



Metis

Study

Increasing competition for resources – what are the implications for security?

No. 09 | November 2018

The views expressed in Metis Studies are those of the authors. They do not reflect the opinion of the Bundeswehr, the Federal Ministry of Defence, or the Bundeswehr University Munich. The primary target audience of Metis Studies are practitioners. Metis Studies are based on analyses of scholarly literature, reports, press articles and expert interviews with academics, think tank analysts and policy-makers. References are omitted. Inquiries about sources can be directed at the author(s) via email.

**Institute for
Strategy & Foresight**

Summary

This study focuses on two natural resources that are particularly relevant for Germany: rare-earth metals, which are needed for the production of future technologies, and natural gas, which is important for energy production in connection with the energy transition. Space mining is also

examined as a proposed form of resource extraction that promises to be an alternative to exploiting Earth. Finally, a number of implications for security and economic policy are discussed, including the possible reconsideration of the Nord Stream 2 pipeline project.

Resources and conflict

The term “resources” covers a broad field and includes rocks, salts and metals, soils and forests, energy generated from water, wind and sunlight as well as fossil fuels. It comprises non-renewable, recyclable and renewable raw materials and elements.

Scarcity of resources entails a risk of conflict, as does resource wealth. The conflict potential of resource wealth is often referred to as the “resource curse” in discussion of developing and emerging countries. Indeed, water scarcity can exacerbate conflict, yet so can oil wealth. Resource scarcity and wealth are, however, generally not the only cause of conflict, and they do not necessarily lead to violent conflict. Instead, competition for resources is usually a (predominantly national) distribution problem that exacerbates conflict in connection with other (mainly political or territorial) causes of conflict.

The political significance and the intensity of resource conflicts, however, have been increasing since the start of the millennium. There are two main reasons why.

Firstly, the economic rise of a number of countries, especially China, has led to a considerable increase in the worldwide demand for resources for industrial production and energy supply and thus an increase in world market prices.

Secondly, the steady progress of climate change acts as a twofold risk multiplier. Water and oil are once again

examples of this development. On the one hand, the Arctic meltdown caused by climate change makes previously inaccessible oil reserves extractable.¹ On the other hand, the increase in the average global temperature exacerbates water scarcity in Africa.²

This paper focuses on two resources that are particularly relevant for Germany: firstly, the so-called rare-earth elements (because of their great significance in the industrial production of future technologies) and, secondly, natural gas (because of its important role in energy production and the energy transition).

This will be followed by a look ahead at space mining as an alternative form of resource exploitation. A discussion of implications for security and economic policy will conclude the paper.

Rare-earth elements

Scarcity of resources is often an artificial problem rather than a natural phenomenon as it is primarily caused by market effects rather than any actual scarcity. Rare-earth elements are one such example.

Despite what the name suggests, these elements are relatively abundant in the Earth’s crust. They are, however,

¹ See: “The impact of climate change on the Arctic”, Metis Study No. 2 (March 2018).

² See: “Food and water scarcity – A key factor in future conflicts?”, Metis Study No. 6 (June 2018).



rare in that their extraction is economically viable at only a few sites.

Rare-earth elements are needed in the production of modern technologies, from LEDs, screens and lasers to various other electronic components, electric engines, generators, and rechargeable batteries.³

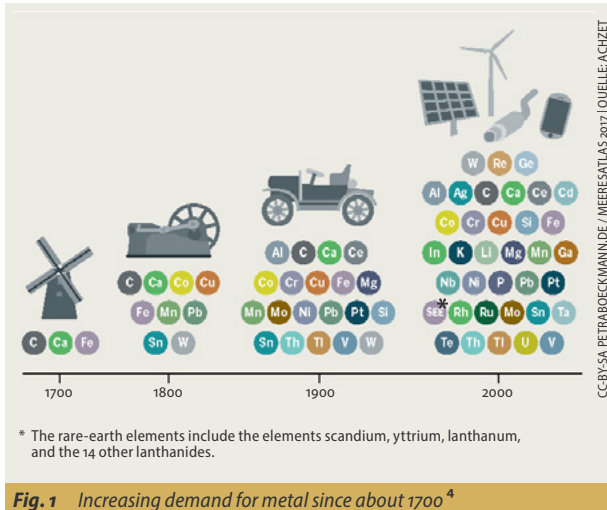


Fig. 1 Increasing demand for metal since about 1700⁴

Germany and its industry, particularly in the area of future technologies such as electromobility and wind power, have a strong interest in stable and undistorted world trade in raw materials and in a reliable, ecologically sustainable and socially responsible supply of rare-earth elements.

Rare-earth elements first became the focus of widespread attention in 2010, when China threatened to limit exports and made headlines worldwide, including in Germany. At the time, China effectively had a monopoly on rare-earth minerals as it controlled around 95% of their global production thanks to low wages and few environmental constraints.⁵

Prices increased but the shortage engineered by the Chinese was not as bad as initially feared, despite China's dominance over the market. The Chinese government struggled to impose export restrictions on its own

industry. Market mechanisms also took effect in that the development of non-Chinese sources was expedited.

China nevertheless still has a dominant market position and the events of 2010 undoubtedly were a wake-up call for the strategic planning of a reliable rare-earth supply.

The Democratic Republic of Congo, on the other hand, serves as an example of how rare-earth deposits, rather than causing economic conflict between suppliers and demanders, can exacerbate a violent conflict within the producing country itself. The DRC is one of the world's leading exporters of tantalum ores such as coltan, which are in great demand. At the same time, it is the scene of one of the bloodiest domestic conflicts since World War II, fuelled by a distribution battle for these resources. The conflict parties in this civil war are financed through the export of these raw materials.

The economic and security implications of the two examples of China and the DRC are discussed in the concluding remarks.

Natural gas

Germany – and the EU in general – are highly dependent on the import of fossil fuels. Natural gas plays a prominent role for two reasons. Firstly, it is the preferred energy source in the transition from the fossil fuel age to the decarbonised age, both because it emits less CO₂ during combustion (compared to coal, for example) and because gas power plants can produce energy flexibly and thus complement the intermittency of renewable energy sources particularly well.

Gross production of electricity in 2017:

Brown coal	22.5 %
Nuclear energy	11.7 %
Hard coal	14.1 %
Natural gas	13.2 %
Petroleum products	0.9 %
Renewable sources	33.3 %
Other sources	4.3 %

Fig. 2 Energy sources (electricity) in Germany⁶

Secondly, the natural gas supply is particularly vulnerable to interruptions by the large suppliers – mainly Russia.

Russia uses its natural gas exports as leverage in its foreign and security policy and as tools of low-threshold hybrid warfare, for example in the destabilisation of Ukraine.

³ Rare-earth elements also play an important role in armaments production, as the presence of lasers in this list indicates. They are also necessary in related areas, such as engine production, guided missiles and armouring.

⁴ Source: The Ocean Atlas 2017, image created by Petra Boeckmann, CC BY 4.0 licence.

⁵ China also has the largest deposits of rare-earth elements in the world. The Chinese Bayan Obo mining district alone accounts for larger reserves than all of Australia.

⁶ Source: destatis.



There is no easy short-term solution to the problem of Germany's dependence on natural gas imports. It has long been clear that the solution can only be a combination of measures to diversify the supply side on the one hand and to reduce demand on the other. This paper does not focus on the efforts Germany must make to bring about the energy transition, such as reducing energy demand through improved building insulation or expanding renewable energies and the electric grid.

More relevant for this study is the Nord Stream 2 pipeline project, both because of its significance for the nexus between energy and security policy and its susceptibility to political course corrections. Its use would foreseeably bind Germany to Russia for about 80% of its natural gas imports. Such a degree of dependence is not in Germany's best interest when it comes to security. This realisation need not necessarily spell a departure from the project but it does serve as an argument in favour of exploring other options, such as a reduction in import volume.

Space: a source of resources for the future?

Both state and private players have recently set their sights on celestial bodies such as the moon and the approximately 17,000 asteroids that are close to earth as an alternative source of raw materials. Private investments have made space travel less costly, which is why space mining is now being considered as a possible future alternative to exploiting Earth's resources, which is both economically and ecologically viable.

Beginning in 2020, the first space probes are scheduled to land on asteroids to explore resources. These asteroids will provide water, which will be converted into fuel for spacecraft by electrolysis, as well as some metallic raw materials, such as platinum, iron, nickel and cobalt. On the Moon, aluminium, iron and magnesium are thought to be easily extractable.

The United States asserted its ambitions with the US Commercial Space Launch Competitiveness Act of 2015, which permits the commercial recovery of space resources by US citizens – and thus private enterprises such as Moon Express or Planetary Resources.

Whether this national US law is compatible with the international Outer Space Treaty of 1967, however, is the subject of controversial debate. Put simply, the Outer Space Treaty declares space to be "common land". Celestial bodies are not subject to national appropriation. Yet, the exploration and use of outer space is permitted, including by private players. Against this backdrop, it is not entirely clear whether the new US law can allow private enterprises to proceed in space the way that fishery does in international waters on Earth. The US administration interprets the law to mean that, while it cannot award US enterprises ownership of celestial bodies themselves, it can award them ownership of the resources extracted from them. Not everybody interprets applicable

international law the way the United States does in this case – Luxembourg is the only other country in the world to have passed a national law on space mining.

The international legal framework for space mining is thus still at an early stage of development. Twenty countries have so far at least passed national space laws.

Germany is a leading space-faring nation and the coalition treaty states that the Federal Government, too, will introduce a space law in order to create investment and legal security for non-governmental space-faring activities. In August 2018, the Federation of German Industries (BDI) not only pointed out that any such law must also make arrangements for space mining but also emphasised the great potential that Germany could tap to help shape the future of this exciting technological endeavour.

Concluding remarks

For Germany, rare-earth elements and natural gas are critically important in different ways. Differentiation is therefore necessary.

As far as rare earth-elements are concerned, Germany will remain heavily reliant on functioning markets and import. In terms of the supply side, resource-strategic interministerial efforts have been ongoing since 2010 to survey and forecast the worldwide resource situation, both in terms of primary raw materials produced through exploiting Earth and of secondary raw materials produced through recycling. The German Mineral Resources Agency (DERA) at the Federal Institute for Geosciences and Natural Resources (BGR) is an important contributor to these efforts, as is the Industrial Resource Strategies think tank that was initiated at the Karlsruhe Institute of Technology (KIT).

The demand for rare-earth elements, however, may change relatively quickly. Certain elements that are in particularly high demand at the moment may soon be less critical. There is ongoing research, for example, into ways of producing batteries using less of these elements – almost entirely without cobalt, for example⁷ – or of substituting especially scarce elements with other metals. Recycling also has potential. One of the main challenges of recycling is that many products contain rare-earth elements in only minute quantities, which makes it more difficult to recover them. It is therefore imperative that available resources be preserved and used more efficiently and repeatedly, for example by designing products to be more easily recyclable. On the demand side, the goal must be resilience, ideally by taking Germany from a linear economy to as close to a circular economy as possible. On the supply side, the push must continue for ecologically sustainable, socially responsible, and, above

⁷ Fluoride ions could also soon replace lithium.



all, diversified production, traded on markets that are as undistorted as possible.

The lessons learned from the 2010 events surrounding China have long been incorporated into German and European strategy documents. Another such lesson would be to not encourage the “securitisation” of the issue. There is (at least currently) no increased competition, let alone violent conflict, over resources between suppliers and demanders. Germany would certainly not stand to benefit from the perception that there is.

The lesson learned from developments in the Democratic Republic of Congo, however, is that the role of resources in the early detection of conflicts, especially in Africa, merits special attention.

When it comes to natural gas, Germany will remain import-dependent for the foreseeable future. Surprising developments are possible even in this area, as impressively demonstrated by the United States, which went from an importer of natural gas to an exporter within a very short time (with the associated repercussions for the local environment and the world climate). For Germany,

however, our only options for real change when it comes to our reliance on imports of natural gas are to reduce consumption, to diversify suppliers and to speed up the transition to renewable energy sources. In short, emission reduction and security policy must go hand in hand.

NATO has placed energy security at the top of its agenda, including efforts to raise awareness, safeguarding critical infrastructures and improving the energy efficiency of armed forces. Informal talks at the level of the North Atlantic Council (“Energy NAC”) have become an annual event. The security concerns of many NATO member nations as well as misgivings within the European Union in terms of energy policy have given Germany cause to reconsider Nord Stream 2.

Most resources on Earth are precious and finite. If, as stated by the Federation of German Industries, the development of the price of raw materials on the global market favours courageous innovation management beyond Earth’s orbit, then Germany must look not just ahead – but also up. 🦋

IMPRINT

Publisher

Metis Institute
for Strategy and Foresight
Bundeswehr University Munich
metis.unibw.de

Author

Dr. Frank Sauer
metis@unibw.de

Creative Director

Christoph Ph. Nick, M.A.
c-studios.net

Cover image

Dominik Vanyi on Unsplash

Original title

*Der verschärfte Kampf um Ressourcen
– welche sicherheitspolitischen
Auswirkungen?*

Translation

Federal Office of Languages

ISSN-2627-0609

This work is licensed under the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

