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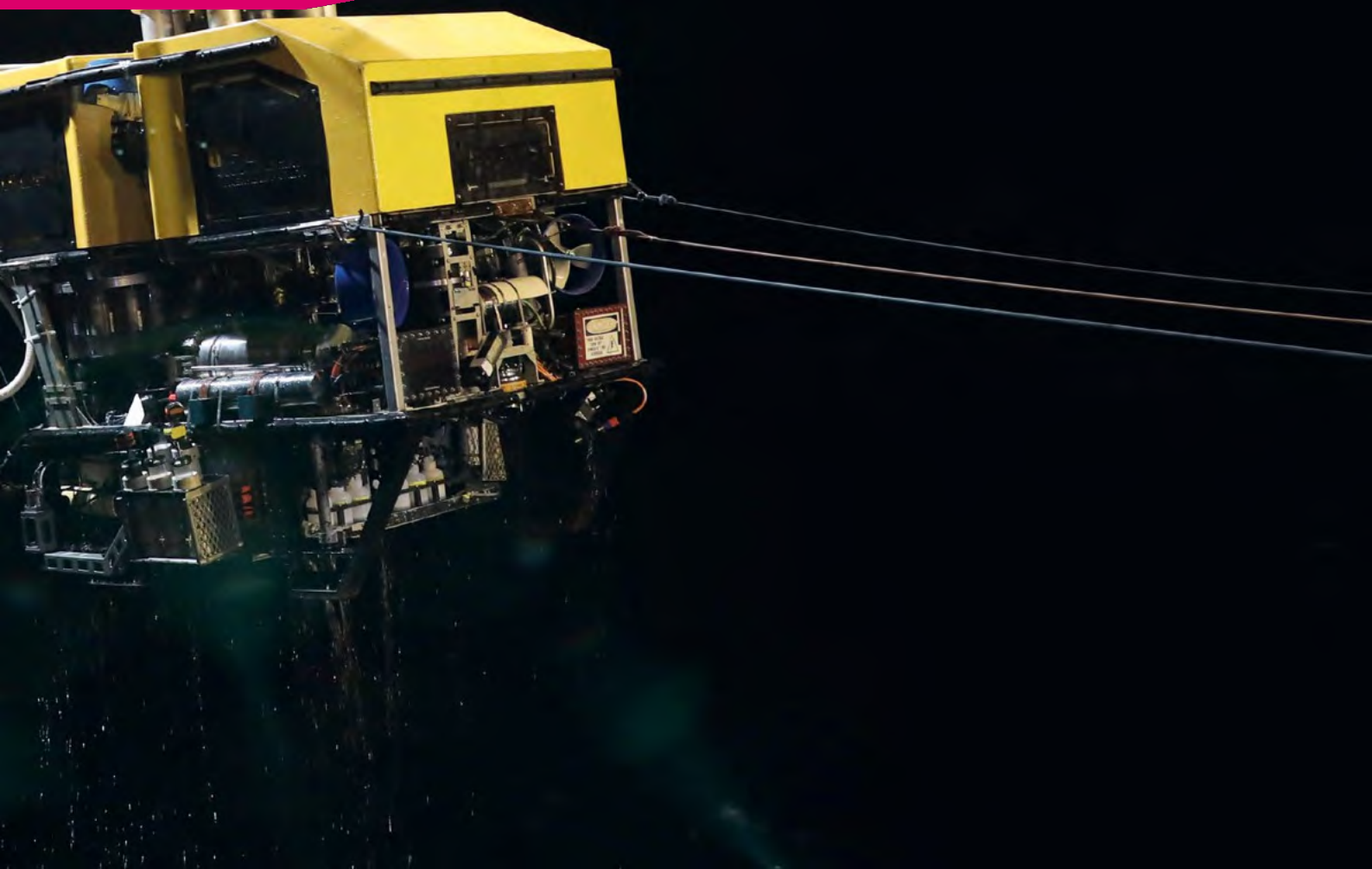
Issues Paper | Raw Materials Policy | International Cooperation

Extracting raw materials in the deep sea

Taking responsibility, seizing opportunities



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Contents

Summary

Extracting raw materials in the deep sea increases the global supply of critical raw materials and strengthens Germany's security of supply.

Climate-neutral technologies must be scaled up in order to achieve the major transformation projects, such as the energy transition, advancing digitalization and infrastructure expansion. The enormous additional demand for critical raw materials for these technologies can be partly met by extracting raw materials from the deep sea.

As control over critical raw materials is increasingly being used as a geopolitical lever, deep-sea mining offers Germany the opportunity to diversify its raw material imports and thus increase its strategic autonomy.

Raw material extraction in the deep sea is a sensitive intervention in the marine ecosystem. The German industry is aware of its responsibility and calls for high environmental standards to be applied in order to ensure sustainable extraction.

Time is of the essence. The International Seabed Authority (IMB) wants to adopt binding mining rules for the deep sea by 2025. The BDI is calling on the German government to actively support the work on the "Mining Code" and help shape it according to its interests instead of continuing to demand a cautious pause.

Raw material extraction in the deep sea opens up new markets for the export of high technology "Made in Germany". With innovative and environmentally friendly extraction systems, German industry can position itself as an important technology partner for maritime raw materials projects.

The BDI is generally open to the extraction of raw materials in the deep sea. If a "Mining Code" is adopted in 2025, Germany should also create the conditions for potential extraction in its territory in the Pacific. This requires a clear signal of political support from the German government.

Much more critical raw materials are needed for the energy transition and digitalization. Some of the demand can be met by extracting raw materials from the deep sea.

The coming metal crisis

The demand for critical raw materials is increasing faster than supply can be expanded. The security of supply is no longer guaranteed.

2

The demand for critical raw materials will increase exponentially by the end of this decade. It is unclear whether the supply will be expanded quickly enough. Geopolitically motivated export restrictions are an additional threat to security of supply. Without a secure and sufficient supply of raw materials, the energy transition, digitalization and infrastructure expansion are at risk.

In view of the pressure to accelerate the energy transition, the extensive use of climate-neutral technologies must be scaled up as quickly as possible. The transformation towards greenhouse gas-neutral technologies, such as batteries for powering electric cars or as energy storage for the power grid, will lead to a considerable increase in demand for metals. In particular, the demand for copper, cobalt, nickel, lithium and manganese is increasing dramatically. According to the International Energy Agency (IEA), 40% more copper, 60% to 70% more nickel and cobalt and 90% more lithium will be needed in the next twenty years alone to achieve the Paris climate target.[1] However, the increasing demand is offset by structural supply deficits in the metal markets. An additional 352 lithium, cobalt, nickel and graphite mines will be needed just to meet the additional demand forecast for battery cell production for electric cars in 2035.[2]

To make matters worse, control over critical raw materials is increasingly being used as geopolitical leverage. According to the Organization for Economic Cooperation and Development (OECD), the number of export restrictions on critical raw materials has increased more than fivefold in 10 years. In addition, protectionist measures by various countries are hindering trade in raw materials.[3]

A widening gap between supply and demand is to be feared.[4] In the race for strategically important raw materials, Germany and Europe are threatened with increasing dependencies and growing supply risks. This trend must be reversed as quickly as possible. After all, critical raw materials are essential for German industry to successfully shape the climate-neutral transformation. Without secure and

Without an adequate supply of raw materials, there will be no energy transition (e.g. wind turbines), no e-mobility (e.g. battery packs), no digitalization (e.g. semiconductors), no Industry 4.0 - but also no infrastructure expansion (e.g. power grids) and no powerful defence or aerospace industry.[5]

A strategic raw materials policy must therefore focus on import diversification. Raw material extraction in the deep sea can contribute to this. On the one hand, this increases the global supply of critical raw materials. On the other hand, it offers Germany the opportunity to reduce its dependence on imports from geopolitical competitors.

The metal crisis is in sight: structural supply deficits and increasing export restrictions for critical raw materials are leading to greater supply risks.

1 IEA, The role of critical minerals in the green energy transition, 7
2 Benchmark Minerals, https://source.benchmarkminerals.com/article/more-than-300-new-mines-required-to-meet-battery-demand-by-2035
3 OECD, https://www.oecd.org/publications/raw-materials-critical-for-the-green-transition-c6bb598b-en.htm
4 International Renewable Energy Agency, https://www.irena.org/Publications/2023/Jul/Geopolitics-of-the-Energy-Transition-Critical-Materials?trk=public_post_comment-text,
Energy Transitions Commission, https://www.energy-transitions.org/publications/material-and-resource-energy-transition/
5 Federation of German Industries (BDI), Analysis of existing dependencies and recommendations for action, https://bdi.eu/publikation/news/analyse-bestehender-abhaengigkeiten-und-handlungsempfehlungen/

Extracting raw materials in the deep sea: enormous economic potential

Import diversification of urgently needed raw materials and a new export market for high-tech products are a double opportunity for German industry.

3

The extraction of raw materials in the deep sea offers a wide range of economic opportunities. Large quantities of critical raw materials are stored in the deep sea. The most important deposit is in the manganese nodule belt of the Clarion-Clipperton Fracture Zone in the Pacific. The nodules are valuable due to their high content of nickel, copper and cobalt. 31 exploration licenses have already been awarded, including to Germany.

Research into the extraction of raw materials in the deep sea and test runs for the technologies required for the extraction of raw materials are nothing new. For over 20 years, the IMB has been issuing licenses to explore the seabed for mineral resources in ocean areas outside the territories of the coastal states. To date, 31 licenses have been awarded in international waters - 19 for the exploration of manganese nodules, five for the exploration of manganese crusts and seven for the exploration of massive sulphides. The licensees come from 20 different countries, 12 of them from Asia, 13 from Western and Eastern Europe, four from Pacific island states and one from South America.[1]

Metals such as cobalt, titanium, molybdenum, zirconium, tellurium, bismuth, niobium, tungsten, rare earths and platinum are enriched in manganese crusts and are processed into high-tech products. Solid sulphides have a high non-ferrous metal content (copper, zinc and lead) and contain gold and silver as well as trace metals such as indium, tellurium, germanium, bismuth, cobalt and selenium.[2]

The largest and economically most important deposits of marine raw materials are located in the so-called manganese nodule belt of the Clarion-Clipperton Fracture Zone (CCZ) in the equatorial North Pacific between Hawaii and Mexico. The nodules in this region are of particular economic interest due to their high nickel (1.4%), copper (1.1%) and cobalt (0.2%) content, which - unlike land deposits - occur together in one ore. The total amount of nodules in the manganese nodule belt is estimated at 25 to 40 billion tons wet weight.[3]

The right of exploration is associated with extensive requirements for the collection of environmental baseline data, the analysis of possible environmental impacts of deep-sea raw material extraction and test runs for the technologies required for raw material extraction. Based on the data collected and knowledge gained, responsible deep-sea extraction will be possible in the coming years, complying with high and internationally agreed environmental protection standards[4] and using state-of-the-art technologies and processes for mining and environmental monitoring.[5]

Manganese nodules are of particular economic interest due to their high nickel (1.4%), copper (1.1%) and cobalt (0.2%) contents, which - unlike land deposits - are occur together in one ore.

1 Rühlemann et. al, https://www.bgr.bund.de/DE/Themen/MarineRohstoffforschung/Meeresforschung/Downloads/Deep-sea mining.pdf? blob=publicationFile&v=2

2 Cf. ibid.

3 Cf. ibid.

4 International Seabed Authority, 2023, The Mining Code, https://www.isa.org.jm/the-mining-code/

5 For example: Trident, 2023, https://deepseatrident.eu

As a member state of the IMB, Germany has also been involved in the extraction of raw materials for many years. Since 2006, the Federal Institute for Geosciences and Natural Resources (BGR) has been exploring a license area for manganese nodules in the Pacific as part of eleven expeditions to date. In addition to mapping the seabed topography and estimating manganese nodule reserves, the work has also included studies on biodiversity and the marine environment in order to record their current state and thus assess the impact of possible future mining. The BGR has investigated the deposits in detail for three particularly economically promising areas with a total size of 4,200 square kilometers. The total quantity of manganese nodules in these three areas amounts to 80 million tons wet weight (56 million tons dry weight). This includes a total of 18.5 million tons of manganese, nickel, copper and cobalt. Assuming a production volume of three million tons wet weight per year, this nodule deposit would be sufficient for around 25 years of raw material extraction in the deep sea. As of 2018, the amount of metal that can be extracted from this corresponds to around 50 percent of German net imports for nickel, 80 percent for cobalt, 300 percent for manganese and six percent for copper.[6] More recent analyses as of 2023 come to similar conclusions: 53 percent for nickel, 80 percent for cobalt, 217 percent for manganese and five percent for copper.[7]

In May 2015, BGR signed a second license agreement for the exploration of sulphide deposits in the central Indian Ocean. The exploration license covers an area of 10,000 square kilometers. BGR has discovered 12 new polymetallic sulphide deposits during its exploration work to date, of which three deposits are inactive and all other fields have active (i.e. with outflowing hydrothermal fluids and the associated special fauna) and inactive areas. These deposits were mapped in detail and sampled close to the surface. As the sulphide deposits form three-dimensional bodies, geophysical methods are also u s e d to map the subsurface. Technologically sophisticated drilling is planned for the coming years.[8]

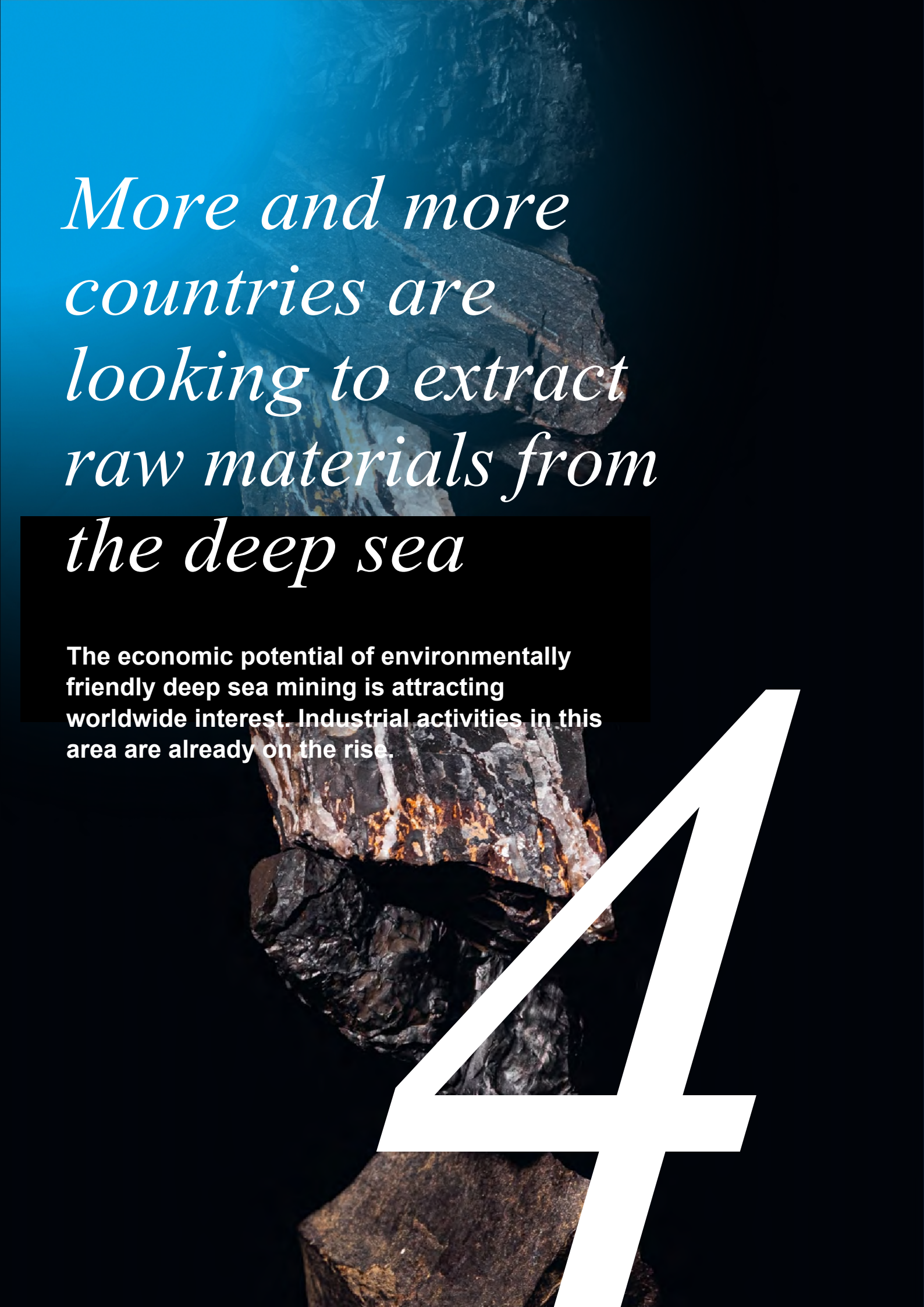
German industry is completely dependent on imports, particularly with regard to metal raw materials. It is therefore important that Germany diversifies its sources of supply. Raw material extraction in the deep sea can also contribute to the diversification of raw material supply chains. Active participation in the exploration of marine raw materials in the Eastern Pacific and the central Indian Ocean is already taking place within the framework of the BGR licenses mentioned above. The right of first refusal associated with the exploration work can contribute to Germany's future supply of raw materials. German industry also has the opportunity to set international standards with technically high-quality and environmentally friendly technologies, both in exploration and in the future environmentally compatible extraction of raw materials in the deep sea and the associated environmental monitoring.

6 Rühlemann et. al, https://www.bgr.bund.de/DE/Themen/MarineRawstoffforschung/Meeresforschung/Downloads/Tiefseebergbau.pdf? blob=publicationFile&v=2

7 Federal Institute for Geosciences and Natural Resources (BGR), 2024, comparison with annual German net imports

8 Rühlemann et. al, https://www.bgr.bund.de/DE/Themen/MarineRohstoffforschung/Meeresforschung/Downloads/Tiefseebergbau.pdf? blob=publicationFile&v=2, p. 229

A large proportion of Germany's raw material requirements could be met by the metals extracted from manganese nodules. be covered.



More and more countries are looking to extract raw materials from the deep sea

The economic potential of environmentally friendly deep sea mining is attracting worldwide interest. Industrial activities in this area are already on the rise.

4

Due to increasing supply risks for critical raw materials, more and more countries are turning to deep-sea extraction. This offers the opportunity to reduce one-sided import dependencies and increase security of supply.

A look at the national waters of individual countries shows that the extraction of raw materials in the deep sea is possible and safe on an industrial scale. Japan, for example, carried out successful tests to mine massive sulphides at a depth of 1,600 meters in the exclusive economic zone (EEZ) back in 2017.[1] Diamonds are currently being mined off the coast of Namibia.[2] Several South Pacific island states, such as the Cook Islands, Tonga, Fiji and Papua New Guinea, are also planning the extraction of deep-sea minerals within their 200-mile EEZ.[3] Saudi Arabia is also preparing to regulate the extraction of raw materials in its own EEZ.[4] Other countries are currently developing new offshore mining laws for national waters. Norway has announced in 2023 that it will soon allow the exploration of critical raw materials in its own EEZ. Contrary to the vote of the European Parliament (EP), a majority in the Norwegian parliament voted in favor of this step in January 2024.[5]

The commercial mining of raw materials in the deep sea is therefore already a reality and will gain further momentum due to the predicted threat of metal shortages. Time is pressing to issue binding rules for deep-sea mining within the framework of the IMB so that environmental protection is also given sufficient consideration. The current situation is that the extraction of raw materials in the deep sea in national territorial waters must not fall below the environmental protection standards of the IMB. As long as there is no "Mining Code", there is no binding environmental protection in national territorial waters in accordance with internationally valid and high standards. As soon as the Mining Code has been adopted, the conditions should also be created in Germany to allow the extraction of raw materials in the deep sea. This offers the opportunity to reduce one-sided import dependencies and increase security of supply. Both are prerequisites for ensuring that Germany has the raw materials it needs for the industries of the future on the path to climate neutrality.

Japan, Saudi Arabia, Norway - more and more countries are focusing on the extraction of raw materials in the deep sea. Germany cannot escape this trend.

1 Government of Japan, https://www.nature.com/articles/d42473-020-00524-y; The Japan Times, https://www.japantimes.co.jp/news/2017/09/26/national/japan-successful- ly-undertakes-large-scale-deep-sea-mineral-extraction/

2 Schneider, https://www.sciencedirect.com/science/article/abs/pii/S2211464520301019; CNN, https://edition.cnn.com/2018/09/03/africa/marine-diamond-mining-namibia/index.html

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4 Permanent Mission of the Kingdom of Saudi Arabia to the United Nations, https://www.isa.org.jm/wp-content/uploads/2024/03/ NV-24-110-ISA-KSA-Laws-in-relation-to-deep-seabed-mining.pdf

5 Barents Observer, 2024, https://thebarentsobserver.com/en/2024/01/norwegian-government-approves-deep-sea-mining-it-devastating-eco-activists-protest

Recommendations

Raw material extraction in the deep sea will come. It's not a question of whether, but how. Five strategic considerations need to be taken into account.

1. Compliance with high environmental protection standards

German industry is clearly committed to environmental protection. Raw material extraction in the deep sea should therefore be carried out in compliance with high environmental protection standards. As part of the awarding of exploration licenses, the IMB, companies and government organizations and institutes have already been collecting comprehensive data over a long period of time and analyzing the potential impact of raw material extraction on the deep-sea ecosystem in the international marine environment. These findings can be used to define targeted protection standards and technical solutions to minimize potential environmental impacts. In recent years, the innovative technologies for extracting raw materials have undergone extensive tests lasting several days to determine their functionality and environmental compatibility, with positive results.[1] Based on the findings, technologies are being further developed and clear standards and requirements for extraction and monitoring technologies are being drawn up by the IMB. If these technological and ecological standards are achieved, the BDI believes that deep-sea raw material extraction can begin.

The impact on biodiversity and ecosystems will depend crucially on the extraction technology used and the chosen extraction strategy and land use. Binding technological and ecological standards and corresponding regulations are therefore needed to minimize the environmental impact as far as possible. Deep sea mining offers a unique opportunity to develop effective environmental regulations before the activity begins. This distinguishes it from all other forms of existing mining activities. With the knowledge already gained about the deep sea ecosystem and the technologies developed, the extraction of raw materials there can, on the one hand, be an instrument for the urgently needed increase in the global availability of raw materials and, on the other hand, a means of minimizing environmental impacts.

-safety and, on the other hand, protect the deep-sea environment as best as possible. Furthermore, under the international legal regime of the IMB, the extraction of raw materials in the deep sea offers all the prerequisites for ensuring the protection of the environment and human rights along global supply chains.

Despite all the advantages that deep-sea mining brings, it is still a sensitive intervention in a hitherto largely untouched ecosystem. This is because the extraction of raw materials is always associated with an impact on nature - whether on land or in the deep sea. Germany should therefore continue to promote research into the deep sea ecosystem and continue to provide financial support to institutions such as the BGR for their research.

It will be crucial that deep-sea mining takes place in a way that allows the ecosystem to regenerate and prevents permanent damage. Germany should therefore influence the development of the Mining Code in such a way that it favors minimally invasive mining.

German industry is clearly committed to environmental protection. Raw material extraction in the deep sea should therefore take place in compliance with high environmental protection standards.

1 The Metals Company, 2022, https://investors.metals.co/news-releases/news-release-details/metals-company-and-allseas- announce-successful-deep-water-test/; DEME, 2021, https://www. deme-group.com/news/metal-rich-nodules-collected-seabed-during- important-technology-trial; Federal Institute for Geosciences and Natural Resources, 2021, https://www.bgr.bund.de/DE/Gemeinsames/Oeffentlichkeitsarbeit/Pressemitteilungen/BGR/bgr-2021-05-12_monitoring-zu-kollektortest-abgeschlossen.html; Federal Institute for Geosciences and Natural Resources, 2021, https://www.bgr.bund.de/DE/Gemeinsames/Oeffentlichkeitsarbeit/Pressemitteilungen/BGR/bgr-2021-05-12_monitoring-zu-kollektortest-abgeschlossen.html; Munoz-Royo, 2022, https://www.science.org/doi/10.1126/sciadv.abn1219

2. Active support for the next steps instead of a unilateral moratorium or a precautionary pause

Time is of the essence to adopt binding mining rules for the deep sea. Since July 2023, licensees have had the legal right to have their mining application reviewed and provisionally approved by the IMB. The Mining Code is now to be adopted by 2025.[2] This is intended to set out all of the rules, regulations and procedures developed by the IMB to regulate the exploration and extraction of raw materials in the international seabed area. The question now is rather when
- and not whether - the commercial mining of manganese nodules will come.

In November 2022, the German government declared its support for a precautionary pause in deep-sea resource extraction.[3] This step is not very effective. This is because there is no majority for it internationally or in the IMB with its 169 member states. Therefore, a precautionary pause or a unilateral moratorium will neither lead to less extraction of raw materials in the deep sea nor to more environmental research or the development of high environmental protection standards. Instead, those actors who strive for less ambitious and therefore more cost-effective environmental protection would prevail. Although you can comment from the sidelines, you have no influence on the course of the game and are of no interest as a partner for cooperation. The aim must continue to b e to make the extraction of raw materials in the deep sea minimally invasive. To this end, it is important that Germany and the EU actively and swiftly engage in every further step towards the formulation and adoption of the Mining Code and the intensification of environmental research. This is the only way to ensure that the high environmental protection standards that the German government rightly demands are implemented in the best possible way.[4]

Instead of a precautionary pause or moratorium, pilot operations should therefore be s t a r t e d as soon as possible. This will allow further important data to be collected on the impact on the deep sea ecosystem and appropriate limits to be defined for the responsible extraction of raw materials in the deep sea. Only the actual mining technology used in real operation will provide valuable data on how effectively it works and how the extraction of raw materials can be designed and optimized in a minimally invasive way. On this basis, realistic limit values can be defined with regard to environmental impact and the necessary requirements for the technologies used.[5] The control system should therefore be adaptive and begin with a pilot phase. Based on the knowledge gained, the regulations can then be further adapted in a simplified process, such as "tacit acceptance".[6]

Instead of a precautionary pause or moratorium, pilot operation should be started promptly. This will allow further important data on the effects on the eco system in the deep sea and define appropriate limits for the responsible extraction of raw materials in the deep sea.

2 Reuters, https://www.reuters.com/sustainability/policy-watch-after-fraught-global-meeting-future-deep-sea-mining-still-hangs-2023-08-03/; International Seabed Authority, https://www.isa.org.jm/news/isa-secretary-general-underscores-progress-and-collaborative-achievements-in-annual-statement-to-the-united-nations-general-assembly/?fbclid=IwAR-3mrv7FuWkxlrZpPAhLgS0HCFTB1zPZ1Nf57uTZeE7d1hP8qhBlrwzF9h0

3 Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection, https://www.bmuv.de/pressemitteilung/schutz-der- meere-deutschland-unterstuetzt-bis-auf-weiteres-keinen-tiefseebergbau

4 Helmholtz Centre Potsdam/German Research Centre for Geosciences GFZ, https://gfzpublic.gfz-potsdam.de/rest/items/item_5005371_4/component/file_5005372/content, p. 71

5 Munoz-Royo et al, Extent of impact of deep-sea nodule mining midwater plumes is influenced by sediment loading, turbulence and thresholds, p. 12

6 International Maritime Organization, https://www.imo.org/en/About/Conventions/Pages/default.aspx; Jenisch, Tiefseebergbau: Mining Code quo vadis?, p. 174

3. Seeing deep-sea raw material extraction as an opportunity to export high-tech "Made in Germany"

The extraction of raw materials in the deep sea opens up new opportunities with regard to the development and export of innovative and environmentally friendly extraction technologies for the global markets. This applies to the extraction of raw materials, their processing and permanent monitoring.

Even though the basic technical components are already being used in offshore oil and gas production and in the near-shore mining of gravel, sand and placer deposits, there is currently no experience with the long-term use of this technology in the deep sea.[7] As model calculations cannot currently b e used to determine which method is most suitable, only on-site component or system tests - known as "pilot mining tests" - can provide clarity and prove the basic functionality of the entire mining system. Due to the successful component tests carried out by Global Sea Mineral Resources (GSR),[8] a subsidiary of the Belgian company DEME, two years ago in two different license areas in the CCZ and the very successful pilot mining tests carried out by "The Metals Company" and "Allseas"[9] a year ago, the German DeepSea Mining Alliance (DSMA) is optimistic that the technological developments for the extraction of raw materials in the deep sea are now progressing quickly and positively, also from the point of view of gentle mining.

In addition to the extraction and transport of the raw materials, the value creation in the mining of marine mineral resources also includes the extraction of the metals and the production of saleable intermediate products. Without a suitable metallurgical process for valorization, the extraction of manganese nodules would be obsolete. In contrast to marine massive sulphides, however, there is no industrially established metallurgical extraction process for either manganese nodules or manganese crusts. For this reason, the BGR has developed a "zero-waste" smelting concept together with RWTH Aachen University, which involves the complete utilization of the nodules. In addition to the metals cobalt, copper, nickel and molybdenum, this also produces a ferromanganese and a silicomanganese product that can be used in steel production and a calcium-silicon mineral product for the construction industry. This concept is unique in the world and has already been successfully tested on an extended laboratory scale.[10]

German industry is in a position to develop innovative and environmentally friendly conveying systems for these areas that meet these requirements. German companies have the necessary expertise and proven individual components in the fields of extraction and conveying technology as well as underwater technology, special shipbuilding and monitoring and measurement technology. If the environmentally friendly extraction of marine raw materials and the accompanying high-tech environmental monitoring can be integrated into an entire economic value chain and possibly even achieve technological leadership, this would give German industry a special position in the international competition for raw materials. In any case, as an important technology partner for the i m p l e m e n t a t i o n of raw materials projects, Germany could secure fair access to raw materials and thus the long-term competitiveness of German industry.

Germany can position itself as an important technology partner for deep-sea raw material extraction.

7 Helmholtz Centre Potsdam/German Research Centre for Geosciences GFZ, https://gfzpublic.gfz-potsdam.de/rest/items/item_5005371_4/component/file_5005372/content, p. 50

8 GSR, https://deme-gsr.com/wp-content/uploads/2023/03/2023_March11_GSR_PataniaII_Final_sp_2-page-version-compressed-2.pdf

9 The Metals Company, https://investors.metals.co/news-releases/news-release-details/nori-and-allse-as-lift-over-3000-tonnes-polymetallic-nodules

10 Rühlemann et. al, https://www.bgr.bund.de/DE/Themen/MarineRohstoffforschung/Meeresforschung/Downloads/Tiefseebergbau.pdf? blob=publicationFile&v=2, 231

4. Becoming less dependent on auto- cratic system competitors through raw material extraction in the deep sea

For strategic reasons in particular, the extraction of raw materials in the deep sea can be an important instrument for reducing one-sided dependencies on raw material imports. Germany is currently dependent on imports from China, for example, as well as from countries with complicated political, economic or military c o n t e x t s if it wants to achieve the goals it has set itself for the energy transition, digitalization or electromobility. Russia and China in particular are systemic competitors, as the German government emphatically emphasizes. In the course of the war of aggression against Ukraine, which violated international law, Russia used energy as an instrument of geopolitical blackmail. China is also using geopolitical considerations to restrict the export of critical raw materials, as was recently the case with the metals galium, germanium and graphite.

A precautionary pause, as currently demanded by the German government, is therefore the wrong signal. Germany and - if other member states follow this example - the EU - are depriving themselves of a potential future source of raw materials with urgently needed metals for transformation projects such as the energy transition. At the same time, China's dominant position in the value chain of critical raw materials would be further strengthened. And this at precisely the time when politicians are calling for a de-risking of one-sided dependencies in strategic sectors.[11] Strategic autonomy can be achieved if raw material imports from China or Russia are reduced. Raw material extraction in the deep sea can be an instrument to come much closer to this goal.

According to the IEA, the boom in electric cars, grid batteries and other climate-neutral technologies resulting from the implementation of the Paris Climate Agreement will quadruple the demand for minerals by 2040.[12] An expansion of terrestrial mining on this scale would mean that we might become even more dependent on China, which would also entail high environmental costs.

The extraction of raw materials in the deep sea offers the opportunity to diversify imports and thus reduce one-sided dependencies.

11 The Hague Centre for Strategic Studies (HCSS), https://hcss.nl/report/reaching-breaking-point-semiconductors-critical-raw-mate- rials-great-power-rivalry/, p. 91; Die Bundesregierung, https://www.auswaertiges-amt.de/blueprint/servlet/blob/2608578/810fda-de376b1467f20bdb697b2acd58/china-strategie-data.pdf; Federal Ministry for Economic Affairs and Climate Protection, https://www.bmwk.de/Editorial/EN/Publications/Industry/industrial-policy-in-the-timeswhen.pdf?blob=publicationFile&v=16; The Washington Post, https://www.washingtonpost.com/world/interactive/2023/china-deep-sea-mining-military-renewable-energy/ International Energy Agency, https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/mineral-requirements-for-clean-energy-transitions, p. 8

12 International Energy Agency, https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/mineral-requirements-for-clean-energy-transitions, p. 8

5. Clear political signal of support

As a signatory state to the United Nations (UN) Convention on the Law of the Sea (UNCLOS) and as a member of the IMB, Germany is a responsible stakeholder in the multilateral framework. The IMB's mandate is to promote the orderly, safe and responsible exploitation and management of deep-sea resources for the benefit of humankind as a whole. In doing so, the IMB also has a duty to adopt appropriate rules, regulations and procedures to ensure effective protection of the marine environment from adverse impacts that may result from the exploitation of resources in the area. [13]

The BDI is generally open to the mining of raw materials in the deep sea. The opportunities outweigh the risks. Finally, a clear German position is also urgent because the extraction of raw materials in the deep sea is also about to be implemented in the exclusive economic and continental shelf zones of the coastal states and there are many opportunities for bilateral cooperation. The topic of raw material extraction in the deep sea should not be put on the back burner any longer. If a "Mining Code" is adopted in 2025, Germany should also create the conditions for mining to begin in its territory in the Pacific. This requires a clear signal from the German government that it will assume responsibility within a multilateral framework, promote and support the mining of manganese nodules and other marine resources and politically support the corresponding commitment of German industry.

When a "Mining Code" is adopted in 2025, it should Germany must also create the conditions for mining can begin in its territory in the Pacific. This requires a clear political signal from the German government.

13 International Seabed Authority, https://www.isa.org.jm/about-isa/

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