TOO

With regard to CO2 emissions, it makes little sense to only consider mining by itself, since the resulting ores also have to be processed for use. This procedure is significantly more energy-intensive than mining, with the conversion of bauxite to aluminium and iron to steel alone responsible for ten to eleven percent of global CO2 emissions (almost one third of industrial emissions). According to the International Energy Agency (IEA), the CO2 intensity of steel production barely changed from 2000 to 2018. 75 percent of the energy required for steel production comes from coal-fired power generation. This is a trend that will not be reversed anytime soon, as Indonesia, the third-largest coal producer, is expanding steel production on a massive scale. As a point of comparison, the country went from being the largest exporter of nickel ore to the largest producer of refined nickel in the period from 2013 to 2021.

India and Russia, two other countries heavily dependent on fossil fuels, are among the top five producers of aluminium and steel. If the aluminium industry were a country, it would rank fifth, as only China, the USA, India and Russia have higher levels of energy consumption. China (nearly 60 percent of the world market) uses 90 percent coal-fired electricity for production, although this has decreased by 12 percent from 2000 to 2018.

DO METAL MINING AND PRODUCTION DRIVE CLIMATE CRISIS?

Due to the high CO2 emissions from mining and the processing of ores into metals, Japanese, Australian, and German researchers have investigated whether raw material extraction and production of metals are compatible with international climate targets. Using *life cycle assessments* and *material flow analysis*, they have come to a clear answer: they aren't.

Faced with the goal of limiting global temperature increases to 2°C, a "business as usual" approach is inconceivable. Although primary raw material extraction could still increase in the next few years within the emissions budget for limiting global warming to 2°C, according to the scientists' calculations, raw material extraction would have to peak by 2030. Otherwise, the emissions generated by the extraction and processing of primary raw materials would not be compatible with the 2°C target.

The issue of global equity is also significant in this context. Even today, stocks of metal resources are unequally distributed (cf. Illustration p. 24). Due to historical exploitation and colonialism, the countries of the Global North consume far more of these natural resources in their current infrastructure for housing, mobility, and energy production than the countries of

the Global South. From a historical perspective, according to the research group, we have accumulated more raw materials than we would be entitled to in a globally equitable, per capita distribution. The researchers also emphasize that the burgeoning demand for energy generation, water treatment, and basic infrastructure in poorer countries—while countries such as Germany continue to consume large amounts—cannot be met with circular economy goals and extended product life alone.

Consumption in high GDP countries is already double the fair global average.

Fair global average: 7 tonnes of metal per capita

	2010 metal consumption per capita in high GDP countries	Global average
Steel	11.370 kg	6.500 kg
Aluminium	369 kg	230 kg
Copper	150 kg	58 kg
Tin	57 kg	34 kg
Lead	23 kg	4 kg
Nickel	19 kg	8 kg

Angaben per capita

CLIMATE JUSTICE

MEETS NATURAL RESOURCES: HOW CAN THE 2°C GOAL BE REACHED IN A GLOBALLY EQUITABLE WAY?

The aforementioned research group provides concrete proposals on what climate-appropriate policies for natural resources could look like. It calls for a complete decoupling of economic growth from the consumption of metallic raw materials. So far, no country has succeeded in doing this. In a 2012 resource efficiency strategy, the German government set the goal of reducing resource consumption by increasing raw material productivity. This goal has not been reached, however, and the increase in raw material productivity that has taken place has not led to a reduction in the use of primary raw materials.

For this reason, the researchers are advocating a significant increase in circular use of raw materials and a strengthening of international cooperation. They have calculated that a globally equitable consumption of metals would amount to seven tonnes per capita. Countries like Germany currently consume this amount many times over. In 2010, the International

Resource Panel also estimated that up to ten times more aluminium and copper is in use per capita in industrialized nations compared to the per capita average for the rest of the world.

For globally equitable resource use, this means that the high consumption levels of industrialized nations cannot be transferred to other nations to avoid missing the 2°Celsius target. The carbon budget for the 2° Celsius scenario similarly limits the production of metals. According to estimates, primary raw materials production would have to peak around 2030. After this point, there must be less mining and, above all, the circular use of raw materials must be in place to the greatest possible extent.

In 2050, an estimated 54 to 87 percent of the raw materials used should come from recycling—depending on the natural resource—with the figure rising to 84 to 100 percent in 2100. Of course, achieving 100 percent is not even theoretically possible, due to quality standards and the laws of thermodynamics. Ultimately, product design must play an important role to get as close as possible to 100 percent. Without substitutions in and changes to our consumption and lifestyle—especially in countries that consume a high level of resources, such as Germany—we will not be able to get by.

THINGS

CAN'T GO ON LIKE THIS!

It's time to think about climate justice and equitable resource consumption together in context, while taking human rights and environmental protection into account in the process. But what might a different future look like? The following suggestions that relate to resource-intensive sectors could be used as a starting point:

Transport:

The transport sector is one of the biggest consumers of metallic raw materials. The current shift within this industry from fossil fuels to electric mobility also provides an opportunity to usher in a fundamental change in the transport sector. Together with aid organization Brot für die Welt (Bread for the World) and development organization MISEREOR, PowerShift has been focusing on the issue of global justice within this sector and has come to some clear conclusions: cars should be smaller and lighter, there should be fewer of them, and the majority should be available for shared use. Towns and villages must be designed to better meet people's needs, which means more space for children to play as well as for pedestrians and for environmentally-friendly modes of transport such as public transport and bicycles.

Renewable Energy:

The RESCUE research project run by the German Environment Agency (UBA) has outlined in its "GreenSupreme" scenario how greenhouse gas emissions in an industrialized country can successfully be decreased by as much as 97 percent compared to 1990 emission levels. The scenario demonstrates that it is possible to reduce an energy demand of around 2,500 terawatt-hours (TWh) in 2015 to below 1,100 TWh by 2050. A combination of energy and resource efficiency measures with sustainable lifestyle changes and a faster and more ambitious restructuring of the existing energy system would, together with liberation from economic growth, enable the consumption of primary raw materials to be reduced by 70 percent by 2050 compared to 2010 levels.

Construction:

The construction sector also drives the demand for metallic raw materials. Over 33 percent of steel, 14 percent of aluminium, and 15 percent of copper used in Germany is utilized by this sector. Current challenges with this industry lie in the preference for demolishing old buildings, insufficient recycling of building materials, and an increase in living space per person. A green transition in the construction industry must address these issues and promote a concept for building that uses fewer natural resources and is socially responsible for all.

CLIMATE-FRIENDLY

REUSE OF METAL RESOURCES

Decoupling economic growth and material consumption is crucial for meeting climate targets. Optimum use of a circular model is a fundamental requirement for making the large-scale use of metal resources at all possible in future. In the short term, recycling can help reduce CO2 emissions significantly. The process of recycling aluminium generates only around five percent of the emissions generated by primary aluminium production, where it is extracted by bauxite. Recycled copper generates 30 to 80 percent fewer emissions. Steel recycling also offers huge potential for reducing emissions.

Improvements to the circular economy are also necessary for a reduction in mining primary resources. However, EU recycling input rates for many types of metal are to date very low (cf. list).

	End-of-life Recycling Input Rate
Iron	31 %
Cobalt	22 %
Copper	17 %
Nickel	17 %
Aluminium	12 %
Rare earth elements	< 1 %
Lithium	< 1 %

CIRCULAR

ECONOMY CHALLENGES

In a 2021 study, the environmental association NABU focused on circular material use rate (CMU) in Germany, by investigating the extent to which raw materials remain within the circular economy. For fossil resources, circular use lay only at 2.5 percent; for metals, it lay at 33 percent, although this rate had barely changed in the previous ten years. Particular obstacles to improved recycling in the metals sector, according to NABU, are fragmented collection systems, impurities, and incomplete recovery methods. In addition, many metals are only used in minute quantities, for instance in mobile phones, meaning that recovery is highly labour-intensive, or is still technologically impossible.

Although limited in number, there are areas of potential for improving these rates. NABU states that a CMU of 40 percent would be possible if all opportunities for recycling were made use of. For some raw materials, recycling volumes have the potential to be even higher. The UBA has calculated that recycled materials could comprise 67 percent of all iron and steel produced, as well as 90 percent of the quantities of copper, lead, aluminium, and zinc produced.

A circular economy is not in itself enough for dispensing with raw materials extracted via mining in the future, however—further action is needed.

ROUTES

TO AN EQUITABLE USE OF NATURAL RESOURCES

Fair Transport for Everyone—Mobility That Meets Needs

Car transport is highly resource-intensive. The weight of new cars is continuing to increase—in Germany, for example, the average weight of a new car is over 1.6 tonnes. One car is used to transport an average of 1.3 people. A car will stand idle for an average of 23 hours, which is highly inefficient and goes against the principles of climate justice and equitable use of natural resources. But being mobile does not necessarily have to mean making as many modes of transport as possible available. The shorter the distance, the more we can reach the places we need to on foot. This underpins the urgent need to drastically reduce the number and size of cars in order to cut down on the use of metal in the transport industry. To do this, vehicle production must switch to greener methods.

ENCOUNTERS

INCLUSION FOR YOUNG AND OLD

CLEAN AIR

SAFE CYCLING

What action is being taken elsewhere? In terms of city planning, Oslo, Ghent, Copenhagen, and Paris are all focusing on people, not cars. City centres are off-limits for cars; on other streets, vehicles can only be used by residents, maintenance workers, emergency services, or taxi drivers, and cargo bikes are available for hire. In Paris alone, almost half of its 140,000 car parking spaces are being transformed into squares or parks.

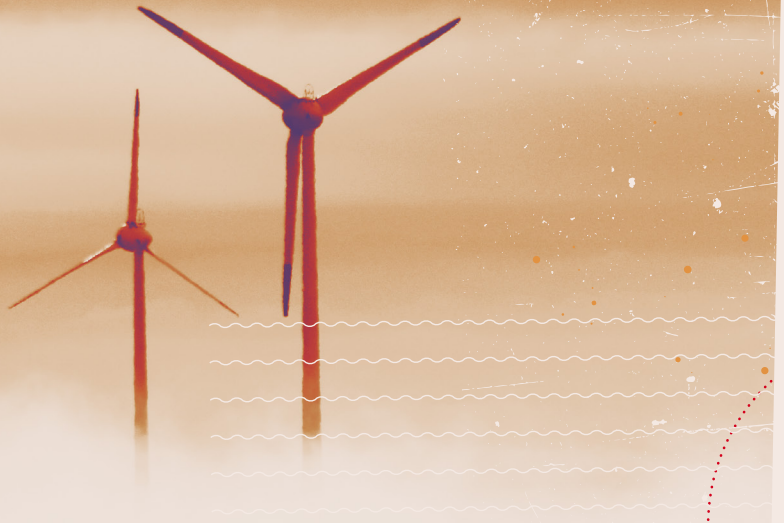
Participation in the public transport planning process should be open to everybody to ensure that the needs of users are met. As demonstrated by cities such as Luxemburg, Riga (Latvia), and Templin (Germany), public transport can also be made very affordable, or even provided for free. The concept of a 15-minute city, in which all essential facilities can be reached on foot, is being discussed more and more. This would lead to the redesigning of cities to better cater for pedestrians and cyclists. One successful example of this is the small town of Pontevedra in Spain where, in 1999, cars were banned from the city centre to create a 300,000 m² pedestrian zone.

THE RIGHT KIND OF RENEWABLE

Public Acceptance of Renewables and Democratizing Energy

At the 2017 UN Climate Conference in Bonn, 20 countries jointly set a target for phasing out the use of fossil fuels in their respective countries by 2030. So far, little has happened. A transition to renewable energy that is socially responsible and conforms to the principles of climate justice would not fail because of a lack of acceptance by the general public, as has sometimes been suggested. The more particular reason it could fail would relate to a lack of democratic and local participation in decisions on local energy supply. But there are projects that show that things can be done differently.

The village of Feldheim, in the district of Treuenbrietzen, Brandenburg, lies south-west of Berlin. It is the first village in Germany that is energy self-sufficient: inhabitants have set up a decentralized, regenerative system using 43 wind turbines to supply their energy and heating. The Canary Island El Hierro is also energy self-sufficient, generating its energy source through wind power. Surplus energy is fed into a pumped-storage power plant, where it can be stored for future use.



When it comes to recycling old wind turbines, however, there is still a backlog. While recycling the steel or reinforced concrete turbine towers is relatively straightforward, resulting in a current recycling ratio of 80 to 90 percent of the entire turbine, the fibreglass turbine blades as well as the motors are more difficult to recycle. The Wind Energy Technology Institute in Flensburg is experimenting with turbine rotors made from wood for this reason.

There is also scope for improvement in the area of solar power. 2017 saw the installation of four million tonnes of photovoltaic panels. 43,500 tonnes of scrap accrued in the same year, and with the rapid expansion of the sector, it is anticipated that this volume could amount to 60 million tonnes by the year 2050. Solar modules require different raw materials depending on the technology used (silicon modules consist of 76 percent glass, ten percent plastic, eight percent aluminium, five percent silicon, and one percent other metals; thin-film modules consist of 89 percent glass, six percent aluminium, four percent plastic, and one percent other metals). Systematic recycling could ultimately generate two billion photovoltaic modules from recycled material by 2050.

STRENGTHENING DEMOCRACY AND PARTICIPATION

Lower Resource Consumption Offers Opportunities for Democracy:

Whether in Tampakan (Philippines), Cajamarca (Peru), Xolobeni (South Africa), Rosia Montana (Romania), or Cáceres (Spain), the number of large-scale anti-mining protests is growing all the time. Regardless of location, the main question asked by protesters is always the same—who makes the decision to grant mining licenses, and under what circumstances is the decision made?

Many countries provide for participation by stakeholders and, in particular, indigenous communities. For instance, there is a principle protected by international human rights standards regarding the free, prior, and informed consent (FPIC) of indigenous communities in the Philippines and in Peru (Consulta Previa), which implements the provisions of International Labour

Organization Convention 169. In general, however, consultations are not conducted lawfully, but they have no consequences for the mine owners.
For these reasons, environmental organizations, human rights groups, religious organizations, and indigenous communities joined forces with other local stakeholders in the Philippines over ten years ago to design an *Alternative Mineral Management Bill*. Their goals included improved co-determination involving all concerned parties, a higher level of taxation that would benefit the local community in particular, regulation of free logging and water usage, and a time limit for mining activity.

Democratizing mining is a key requirement—but other places in the world have taken much more radical steps. Mining has been banned in Antarctica since 1998, in El Salvador since 2017, and in the Cuenca region of Ecuador since 2021. Surface mining has been illegal in Costa Rica since 2010, as well as in some regions of the Philippines. Extracting radioactive mineral resources has also been banned in Kyrgyzstan since 2019, and in Spain since 2021.

A RAW MATERIAL

TRANSITION MUST BE ANCHORED IN CLIMATE JUSTICE

Extracting and processing natural resources, and the way in which they are used, has an influence on the climate crisis. Additionally, mining can intensify the effects of climate change. Mining uses large amounts of water, which contributes to shortages in areas that frequently suffer drought, and it plays a role in deforestation in countries such as Indonesia, Brazil, Peru, and the Philippines. Biodiversity is also under threat from mining, and the corresponding extinction of animal and plant species can result in the collapse of entire ecosystems.

To achieve climate policy goals, we need a fundamental raw material transition that significantly reduces the overall consumption of metallic primary raw materials. As many minerals as possible should stay in the ground. The natural resources that are already in use must be shared equitably, and a circular economy model should be adopted to recycle and use them for as long as possible.

The reduced amount of raw materials extracted by mining that is needed for future use must also be mined in compliance with human rights and strict environmental standards.

THE FIRST STEPS

TOWARDS TOTAL REDUCTION:

Due to the urgency of the climate emergency and the negative effects of resource extraction, industrialized countries must initiate a raw material transition with the goal of completely reducing raw material consumption. A shift to a circular economy strategy could create real momentum. This strategy has been adopted by the Netherlands, who aim to have a comprehensive circular economy in place by 2050 and reduce the consumption of metallic, mineral, and fossil resources by 50 percent by 2030 compared to 2014 levels. This will result in less exploitation of raw material deposits in the rainforest, in highly biodiverse locations, and in the deep sea. Other proposals that could be considered include the introduction of globally equitable per capita levels of consumption.

Learn more: power-shift.de & ak-rohstoffe.de

TODAY FOR TOMORROW!

SOURCES AND FURTHER READING

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