

National raw materials strategy: material resources for the major transitions

December 9, 2022

Executive summary

The goal of this national raw materials strategy is to improve security of supply of critical raw materials in the medium term. It is important for many businesses to have sufficient availability of critical resources. In particular, the production of renewable energy technologies for the energy transition is increasing demand for minerals and metals such as lithium, cobalt and rare earth elements. These raw materials are also used in digital technologies, healthcare technologies and material. This makes control over critical raw materials worldwide not only a key economic issue but increasingly also a geopolitical one. Europe is a key player, but it is also in a vulnerable position.

The transitions in the energy and other sectors give the Netherlands and the EU the opportunity – and the responsibility – to tackle vulnerabilities in raw material supply chains and reduce the adverse effects of extracting and processing critical raw materials on people and the environment, preferably at European level. The Dutch government is focusing on five areas of action: 1) circularity and innovation, 2) sustainable European mining and refining, 3) diversification, 4) greater sustainability of international supply chains and 5) knowledge building and monitoring. All of these are in line with European policy (e.g. the Critical Raw Materials Act) and national policy (the National Circular Economy Programme, for instance).

The five areas of action build on existing policy on circular economy, innovation, economic diplomacy, responsible business conduct (RBC) and European raw materials partnerships. This strategy sets out additional national policy and describes how the Netherlands will strive to shape policy within the European Union. The government has also announced new actions relating to:

- The Netherlands' approach to the EU Critical Raw Materials Act (see text box), with due attention to sustainable European mining and refining, circular strategies, diversification, strategic reserves and knowledge building;
- Integrating the raw materials strategy as a strategic opportunity into industrial policy by exploring the pros and cons of refining capacity in the Netherlands;
- Promoting research and innovation, for example in the field of circular economy (complementing the National Circular Economy Programme 2023-2030), and research into social and environmental risks in critical raw material supply chains;
- Setting up a Dutch monitoring system and providing businesses with relevant information, for example using an improved version of the *Grondstoffenscanner*, an online tool that gives businesses insight into the RBC risks associated with the raw materials they use;
- Research into the interests of Dutch companies and the scope for using the export credit instruments of Atradius Dutch State Business, Invest International, Invest-NL and the Netherlands Enterprise Agency (RVO);
- Supporting international cooperation and economic diplomacy, for example by entering into and building on bilateral partnerships and by working with like-minded countries within the UN, the EU and international sustainable mining forums;
- Putting issues on the international agenda, notably the footprint associated with the growing

- raw material requirements for the clean energy transition and the need for policy coherence;
- Devoting more attention to climate and environmental risks in programmes for sustainable supply chains;
- The proposed appointment of a Special Representative for the Raw Materials Strategy, who will contribute to achieving this strategy internationally.

Critical raw materials

The European Commission defines critical raw materials as metals and minerals that are most important economically and have a high supply risk. Currently there are 30 substances on the list of critical raw materials (see Figure 3 in annexe 1A), which is updated every three years. As part of the Dutch raw materials strategy, the government will analyse which of these critical raw materials are important specifically for the Netherlands and which raw materials that are not on the EU's list may need to be considered, including in national policy.

Critical Raw Materials Act

In her State of the Union address, European Commission President Ursula von der Leyen announced plans to introduce a European Critical Raw Materials Act (CRMA). The CRMA should ensure that the EU prioritises critical raw materials and sets self-sufficiency targets for different stages of the value chain (see annexe 1D). The Dutch raw materials strategy, including the five areas of action, will underpin our approach to the CRMA to achieve the goal of security of supply. With regard to European mining, for example, the Netherlands will focus on sustainable conditions, impact assessments and scaling up refining (see 4.2). We will also draw attention to the four circular strategies: reducing use of raw materials, substituting raw materials, extending product lifespan and ensuring high-grade processing (see 4.1). In terms of diversification, it is important to enter into and build on EU raw materials partnerships with other nations, including in Africa and Latin America (see 4.3).

The EU must also deliver a robust policy aimed at creating more sustainable global raw material supply chains and at responsible mining, particularly in developing countries (see 4.4). Finally, Europe will need a common approach to monitoring and knowledge-sharing, with the Netherlands itself investing in its own knowledge position (see 4.5). When raw materials are classified as critical, the Netherlands would ask that consideration be given to the differences in economic structure among EU member states. The government will keep the House of Representatives fully informed about the Dutch approach to the CRMA once the Commission has presented its legislative proposal.

Notes for the reader

Section 1 is an introduction. The next two sections analyse the problems of critical raw material supply security (Section 2) and the impact of raw material supply chains on people and the environment (Section 3). Section 4 discusses the areas of action. Finally, Section 5 looks ahead to 2023.

1. Introduction

The energy transition is shifting global demand away from fossil fuels such as coal, oil and gas towards critical raw materials such as lithium, cobalt and rare earth elements. The growing use of wind turbines, solar panels and storage batteries, for example, is significantly boosting demand for these critical minerals worldwide. For many of these materials, the European Union is

dependent on imports of raw materials and semi-finished products from third countries.

Control of critical raw materials is of not only economic but increasingly also geopolitical importance. Around the world there is a race to acquire technological leadership and a strategic position in the global energy transition. Europe's growing need for critical raw materials makes it relatively vulnerable, since very few of these materials are extracted and processed within its borders. Moreover, the various superpowers do not all abide by the same rules. Countries with a dominant position in the critical raw materials supply chain through mining, refining or logistics may abuse it to put economic pressure on other countries, for example by restricting exports. Strategic dependencies therefore pose not only a business risk, but also a risk to our public interests, including national security and healthcare, and to our open strategic autonomy (see annexe 1B). Shifting geopolitical relations threaten the open global economic system and the rules-based multilateral trading system. Countries are increasingly prepared to use their economic influence as a geopolitical weapon. These trends have major consequences for the EU's resilience, and individual countries are now working to enhance their own resilience. Raw material consumption is also associated with a large global footprint. At the moment, the raw materials needed for the energy transition and the effects of extraction and processing on the climate and on people and the environment, i.e. on sustainable development worldwide, are not being adequately taken into account.

The green and digital transitions give us the opportunity – and the responsibility – to regulate extraction and supply of these raw materials better than we used to. The coronavirus pandemic showed how intertwined our supply chains are internationally and how disruptions can have a global impact. The Russian invasion of Ukraine and the West's sanctions in response revealed that being overly dependent on a single supplier for natural resources such as oil and gas puts the Netherlands and the EU in a vulnerable position. Moreover, Russia also produces other materials, e.g. aluminium, palladium and chemical fertiliser ingredients. The recent developments highlight the urgent need to mitigate strategic dependencies and avoid new strategic dependencies when it comes to critical raw materials.

Tackling these significant and urgent issues is forcing the Netherlands and the EU to make tough choices. Difficult dilemmas regarding security of supply, sustainability and collaboration with less like-minded countries that operate according to different standards call for carefully considered decisions, both now and in the future. The Netherlands and the EU aim to take substantial measures, with due regard for our principles at all times. Often there are no easy solutions, which is one of the reasons why the government has developed this raw materials strategy. We are not starting from scratch, however: businesses, civil society organisations and the government have already done much in this area, based on the 2011 Raw Materials Strategy. One example is the launch of the 2016 government-wide Programme for a Circular Economy by 2050, which laid the groundwork for the Dutch transition to a circular economy. It also paved the way for the development of the *Grondstoffenscanner* and for the Netherlands to play a leading role in implementing RBC in raw material supply chains.

In pursuing this strategy, the government is striving to improve critical raw material supply security in the medium term. It is important for many businesses to have sufficient availability of

these materials. The energy transition increases the chance of shortages, and geopolitical developments may put international supply under further pressure. This in turn increases the risks for our supply chains and consequently for the Dutch economy, which is why it is vital to improve security of supply of critical raw materials wherever possible. That is therefore the central goal of this strategy.

In striving to achieve greater security of supply, one important prerequisite is to avoid any adverse effects on people and the environment. Improving the way mining, refining and processing are carried out also helps make production processes more stable and reduces investment risks in the supply chain. Efforts to green these industries are also in line with objectives that the government has set for the climate and energy transitions and the circular economy. Moreover, pursuing a trade agenda while focusing on sustainability makes the Netherlands and the EU attractive alternative partners for resource-rich countries encountering buyers who do not have the interests of people and the environment at heart.

In principle, companies are and will continue to be responsible for their own supply chain of raw materials and processed products. However, the global raw materials market exposes society to risks that individual businesses cannot offset alone. Changing geopolitical dynamics and potential shortages of raw materials that are absolutely essential in serving public interests, through the energy transition, the digital transition, healthcare, vital infrastructure and defence, demand an appropriate response from government.

The European Commission periodically determines which raw materials are considered critical on the basis of their economic value and high supply risk. The list currently comprises 30 critical raw materials (see annexe 1A), which are all needed for producing components for the digital transition, such as microchips and digital displays, and for quantum technologies. In short, our future economy and our present economy require different material resources. This strategy focuses on critical raw materials because, by definition, they play a key role in serving public interests and have the greatest supply risk. The approach adopted in this strategy may also be applicable to other raw materials at some point in the future.

The challenges related to raw materials call for a European approach, since EU member states share an internal market and are much more effective when they work together. The Commission is very active in this area (see annexe 1D) and plans to present its proposal for the Critical Raw Materials Act (CRMA) in 2023, an initiative that has the Netherlands' full support. This national raw materials strategy therefore serves as a starting point for the Netherlands' contribution to the development of the CRMA and the promotion of Dutch interests. A national strategy also has the added benefit of clarifying the strategic opportunities open to Dutch companies and which raw materials are essential for our country (criticality analysis; see 4.5). Furthermore, this strategy creates synergy between national policy instruments, for instance in the context of the circular economy and industrial policy.

Access to raw materials is important for our competitiveness. Since the Netherlands imports but does not export critical raw materials – most of which enter this country as part of semi-finished and finished products – Dutch companies' production costs will rise if these supplies become scarcer and hence more expensive. Costlier raw materials will affect our national prosperity, which

means that the energy transition will have a higher price tag and may even be delayed. Countries that produce their own critical raw materials will see an increase in their national income, just as the Netherlands benefited from gas extraction operations in the past. Yet the increased demand for critical raw materials due to the various transitions also opens up strategic opportunities, including for Dutch companies: innovative revenue models based on circularity, refining and processing of raw materials into semi-finished products, and logistics and services related to sustainable mining are just a few examples. Dutch industry has a strong position in fossil fuel value chains, for instance, partly because of its excellent track record in logistics. The government therefore thinks that the Dutch private sector – but also knowledge institutions and civil society partners – could play a key role. In the coalition agreement, the government stated that it aspires to be a European leader in the transition to a green economy, e.g. by providing stimulus for electric vehicles and renewable energy generation.

This strategy is partly a response to the motion submitted by Dutch MP Kiki Hagen,¹ calling on the government to develop a raw materials strategy that focuses on strategically accelerating the circular economy, pursuing a green industrial policy and securing crucial raw materials for the energy transition. This ties in with the government-wide goal, set down in the National Circular Economy Programme and its predecessors, to achieve a fully circular economy by 2050. The government also committed to drafting a raw materials strategy in the Minister of Economic Affairs and Climate Policy's letter to parliament on a strategic, green industrial policy,² the Minister for Foreign Trade and Development Cooperation's policy document 'Do what we do best' and in various debates in the House of Representatives with these and other ministers. This strategy also responds to the motions by MPs Alexander Hammelburg³ – who urged the government to secure the availability of raw materials that are critical for achieving the climate goals – and Ruben Brekelmans⁴ – who called on the government to prioritise access to essential raw materials in its relations with Latin America and the Caribbean. Security of supply of critical raw materials will also be on the agenda of the interministerial strategic dependencies task force, which will be set up in accordance with the parliamentary motion by Ruben Brekelmans and Agnes Mulder.⁵ As such, the raw materials strategy forms part of wider efforts in relation to strategic dependencies (see also the recently published letter to parliament on open strategic autonomy).⁶ Moreover, this strategy is closely linked to the letter to parliament regarding a stronger approach to state-sponsored threats, which also highlighted the Netherlands' and the EU's high-risk strategic dependencies on critical raw materials. Lastly, this strategy is closely aligned with the whole-of-government security strategy, which aims to make the Kingdom of the Netherlands more resilient to threats to national security that partly result from shifts in the global geopolitical landscape. The ministries of Infrastructure & Water Management, Economic Affairs & Climate Policy, and Foreign Affairs recently held a stakeholder session to glean ideas and information from companies, knowledge institutions and civil society organisations. The insights gained were then used to develop this strategy.

¹ Parliamentary Paper, House of Representatives 2021-2022, 32852, no. 192.

² Parliamentary Paper, House of Representatives 2021-2022, 29826, no. 147.

³ Parliamentary Paper, House of Representatives 2022-2023, 21501-02, no. 2529.

⁴ Parliamentary Paper, House of Representatives 2020-2021, 21501-02, no. 2366.

⁵ Parliamentary Paper, House of Representatives 2021-2022, 35925 V, no. 97.

⁶ Parliamentary Paper, House of Representatives 2022-2023, 35982, no. 9.

The aforementioned recent letter to parliament on open strategic autonomy indicated how the Netherlands views dependencies on third countries in the value chains of these technologies. Because this is where dilemmas become apparent. For instance, the Netherlands wants to invest more in rooftop solar power systems, but at the same time we know that PV panels are predominantly produced in China, including with forced labour. We would also like to progress with the electrification of the transport system, but at the same time we know that there are only a few countries where large-scale extraction of some of the raw materials used in batteries, such as cobalt, takes place. We therefore need to make our economy more resilient, for instance by diversifying and addressing these constraints in the value chain as part of our foreign diplomacy efforts.⁷ The Netherlands must be resilient, and our policy should also take into account the actions of other countries. The US, for example, recently announced the Inflation Reduction Act,⁸ which aims to promote domestic production of clean energy through grants and local content requirements. The Netherlands and the EU are concerned about whether the Act complies with WTO trade rules, in particular the discriminatory nature of some of the grants. This legislation also has indirect consequences for our own security of supply and calls for Europe to step up its efforts to develop open strategic autonomy. As stated in the letter to parliament on open strategic autonomy, the raw materials strategy is part of the government’s commitment to increase our economic resilience and mitigate high-risk strategic dependencies.

This document successively analyses the problems of critical raw material supply security and the negative impact in critical raw material supply chains, before examining the various possible courses of action and the role the Netherlands can play. Relevant further information can be found in annexe 1.

2. Supply security of critical raw materials

Raw materials are important for our economy, our society and our competitiveness. Companies need them to make semi-finished and finished products, and society needs products such as batteries, electric cars, solar panels, phones and military technologies. In principle, businesses themselves best know what the situation is with regard to the security of supply of the raw materials they require. However, in terms of security of supply in the medium term, two trends are emerging that demand a proactive, coordinating role from government: strategic dependencies and growing demand for critical raw materials and processed critical minerals.

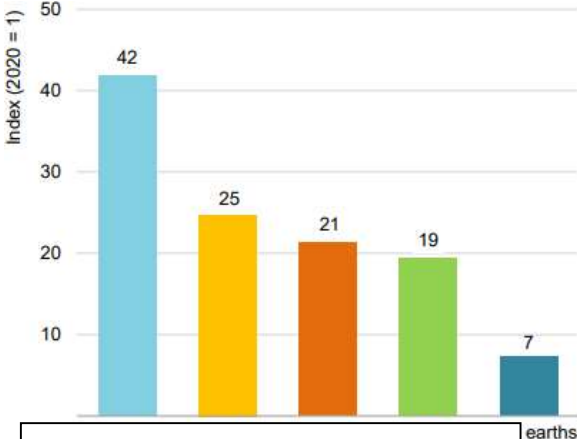


Figure 1. Growth in demand for selected critical raw materials, 2040 relative to 2020 (=1), to achieve the Paris goals. Lithium demand will increase by a factor of 42. Source: IEA

⁷ As stated in the coalition agreement, reducing our dependence on others for strategic goods and raw materials is one of our foreign policy strands.

⁸ Under the Inflation Reduction Act the purchase of an electric car qualifies for a tax credit if 40% of the critical minerals are extracted, processed or recycled in the US or in countries with which the US has a free trade agreement.

Supply security risks arise because of the enormous volume of critical raw materials required for the climate transition – and for the digital transition albeit in smaller volumes – compared to our present-day economy (see Figure 1). The energy transition involves a shift away from fossil fuels such as coal, oil and gas towards metals like lithium, nickel and copper.⁹ Critical raw materials also serve other public interests, as they are needed for key technologies that will play an important role in Europe’s future earning capacity. Tungsten, for example, makes phones vibrate when a call or message is received, and gallium and indium are used in LED lighting.¹⁰ Rubber is needed for medical gloves, while magnesium and titanium are essential for making medical devices. Our vital infrastructure¹¹ and defence industry also make use of critical raw materials, such as beryllium, gallium and cobalt.¹²

Metabolic et al.¹³ have estimated the quantity of raw materials needed for Dutch consumers and businesses to achieve the energy transition. In some cases, it can be as much as 15% or even 25% of current global production, even though we account for just 0.5% of global final energy consumption. The International Energy Agency (IEA) maintains that ‘rising deployment of clean energy technologies is set to supercharge demand for critical minerals’.¹⁴ On average, the supply of critical raw materials is also on the rise,¹⁵ varying per raw material. The supply of lithium has tripled in the past ten years, while that of rare earth elements has doubled. Yet this is insufficient to satisfy growing global demand. Although estimates are uncertain and depend on several factors, such as technological developments and progress with the energy transition, they underscore the urgent need to scale up efforts. This does not mean that physical shortages are inevitable, however, as experts believe there are enough minerals in the Earth’s crust. Furthermore, price rises have an attenuating effect on shortages, by promoting innovation and substitution, for example.

⁹ Uranium is an essential fuel for nuclear reactors. The geopolitical risks relating to acquisition of this resource for nuclear energy are relatively low in the long term, as there are sufficient uranium reserves worldwide and many different suppliers. Moreover, uranium can be stored for a long time without degrading. See also ‘Scenario Study Nuclear Energy’, September 2022 (Witteveen+Bos and The Hague Centre for Strategic Studies (HCSS), commissioned by the Ministry of Economic Affairs and Climate Policy). Conclusions and summary available in English.

¹⁰ EU Action Plan on Critical Raw Materials, 2020.

¹¹ An analysis is currently being conducted of the resilience of Dutch vital infrastructure. Consideration is also given to dependencies on specific material resources. The House will be updated on the subject in a letter to parliament regarding the intensified approach to vital infrastructure, to be submitted in early 2023.

¹² European Commission (2016), ‘Raw Materials in the European Defence Industry’, JRC Science for Policy Report.

¹³ Metabolic, Copper et al., ‘Een circulaire energietransitie’.

¹⁴ IEA, ‘The Role of Critical Minerals in Clean Energy Transitions’, March 2022

¹⁵ OECD, ‘Raw Materials Critical for the Green Transition: Production, International Trade And Export Restrictions’, forthcoming (based on United States Geological Survey data).

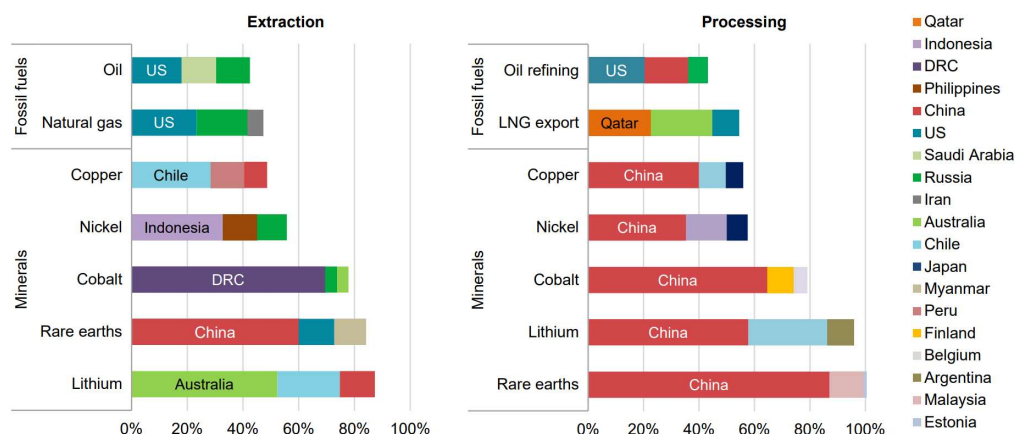


Figure 2. Share of producing countries in production of selected minerals and fossil fuels. Source: IEA.

The second trend concerns the Netherlands' and the EU's heavy dependence on other countries for critical raw materials and the strong geographical concentration of most mining operations. Most rare earth elements are from China, cobalt comes mainly from the Democratic Republic of the Congo (DRC), and lithium from Australia (see Figure 2).

The extraction of raw materials is not the only area where we have strategic dependencies, but they are even more concentrated for processing (see right-hand panel in Figure 2), in which China has established a very strong position in recent years.¹⁶ Many raw materials mined in Africa, Australia or Latin America are processed in China before being exported to Europe. China also has strategic positions in production, logistics and foreign mines (e.g. in Africa and Latin America), thus strengthening its hold on the raw material value chain. This makes us geopolitically vulnerable. Add to this the fact that the threats to our society from the rest of the world are growing.¹⁷ China's export control legislation explicitly states that exports can be stopped if this is in China's interest. This goes further than national security concerns, covering economic and political interests too. In the past, China has demonstrated its willingness to use dependencies on raw materials geopolitically in the form of economic coercion, for example when it imposed export quotas on rare earth elements, a practice that the World Trade Organisation (WTO) ruled in 2014 was contrary to WTO rules. Other countries could also use our strategic dependency on critical raw materials for geopolitical ends.¹⁸ The invasion of Ukraine by Russia, which led to the West imposing sanctions, revealed just how dependent we are on commodities such as neon and palladium, as shortages have disrupted the production of chips and cars, for example.

¹⁶ HCSS, 'Securing Critical Minerals for Critical Sectors', The Hague, December 2022. <https://hcss.nl/report/securing-critical-materials-for-critical-sectors-policy-options-for-the-netherlands-and-the-european-union/>.

¹⁷ Military Intelligence and Security Service (MIVD), 2021 Annual Report.

¹⁸ See the results (forthcoming) of the pilot geo-economic monitor, which will look at topics such as our lithium dependency.

In absolute terms, there are no shortages of most raw materials; these resources are abundant in the Earth's crust but must be extracted. Raw material supply is fairly inflexible in the short term, as it takes 10-15 years to develop and operate a mine. Moreover, many critical raw materials are extracted as a by-product of other raw materials, such as indium from zinc. Many critical raw materials can also be extracted in Europe – though not in the Netherlands (see Figure 4 in annexe 1). Scandinavia and Ireland, for example, have lithium and rare earth elements, while Finland, Sweden and Greenland have deposits of cobalt.¹⁹ The volume of critical raw materials currently extracted in Europe is still fairly low, however, partly due to lack of investment in mines, permitting procedures and public opposition because of the environmental impact of extraction. Europe also sets high standards for sustainability, environmental protection and human rights. The inevitable conclusion is that it is more difficult and more expensive to extract raw materials in Europe than in some other countries. It is important to make both the private sector and the general public more aware of this fact. Critical raw materials can also be found in the deep seabed. Extraction is not yet possible, but the potential opportunities and ecological risks are being explored (see annexe 1E).

The government has a role to play in identifying and addressing societal risks at an early stage, especially where the market fails to do so adequately. One important point is that market prices also have an attenuating effect on shortages. If raw materials prices rise because of growing shortages, markets and production processes will be organised differently. Companies will explore alternatives, or seek to reduce their raw material usage through innovative product design (for example, incorporating circular principles). Revenue models will be developed for critical raw materials recovery within the EU. Market forces and a leading role by the government will therefore go hand in hand. Furthermore, each raw material has its own unique methods of extraction, refining and processing, with the result that the risks per raw material vary. This calls for a tailored response. While extraction in Europe may be a good choice for one raw material, diversification or substitution may be preferable in another case.

The Netherlands does not currently play a major role in critical raw material value chains, as it has next to no deposits of these resources, nor facilities for refining them. The main entry route for critical raw materials is via semi-finished or finished products. Many critical raw materials that originate from outside the EU enter the Netherlands after being processed in countries like Germany or Belgium.²⁰ Direct dependencies on raw materials therefore scarcely feature on the Dutch list of strategic dependencies,²¹ but there may well be an indirect dependency further down the value chain. Since the Netherlands has to import critical raw materials, indirectly or directly, from other countries, our competitiveness and prosperity will suffer if these materials become more scarce and hence more expensive.

Nevertheless, there are definite strategic opportunities for Dutch business and industry. The Netherlands holds a very strong position in value chains of traditional raw materials. Thanks to our advantageous geographical location and our ports, we are one of Europe's biggest importers and

¹⁹ HCSS, 'Cobalt mining in the EU: Securing supplies and ensuring energy justice', The Hague, October 2022.

²⁰ TNO (2015), 'Materials in the Dutch economy: A vulnerability analysis'.

²¹ Parliamentary Paper, House of Representatives 2020-2021, 35570-XVII, no. 26.

exporters, especially of fossil and organic raw materials.²² In 2019 the Netherlands imported €23 billion in metals and minerals, while exports were worth just under €28 billion. Some 40% of these raw materials are re-exported immediately, mainly to other EU countries, and the rest is processed in the Netherlands. For instance, the Netherlands is one of the largest diesel producers in the world, and Dutch industry processes petroleum into plastics and iron ore into steel.

Dutch industry, the logistics sector and related businesses could use the comparative advantages they enjoy in traditional raw material value chains to secure their place in critical raw material value chains. Even though the Dutch subsurface contains little in the way of critical raw materials, we could contribute to European open strategic autonomy by developing our refining capacity. The Netherlands also has industrial operators involved in the assembly and manufacture of products that contain critical raw materials, such as medical isotopes (for which we have unique irradiation capacity) and solar panels. We could use the knowledge and innovative capability of our companies and knowledge institutions to support smart product design and recovery of critical raw materials. Section 4.1 discusses this in more detail.

3. Impact in raw material supply chains

With a view to achieving the Paris climate objectives, the government is focusing on accelerating the energy transition and the development of a circular economy. However, the raw materials needed for the energy transition and the effects of extraction and processing on the climate, people and the environment, i.e. on sustainable development and prosperity in the Netherlands and around the world, are not being adequately taken into account. The importance of changing consumption and production processes to reduce adverse environmental effects is recognised internationally in the 12th UN Sustainable Development Goal (SDG 12), aimed at ensuring 'responsible consumption and production'.

Revenues from the export of raw materials are of key importance for many low- and middle-income countries. In 2018 extractives accounted for more than 20% of export revenues in 43 of these countries. In some cases, this figure is as much as 80% (e.g. in the DRC, Guinea and Mongolia).²³ Growing demand for critical metals and minerals is therefore an opportunity for these countries to capitalise on their wealth of resources and use the income to drive sustainable development.²⁴ The actual contribution of the extractive industry to sustainable development is not always positive, however. The well-known term 'resource curse', also known as the paradox of plenty or the poverty paradox, is the phenomenon of countries with an abundance of natural resources having worse development outcomes due to an absence of strong political and economic institutions.²⁵ There are concerns that rising demand for raw materials is exacerbating existing problems associated with mining and refining, and is increasing pressure to open more

²² Statistics Netherlands (CBS), International trade in raw materials, Internationalisation Monitor 2021-II.

²³ Ericsson, M. & Lof, O. (2020), 'Extractive dependency in lower-income countries: Evolving trends during the transition to a low carbon future.' WIDER Working Paper 2020/120.

²⁴ UN (2021), 'Transforming Extractive Industries for Sustainable Development'.

²⁵ Savoia, A. & Sen, K. (2020), 'The Political Economy of the Resource Curse: A Development Perspective.' WIDER Working Paper 2020/123.

mines in countries with vulnerable natural ecosystems.

In addition, mining problems (discussed below) could lead to destabilisation of raw material supply chains, high, volatile prices and failure to supply the volumes required for the energy transition. This is because substantial supply chain risks deter investors, as companies are directly exposed to the effects of conflict and climate change, for example, and also run the risk of damage to their reputation, both locally and further down the supply chain. Moreover, local communities might oppose new mining projects because they are adversely affected by them. This emphasises the fact that, to improve security of supply, governments, companies and civil society organisations have to invest in stable, well-functioning and hence sustainable raw material supply chains.

Impact on the climate and the environment

Mining is an energy-intensive industry that usually operates in remote areas with no existing infrastructure. Mining activities often contribute to deforestation, biodiversity loss and water scarcity. Ten percent of the world's forests have already been negatively impacted by large-scale mining and related practices.²⁶ According to research, around 29 tonnes of copper can be found in a single offshore wind turbine;²⁷ to extract this amount, miners have to move tonnes of earth and rock, which has a considerable impact on nature and biodiversity.

Extraction of critical raw materials also requires large volumes of water. Copper and lithium extraction, for example, have particularly high water requirements, yet more than half of this production is concentrated in areas with high levels of water stress.²⁸ Water sources and soil can become polluted because of the chemicals used in ore processing, for example, and mine tailings, which are often toxic. The collapse of tailings dams have caused major disasters in the past, and leakage can release waste into the environment. It is worth noting that mines are often located in areas that have protected forests, high water stress levels, and particularly valuable biodiversity.²⁹

Furthermore, the quality of current raw material deposits falls with rising demand, as in Chile, for example, where average copper ore grade has declined by 30% over the past 15 years.³⁰ Extracting metal content from lower-grade ores requires more energy and water per production unit and generates more mining waste.

Although the transition from fossil resources to critical raw materials for renewable energy technologies initially leads to a substantial reduction in CO₂ emissions, the production of critical raw materials also causes emissions that will eventually have to be reduced. According to the World Bank, aluminium, graphite and nickel production for renewable energy technologies account for a cumulative 1.4Gt CO₂eq up to 2050, nearly equivalent to the total 2018 CO₂ emissions from France, Germany and the United Kingdom combined.³¹

²⁶ World Bank (2019), ['Forest-Smart Mining: Identifying Factors Associated with the Impacts of Large-Scale Mining on Forests'](#), p.167.

²⁷ [Energy Monitor \(2021\), 'Why keeping an eye on copper is vital for the energy transition'](#)

²⁸ World Bank (2020), 'Minerals for Climate Action', p.12.

²⁹ International Resource Panel (IRP) (2020), 'Mineral Resource Governance in the 21st Century: Gearing Extractive Industries towards Sustainable Development'.

³⁰ IEA (2021), 'The Role of Critical Minerals in Clean Energy Transitions', p.12.

³¹ World Bank (2020), ['Minerals for Climate Action'](#).

Impact on people and society

Extraction and processing of raw materials also has impact on society. On the one hand, growing demand for critical raw materials can boost the socioeconomic development of resource-rich countries, for example through revenues in the form of wages and taxes, jobs and investment in infrastructure. Research by the World Bank³² has shown that, in mineral-dependent low- and middle-income countries, mining helps bring about a faster improvement in their Human Development Index (HDI) scores. On the other hand, there are also various problems: 1) direct human rights abuses in mining and production, including child and forced labour, poor working conditions, lack of safety protocols, and sexual violence; 2) systemic problems such as conflict financing, corruption, smuggling and gender inequality; 3) indirect problems such as health risks from environmental pollution; and 4) missed economic opportunities for the local population, including income lost in wages or tax revenues due to displacement by mining operations.

The nature and severity of the problems differ per supply chain and per country. A distinction should also be made here between industrial mining and refining, and artisanal and small-scale mining (ASM – see annexe 1C for further information), which in 80-90% of cases is informal and often takes place in remote areas or around large mines. ASM is associated with social problems, including child labour, health and safety risks, gender inequality and sexual violence.³³ At least 60% of global cobalt production, for instance, is sourced from the DRC, where 40,000 of the 255,000 cobalt mine workers are children.³⁴ An estimated 30% of ASM workers are women, though gender inequality means that they do not always benefit from the returns or have a voice in decision-making.³⁵

It is difficult to tackle the problems associated with extracting and processing raw materials, for one thing because mineral supply chains often lack transparency and involve many intermediate stages. There are also governance gaps at several levels.³⁶ At national level, there may be a lack of good legislation and enforcement in the areas of taxation, working conditions, etc. Corruption may also be rife, for example in permitting procedures and at border control checkpoints. This contributes to illegal trade and smuggling. Raw material extraction and illegal trade in unstable regions are therefore often the cause of, or the catalyst for, uneven economic development, conflict and conflict financing, and corruption. This is the case for critical raw materials such as cobalt, tungsten and tantalum, which are produced in conflict-affected and high-risk areas.

The growing demand for raw materials therefore offers opportunities for resource-rich developing countries, but responsible extraction and processing is essential to ensure that this contributes to sustainable development. Governments and industry will also have to aim for responsible, sustainable production so as to continue attracting investment and safeguarding competitiveness in a new economy, in which the focus is increasingly on high sustainability standards and low

³² World Bank (2014), 'The Contribution of the Mining Sector to Socioeconomic and Human Development'.

³³ GIZ (2020), 'Sexual Gender Based Violence in the Mining Sector in Africa'.

³⁴ Wilson Center (2020), '[The DRC Mining Industry: Child Labor and Formalization of Small-Scale Mining](#)'.

³⁵ GIZ (2019), '[Encyclopedia of Gender and Mining](#)'.

³⁶ IEA (2022), '[Why is ESG so important to critical mineral supplies, and what can we do about it?](#)'

emissions.

4. Areas of action

The Dutch government is focusing on five areas of action to improve critical raw material supply security:

- (1) circularity and innovation,
- (2) sustainable European mining and refining,
- (3) diversification,
- (4) greater sustainability in international supply chains, and
- (5) knowledge building and monitoring.

The problems outlined above are complex and of a structural nature, which is why the government is opting for a combined approach encompassing five areas of action, with a focus on the medium to long term in each. The raw materials strategy will help shape Dutch policy efforts at EU level in the areas of action listed above.

The government will work closely with relevant stakeholders: businesses, knowledge institutions, financial institutions and civil society organisations. Companies will largely have to address risks related to security of supply, planetary pressure and complex supply chains themselves. Unless public interests are at stake, government does not actively work to prevent price rises or interruptions in supply chains in the short term. If prices change, companies will have to alter their tactics, for example switching to other raw materials or passing on the increase to their buyers. The government can, however, intervene in the event of societal risks that companies cannot deal with on their own and that put public interests at stake. These risks – or public interests – form the starting point for the policy to be implemented.

The government prefers to address resource-related challenges at EU level. With its large internal market the EU has more bargaining power with third countries than the Netherlands on its own. Moreover, there are more (and different) critical raw materials across the whole EU than in each individual member state.

In 2011 the government in office at the time published a Raw Materials Memorandum, which also acknowledged the importance of focusing on sustainability in the context of production, reuse, recycling and lower consumption, and which emphasised the economic opportunities of innovation for the Netherlands. The memorandum also recommended bilateral policy, strategic partnerships and development cooperation. A few aspects of policy have been put into effect and are touched on below. In some cases, we will have to strengthen policy, while in others the government is announcing new actions.

The government intends to appoint a Special Envoy for the Raw Materials Strategy, who will contribute to achieving this strategy internationally. Among the envoy's tasks will be to promote the Netherlands' interests on the international stage through bilateral cooperation and influencing the EU's CRMA.

4.1. Circularity

Using available critical raw materials as efficiently as possible increases security of supply while also reducing the negative impact of supply chains. We can do this by adopting four circular strategies: reducing raw materials usage, substituting raw materials, extending product lifespan and ensuring high-grade processing (see also text box below).

Circularity benefits society in four ways: (1) mitigation of climate change (preventing greenhouse gas emissions), (2) a cleaner environment (better air, water and soil quality), (3) restoration of biodiversity and (4) increasing security of supply of raw materials. Reusing products, parts and raw materials is generally less energy-intensive and has less environmental impact than using primary raw materials. For example, producing steel from recycled scrap instead of iron ore consumes 72% less energy.³⁷

Circular strategies

Circular economy policy identifies four ways of making the use of materials more circular. These are based on the policy brief by the Netherlands Environmental Assessment Agency (PBL). This is in fact a simplified version of the R-strategies (see Figure 5 in annexe 1):

1. Reducing raw materials usage (input): using fewer (primary) raw materials by abstaining from the production or purchase of products, making them more efficient, or sharing products ('narrowing the loop').
2. Substituting raw materials: replacing finite raw materials with renewables (secondary raw materials and sustainable bio-based materials in high-grade applications), or with other, more generally available raw materials with a lower environmental burden.
3. Extending product lifespan (use): making longer and more intensive use of products and components through circular design, reuse and repair; this slows down demand for virgin raw materials ('slowing the loop').
4. High-grade processing (loss prevention): recycling materials and raw materials, reducing the amount of waste being incinerated or landfilled and ensuring a more high-grade supply of secondary raw materials, thus decreasing demand for virgin raw materials ('closing the loop').

When talking about circularity, we often think of recycling, but it is more than that. The R-strategies are important in this context. This is a set of circular strategies for using raw materials more efficiently (see text box).³⁸ The R-strategies imply that we look differently at raw materials right from the design and production phase.³⁹ Substituting materials – choosing raw materials that have a smaller footprint or are less scarce – is one of these circular strategies. For example, a lot of iridium is required as a catalyst for hydrogen production when PEM electrolyzers are used, but alkaline electrolyzers use very few critical metals. Refurbishment of digital equipment is another way to reduce our consumption of primary critical and non-critical raw materials. By shifting our focus to circular strategies with the highest 'R value', such as refuse or reduce, we will make most impact

³⁷ Netherlands Environmental Assessment Agency (PBL) (2022), Circular Economy Progress Report.

³⁸ PBL (2021), 'Policy brief – Possible objectives for a circular economy'.

<https://www.pbl.nl/en/publications/possible-objectives-for-a-circular-economy>.

³⁹ [Ecodesign for sustainable products | European Commission \(europa.eu\)](https://ecodesign.europa.eu/codesign/en/10-circular-design-principles).

Buildings, infrastructure and goods such as televisions, batteries and electrical appliances contain large amounts of sometimes costly raw materials. They could be regarded as a kind of urban mine from which resources can be extracted. By preserving raw materials that are already in the production chain, reserves will be accumulated that can be used over and over again.

If circular strategies are to be implemented, innovation will be an important factor. This opens up strategic opportunities for Dutch companies. At the moment, many are already actively engaged in circular practices, especially when it comes to recycling. With an 80% waste recycling rate (albeit mainly low-grade recycling), the Netherlands is one of the frontrunners in Europe.⁴⁰ Innovative industrial players could design wind turbines, batteries and solar panels in such a way that the critical materials they contain can be extracted at the end of the product's life and reused for production purposes. Annexe 1F describes the action taken on batteries and identifies best practices.

The government is planning to take the following specific actions:

- The National Circular Economy Programme 2023-2030 (NPCE) will be presented in early 2023⁴¹ and will outline the main policy to be pursued at national level to achieve the goal of making the Netherlands fully circular by 2050. The Secretary of State for Infrastructure and Water Management is coordinating the government-wide Circular Economy Programme. This programme and the raw materials strategy are complementary and can reinforce each other in terms of increasing security of supply in the medium term and reducing the adverse effects of extraction and processing of critical raw materials on people and the environment. The raw materials strategy will focus particular attention on the actions to be taken within and outside the EU to achieve these objectives. These actions will also be closely linked to societal goals and activities that will soon form part of the NPCE.
- In the further elaboration of the EU CRMA, the Netherlands is pressing for the implementation of circular strategies, preferably with the highest 'R-value' as possible.
- The government will encourage innovation focused on the urban mine, including modular design of energy infrastructure and recovery of critical materials from waste. We will do this by means of:
 - Mission-driven innovation policy: in 2023 the knowledge and innovation agendas of the mission-driven innovation policy will be updated, in line with this government's priorities. Special attention will be devoted to the three transitions (climate & energy transition, digitalisation and the circular economy) and key technologies. Innovation aimed at circularity of critical raw materials also plays an important role in achieving a circular economy.
 - The National Growth Fund (NGF): in developing proposals for the third round of the NGF, the Ministry of Economic Affairs and Climate Policy will focus on the three transitions mentioned in the coalition agreement, which includes the circular economy. The Ministry

⁴⁰ PBL, Integral Circular Economy Report 2021, p.15.

⁴¹ As promised by the Secretary of State for Infrastructure and Water Management during the debate with the parliamentary committee on circular economy on 2 November 2022.

is currently working with partners on proposals concerning biobased chemicals, circular PV panels and circular battery technology. The Ministry of Infrastructure and Water Management is drawing up proposals on circular concrete and a NGF project on circular plastic is ongoing.

- Procurement policy: the Ministry of Economic Affairs and Climate Policy is including circularity criteria in tenders for wind farms and for the development of solar panels.⁴² We can gradually extend this to other public works contracts, such as for defence, telecoms or construction. This will create an urban mine of products that the government itself procures, from which critical raw materials can be recovered.
- Customised agreements for sustainability in industry: the government is exploring the options for helping companies with ambitious circular projects, for example by making targeted policy interventions to develop markets for new sustainable products.
- Due to the international character of product supply chains, the government is also promoting circular economy in developing countries.

4.2. Sustainable European mining and refining

In view of the global demand for critical raw materials as a result of the energy and digital transitions, Europe, too, has a duty to increase its production capacity of these resources, by extracting these minerals from European soil and scaling up refining and processing capacity. Moreover, onshoring some raw material extraction and refining capacity would reduce strategic dependencies (and increase strategic autonomy) and – provided high sustainability standards are set – lower the environmental burden. However, EU-sourced minerals will be more expensive than those from countries with lower standards.

The government will support upscaling European mining, firstly by being constructively involved in the discussions on the forthcoming CRMA. The Netherlands also considers it important that mining be done sustainably, as is already the case with lithium extraction in Portugal, and will therefore advocate mining in places where external effects can best be minimised. Secondly, by means of an impact assessment we want to obtain insight into the extent to which critical raw material deposits in the EU would be able to cover demand, and thus clarify to what extent these can offer supply security. Thirdly, we believe it is important to support mining with refining capacity in Europe to prevent raw materials having to be processed in third countries such as China, which only serves to perpetuate strategic dependencies. The role the Netherlands can play here is limited by the fact that we have scarcely any critical raw materials; nevertheless, we can contribute financial resources, knowledge and expertise.

In specific cases, keeping strategic reserves could potentially mitigate risks in the short term, as happens now with oil and gas, although it would require complex strategic, political, financial and technical choices to be made. Strategic stockpiling is most effective when coordinated at EU level, but this is complicated by the fact that the EU is more dependent on components containing critical raw materials than on the critical raw materials themselves.

⁴² Parliamentary Paper, House of Representatives 2021-2022, 32813, no. 1046.
AVT22/BZ-221227-002

It only makes sense to have strategic reserves if they are closely coordinated with existing or planned mining and refining operations in Europe. The debate should therefore also focus on possible strategic reserves for components and is linked to the European Commission's proposal for a Single Market Emergency Instrument (SMEI). Another factor is that the criticality of raw materials and components may change over time, for example as new materials are developed, which could result in certain stocks having less benefit in the future. Furthermore, stockpiling is part of companies' supply chain management, and government will only intervene to protect public interests. A case-by-case approach is needed, weighing up the costs and benefits of different policy options. Diversification will often turn out to be less expensive than stockpiling.

The government is planning to take the following specific actions:

- Make a constructive contribution to the European mining section of the CRMA. Focus on sustainable conditions, impact assessment and scaling up refining.
- Integrate the raw materials strategy as a strategic opportunity into industrial policy by exploring the pros and cons of refining capacity in the Netherlands.
- At EU level, assess the possibilities, necessity and creation of strategic reserves.

4.3. Diversification

By diversifying the supply of raw materials (processed or otherwise), we reduce our strategic dependencies and increase our open strategic autonomy. Although companies are responsible for their own value chain, government can facilitate and promote diversification in various ways at both national and EU level. The government is planning to take the following specific actions: support EU raw materials partnerships, step up the role of the network of diplomatic missions, examine the role of Dutch businesses in international supply chains, and study export credit insurance and possible other financial instruments. The government is striving to establish stable trade relations with key trade partners. In long-term, enduring partnerships, security of supply and sustainability reinforce each other.

At EU level, the EU can enter into raw materials partnerships by means of trade agreements or by concluding independent partnerships. These sorts of agreements are becoming increasingly strategic. Developing raw materials partnerships is one aspect of the Commission's Action Plan on Critical Raw Materials. Talks on future partnerships are still ongoing (see annexe 1G for a summary of existing and future partnerships). The partnerships may relate to various stages of the value chain, including extraction, refining and further processing, as the EU depends on imports of components containing raw materials. The underlying principle is that the partners work together on an equal footing. Partnerships are formed with both developed and developing countries. The Netherlands and the EU also work with like-minded countries in multilateral forums (see annexe 1H for a summary), where discussions cover such topics as supply risks, international standards and opportunities for knowledge-sharing.

Trade agreements may include undertakings to reduce or prevent trade-restrictive measures for critical raw materials (e.g. duties and quotas), promote sustainable extraction and improve market access for European businesses (see annexe 1I for examples). Such undertakings may also

encourage investments and exploitation of critical raw materials in third countries. In independent partnerships, various agreements may be made about, for instance, reciprocal adaptation of policy and regulatory frameworks for mining, integration of value chains, and research and innovation. One example of an independent bilateral partnership is the July 2021 Memorandum of Understanding (MoU) between the EU and Ukraine on raw materials. The EU-US Trade and Technology Council also addresses the issue of critical raw materials, for example for the semiconductor value chain.

At national level, we can focus more strongly on economic diplomacy and providing services through our embassies abroad. Economic diplomacy should not be limited to like-minded countries. With a view to diversification, we should also engage in dialogue with less like-minded nations, while upholding our norms and values. In this context, it is important for our embassies and the local EU representatives to work together and coordinate their efforts. Our embassies also monitor the raw materials policy of their host country and report back to The Hague. The current plan to expand the mission network, which includes stepping up efforts in the area of economic security, will also focus on implementing the raw materials strategy.

The Netherlands has no multinational mining companies that supply critical raw materials, but there are internationally operating Dutch companies that provide related services. If necessary, our embassies in resource-rich countries can facilitate contact with local authorities. For this purpose, the government will identify which Dutch firms are internationally active in the mining industry and in trading and processing critical raw materials. In addition, the government will study how export credit instruments, such as investment insurance, can be used to help companies wishing to invest in securing access to critical raw materials. The study will also look at what other countries are doing in this area.

As the need to extract sufficient critical raw materials to support important transitions becomes more urgent, the potential contribution that deep-sea mining can make to global production and security of supply is attracting more and more interest. Various critical metals and minerals, such as cobalt, manganese, nickel and copper, can be sourced from the deep seabed. The actual contribution of deep-sea mining is difficult to assess at present. This is because, on the one hand, the deep seabed is still being explored to ascertain the quantities of critical raw materials present, while on the other, demand for these materials may change in the future as a result of technological developments.

Many of the potentially important deposits are located in waters outside state jurisdiction, i.e. to which, in principle, any sovereign state can lay claim under international law. Here, too, China and Russia are now developing strategic positions. Given our highly developed maritime industry, the Netherlands could do the same, following the example of a few other European countries.

Under the UN Convention on the Law of the Sea, exploration and exploitation may only take place with the approval of the International Seabed Authority, which is currently working on the rules under which exploitation will be permitted, given concerns about the impact of future exploitation activities on the marine environment. There is an ongoing international debate about deep-sea mining, partly because scientists do not yet have enough data to accurately determine its effects.

The government will formulate a definite stance on this subject in due course and will also consider

it in the context of this strategy, adopting the basic principle that exploitation activities may only take place if the carrying capacity of the marine environment is not exceeded. From the point of view of security of supply, dependencies in the processing chain will also be examined, in connection with possible refining capacity in the Netherlands. See annexe 1E for further information about deep-sea mining.

The government is planning to take the following specific actions:

- Within the EU, the government will continue to actively promote efforts to enter into and build on partnerships on raw materials (processed or otherwise), including with countries in Africa and Latin America.
- With regard to expanding the role of the mission network, efforts focusing on the topics of economic resilience and security will also address the implementation of the raw materials strategy, with support from The Hague.
- The government will identify which Dutch firms are internationally active in the mining industry and in trading and processing critical raw materials.
- The government will identify the scope for using the export credit instruments of Atradius Dutch State Business and possible other financial instruments, such as those of Invest International, Invest-NL and the Netherlands Enterprise Agency RVO.
- The government will adopt a definite stance on deep-sea mining.

4.4. Greater sustainability of international supply chains

The way in which critical raw materials are extracted and processed is vital. Only if this is done responsibly can the UN Sustainable Development Goals and climate and environmental goals be achieved. In addition, the materials transition provides an opportunity to alleviate poverty in resource-rich developing countries. With this in mind, the government is working through Dutch programmes and with EU partners to make supply chains more sustainable. This is consistent with the approach that foreign trade and development cooperation strengthen each other.⁴³ Since 2011, when the previous Raw Materials Strategy was published,⁴⁴ the Netherlands has played a key role internationally in advocating for and shaping partnerships that drive sustainable supply chains. We can build on these efforts.

As the critical raw materials situation becomes more pressing, further action is needed both within and outside the EU. In the Action Plan on Critical Raw Materials,⁴⁵ one of the areas the EU focuses on is promoting responsible mining practices through the EU regulatory framework and relevant international cooperation. With regard to the forthcoming CRMA, the Netherlands will call for a more ambitious development portfolio to be developed and implemented and for public-private

⁴³ 'Do what we do best: A strategy for Foreign Trade and Development Cooperation', Parliamentary Paper, House of Representatives 2021-2022, 36180, no. 1. This approach is also incorporated into the Global Climate Strategy and will have an impact on the forthcoming Africa Strategy.

⁴⁴ Letter to parliament on raw material supply security, Parliamentary Paper, House of Representatives 2010-2011, 32852, no. 1.

⁴⁵ European Commission (2020), 'Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability'.

finance to be leveraged for this purpose. The EU's Global Gateway⁴⁶ presents opportunities to use investments to make raw material supply chains more sustainable. It is essential to the Netherlands that efforts be made to ensure that the various EU initiatives to promote sustainable supply chains are consistent, so as to increase effectiveness and viability. The expertise of organisations such as the International Resource Panel and the World Resources Institute could be useful here. Alongside its efforts at EU level, the Netherlands is promoting more sustainable raw material supply chains through its own programmes and national RBC policy. Based on the final version of the CRMA, we will also review our own relevant policy instruments and adjust them where necessary.

The Netherlands is working within the EU and international forums to ensure that equal partnerships with resource-rich developing countries, a just transition and more sustainable raw material supply chains are the cornerstones of policy. Until now, the sector has rightly concentrated on addressing serious social problems such as child labour, particularly in relation to conflict minerals (annexe 1K explains this concept). That focus will have to be broadened, however, in order to step up action on environmental and climate challenges in the sector.

Calling attention to and quantifying impact

Reducing our footprint in raw material supply chains starts with quantifying its impact and putting the issue on the agenda. Many battles still have to be won here, in terms of research and raising both awareness and the profile of the issue. This is because the term footprint has multiple facets: potentially, it may concern deforestation, water consumption, biodiversity loss and poor working conditions. Policy coherence at both national and EU level is also important. The World Bank's publication 'Minerals for Climate Action', financed by the Netherlands, has already put this thinking on the map.

The government is planning to take the following specific actions:

- Together with like-minded countries, the Dutch government will continue to draw attention to the impact of the transitions on climate and developing countries, within both the EU⁴⁷ and the UN.
- Advocate new research, such as analysis of the different social and environmental risks in all critical raw material supply chains.
- Promote coherence of policies concerning Dutch production and consumption of and trade in raw materials, as set out in the revised Action Plan on Policy Coherence for Development.
- More actively link mining to policy objectives on deforestation, biodiversity and water, for example by raising the matter of water use in the mining industry at the UN 2023 Water Conference.

Responsible business conduct (RBC)

⁴⁶ Global Gateway is a new European strategy to channel investments in order to boost smart, clean and secure links in the digital, energy and transport sectors.

⁴⁷ For example, in relation to the CRMA and in the EU's strategic framework for the Great Lakes region in the DRC.

Many companies in the EU and the Netherlands are located in the downstream part of supply chains that begin with critical raw materials. By applying the OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights (UNGPs), they can contribute to making practices in their supply chains more sustainable.

A few years ago, the Netherlands called for the EU to introduce the Conflict Minerals Regulation,⁴⁸ which came into force in 2021 for importers of tin, tantalum, tungsten and gold. Other EU initiatives that concern the raw materials sector are also ongoing, such as the proposed Corporate Sustainability Due Diligence Directive (CSDDD), the Corporate Sustainability Reporting Directive (CSRD),⁴⁹ the proposed Battery Regulation⁵⁰ and the proposed Regulation to prohibit the import of goods made using forced labour.⁵¹ The government sets store by these measures being consistent so as to boost feasibility and effectiveness. Another key aspect is that developing countries should benefit from these agreements. Within the OECD, the Netherlands is advocating that circularity and environmental risks be included in, for example, the OECD Guidelines for Multinational Enterprises and the OECD guidance for minerals.

On the domestic front, the Netherlands is introducing RBC legislation. The government also recently set up the RBC support office, which provides companies with information about responsible business practices, and stepped up support for sector-wide initiatives with a new grant scheme launched in September 2022. In the final two years of the voluntary RBC agreement for the metals sector, the focus will be on the participating companies carrying out due diligence collectively and individually. Negotiations led by the Social and Economic Council are also currently taking place to reach a voluntary RBC agreement on renewable energy. Lastly, the government encourages sustainable public procurement at central government level, where there are genuine risks in critical raw material supply chains (see annexe 1L for further details).

The government is planning to take the following specific actions:

- Pursue RBC policy as part of a smart mix of policy measures, including legislation.
- Focus on ensuring consistency between the various RBC measures in the EU that concern the raw materials sector.
- Ensure that developing countries benefit from new European legislation and international agreements by pushing for impact assessments, and that these countries are also involved in shaping these measures.
- Actively participate in the review of the Conflict Minerals Regulation, the final report on

⁴⁸ The Conflict Minerals Regulation aims to ensure legal, responsible trade in minerals sourced from conflict-affected and high-risk areas, based on the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, which focuses on gross human rights violations such as forced labour and the worst forms of child labour.

⁴⁹ The Corporate Sustainability Reporting Directive (CSRD) will significantly expand the group of companies required to report annually on environmental, social and employment issues, respect for human rights, and anticorruption and bribery measures (sustainability risks). The CSRD will progressively come into force in 2024.

⁵⁰ The Battery Regulation aims to improve the sustainability of batteries throughout their entire life cycle – from extraction of raw materials through to recycling after use – to protect human health and the environment. The due diligence obligation relates to the purchase and processing of and trade in primary and secondary raw materials needed to manufacture batteries.

⁵¹ [European Commission \(2020\), Proposal for a Regulation of the European Parliament and of the Council on prohibiting products made with forced labour on the Union market.](#)

which is due to be completed by about July 2023.

- In discussions on the revision of the OECD Guidelines for Multinational Enterprises, explore whether a new section can be included following up on specific recommendations for circular business practices. Regarding the OECD guidance for minerals, the Netherlands is advocating that climate and environmental risks be included.

Responsible mining practices

In addition to RBC policy, the Netherlands promotes more responsible, sustainable mining in resource-rich countries through partnerships and programmes. Over the past ten years, in conjunction with a few other countries, we have highlighted the need to green the mineral sector, both within the EU and around the world, provided financial support where necessary and set up a number of international (multi-stakeholder) initiatives that continue to grow. At EU level, the Netherlands was one of the initiators of the European Partnership for Responsible Minerals (EPRM) (see further details in annexe 1M), funding for which was extended for a further five years in 2021. We were also involved in launching the International Tin Supply Chain Initiative (ITSCI), which enables companies to source conflict-free tin from the DRC, and joined forces with a number of knowledge partners to establish the Women's Rights and Mining network.

The lack of information about the complete footprint of the energy transition prompted the Netherlands to support research by the World Bank into the role of critical raw materials in this transition.⁵² The World Bank's Climate Smart Mining (CSM) initiative was subsequently launched with funding from the Netherlands, with the aim of developing strategies and instruments for a more sustainable approach to mining.

Since 2021 the Netherlands has cofinanced the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), an alliance of 80 countries and the only global forum for member governments to discuss this topic. The IGF has developed a framework for responsible mining policy and helps countries implement it. Furthermore, as a member of the Extractive Industries Transparency Initiative (EITI), the Netherlands promotes transparency in financial flows within the industry. In the unstable Great Lakes region in the DRC, where many critical raw materials are sourced, the Dutch government is striving for better certification mechanisms and stronger local policy to combat illegal money flows and trade in the mineral sector. Our efforts to improve labour standards, infrastructure and tax policy are also helping to create favourable conditions for sustainable mining. International financial institutions, such as the African Development Bank (AfDB), support the mining industry in developing countries by advising on regulatory matters and transferring knowledge. Through the International Monetary Fund, for instance, the Netherlands provides more than 30 countries with technical assistance on good financial and fiscal management of natural resources. As a country, we also have a responsibility to tackle international tax avoidance.

The government also considers it important for the voice of local communities, particularly women, to be heard in the mining sector and for them to be able to influence decisions that directly affect them. We are therefore working with partner organisations to strengthen local

⁵² World Bank (2020), '[Minerals for Climate Action](#)'.
AVT22/BZ-221227-002

civil society (e.g. through the Policy Framework for Strengthening Civil Society).⁵³

European leadership in setting international standards for responsible extraction, processing and recycling of critical raw materials is an important aspect of the European energy transition. The extent to which European parties are successful in this will affect Europe's competitiveness and the protection of European values, which include consideration for people and the environment in the supply chain.

The government is planning to take the following specific actions:

- Continue building on existing partnerships, support international forums and work with the World Bank.
- Put more emphasis on critical raw materials, environmental and climate issues, and gender equality (in line with feminist foreign policy).
- Shape a just transition, for example by engaging in effective diplomacy and dialogue on an equal footing with all groups involved. The Advisory Council on International Affairs is currently preparing an advisory report on the energy transition and a just transition.
- The government will investigate what role Dutch development bank FMO and international financial institutions such as the European Investment Bank, the International Finance Corporation (IFC), AfDB and the European Bank for Reconstruction and Development (EBRD) can play in making raw material extraction in developing countries more sustainable.
- The Netherlands will also strive for an ambitious EU programme and for public and private funding to make raw material supply chains more sustainable through EU initiatives relating to raw materials, such as Global Gateway and the European CRMA.
- The Netherlands and the EU will campaign for closer cooperation focusing on information-sharing, coordination and enlarging the EU's influence in international standardisation organisations, as well as on responsible extraction, processing and recycling of critical raw materials.

4.5. Knowledge building and monitoring

Knowledge building and monitoring are needed to be able to pursue a proactive policy on raw materials. This is part of broader efforts designed to accumulate knowledge of and monitor strategic dependencies. Fortunately, the independent research organisation TNO, universities, the European Commission and other EU member states have already accumulated a wealth of knowledge. The German Mineral Resources Agency (DERA), for example, analyses international commodity markets, identifies price and supply risks, and explores the potential for substitution and improving efficiency. Belgium recently announced its intention to set up an observatory for raw materials under the Federal Institute for Sustainable Development (FIDO/IFDD). Beyond the EU, South Korea's Economic Security Center monitors value chains and analyses trends in critical

⁵³ For example, under the Reclaim Solidarity! Programme Solidaridad is working to improve labour conditions in the gold industry. Furthermore, the Fund against Child Labour and the Fund for Responsible Business offer companies financial support to work with civil society organisations in tackling abuses in their chain, including in the gold and cobalt industries.

materials.

The Netherlands considers it important to use and pool existing knowledge and to clarify what raw materials and related strategic components and finished products are most relevant from a geo-economic and sustainability point of view. Besides European monitoring, we are therefore committed to introducing a Dutch monitoring system, which will include a methodology for determining which raw materials and related strategic components and finished products are critical for the Netherlands. This is known as a criticality analysis. This methodology will be in line with the European school of thought (see annexe 1J). It is vital that the Dutch monitoring system is compatible with the circular economy monitoring system and the associated integral circular economy reports (ICER) published by the PBL.

It is also important to regularly review the policy. By having a better understanding of the current situation regarding security of supply, we can ensure that the economy is more resilient in the long term. In the context of the CRMA, the Netherlands considers it important to investigate what roles circularity and the urban mine can play in improving security of supply and availability of critical raw materials in the EU.

The Dutch online tool *Grondstoffenscanner* provides businesses with information about the types of raw materials needed for various finished products. In this way it contributes to knowledge-sharing and enhances awareness amongst its users. RVO maintains the instrument and also has programmes for Dutch companies on the subject of raw materials and circularity. The government is aiming to make further improvements to the *Grondstoffenscanner*.

The Netherlands will also strive for better knowledge exchange between like-minded countries, for example by improving collaboration with German and Belgian research institutes. We will also advocate that joint European monitoring and knowledge-sharing be included in the Critical Raw Materials Act. To be a good partner, the Netherlands will also need to invest in its own knowledge position.

Studies are currently ongoing to gain more insight into value chains and dependencies. The pilot version of the geo-economic monitor will soon be launched (developed by SEO Amsterdam Economics, the Clingendael Institute (the Netherlands Institute of International Relations) and TNO for the Ministry of Economic Affairs and Climate Policy and the Ministry of Foreign Affairs). The Ministry of Economic Affairs and Climate Policy has commissioned Statistics Netherlands (CBS) to look into ownership concentration in supply chains (study due to be completed in the second quarter of 2023), and TNO is investigating the relationship between strategic products and public interests for the Ministry of Foreign Affairs (first phase will be completed in 2023).

5. Looking ahead to 2023

We shall endeavour to report back to the House by summer 2023 on how the objectives and follow-up actions are being taken forward and translated into a programmatic approach that is closely aligned with the National Circular Economy Programme. When the above objectives are worked out in greater detail, the additional resources needed will be specified. Below are specific follow-up

actions that arise from this raw materials strategy and that the government – in addition to the coherent policies it is already implementing – will revisit next year:

- Integrate the raw materials strategy into mission-driven innovation policy by focusing on circularity of critical raw materials in the latter (see 4.1).
- Integrate the raw materials strategy as a strategic opportunity into industrial policy by exploring the pros and cons of refining capacity in the Netherlands (see 4.2).
- Determine the Netherlands' position with regard to the potential of mining for critical raw materials in Europe and advocating this position in the context of the CRMA.
- Building knowledge on and monitoring raw material supply chains (see 4.5).

The government intends to appoint a Special Envoy for the Raw Materials Strategy, who will contribute to achieving this strategy internationally.

Annexe 1: Further information and definitions

1A. Critical and other raw materials

European countries, including the Netherlands, are heavily dependent on imports of virgin and processed raw materials, though not to the same extent for all such materials. The European Commission has its own definition of what a 'critical' raw material is;⁵⁴ moreover, many countries conduct their own risk assessment. Generally, attention has focused on minerals and metals that have to be extracted in a specific way, where extraction activities are concentrated in a few countries, where future demand for these materials will grow fast and production often cannot keep up with demand. Critical raw materials are used in relatively small volumes compared with fossil resources, but are essential because of the role they play. Important examples – with highly geographically concentrated dependencies – include rare earth elements such as neodymium, as well as iridium, silicon, lithium, cobalt and phosphorus.

This strategy focuses on critical raw materials because, by definition, they play an important role in our future economy and have the highest supply risk. Nevertheless, other raw materials may also be affected by the issues outlined here.

Fossil resources such as petroleum and natural gas, biotic raw materials such as sugar, grain or timber and pharmaceutical ingredients for medicines are not defined as critical raw materials. Then there are other raw materials – such as sand, salt⁵⁵ and gravel – that are not yet classified as critical because there is no significant supply risk at the moment.

Clearly, all these raw materials are important in addressing the challenges facing our country, for instance in the areas of construction, health and agriculture. The thinking that the government puts forward in this raw materials strategy can also be applied to other raw materials, not just those termed critical. This does, however, call for further analysis and a tailored response. There are already policies on fossil resources, agricultural commodities, pharmaceutical ingredients and green hydrogen,⁵⁶ but these are outside the scope of this strategy.

⁵⁴ European Commission (2020), 'Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability'.

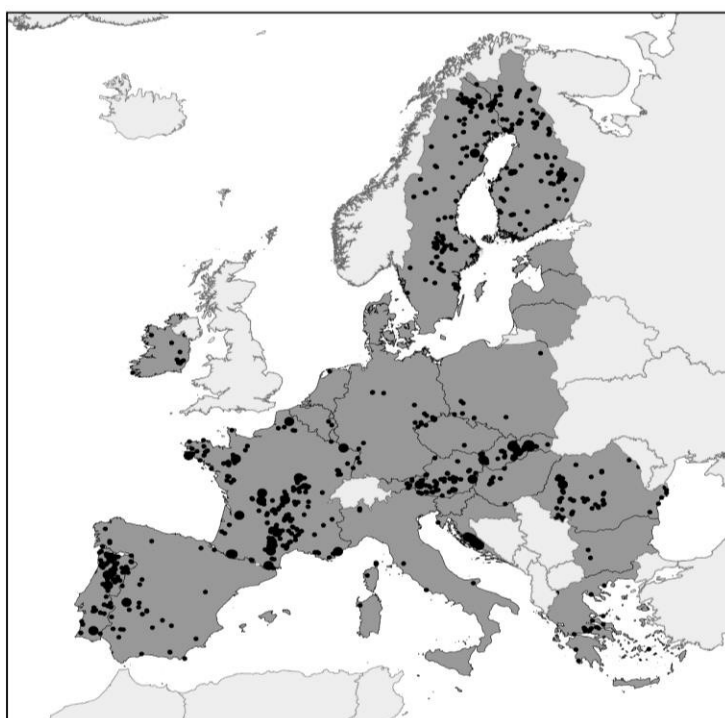
⁵⁵ At the request of the House of Representatives, a salt extraction strategy is currently being developed. The Secretary of State for the Extractive Industries will present this to the House in January 2023.

⁵⁶ For example, the national protein strategy (Ministry of Agriculture, Nature and Food Quality, December 2020) and the letter to parliament on the policy agenda for pandemic preparedness (Ministry of Health, Welfare and Sport, April 2022).

2020 EU Critical Raw Materials List (new raw materials added since 2017 are in bold)		
Antimony	Hafnium	Phosphorus
Baryte	Heavy rare earth elements	Scandium
Beryllium	Light rare earth elements	Silicon metal
Bismuth	Indium	Tantalum
Borate	Magnesium	Tungsten
Cobalt	Natural graphite	Vanadium
Coking coal	Natural rubber	Bauxite
Fluorspar	Niobium	Lithium
Gallium	Platinum group metals	Titanium
Germanium	Phosphate rock	Strontium

Figure 3. European Commission's list of critical raw materials

CRITICAL RAW MATERIALS POTENTIAL IN THE EU



Data provided by EuroGeoSurveys combined with other EU data sources

Figure 4. Deposits of critical raw materials EU-27 (2020) (Source: COM/2020/474/Final)

1B. Open strategic autonomy and public interests

Within the EU, the Netherlands is a strong champion of open strategic autonomy (OSA). For the Dutch government, the EU's open strategic autonomy represents its ability, as a global leader, to safeguard its public interests, working with international partners and relying on its own insights and choices, and to be resilient in an interconnected world. Mitigating the risks of strategic dependencies (e.g. on critical raw materials) is one of the three key tenets of the Dutch approach

to this subject within the EU. An open economy, international cooperation with like-minded partners, a level playing field and diversification are important items on the OSA agenda.⁵⁷

Public interests are societal interests that are not satisfactorily served by the market in a particular country or region, with the result that the government takes over the task. Social and political views play a major role here. This makes public interests context- and time-dependent. Public interests include finding solutions to societal challenges (the energy transition and digitalisation), circular economy, national security, public health, future earning capacity and, in a broad sense, our fundamental values.

1C. Artisanal and small-scale mining (ASM)

The number of people employed in ASM worldwide has tripled over the last decade to almost 45 million across 80 countries. With the price of minerals rising, this form of mining offers poor people an alternative source of income to farming, which tends to be less lucrative. ASM plays a significant role in the production of critical and other raw materials, accounting for 18-30% of total cobalt production, 26% of all tantalum, 25% of all tin and 20% of all gold. Many artisanal and small-scale mines are located around industrial mines, with the result that raw materials extracted through ASM (sometimes illegally) end up in the reserves of the latter. ASM includes both formal and informal mining operations with predominantly simplified forms of exploration, extraction, processing and transportation. ASM is less capital-intensive and more labour-intensive compared with large-scale mining (OECD, 2019).

1D. Initiatives at European level

The European Commission launched a strategy specifically for raw materials in 2008, with the aim of safeguarding security of supply. Since 2011, the EU has published an updated list of critical raw materials for Europe every three years. In 2020, armed with this information, the Commission developed an Action Plan on Critical Raw Materials and set up an industrial alliance with stakeholders dealing with critical raw materials. Although the actions set out are proceeding according to plan and other important strategies are already in place, such as the Circular Economy Action Plan, the current context of growing demand for critical raw materials and increasing geopolitical instability would appear to be pushing the Commission to take a stronger policy line.

In her State of the Union address, Commission President Ursula von der Leyen announced the launch of the European Critical Raw Materials Act (CRMA). The CRMA, for which the Commission plans to present a proposal in 2023, should ensure that the EU sets out clear priorities regarding which critical raw materials it wishes to use and should set objectives for capacity at different stages of the value chain (e.g. exploration, extraction and refining). Other aims are to ensure better monitoring and risk management by setting up an early warning mechanism, and to improve information exchange, for example between national agencies. Strategic projects in the EU should be identified and developed, and there should be better access to finance for projects within and outside the EU. Finally, the Commission intends to strengthen the framework for circularity and material efficiency and enhance cooperation to build up strategic reserves.

⁵⁷ See the [letter to parliament on open strategic autonomy \(OSA\)](#) of 8 November 2022 (in Dutch) for further details about the key tenets of the Dutch approach to OSA.

Outside the context of the Act, the Commission also wants to forge stronger strategic partnerships with third countries, step up research and innovation on raw material efficiency, recycling and substitution, and ensure that the EU has sufficient skills in the field of raw materials.

1E. Extraction at sea

Deep-sea mining could potentially create opportunities for securing a more diverse supply of critical raw materials and increasing our open strategic autonomy. Various critical metals and minerals, such as cobalt, zinc, manganese, nickel and copper, could be sourced from the deep seabed. Cobalt is already a critical raw material for the EU, and although copper, manganese and nickel have not yet been classified as such, they play an essential role in the economy and a renewable energy system.

Many deposits are located on the deep seabed outside the national jurisdiction of coastal states, where, in principle, any sovereign state may undertake extraction operations. The International Seabed Authority (ISA) is currently developing regulations to govern the exploitation of mineral resources. China and Russia have also acquired a strategic position in this area and, like a few European countries, have received one or more exploration contracts.⁵⁸

It should be noted, however, that deep-sea mining is still at the development stage, so exploitation is not yet an option. The technology is not proven, and the regulations still have to be hammered out. Deep-sea mining technology is advancing faster than expected, though, making it a likely prospect in the relatively near future.

There may be a significant role for the Netherlands here. We have a strong, sustainable maritime industry, which could play an active part in securing access to critical raw materials by means of deep-sea mining, since it is this industry that carries out extraction operations on the deep seabed.

However, there is also great concern about the detrimental consequences and risks of deep-sea mining for the marine environment and for ecosystems on the deep seabed. This is currently the subject of much research, including by Dutch knowledge institutions. The Netherlands is advocating that strict rules on the protection of marine habitats should be in place before exploitation begins. There is still a great deal of uncertainty at this stage about the disruptive effects of deep-sea mining on the marine environment and deep-sea life, which is why a number of scientists and environmental organisations, as well as a few countries, are calling for exploitation to be postponed, at least temporarily, until more is known about it.

The government still has to adopt a definite stance on deep-sea mining,⁵⁹ which will be based on strict implementation of the precautionary principle and the cumulative effects approach. The basic principle is that exploitation activities should only take place if the carrying capacity of the marine environment is not exceeded. In considering its stance, the government will also take into account

⁵⁸ ISA has currently issued 31 exploration contracts involving the following countries: Belgium, Brazil, Bulgaria, China, the Cook Islands, Cuba, the Czech Republic, France, Germany, India, Jamaica, Japan, Kiribati, Nauru, Poland, Russia, Singapore, Slovakia, South Korea, Tonga and the UK. See [ISA Annual Report 2022 ENG Chapter4.pdf](#).

⁵⁹ Parliamentary questions 26/4, answers 4/7, 2021-2022, no. 3380.

this strategy and the Netherlands' potential future refining capacity, as well as the potential contribution of deep-sea mining to the security of supply of critical raw materials.

1F. Batteries

One of the measures required to improve the sustainability of transport and the energy system is energy storage, and here batteries play a key role. Central government launched a battery strategy in 2020 to ensure that the increased use of batteries would be responsible, sustainable and safe.

Batteries currently sold contain scarce raw materials such as lithium, cobalt, nickel and graphite, which tend to be geographically concentrated (for example, 80% of global cobalt production happens in the DRC). Moreover, extraction often involves environmental, social and governance challenges. Current research largely focuses on reducing the content of these raw materials, especially cobalt. Innovation is also driving the development of new battery types that do not contain these raw materials at all, such as LFP, sodium-ion, redox flow and seawater batteries. Promising Dutch startups are working on the latter two types in particular, with central government funding.

Batteries that are used in electric vehicles could also be connected to the grid for smart charging and discharging (also called Vehicle-2-Grid). The Netherlands has good EV charging infrastructure, so this solution provides scope for reducing the total number of batteries by making better use of them. Battery life is also steadily improving. In addition, it is important for the Netherlands to join in with EU initiatives. Our membership of the European Battery Alliance is one example. The Commission has identified batteries – including critical metals – as a strategic value chain. The proposed EU Battery Regulation places a strong emphasis on repair and recycling of batteries and sets percentages for minimum recycled content in new batteries.

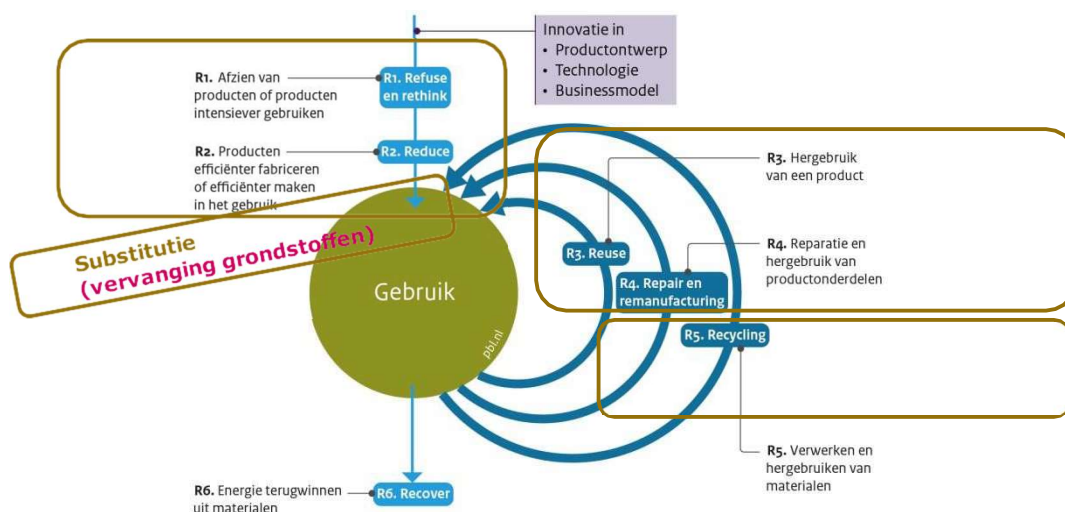


Figure 5. R-strategies (source: PBL)

1G. EU raw materials partnerships

The European Commission has strategic partnerships on raw materials with, for example, Canada and Ukraine, and is in talks with Norway, Serbia, Australia, Chile and a few African countries.

1H. Multilateral forums - The Netherlands and the EU also work with like-minded countries in multilateral forums, such as the Minerals Security Partnership, the Organisation for Economic Co-operation and Development (OECD) and the Conference on Critical Materials and Minerals.

1I. Trade agreements on raw materials - The Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union is an example of a trade agreement that includes undertakings on raw materials. The EU is also seeking to reach agreements on critical raw materials in the ongoing trade negotiations with Australia and in the negotiations to modernise the existing EU-Chile Association Agreement.

1J. Criticality analysis - Drawing on previous research,⁶⁰ and based on three indicators, TNO has proposed to provide a clearer picture of the risks of raw material supply security for the Netherlands. When analysing the criticality of, for example, metals essential for the energy transition, it is worth starting from the material composition of products such as electrolysers for hydrogen production. After that, it is useful to look at the criticality of these raw materials and the Netherlands' growth expectations, so as to be able to estimate future market demand for these products up to 2030 as accurately as possible.

1K. Conflict minerals - In politically unstable areas, armed groups often use forced or child labour to mine minerals, which they then sell to fund their activities, for example to buy weapons. These 'conflict minerals', such as tin, tantalum, tungsten and gold, are subsequently used in everyday products such as mobile phones, cars or jewellery. Besides being conflict minerals, tantalum and tungsten are classified as critical raw materials.

1L. Sustainable public procurement by central government - This is currently governed by the obligation to include requirements on international social conditions in all contracts put out to tender under EU rules. This means that all buyers are required to analyse and address risks in their supply chain relating to working conditions, human rights and the environment. The obligation applies to procurement in such categories as 'energy', 'ICT' and 'data centres & connectivity', where critical raw material risks are all too real.

1M. European Partnership for Responsible Minerals (EPRM) - This partnership is an accompanying measure to the EU Conflict Minerals Regulation and the only public-private fund available to governments, civil society organisations and industry for investing directly in mining communities. The fund also helps companies to comply with their due diligence obligations. The secretariat of the EPRM is run by RVO.

⁶⁰ TNO (2021), 'Kritikaliteit van grondstoffen – ontwikkeling en operationalisatie'.
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