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A COMMENTARY ON THE GEOPOLITICS OF THE TRANSITION TO CLEAN ENERGY AND GLOBAL ECONOMIC DECARBONISATION

HIGHLIGHTS OF REGIONAL DEVELOPMENTS AND TRENDS IN THE SUB-SAHARAN AFRICA AND EUROPEAN UNION REGIONS

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Content

Preface

A report on *'The Global, Regional and National Perspective of Geopolitical Impacts of Decarbonisation'* focusing on Sub-Saharan Africa and the EU was documented in March 2022. However, since its completion, major global, regional and to a lesser degree national events in the extractives and energy sectors have reshaped the geopolitics of trade in the sectors' energy transition and impacted the quest to decarbonise global economies, as envisioned at COP15. The developments have impacted (1) policies to do with fossil fuels as the main contributor to carbon emissions and the global energy mix, (2) demand for and security of supply for minerals deemed critical minerals for decarbonisation, (3) regional and national policies or strategies for a transition to clean energy, (4) bilateral and regional partnership strategies for securing the supply of critical minerals and (5) global priorities, debates, and negotiations towards decarbonisation. Therefore, contained in this report are highlights of major developments and the impacts of the developments on policies and geopolitical developments in Sub-Saharan Africa and the European Union.

SECTION 1

INTRODUCTION

1. Introduction

1.1 Global Context

To address the adverse impacts of global warming and climate change, during the 2015 UN Climate Change Conference (COP21) in Paris, world leaders signed the Paris Agreement. The agreement lays out a legally binding framework to guide countries in meeting the goal of reducing greenhouse gas emissions to hold the global temperature increase to below 2°C, thereby meeting the commitment to limiting the global temperature rise to 1.5°C. The COPs also recognised that, globally, CO_2 is disproportionally emitted by industrialised countries. Given the higher contribution of industrialised regions towards global warming, the resulting adverse impacts on poor nations and disparities in the wealth between these nations, the agreement also commits developed countries to provide finance to developing countries. The goal is to ensure that the latter can mitigate climate change risk, strengthen resilience, and enhance adaptation to climate impacts. The agreement came into force in 2016 and involves 194 states and the EU.

Most importantly, the agreement includes commitments by all countries to reduce emissions nationally. To monitor country interventions and progress, every five years each country is required to submit an updated national climate action plan, known as Nationally Determined Contributions (NDCs). The commitment stipulates two parallel workstreams. The first is commitment by all members to reduce carbon emissions by ending the reliance on fossil fuels as the leading source of energy. The second is the scaling up of the use of technologies necessary to generate energy from cleaner sources and processes. There is the recognition that, just as reducing carbon emissions calls for an end to the use of certain fossil fuels, up-scaling clean-energy generation calls for an increase in the supply of minerals and the production of metals necessary for associated technologies and infrastructure.
Despite collective commitment at COP28 to "transition away from fossil fuels" and keep the target of limiting global warming to 1.5°C by 2030, the Global South and the Global North face different challenges and therefore have different policy-implementation priorities. The south is grappling with the challenge of mitigating the adverse impacts of global warming with limited resources, while the north seeks to adapt to a new industrial order made possible by significant technological and financial capability.

For fossil-fuel-dependent countries in the Global South, the commitment implies an end to the development of fossil-fuel resources and potentially renders the resources economically stranded. Therefore, affected countries defended their right to benefit from their resources on the grounds that, just as the industrialised north grew its economies by using fossil fuels to generate energy, they too deserve the same opportunity, while reducing the dependence on the resources by investing in cleaner energy sources. The argument was successfully made at COP28, leading to an outcome by which it is now up to national governments to decide whether to and how quickly to end the reliance on oil, natural gas, and coal. What is not clear are the long-term impacts of the decarbonisation agenda.

However, the need to reconcile these policy priorities and pathways towards the transition to clean energy is an important corner pole of the global and regional geopolitics of decarbonisation. Differences in policy priorities are not simply a matter of the Global North and Global South, but the interests of individual countries and regional blocs add complexity. The complexity is worsened by the changing national and international environment in relation to politics, security, trade, and public sentiment. It is this dilemma of geopolitical interplay that has proven a challenge during one negotiation after another at the COPs. In engaging each other, countries in the EU and Sub-Saharan Africa do so within this broader context.

1.2 Regional Context: The European Union and Sub-Saharan Africa

Apart from the global context, the EU and Sub-Saharan Africa have historical and contemporary geopolitical factors that underpin trade and de-

carbonisation policies. To begin with, the EU and Sub-Saharan Africa regions operate on opposite sides of the geopolitical spectrum of the global decarbonisation agenda. This is primarily because of the EU's degree of industrialisation, levels of CO_2 emissions, capacity to meet NDCs based on economic wealth, power based on global alliances and availability of institutional structures to leverage its position of advantage. Nevertheless, the regions are important to each other, although for different reasons.

First, the EU remains the largest single market for African goods, which accounted for 33% of the continent's exports.[1] Trade is however asymmetric, because Africa's imports from the EU are less than 6%, with South Africa and northern African countries such as Morocco or Algeria taking the largest share, leaving some African trade blocs with less than 0,5% of total EU imports.[2] The structure of exports and imports is also skewed such that Africa mainly exports raw materials, while the EU exports to Africa mainly capital and consumer goods.

However, Africa is an important trade partner to the EU, such that European foreign direct investment (FDI) stock in 2017 stood at €222 billion. This is more than five times higher than that between the EU, China and the US. Second, the EU enjoys the benefit of powerful global alliances, including membership of NATO, the G7 and the G20. The bloc and its members are also major shareholders and financiers of the World Bank (WB), the International Monetary Fund (IMF), the African Development Bank (AfDB) and the European Investment Bank. These international bodies control global trade policy and laws, development finance conditions and security agenda with significant influence over regional and national affairs in Sub-Saharan Africa.

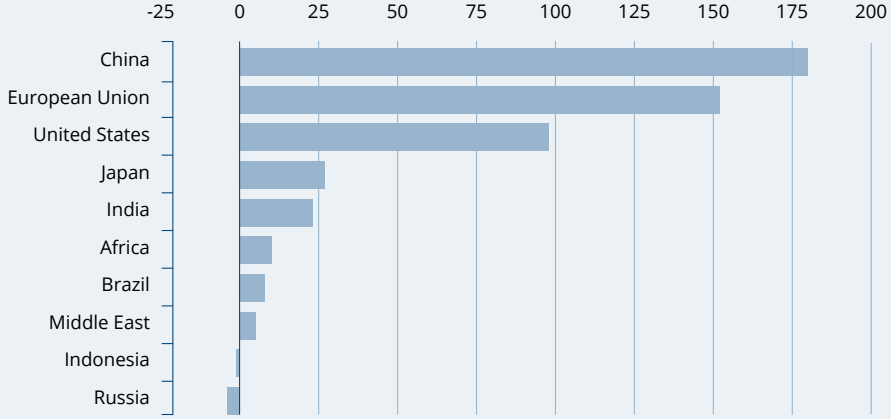
On the other hand, the transition to clean energy will be costly. This is especially so for countries that do not already have an industrialised base to build on. Yet, even with this advantage, if one looks at subsidies in the EU, it becomes clear that poor nations in Sub-Saharan Africa cannot afford the necessary investment in the transition. For instance, as a continuation from the Intelligent Energy Europe of 2003–2013 and Horizon 2020 Energy Efficiency of 2014–2020 programmes, the LIFE Clean Energy Transition sub-programme continues to support EU policies through grants and has a budget of about €1 billion from 2021 to 2027.[3] The grants are intended to break market barriers that hamper the socio-economic transition to sustainable energy and typically engage multiple small and medium-sized stakeholders, multiple actors including local and regional public authorities and non-profit organisations, as well as consumers.

A report by the Africa Centre for Sustainable Development, an arm of the United Nations Development Programme (UNDP), estimates that

> *"Africa will need $70 billion in annual investment towards the renewable energy sector until 2030 to implement a clean energy transition. The primary goal of such a transition includes the decarbonisation of the economy, thus curbing carbon emissions and improving Africa's resilience to climate change-related natural disasters."* [4]

However, as can be seen from the IEA data in Figure 1, clean energy investment inflows into Sub-Saharan Africa are significantly lower than in the EU and other industrialised regions. According to the same source, by 2022, investment in renewables in the EU was more than US$150 billion, while it was only about US$10 billion in Africa.[5]

Figure 1: Increase in Annual Clean Energy Investment in Selected Countries and Regions, 2019–2023 (billion US$ in 2022)



Source: IEA

This offers significant trade and commercial opportunities through R&D, the import and export of raw materials, construction projects, manufacturing, supply chains, logistics and retail. As such, the transition to clean energy is as much a trade-competitiveness undertaking as it is an environmental matter, hence, the pressure of vested geopolitical interests. From an industrial, economic, trade, and global-power perspective, the EU and Sub-Saharan Africa also operate at different ends of the spectrum, such that, by 2022, while the EU represented 14.5% of the world's GDP, Africa made up 33 of the world's 46 least developed countries (LDCs), mainly in Sub-Saharan Africa.[6] However, regarding global warming, between 1960 and 2020, current EU countries have been responsible for 15.4% of all global carbon emissions, while African countries have accounted for only 3.3%.[7]

The EU is a legally constituted political, economic, legislative and judicial entity that is competent and empowered to act on behalf of its 27 member states. This means that, while there are occasional differences in policy, for instance, on the generation of thermal coal and nuclear energy, the EU nevertheless can adopt a collective view on most high-level regional policy matters. The frameworks afford the EU the ability to promote regional interests effectively. This also means that the EU can engage more effectively on the global stage. In contrast, Sub-Saharan Africa (and the rest of Africa) has no equivalent legislative, judicial, and administrative structures or powers. As such, the Africa region lacks an effective collective lobbying mechanism on the global stage. Even if it did, because Africa is reliant on multilateral or bilateral support from the EU and DFIs for much of its development agenda, its bargaining position is nevertheless weak relative to that of the EU which brings political and financial independence to the table. Between these global and regional factors are the realities that underpin the geopolitics of decarbonisation and some highlights are detailed under sections 2 and 3 below.

SECTION 2

AN OVERVIEW OF THE GEOPOLITICS OF DECARBONISATION POLICY IN THE EU AND SUB-SAHARAN AFRICA

2. An Overview of the Geopolitics of Decarbonisation Policy in the EU and Sub-Saharan Africa

While there are some overlaps in global and regional policy considerations for the fossil-fuel and mineral sectors, they nevertheless manifest differently. The main reasons are the differences in their market structures, national or regional strategic and economic value, contribution towards climate change and impacts on the energy transition. In the two regions, the very goals of policy interventions vary. Therefore, the structure of the report takes cognisance of this by discussing policy trends in fossil fuels and separately discussing those pertaining to minerals.

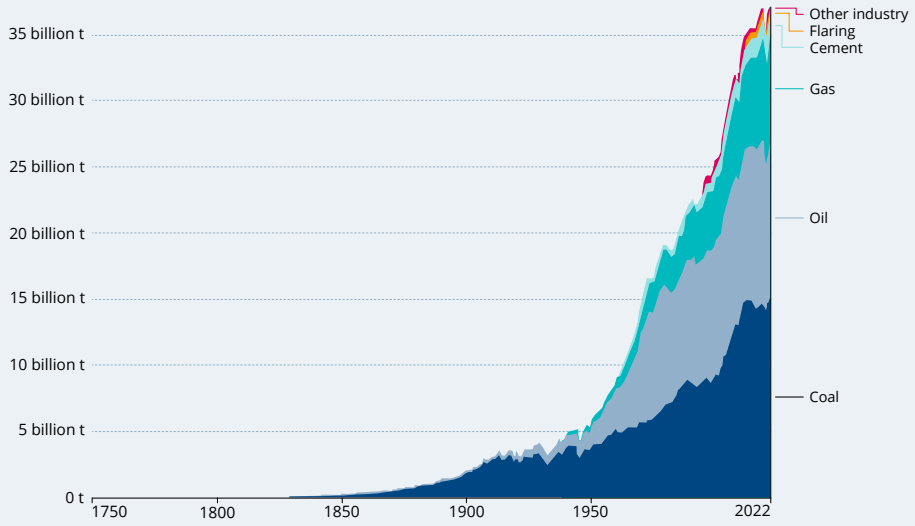
The fossil-fuel sectors accounted for an estimated 91% of emissions in 2022.[8] Figure 2 shows the relative levels of carbon emissions between the three fossil fuels.[9] One of the main reasons for the higher percentage is the extensive integration of resources in many national economies in many parts of the world. Fossil fuels are a huge source of revenue, electricity, transportation fuel, heating, agro-chemicals, petrochemicals, and other products. Fossil fuels are therefore major contributors to global warming and climate change. However, fossil fuels are not homogeneous and impact the environment in a variety of ways; hence, each requires fit-for-purpose policy interventions. For this reason, oil, gas, and coal have been commented on individually in the report. Because uranium is an energy mineral, for this commentary, the mineral has been included in the same section.

2.1 Oil and the Environment

Environmentally, oil projects are the leading source of carbon dioxide emissions at scopes 1, 2 and 3. At scope 1, which is mainly production, developers opt to burn (flare) the associated gas rather than capture and market it based on a simple cost-benefit analysis. It is cheaper to burn it by flaring than capture it for trading. According to the World Bank:

> *"Seven countries continue to light up the global map, year after year: Russia, Iraq, Iran, the United States, Algeria, Venezuela and Nigeria have been the largest flaring countries for nine years running, since the first satellite was launched in 2012. While these seven countries have together produced some 40 percent of the world's oil each year, they have also accounted for roughly two-thirds (65 percent) of global gas flaring."* [10]

Figure 2: World CO_2 Emissions by Fuel or Industry Type



Source: Global Carbon Budget

The main driver of oil's carbon footprint downstream of production and in scope 2 is the use of energy-intensive tankers to move oil to markets, energy-intensive plants to refine the product and energy-intensive transportation to deliver it to consumers. In scope 3, the main cause is the use of oil by industry clients as fuel in the transporting and manufacturing of petrochemical byproducts like plastics, flooring and moulding in furniture, cars and aeroplanes. It is this extensive use of oil across industries and throughout its value chain that accounts for its carbon footprint.

2.2 Oil: National and Regional Economy Perspective

While all countries recognise that fossil fuels are carbon-intensive and an environmental challenge, looked at from the regional or national economic perspective of oil producers, the picture changes dramatically from a negative to a positive one. The result is that policies differ and manifest differently based on the levels of the economic importance of the oil sector to national economies. On the other hand, given the diversified nature of the economies of EU member states, though oil is a major contributor of tax revenues and other economic deliverables for some, the economies are resilient and can implement plans to end the use of fossil fuels without dire consequences for themselves. In contrast, as can be seen in Table 1, oil-dependent economies in Sub-Saharan Africa do not have the same level of resilience and an end to oil production would spell economic doom. This leads to a divergence of views on the pace of decarbonising national economies, the transition to clean energy and climate-change policy interventions.

From the perspective of several Sub-Saharan countries with significant oil reserves that have transformed national economies and continue to be the bedrock of economic development such that, based on reserves and production, out of the world's top 20 countries, four are in Africa, namely, Algeria, Angola, Libya and Nigeria. In 2022, Africa's proven oil reserves stood at 125.3 bbl and accounted for 7.2% of the world's proven reserves.[11] As of 2023, oil reserves in the four leading countries together were nearly 6.4% of global reserves. The percentage split by country was Libya at 2.9%, Nigeria at 2.2%, Algeria at 0.7% and Angola at 0.59%.[12] The figures may seem modest, but, given that only the top three out of 98 countries in the list have double-digit figures, the percentages are significant. The top countries are Venezuela at 18.2%, Saudi Arabia at 16.2% and Canada at 14.6%.[13] The statistics on reserves illustrate the long-term potential for countries to continue to profit from the oil trade. Thus, while recognising the need to decarbonise global economies, a major geopolitical consideration for policymakers in oil-rich countries is the short- and long-term impacts of the opportunity cost of ending oil production and related byproducts. Table 1 illustrates the contribution of oil to the gross domestic products (GDPs) of six top producers in Sub-Saharan Africa during 2022.[14]

Table 1: Crude Oil Contribution to GDP

Country	2020 Annual Crude Oil Production (bpd)	2020 GDP %
Nigeria	1.65 m[15]	13.8
Angola	1.13m[16]	29.9
Republic of the Congo	269 000[17]	21.2
Ghana	142 000[18]	10.8
Gabon	191 000[19]	36.7
Equatorial Guinea	119 000[20]	60.0
Chad	124 000[21]	30.6

Source: Africa: Countries with Highest Oil Revenues 2020 | Statista

The level of dependency makes these countries vulnerable to short-term crude price volatility, as experienced in 2019 when crude fell US$39 per barrel. This and poor fiscal policies make the countries subsumptive to high levels of sovereign debt, mainly from loans granted by development finance institutions (DFIs). For instance, a 2020 report by the AfDB predicted that

> *"in the short term, the average debt-to-GDP ratio in Africa is expected to increase significantly to over 70%, from 60% in 2019. Most countries in Africa are expected to experience significant increases in their debt-to-GDP ratios for 2020 and 2021, especially resource-intensive economies."* [22]

Not surprisingly, reports also show that, on a government debt-to-GDP basis, the oil producers listed in Table 1 are some of the highest-ranking in Sub-Saharan Africa. Except for Equatorial Guinea at 27.1%, the others are in the second, third or fourth percentile.[23] This means that, though at face value, oil-rich countries might appear able to fund the transition to clean energy, the reality is far from it. Indeed, rather than build national reserves, much of the public revenue gained from recent higher-than-normal crude oil prices will be ploughed into servicing debt and not into the transition to clean energy projects.

Equally problematic for oil producers is the long-term trajectory of oil projects. The industry offers mixed signals, as some international oil companies (IOCs) cut back exploration and other development-project budgets in anticipation of an overall decline in demand for petroleum products due to the transition to clean energy and the decarbonisation of the global economy. For instance, in October 2020, international media reported that the head offices of BP and Shell had each announced that the two companies would cut jobs that would affect all their operations globally, especially new projects. According to an analysis by Deloitte in October 2020, the oil sector and related industries in the US retrenched an estimated 107 000 workers between March and August 2020. The same report stated that this was the fastest rate of layoffs in the industry's history. The report further estimated that about 70% of the jobs lost during the pandemic may not be recovered by the end of 2021. In Sub-Saharan Africa, by February 2021, Shell Nigeria announced the sale of some 30 onshore oil fields. Chevron followed suit. Though the assets are associated with the risk of bunkering, most observers also recognise that the actions of the majors are indicative of a trend to divest from oil. If correct, this could be the beginning of a fall in inward investment and therefore future oil revenue.

However, not everyone is convinced that the end of the fossil-fuel-dominated era is insight. In 2022, Shell and Total Energies discovered oil with associated gas offshore in the Orange Basin in Namibia's maritime waters. Though it is too early to determine the level of oil reserves, the two companies deem the oilfields significant and the Qatar State Oil company has partnered with the National Petroleum Corporation of Namibia (NAMCOR) for the development of the fields. In fact, in a March 2024 report by the US-based firm DW Energy Group,

> *"the oil and gas sector continue to offer fertile ground for investment, with the current market conditions presenting both challenges and opportunities. As the world continues to rely on oil and gas as primary energy sources, the sector remains a key area for investment."* [24]

Minimally, developments such as these suggest a misalignment between decarbonisation goals and national development policy priorities.

As can be seen in Figure 2, the most carbon-intensive fossil fuel is coal, followed by oil and gas. Assuming the priority is to lower emissions, national and regional decarbonisation plans would target the three sources sequentially. However, the level of economic reliance on any of the three sources for economic development or energy has so far had a greater influence on policies in the two regions. Targeting oil is especially difficult, for two reasons. The first is its integration into many industries, especially through the transport sector. On the other hand, many oil-rich countries in the gulf have enough financial resources to withstand pressure from the North and can continue to invest in petroleum-development projects without risk of adverse economic or political consequences to themselves. Though oil-rich countries in Sub-Saharan Africa have not built this resilience, they might nevertheless benefit from the conditions in which powerful oil producers can resist pressure to end oil production in the near future because they are less vulnerable to having conditions imposed by the Global North.

Oil, Global and Regional Energy Mix

Reports, including one by The Economist Intelligence (EIU), show that oil dominates the global energy mix and, in 2022, accounted for an estimated 81% of total energy consumption.[25] Oil is the world's largest energy source in the transport sector and, as illustrated in Figure 3, oil and other fossil fuels are the largest providers of energy globally, including in the EU. Oil is a major source of energy for vehicles, sea cargo and aviation.[26] This overdependence on oil for transport in the face of a commitment to decarbonise the world's economies through the reduction of CO_2 emissions is a major challenge facing EU governments. The integration of oil in EU economies is so high that reports show that the bloc's import dependency for the entire family of crude oil and petroleum products surged to a record high of 97.7% in 2022.[27] This is contrary to the EU's energy policy objectives of 2015.[28] Among others, the events following Russia's invasion of Ukraine highlighted the fact that the EU and other regions struggle to phase out fossil fuels to meet decarbonisation goals.

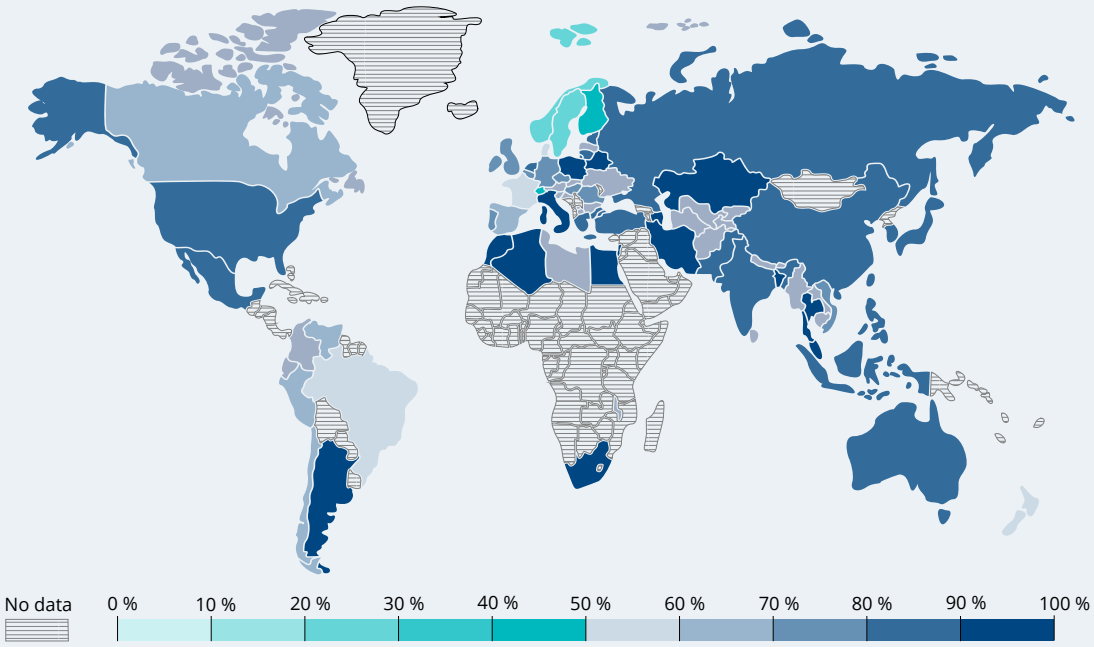
Following the war, the EU prohibited the import of seaborne crude oil and refined petroleum products from Russia.[29] Around half of Russia's oil exports go to the EU. In 2021, the EU imported €71 billion worth of oil: crude oil (€48 billion) and refined oil products (€23 billion) from Russia. The decision by the bloc to impose sanctions on Russia added to the complexity of debates on the region's energy mix by the increased risk of an energy deficit, crude oil market disruptions and price volatility. The development also raised concerns over potential disruptions of short-term energy-transition plans.

The impacts of the embargo were manifested differently among EU states, but the underlying factors were the degree of reliance on imports for energy, the intensity of industrialisation and the national energy mix. Regarding the EU's energy policy objectives, the development risked undermining progress regarding objective 3 and 4 namely,

> *"to improve energy efficiency and reduce dependence on energy imports, cut emissions, and drive jobs and growth" and "to decarbonise the economy and move towards a low-carbon economy in line with the Paris Agreement."* [30]

Collectively the EU and trade partners like the UK were therefore compelled to institute measures to contain the risk of an energy deficit, in-country political fallout and global geopolitical risk. However, due to concerns over the impacts of a fall in oil supply and the actions of OPEC mem-

Figure 3: Share of Primary Energy Consumption from Fossil Fuels



Source: Energy Institute – Statistical Review of World Energy (2023)

bers, the price of crude oil rose sharply from as low as $42 per barrel during Covid to above $100. As a result, oil-producing countries in Sub-Saharan Africa benefitted from higher public revenue. EU tax collectors benefitted from higher corporate tax and triggered a debate on windfall tax in the EU and UK. The Ukraine war highlighted the vulnerability of the EU to the business of oil freight, insurance and services related to oil supply, triggering different responses from governments in the larger region. For instance, as part of an overall energy security policy, the UK reintroduced bids for oil exploration in the North Sea, prompting outcries from civil society.

Though not an EU matter, an interesting development relates to an October 2022 UK North Sea Transition Authority (NSTA) announcement that blocks were being made available for oil companies to bid for. On 30 October 2023, the NSTA announced the offer of 27 new licences in the first set of awards for the 33rd round. In the notice, NSTA further stated that it

> *"requires industry to operate in a way consistent with net zero ambitions, lowering production emissions and making serious progress on the solutions that can contribute to the UK achieving net zero."* [31]

As such, whereas the expectation had been that, following COP26, the sector would be weakened, the Ukraine war and the future insecurity of supply reaffirmed the future of oil, at least in the foreseeable future.

In contrast, Africa's main challenge regarding oil-based energy sources is not the carbon intensity of oil but a need to use oil reliably and to cost-effectively generate and transmit energy in order to increase affordability. This means that, rather than policies that are necessitated by the need to decarbonise economies through a change in the energy mix, Sub-Saharan governments perceive oil as a resource to fund energy access and the transition to clean energy simultaneously.

2.3 Natural Gas, National Economies and Energy Mix

It is worth noting a few differences between oil and gas pertaining to resource economics, production and the marketing of natural gas and gas byproducts. Gas projects can be based either on gas associated with oil production or on independent liquid natural gas deposits that are developed based on their standalone commercial viability. When gas is part of an oil field, oil is preferred because there is greater demand for it; it commands a higher price and offers better returns. From a marketing perspective, gas offtake agreements often fix the price upfront with little flexibility over the duration of the agreement. Thus, unlike crude oil, gas is not influenced by market volatility or the actions of major producers like OPEC, towards which traders and analysts look to speculate on price. The result is the international trade of gas differs from that of oil at global, regional, country and even project level.

Gas and the Environment

CO_2 emissions from gas associated with oil production are a corporate strategic and national policy choice. Hence, the desire to reduce carbon emissions has increased the momentum towards solutions to avoid gas flaring. Quite apart from marketing the product, another growing solution is carbon storage. On the other hand, because of technology-based interventions, gas emissions can be lowered. Hence, until 2020, gas was considered a potential bridge between oil and cleaner sources of energy. Based on the environmentally friendlier qualities of natural gas, the World Bank and other DFIs continue to fund aspects of gas-development projects. However, this is not without controversy and the pathway has been difficult because it was met with both political and civil-society opposition.

Natural Gas Regional and National Economies

As with oil, the Sub-Saharan Africa region has large natural gas reserves, notably in Nigeria and Mozambique, with 2.6% and 1.4% respectively. Post-millennium discoveries of gas in the region, including Mozambique, Tanzania, Senegal, Namibia, South Sudan and Ethiopia's Ogaden Basin, have boosted the region's standing in the sector. According to analysts at PWC, the latter

alone contains 8 tcf of natural gas reserves and, at full capacity, the reserves are worth a potential US$7 billion a year. The same report states that, in 2019, at 509.6 tcf, Africa's proven gas reserves were up 4.5% from the previous year, which equates to 7.5% of the world's proven reserves.[32]

As shown in Figure 4, compared with Europe and the Middle East, gas reserves in the region are smaller but significant. In 2012, when the US firm Anadarko Petroleum Corporation announced a further gas find off the coast of Mozambique, it was estimated to be up to 60 trillion cubic feet of recoverable gas. Analysts suggested that the find would be enough to meet the entire gas consumption of Europe's four biggest economies – Germany, France, Britain and Italy – for up to six years.[33]

Therefore, notwithstanding the low reserves, seen in the context of global demand and national economies, the reserves represent important sources of supply, FDI and public revenue. For instance, Angola Natural Gas: Exports were reported at 7539.586 Cub m in Dec 2022.[34] For emerging producers such as Mozambique, Senegal and Tanzania, gas projects can be transformative. On 30 September 2019, an announcement by TotalEnergies of the company's US$3.9 billion acquisition of rights to Mozambique's gas fields from Anadarko resulted in an US$880 million capital gains tax payment to the country's tax authorities.[35] From a regional perspective, the geopolitics of decarbonisation and phasing out of the production of natural gas must be seen primarily from the point of view of opportunity cost and the impact on national export revenue, as well as the value of a cheaper source of energy. Though natural gas has, for decades, lagged coal and oil as an energy source, today its consumption is growing rapidly, often as a replacement for coal in the energy mix.

Hence, some policy analysts have argued that flaring and other forms of releasing methane into the atmosphere are not just harmful environmentally but wasteful economically. Consider the following extract:

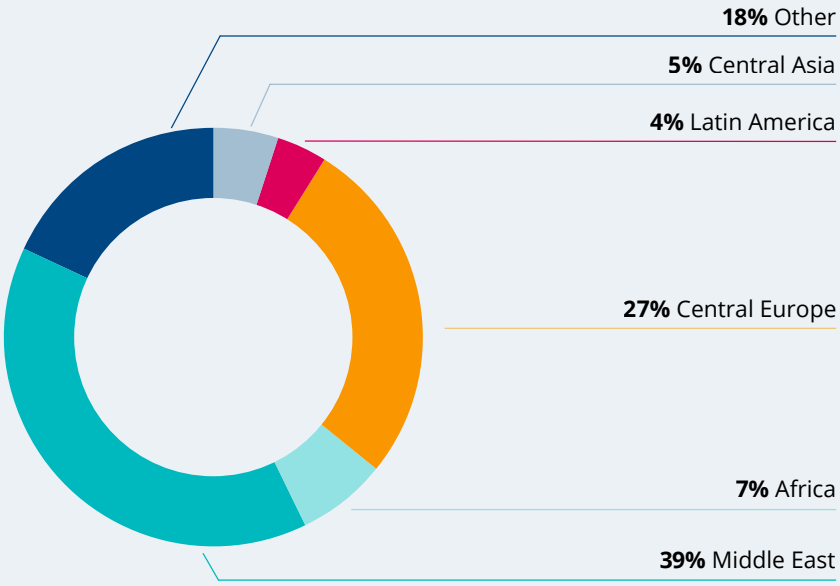
> *"Flaring and venting waste 8% of global natural gas production annually, contribute 6% of global greenhouse gas emissions."* [36]

So, while the practice of gas flaring might make sense for project economics and return on investment for project sponsors for host countries, it is a waste of a valuable natural resource and offers citizens a more costly option for meeting energy needs by importing oil-based fuel. Based on this, one could argue that, in poorer countries, while the value of oil is overstated, that of gas is understated.

Gas Global and Regional Energy Mix

Despite environmental risk, in the EU, gas remains widespread as a heating fuel and is chea-

Figure 4: Distribution of Proven Natural Gas Reserves in 2020 (%)



Source: https://www.researchgate.net/figure/Natural-gas-reserves-estimates-in-various-geopolitical-areas-percentage-of-total_fig2_237338604

per. Gas is a major source of domestic heating and changes in policy impact private citizens directly. It is also more sensitive to electoral politics, leading to policy inconsistencies. Notwithstanding, in November 2020, a proposal was tabled at the EU such that power plants fuelled by natural gas will not be classed as "sustainable" or "transition" investments in Europe unless they meet emission limits. However, the recommendation was not seen through. Reports show that the limit of 100 grams of CO_2 equivalent per kilowatt hour would prevent gas plants from being labelled as a "transition" technology on the way to reaching net-zero emissions by 2050. The proposed standards were tabled under the EU's sustainable finance taxonomy, which determines what type of investments make a substantial contribution to the EU's fight against climate change. Failing to obtain the EU's green label would deprive those gas power plants of billions of euros in funding, as private investors seek shelter in investments seen as climate-friendly.

On 2 February 2022, the European Commission endorsed fossil gas as a "transition" fuel under its sustainable finance taxonomy in a move that campaigners called

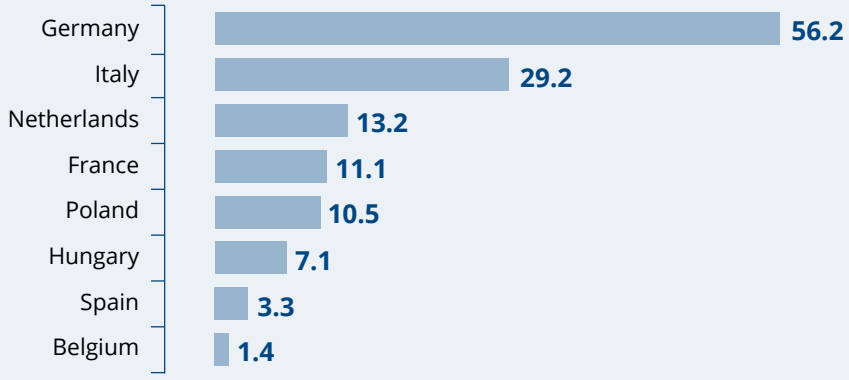
"the biggest greenwashing exercise of all time".[37]

The decision had been fought over by EU member states. Germany and much of Central and Eastern Europe had supported gas's inclusion, while nations like Denmark, Sweden, the Netherlands, Luxembourg and Austria had opposed it. The decision means that, at least soon, albeit for different reasons, gas will be considered an acceptable clean energy-transition product. This is important for producers and consumers alike. Yet, following the invasion of Ukraine, EU countries halted most imports from Russia of natural gas via pipeline. Up to that point, most of the EU's supply was made up of gas imports from Russia, as illustrated in Figure 5. So, sanctions added to the risk of energy insecurity. So, while maintaining imports of LNG from Russia through sea freight, to minimise the risk, the EU took several measures, including increasing US imports. According to the US Energy Information Administration (EIA), to this day, the US remains the region's largest supplier of liquefied natural gas (LNG) in 2023 for a third consecutive year. In second and third position are Russia and Qatar, respectively. Combined, the three countries accounted for three-quarters of Europe's LNG imports in 2022 and 2023.[38]

Other regions, including countries in Africa, also saw an increase in exports of gas to Europe, in no small measure because EU countries sought alternatives to Russia. Notably, the German Chancellor Scholz travelled to Senegal, Ghana and later Nigeria to boost trade in the commodities and energy sectors. Reports suggested that German companies aimed to boost their activities in Africa this year, especially in areas such as green hydrogen and liquefied natural gas.[39] Beyond that, EU countries reactivated dormant regasification projects and commissioned new ones.

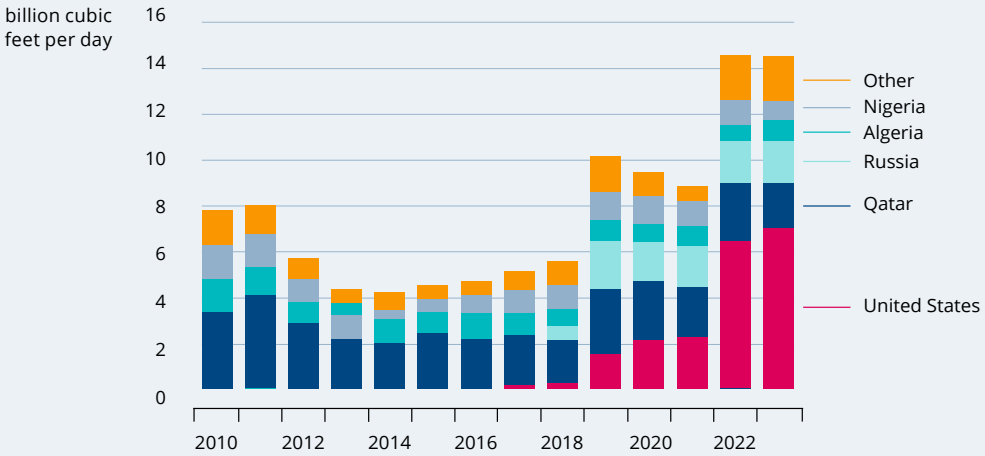
The rise in demand led to price growth, which benefitted Sub-Saharan Africa and other exporters, as can be seen in Figure 6. However, these developments do not auger well for decarbonisation.

Figure 5: Russian Gas Exports – Countries by billion of cubic metres imported from Russia



Source: IEA. Estimates for 2021

Figure 6: EU and UK LNG Imports
Europe (EU-27 and UK) annual LNG imports by exporting country (2010-2023)



Source: The United States remained the largest liquefied natural gas supplier to Europe in 2023 - U.S. Energy Information Administration (EIA)

2.4 Coal, the Environment, National Economies and Energy Mix

As the most abundantly used fossil fuel before the 1970's increase in oil production, coal was relied on for much of the energy consumed during the First Industrial Revolution and much of the 19th century. To this day, because of its availability and low cost, coal remains a significant part of the global energy mix and provides power in some heavy industries. Coal is also used in other industries, notably in steelmaking. However, as with other fossil fuels, coal has significant adverse environmental impacts. Thus, as is the case for oil and gas, phasing out coal consumption is essential to achieving the COPs goal of net zero.

Coal and the Environment

Besides carbon intensity, other environmental effects of both coal mining and coal power plants do not bode well for either environmental protection or climate change based on scope 1 and 2 emissions. To begin with, as with all mining projects, coal mining is energy- and water-intensive. Coal mining also often requires the stripping of top layers of soil, removal of plants and sometimes the relocation of humans (or underground rock) to make way for the extraction of the mineral. The removal of topsoil leads to erosion, dust pollution and loss of habitat. Coal mining causes acid mine drainage, which causes heavy metals to dissolve and seep into the ground. Both can contaminate surface water and underground aquifers. Workers exposed to coal dust for long periods sometimes develop serious health problems. Coal, like other fossil fuels, emits fly ash particles into the atmosphere, which contribute to air pollution problems. Environmental impacts associated with using thermal coal to generate energy include emission, ground-level ozone, smog, and acid rain. When burnt to release energy, coal produces several gases, including carbon dioxide, nitrogen oxide, sulphur dioxide and methane, all of which contribute to global warming and climate change.

Coal and Sub-Saharan African Economies

However, supporters of coal mining and thermal energy, including those from poor countries in Sub-Saharan Africa, argue that the world needs coal because, at the very least, it is the cheapest source of energy and is used in 70% of the world's steel production and therefore is an essential component of many industrial processes. Further environmental risk can be mitigated using technology to limit emissions, smog and other environmentally undesirable chemical substances associated with coal and thermal energy generation.
Industry associations have pushed back and indicate that

> *"different technologies have been developed to tackle different environmental impacts – from tackling air pollution, to cutting CO_2 emissions and reducing water usage. These technologies mitigate the environmental impact of coal from mining through to end use."* [40]

Table 2: Top Ten African Countries Based on Coal Reserves

Countries	Coal reserves, 2021	Global rank	Available data
South Africa	10905.15	1	2008–2021
Mozambique	1975.34	2	2008–2021
Botswana	1829.83	3	2008–2021
Zimbabwe	553.36	4	2008–2021
Nigeria	379.19	5	2008–2021
Tanzania	296.52	6	2008–2021
Swaziland	158.73	7	2008–2021
DR Congo	97	8	2008–2021
Algeria	65.04	9	2008–2021
Zambia	49.6	10	2008–2021

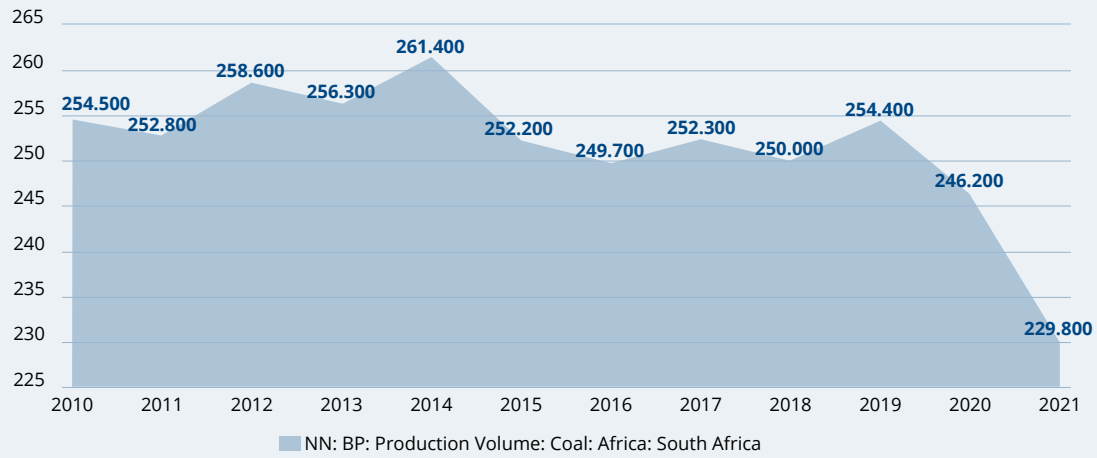
Source: TheGlobalEconomy.com. Coal reserves - Africa. (data based on 2021) https://www.theglobaleconomy.com/rankings/coal_reserves/Africa/

Nevertheless, the future of thermal coal hangs in the balance because DFIs, including the World Bank (WB), AfDB, and the EIB, have banned financial support for coal projects. This has had far-reaching impacts. In Sub-Saharan Africa, the largest reserves and production of thermal coal are in the Southern African Development Community (SADC), which comprises eight of the top ten countries. As seen in Table 2, the top five are South Africa, Mozambique, Botswana, Zimbabwe, and Nigeria, in that order.[41]

Therefore, as with other fossil fuels, ending the use of coal has been met with opposition, due to divergent national, regional and corporate interest based on economic reliance on the resource and the necessity for energy security. For instance, when DFIs ended funding of new coal projects, the impact was dire. In South Africa alone, net investment in the coal industry was R4.5 billion (US$0.30681 billion). In 2010, it decreased to R2.5 billion (US$0.1705 billion) in 2018, which is an average decline of 15% per year at a rate of ZAR1 = 0.06818US$.

For reasons of energy security, the protection of jobs and, to a lesser degree, in order to secure large amounts of export revenue, many of the coal-producing African countries remain committed to continued exploitation of the resource. For instance, coal is Botswana's only source of energy to generate electricity.[42] South Africa's figures on domestic consumption of useable coal vary between 60% and 70%.[43] Hence, production has been steady, except during the Covid-19 crisis, when it was down by nearly 1.65% from the previous year, as shown in Figure 7.[44]

Figure 7: South Africa Coal Production as of 2022



Source: South Africa Coal Production, 1981 – 2022 | CEIC Data

According to the South African Minerals Council, in 2022, the coal industry employed 90 977 people and achieved R252.3 billion in export sales.[45] This is slightly less that the 2019 figure of 92 230 people, which represented about 19% of total employment in the mining sector. However, the sales figure is higher than the R139.3 billion in 2019 (est. US$9.55). In that year, the industry spent R61 billion (est. US$4.18) procuring goods and services, most of it locally, thus contributing to the creation and protection of employment in other industries.[46] The integrated nature of coal in the national economy means the economic impacts of an end to thermal energy would be dire for those affected.

Nevertheless, much to the objection of industry and labour unions, this did not prevent the Global North from putting pressure on South Africa and other major coal producers to increase the pace at which coal would cease to be part of a national energy mix. As part of an agreement between the country and the US and EU partners, in 2022, the United States committed more than $1 billion as part of an $8.5 billion international aid package to catalyse South Africa's shift to renewable energy. In the previous year, at COP26, the US joined Britain, France, Germany and the European Union in a partnership to help South Africa finance a quicker transition from coal, that was intended to be a model for other coal-producing countries. In an announcement, former British Prime Minister Boris Johnson told the United Nations COP26 meeting in Glasgow that

> *"the initiative was valued at $8.5 billion overall and would help move the world towards meeting its climate targets by choking off international finance for coal".*[47]

Coal, Global and Regional Energy Mix

Following the outbreak of the Ukraine war in 2022, as with oil and gas, the EU imposed an import ban on all forms of Russian coal. The ban affects one quarter of Russian coal exports, amounting to an €8 billion loss of revenue per year for Russia.[48] However, once again, the EU's actions undermined energy security, compelling the bloc and the UK to replace Russian imports with coal imports from other regions. Thus, the decisions slowed down plans to phase out coal, even if only temporarily. Measures included ramping up imports of thermal coal from other regions of the world and resuming coal-based power generation. One of the EU's major suppliers was South Africa and that country's coal exports soured despite the deal made in Glasgow, presumably because, while demanding that South Africa closes its power plant, the EU and the UK left the option of imports into their jurisdictions open.

According to the industry portal The Coal Hub, coal exports from South Africa to the EU surged by 677.0% year over year n 2022 to 15.8 mln tonnes, from just 2.0 mln t in 2021. The EU is the second largest destination for South African coal, after India, whose share is 24.2%.[49] Overall, it is estimated that global coal supply is likely to have peaked in 2023 and to decline in line with demand. Nevertheless, growth in global coal demand in 2022 pushed global coal supplies to new highs of about 8 582 Mt (up 7%).[50] Global production was led by China and Indonesia. The result has been that, in addition to a sense of injustice in being cajoled into phasing out coal, Sub-Saharan countries object to the fact that, not only do G7 members therefore lack a moral compass, but EU governments lack commitment towards the next zero target and appear willing to pursue decarbonisation as long as they do not have to compromise national economic goals and energy-security needs.

In addition, based on the actions of the EU and other G7 member states, coal-power-dependent countries have found it politically and economically challenging to make the case that their countries should take the lead in phasing out coal while the EU and others rely on their countries' exports of coal to secure the supply of energy. This might explain the fact that negotiators failed to agree on an end date for coal during the COP28 negotiations. However, it continues to be an evolving policy challenge, although in a recent decision, G7 members agreed to shut down coal plants by 2035.[51] This is significant on the global scale because the G7 is an influential club that includes Canada, France, Germany, Italy, Japan, the UK and the US, with the EU as a member with special status. These countries set the tone for global policy, including the decarbonisation agenda. More importantly, they control the policies of DFIs upon which developing nations depend for loans. The G20 includes major coal users like China, India and South Africa, and petroleum producers, such as Saudi Arabia and

Russia. So, whereas coal was the first casualty of decarbonisation, ironically, the actions of the EU and UK have placed coal back into the energy mix and opened the door for other fossil fuels. Based on the actions of some EU members and the UK, the industrialised regions appear to operate by different standards at home and abroad. While using their voice in multilateral forums and DFIs to influence extractives and energy policy in developing countries to end fossil-fuel production and seen through the actions of the UK's NSAT and Germany's commissioning of thermal power stations, the EU appears unable to strike the right balance so far.

2.5 Uranium, the Environment, National Economies and Energy Mix

Uranium is a metallic substance, not a fossil fuel, but is classified as an energy mineral. It is soluble and highly reactive. It is contained in many products, including phosphate fertilisers and occurs in soil, where it is absorbed by plants. It is also found in air as dust that falls onto surface water, on plants or on soils through settling or rainfall.

Historically, the geopolitics of uranium have evolved from security of supply and the former USSR's dominance to concerns over nuclear-arms proliferation and nuclear-reactor safety. The end of the cold war changed the dynamics, with a greater focus on the second issue as related to regimes deemed hostile to the West and then environmental and health risks. Based on security of supply, the presence of Chinese investors in Africa has also added a different geopolitical dimension. For instance, in Namibia, Chinese companies have taken control of two uranium-producing mines, Husab and Rössing.[52] As a result of a prolonged period of low uranium market prices, other mines closed in Malawi and Namibia in 2014 and 2018, respectively, though the deposits are small. However, production from those countries does add to global output and diversifies sources of energy and contributes revenue to national economies.

Uranium and the Environment

As with most chemicals, uranium is not dangerous; however, *"some of its decay products do pose a threat"*.

On the other hand, levels of dosage and unsafe ways of disposal leading to water and soil contamination cause toxins that can be harmful to the environment and living things. As a source of energy, uranium is controversial because of the risk that nuclear-power plants pose if radioactive material derived from the uranium accidentally escapes into the air from the inner chambers of the otherwise sealed plants. The argument on how likely this is and if the risk to the environment, humans and other life forms is worth taking is at the core of the question of whether uranium should be part of the global energy mix. Opponents fear that an accident in a nuclear reactor could result in widespread contamination of air and water, human injury with intergenerational health defects. Further, accidents have occurred, although containment vessels are designed to withstand even extreme weather events and earth tremors. Those who promote nuclear energy argue that, though it is associated with significant level 2 emissions, unlike fossil-fuel-fired power plants, nuclear power reactors do not produce direct carbon dioxide emissions or pollute the air. Furthermore, nuclear reactors and power plants have extensive safety and security features. According to the US Energy Information Administration (EIA), a major environmental concern relates to radioactive waste, such as uranium mill tailings, spent (used) reactor fuel, and other radioactive matter. These materials can remain radioactive and dangerous to human health for thousands of years. This concern and advocacy have led to an incremental decline in the use of uranium as a source of energy faster than other energy minerals. Hence, the argument by some that nuclear power plants should be part of the energy-transition mix.

Uranium Regional and National Economies

Except for countries in central Asia and Niger, uranium reserves are small in relation to the other energy minerals discussed above. Table 3 shows production levels by major producers worldwide. Of the top ten, two, namely, Namibia and Niger, are in Sub-Saharan Africa. According to the World Nuclear Association (WNA), about two-thirds of the world's production of uranium is from mines

Table 3: World Uranium Mining Production

Country	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Kazakhstan	22 451	23 127	23 607	24 689	23 321	21 705	22 808	19 477	21 819	21 227
Canada	9331	9124	13 325	14 039	13 116	7001	6938	3885	4693	7351
Namibia	4323	3255	2993	3654	4224	5525	5476	5413	5753	5613
Australia	6350	5001	5654	6315	5882	6517	6613	6203	4192	4553
Uzbekistan (est.)	2400	2400	2385	3325	3400	3450	3500	3500	3520	3300
Russia	3135	2990	3055	3004	2917	2904	2911	2846	2635	2508
Niger	4518	4057	4116	3479	3449	2911	2983	2991	2248	2020
China (est.)	1500	1500	1616	1616	1692	1885	1885	1885	1600	1700
India (est.)	385	285	385	385	421	423	308	400	600	600
South Africa (est.)	531	573	393	490	308	346	346	250	192	200

Source: World Uranium Mining Production - World Nuclear Association

in Kazakhstan, Canada and Australia. The tonnage produced between 2013 and 2022 is shown in Table 3. In 2022, Kazakhstan produced the largest share of uranium from mines (43% of world supply), followed by Canada (15%) and Namibia (11%).[53] Thus, uranium remains an important but small part of the global energy mix and the ensuing debate over an ideal roadmap to decarbonisation.

Besides the war in Ukraine, a spate of coups in West Africa – in Burkina Faso, Mali and Niger – have added to the heightened sense of geopolitical tension as relates to the security of supply of uranium. One of the first decisions of the military government was to cancel mining leases and off-take agreements between French gold and uranium miners, followed by a ban on exports of the commodities to France. In a new diplomatic move, the countries also invited the Russians as new trade partners in uranium production and exports, adding to EU insecurity of supply of the substance.

Uranium, Global and Regional Energy Mix

The coups in the Sahel followed a decision by the EU, Japan and others to restart nuclear plants to mitigate what was deemed a potential global energy deficit following the Ukraine war. Thus, the world has come full circle, and it does appear nuclear energy is back in the global mix. Importantly and presumably for reasons of enlightened self-interest, the EU did not impose any ban on imports of uranium from Russia. Instead, reports estimate that, based on an analysis of payments,

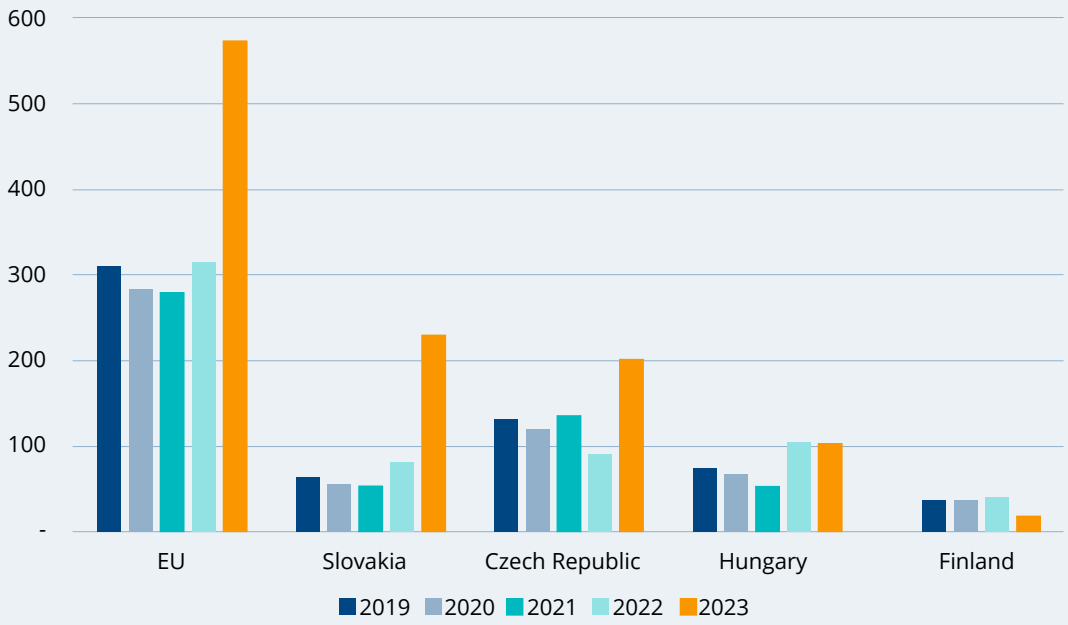
> *"in 2022, EU countries paid a total of €280 million for Russian nuclear fuel in 2022, that more than doubled to €686 million for last year. In physical terms, this represents an increase from 314 tons of nuclear fuel to 573 tons".* [54]

Though a small part of the energy mix in the EU, to the degree that some countries generate nuclear energy, these countries are vulnerable because of dependence on Moscow and parts of Africa for the raw material necessary to generate nuclear fuel, especially when uranium imports in the region have risen, as can be seen in Figure 8. In contrast, in late 2023, the US Congress introduced a bill:

> *"It bans unirradiated low-enriched uranium (i.e., uranium that has not been in a reactor) that is produced in Russia or by a Russian entity from being imported into the United States. The bill also prohibits the importation of unirradiated low-enriched uranium that has been swapped for the banned uranium or otherwise obtained in a manner designed to circumvent the ban's restrictions".*[55]

On 1 May 2024, the US Senate approved the legislation to ban imports of Russian uranium to the United States. This illustrates that, though aligned on many energy policies, when it comes to individual sovereign interests, countries in the Global North do not always move in unison.

Figure 8: Nuclear Fuel Imports from Russia into EU Countries in 2019–2023

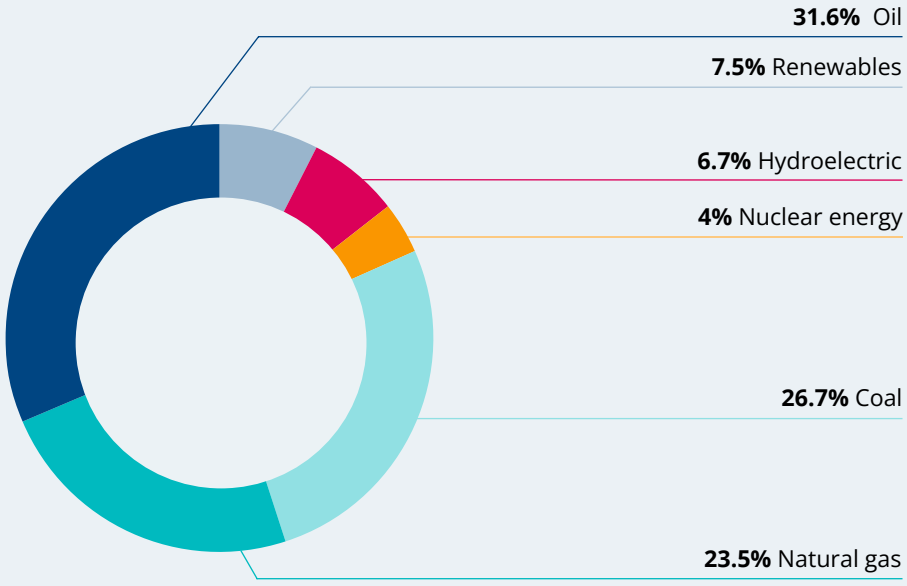


Source: Digges, C. (2024, March 15). Europe doubled its import of Russian nuclear fuel for 2023, data say. Bellona.org. https://bellona.org/news/nuclear-issues/2024-03-europe-russian-nuclear-fuel

2.6 Observations

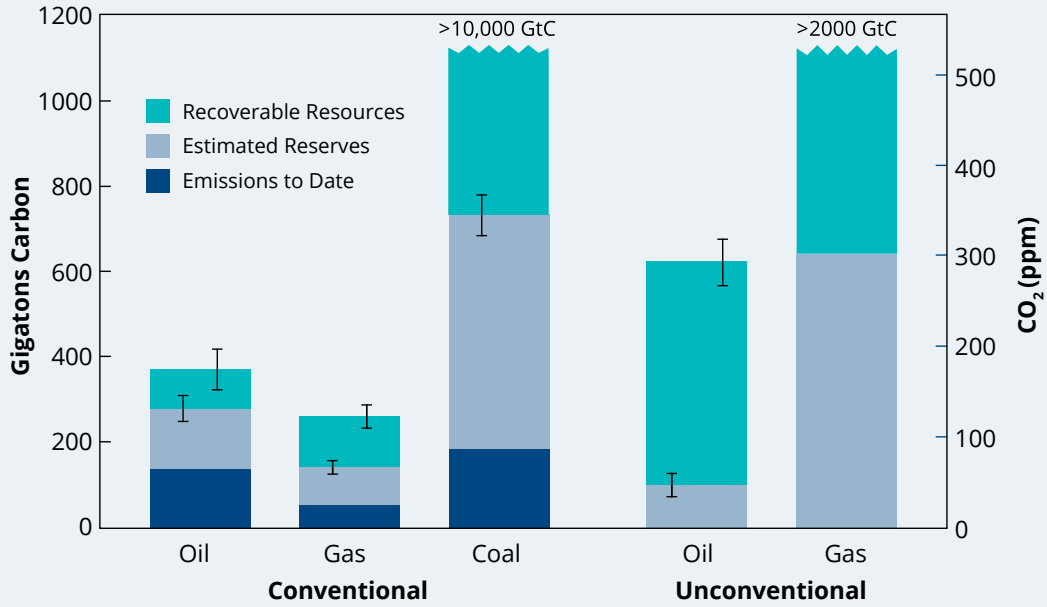
Fossil Fuels and the Global Energy Mix:
Though it is widely accepted that, based on greenhouse emissions, fossil fuels are an environmental nightmare and that they are the main reason behind the planet's rising temperature and other adverse impacts on climatic conditions, eliminating fossil fuels remains problematic. The main challenge is the integrated nature of fossil fuels with industry and modern lifestyles, especially in industrialised nations. Equally, challenging is the economic and industrial dependence on coal, oil and gas for energy and revenue by several developing countries. These factors make plans to transit to cleaner sources of energy as envisioned at the COPs and through NDCs both costly and difficult to execute. The outcome is that, as can be seen in Figure 9, according to the 2023 Statistical Review of World Energy, oil continues to have the largest share of the global energy mix (31.6%), followed by gas and coal at 22.7% and gas at 23.5%. This means fossil fuels together account for a whopping 81.8% of energy consumed worldwide. In contrast, renewables only make up 14.2% and the rest comes from nuclear.[56] To meet COPs commitments, governments are going to have to reduce fossil-fuel consumption dramatically.

Figure 9: Global Energy Mix as of 2023



Source: Statistical Review of World Energy

Figure 10: Carbon Emissions by Different Forms of Fossil Fuel



Source: James Hansen, Columbia University; Pushker Kharecha; Makiko Sato, Columbia University, Valerie Masson-Delmotte; Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature, PLOS ONE, December 2013

Policy Inconsistency and Conflicting Regional Interests:

There appears to be some inconsistency in the EU as relates to the decisions by the bloc and those of individual member states. For example, the EU first decided that gas should be fazed out, only to reconsider the matter and classify gas as a transition fuel. However, following the Ukraine war, some EU countries have also resumed coal power generation followed by nuclear power stations. The result is that, while the EU indicates commitment towards net zero and has funded some Sub-Saharan Africa governments to divest from coal and gas, the same governments have contributed towards a growth in the export of both sources
of energy.

Similarly, while the EU contemplates a less-carbon-intensive environment in the bloc through demands for low carbon imports and a circularised economic order, the EU does not support a movement in this direction in parts of the Global South. Instead, car dealers and others are at liberty to export used cars, used clothing and other environmentally damaging used merchandise to Sub-Saharan Africa. Given the EU's goal to form partnerships with countries in Sub-Saharan Africa, this conflict of interest might undermine the EU's partnership strategy based on an appearance of double standards and potentially increasing geopolitical differences at future COP negotiations.

Future Investments in Fossil Fuels:

Following COP 26 in Glasgow, it appeared that the demise of the petroleum and coal industries was inevitable since investments in oil exploration by listed international oil companies had been declining. The exception are state-owned enterprises (SOEs), some of which have large enough sovereign funds to fund projects and enjoy the benefits of the interim period before demand for oil and gas dries up. For instance, in March 2022, the media reported that the SOE in Saudi Arabia, Saudi Aramco, stated that

> *"it would boost its capital expenditure (capex) to $40–50 billion this year, with further growth expected until around the middle of the decade. Capex was $31.9 billion last year, up 18% from 2020—indicating an increase of about 50% for this year at the middle of the guidance range."* [57]

In 2021, the federal government of Nigeria invested $2.76 billion in the Dangote Refinery. In 2022, total investment in the Sangomar oil project in Senegal was estimated at between $3.8 billion and $4.2 billion, compared to $3 billion in 2021.[58]

In contrast, in 2020, Shell plc redefined its core business as energy and not oil and gas. In addition, some OICs in Africa were selling onshore assets, investing heavily in renewables, while reducing exploration and R&D budgets, while investing significantly in renewable-energy projects. Thus, it was reasonable to assume that, while oil would remain part of the energy mix for the foreseeable future, prospects for new projects, especially in the Global North, were slim. However, things changed with the EU's resumption of imports of coal and gas, as well as a 2023 decision by the UK government to open bids for oil blocks in the North Sea on a quarterly basis until further notice. Both suggest that investments in new oil and gas projects might be on the rise. Having been the first casualty of decarbonising following the 2015 Paris Climate Change Agreement, the fate of coal is unclear, as can be seen from a rise in imports into the EU following the Russian invasion of Ukraine and the EU's fear of an energy deficit.

Decarbonisation and Affordability

It appears that the one thing that might keep hopes high for fossil fuels in the region is the failure of COP negotiations to fully address the question of who pays the price for decarbonisation. In this respect, the controversy revolves around culpability based on current and historic levels of carbon emissions and the north's failure to meet its commitment to pay the $100 billion pledge. Following the Paris Agreement and the recent creation of the Loss and Damage Fund and conditions of funding are seen by some as inadequate and inappropriate to meet the obligations of the industrialised north. Nevertheless, no one argues against the need for the Global North to assist the Global South in meeting the costs of mitigating the impacts of climate change.

SECTION 3

GEOPOLITICS OF CRITICAL MINERALS AND DECARBONISATION IN THE EU AND SUB-SAHARAN AFRICA

3. Geopolitics of Critical Minerals and Decarbonisation in the EU and Sub-Saharan Africa

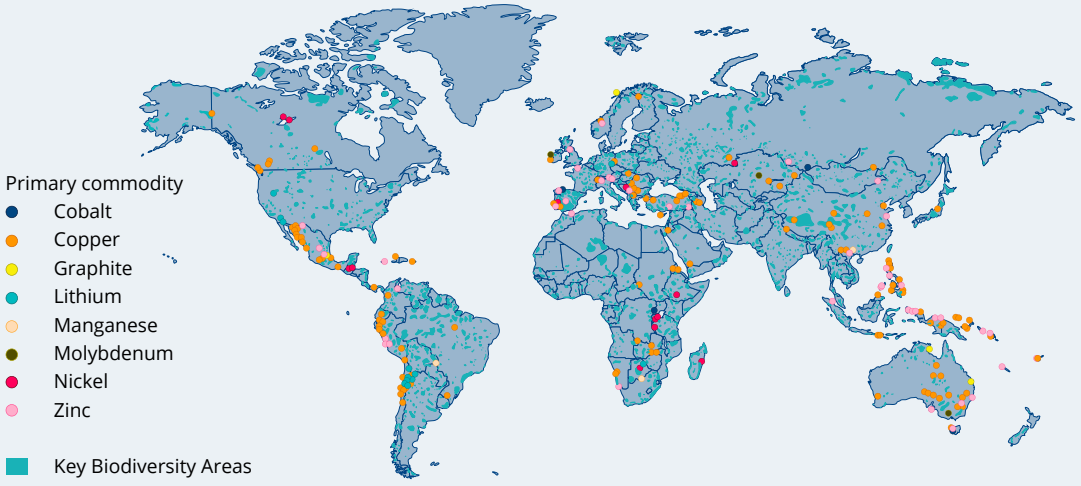
3.1 Overview

This section contains an overview of regional and national policies pertaining to minerals deemed critical for energy-transition technologies and other industries. Of special interest in the EU is the region's quest for security of supply, while governments in Sub-Saharan Africa want to leverage demand and beneficiate minerals. So essential is security of supply that the EU maintains a list of such minerals and monitors changes in demand and the availability of each under the broad category of Critical Raw Materials (CRMs).

The concept of *"critical minerals"* is both a policy guide and a strategic choice because no mineral substance is inherently or permanently critical and the classification changes as the rationale behind it does. The two common factors that influence the classification are technology that necessitates the use of a specific mineral in making components or in manufacturing processes and scarcity of a mineral leading to a supply deficit. The classification of minerals as critical varies from country to country and the list is revised from time to time. However, it is generally accepted that, for the transition to clean energy, cobalt, copper, graphite, lithium, manganese, nickel and a number of rare earth elements (REE) fit this profile.

This means that, whereas emissions from fossil fuels are the main cause of climate warming, certain minerals are considered part of the solution to lower temperatures in the atmosphere. This is because the substances are essential for technologies for transiting to cleaner energy and thereby laying the foundation for decarbonising global economies. However, it would be misleading to suggest that mineral projects do not contribute to CO_2 emissions because, albeit with lower levels of intensity, they do. In addition, at different stages in the value chain, substances differ in their carbon intensity and emissions. This means that, by substituting energy from fossil fuels with cleaner sources during production, processing and transportation at scopes 1, 2 and 3, the carbon footprint of mining operations can be further reduced.
On the other hand, without the right measures, due to mining's physical footprint and high water consumption, projects conflict with other users for land and water resources and impact biodiversity adversely. As shown in Figure 11, some critical mineral reserves are found in some of the world's most delicate ecosystems. In such cases, a trade-off must be made, especially as demand for minerals will lead to an increase in mining activities. Therefore, in addition to their essential nature in clean energy, CRMs must also be developed based on this broader environment, social and governance (ESG) context.

Figure 11: Mines in Key Biodiversity Areas



Source: S&P Global Sustainable1, S&P Intelligence

3.2 EU CRM Policy and Geopolitics of Minerals Supply Security

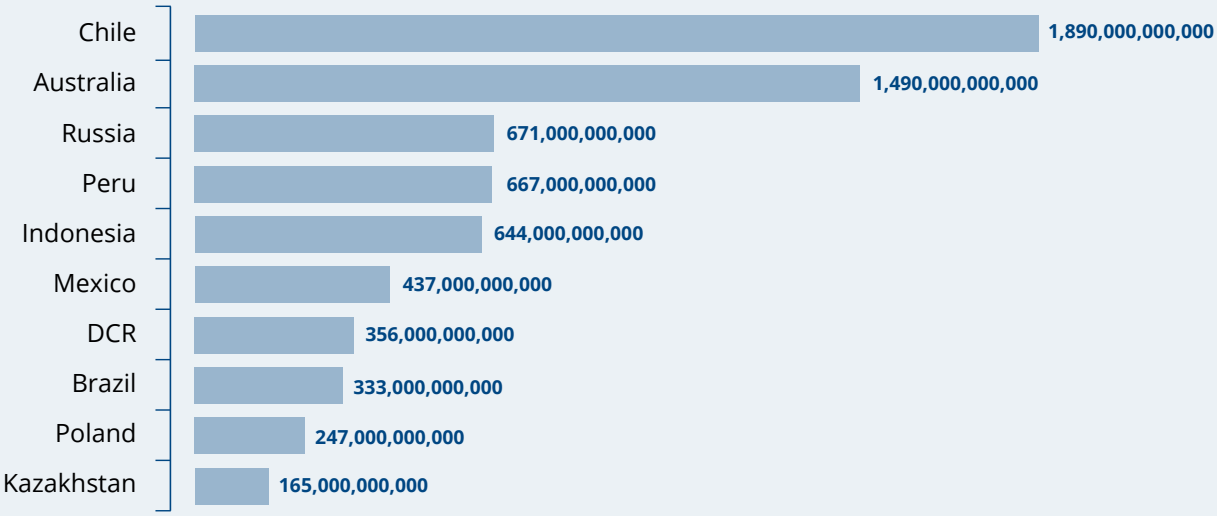
The EU's critical classification of minerals was influenced by the bloc's strategy for CRMs aimed at ensuring the security of the supply of metals to several industries. The goal is to meet increased raw-material demand arising from the need to scale up the production of energy-transition technologies and other supplies. These are necessary for changing the bloc's energy mix and replacing fossil fuels with solar, windmills and hydropower, among others. Of particular importance are metals for battery storage and e-vehicles, without which clean energy may not be scalable in the short term. However, EU policies are not only aimed at securing supply; the EU wants the supply to also be from politically stable sources.

The EU first produced a list of strategic critical minerals in 2011, and the list has been revised five times, with the latest version published in 2023. The list is first based on the economic importance of a mineral to the EU economy, based on end-use applications and its value addition in manufacturing. The second consideration is risk based on the likelihood of disruption to supply. The risk assessment is based on the concentration of primary supply in raw-material-producing countries, considering their governance performance and trade policies on the EU. One can see from Figure 12 why supply and the risk of disruption of supply concerns EU countries, most of which are heavily dependent on imports of CRMs. As seen in the same figure, among EU countries, only Poland features in the top ten lithium-, copper-, cobalt- and nickel-rich countries.

Though not shown on this chart, China dominates the supply of REEs, with a global supply share of 70%. It is a major supplier to the EU of essential parts for manufacturing various products. The bloc relies on China for 80% of its lithium and 100% of its heavy REE supplies, with Beijing recently limiting its exports to the EU of two critical metals, gallium and germanium. A change in Chinese trade policy or an inability to produce or transport materials (as was the case during the Covid-19 pandemic) could spell disaster for EU countries.

This highlights two factors. The first is the need for the EU to diversify and/or find alternative sources. The second is that the insecurity of supply is not just a function of the EU lacking its own CRMs but also depends on relations between itself and CRM-exporting countries. In recent times, ongoing geopolitical tension between the EU and Russia, as well as China, exacerbated this risk. The situation is further worsened by the fact that, in some countries rich in CRMs, SOEs and therefore diplomacy play a direct role in trade policies and relations. Major mineral-producing countries that feature in Figure 12 with large SOEs in mining include Brazil, China, Chile, the DRC, Indonesia and Russia.

Figure 12: Countries with the World's Largest Mineral Reserves: The Top Ten Critical Minerals
World mine reserves of lithium, copper, cobalt and nickel, country US$ value



Source: Gordon, O., & Gordon, O. (2023, August 30). The top ten critical minerals powerhouses of the energy transition. Energy Monitor. https://www.energymonitor.ai/sectors/extractive-industries/the-top-ten-critical-minerals-powerhouses-of-the-energy-transition/?cf-view.

In response, the EU is proactively implementing plans to diversify sources of mineral imports. To reduce risk, the EU is devising partnership strategies to align interests, strengthen trade relations and reduce the risk of isolation. A good example of such an initiative is the Minerals Security Partnership (MSP) policy, leading to the announcement of the Minerals Security Partnership Forum (or "MSP Forum") between the EU, the US, and other partners. Other countries, including the UK, have developed similar strategies. The former initiative is intended to serve as a new platform for cooperation in the area of CRMs that are vital for the global green and digital transitions. The announcement stated that

> *"the MSP Forum builds on the EU's Critical Raw Materials Package adopted in March 2023, which emphasized the need for more diverse and more sustainable CRM supply chains through new, mutually supportive international partnerships, such as the CRM Club."* [59]

The EU's €300 billion Global Gateway investment programme will be used to incentivise raw-material projects in partner countries. However, evidently the long-term goal is to end an over-dependence on other jurisdictions. EU Internal Market Commissioner Thierry Breton said:

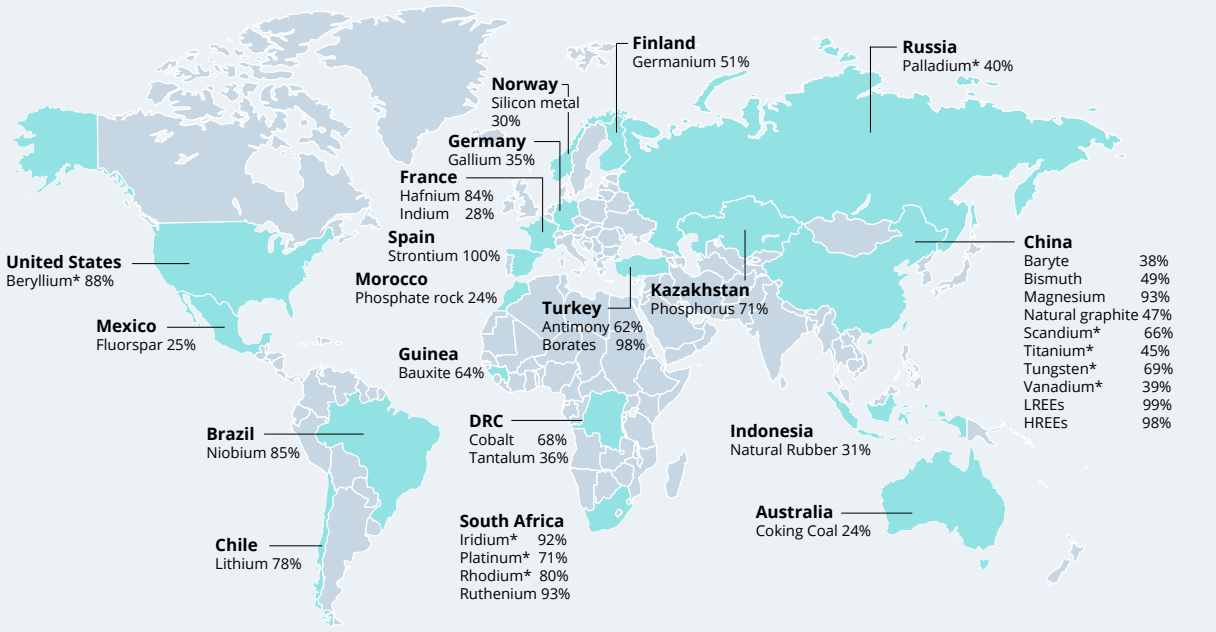
> *"We are now clear that in the EU we cannot replace a fossil-fuel dependency with a raw material one."* [60]

EU's CRMs and Secured Supply

However, the EU is not alone in seeking partnerships with African countries, because China, Russia, the UK and the US have policies aimed at achieving the same goal. This heightens the need for the EU to put forward a more attractive value proposition. However, it also adds a sense of policy agency for governments in Sub-Saharan Africa to secure long-term trade arrangements with the EU before the EU secures adequate supplies from other sources or before a major fall in demand.

For the foreseeable future, however, the EU relies on other regions of the world for some special minerals. As a matter of policy, the EU wants much of the materials imported to be processed in EU countries. Indeed, the EU's current target is to process at least 40% of its annual consumption of raw materials by 2030.

Figure 13: EU Sources of CRMs



* share of global production

Source: European Commission. (2020). Study on the EU's list of Critical Raw Materials (2020) Final report. Publications Office of the European Union. https://rmis.jrc.ec.europa.eu/uploads/CRM_2020_Report_Final.pdf

3.2.1 Other Factors Likely to Impact Supply

The Role of Technology in the Geopolitics of CRMs

As can be seen from the Global Gateway programme, access to financial resources plays a major part in the ability of the EU to compete and reduce the risk of dependence on external supply. Access to and influence over trends in technology also can reduce risk. The supply of minerals paves the way for technological solutions, and therefore strengthens those with access, while weakening those without. Investing in research and development (R&D) to minimise risk through either material substitution or less intense use of minerals is a major part of the geopolitics of CRMs. In a recent development, the bloc made an investment of €470 million in developing innovative solutions to reduce the EU's dependence on critical raw materials through an initiative known as the CRM Act. Projects to be funded include innovative solutions for circularity in wind-energy technology or partnership on batteries.[61] This is only one example of how the EU mobilises resources to reduce CRM supply insecurity in its economies and plans for energy-transition goals. This fact also potentially erodes the value of the resources in exporting countries.

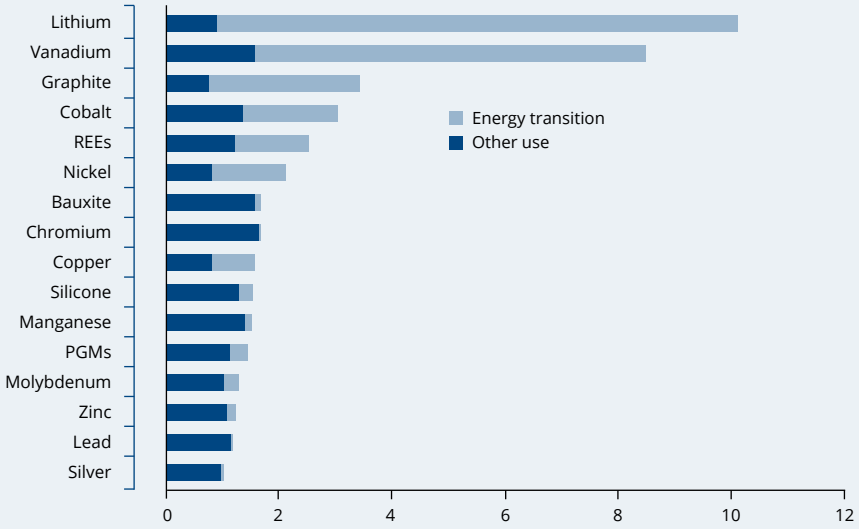
The EU is not alone, as China, the UK and the US have similar initiatives to support national industries. For instance, in 2023, China further solidified its position and announced a ban on the use of REE-processing technologies developed in its jurisdiction outside China in other countries.[62] This further demonstrates the role of technology in the geopolitics of energy transition.

Seabed Mining and Mineral Security of Supply

As demand rises relative to the supply of some CRMs, some countries, including those in the EU, have started to look at an unconventional potential source, namely, mining of the seabed. Seabed mining is regulated by the International Seabed Authority (ISA) of the United Nations and, over the last two years, debates on terms for granting licences and regulating the activities have gained momentum. However, early exploration not only suggests significant reserves but that the mineral content generally comprises cobalt, nickel, copper, and manganese, most of which are CRMs. However, as can be expected given the novel nature of the idea, the response to prospects for granting mining licences have been mixed. Countries like Canada, Norway and China are supportive. Others, including France, are not, while the US has not made a pronouncement despite pressure from some federal institutions to support the idea. If regulatory issues can be resolved, this will pave the way for collecting tonnes of polymetallic nodules from the sea floor.

Here too, debates are influenced by the geopolitics of self-interest. For instance, driven by a quest for security of supply, in 2023, Belgium became the latest advocate for seabed mining. The country's federal parliament passed a law endorsing seabed mining while demanding that the mining be undertaken responsibly.[63] The measures were approved in order to bolster the country's position as a Blue Leader and pioneer of responsible seabed mineral extraction, albeit on condition that the extraction of seafloor minerals is first sanctioned by yet to be approved United Nations licensing regulations. If regulatory issues

Figure 14: CRM Demand Growth
Ratio of 2050 to 2022 demand under a net zero emissions scenario.



Source: International Energy Agency (IEA) World Energy Outlook (2023); and IMF staff calculations

can be resolved, this will pave the way for the collection of tonnes of polymetallic nodules from the sea floor. For instance, The Metals Company which is a frontrunner in seabed exploration, estimates that areas under its exploration in the Pacific have mineral reserves capable of meeting supply needs for 280 million e-vehicles.[64]

For its part, the African regional group in the ISA expressed concern over the potential impacts of large volumes of minerals on the market and their effect on public revenue from land-based mining. The members argued for and secured a consensus for a fiscal regime for ISA which would compensate for any material losses suffered by terrestrial mining economies. It was also agreed that a mechanism for equitably sharing benefits derived from seabed mining be developed. Other concerns are related to the impacts of seabed mining on conservation and coastal states and the blue economy. If the UN approves seabed mining, the outcome will be a narrowing of the supply and demand gap, as shown in Figure 14. This will result in a remapping of global mineral supply chains and the very geopolitics of CRMs.

3.3 Africa, Critical Minerals and Geopolitics

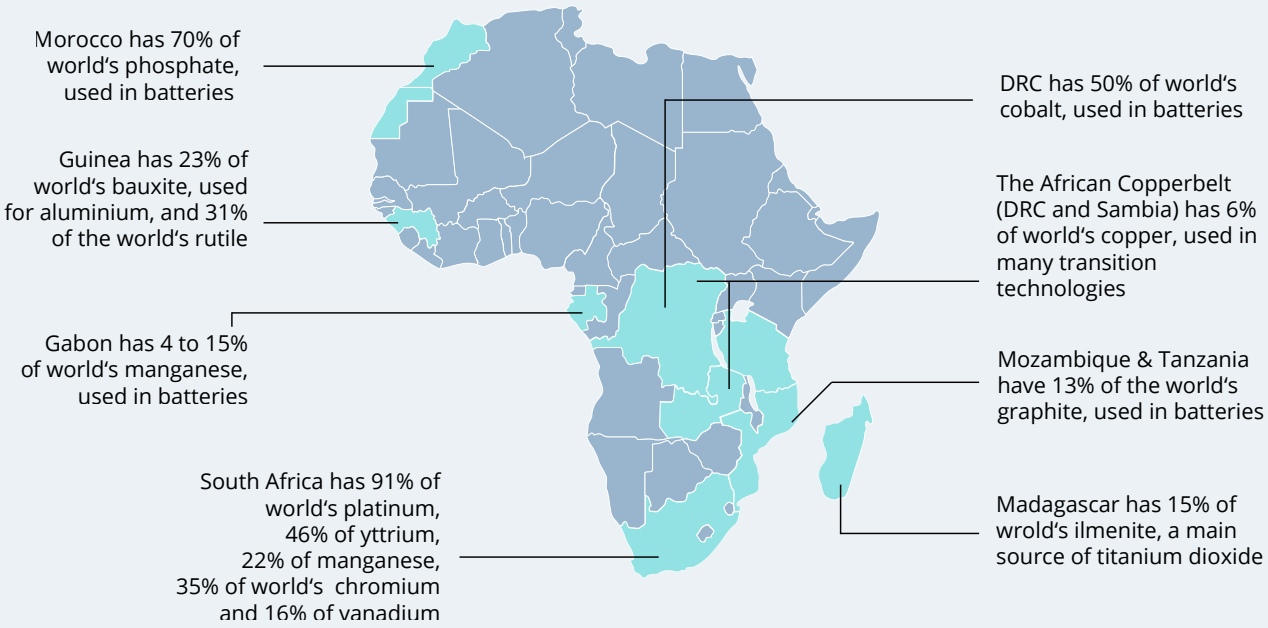
3.3.1 Sub-Saharan Africa and CRM Endowment

Africa has significant mineral resources, some of which are deemed critical for EU industries and the transition to clean energy. The region's leading mineral producers include the DRC, Guinea, Mozambique, Niger, South Africa, Zambia and Zimbabwe. As can be seen in Figure 15, not only does the region have large reserves of industrial minerals like iron ore for steel, bauxite for aluminium and platinum group metals (PGMs) but it also has large reserves of minerals that are essential for energy-transition technologies, some of which are destined for the EU.

3.3.2 Sub-Saharan Africa and Leveraging CRM Demand

Export of CRMs from Sub-Saharan Africa, however, requires reconsideration, for two important reasons. The first is that the idea of CRMs is a policy concept designed to address the security

Figure 15: Africa's Industrial Mineral Resources
African Countries with large shares of critical minerals



Source: Papa Daouda Diene et al., Triple Win: How Mining Can Benefit Afric's Citizens. Their Environment and the Energy Transition, Research Report (New York: Natural Resource Governance Institute, 2022)

of supply of certain minerals in industrialised regions (including the EU) such that governments can sustain economic growth albeit under less carbon-intensive conditions. Africa's development challenges differ from those of the EU. Policymakers argue that mineral development policies in Sub-Saharan Africa should be a vehicle for economic transformation and not to meet the needs of the EU and other regions of the world. This puts the two regions at loggerheads and lies at the core of the geopolitics of CRMs between Africa, the EU, and other industrialised countries.

Historically, the structure of trade between the two regions has been such that Sub-Saharan Africa is a strategic source of CRMs upon which parts of the EU and UK economies relied to industrialise. As demand for minerals increases, there is no evidence that this pattern is likely to change and is seen by Africa's policymakers as a major economic injustice that impedes regional prosperity. Therefore, the region's politicians, thought leaders and civil-society organisations are calling for an end to export-orientated policies in preference for beneficiating the CRMs instead. From a sustainable development perspective, advocacy for mineral value addition is a difficult principle to dismiss because there is plenty of evidence that it has economic merit.

In Sub-Saharan Africa, a good example is South Africa, where mining is integrated into the economy upstream and downstream of the value chain. This has resulted in greater economic contribution to the economy. A study by the leading mining suppliers' association known as the Mining Equipment Manufacturers of South Africa (MEMSA) demonstrated this. MEMSA is an association of 36 corporate members and specialises in the provision of mining equipment and services, including drilling, site preparation, transport, earth-moving equipment, health and safety, information systems, environmental protection, and refurbishment of component parts for a range of maintenance works. Collectively, in 2019, the members employed 5000 people and had a sales turnover of US$300 million. In that year, the members exported about US$16.46 million (ZAR250 million) worth of goods.[65] This market for goods and services would not be possible without a vertically integrated mineral value chain.

3.3.3 Other Factors

To pave the way for mineral beneficiation, some Sub-Saharan governments have instituted laws restricting the export of CRMs. For instance, following discoveries of lithium deposits, three countries in Sub-Saharan Africa introduced policies to ban the export of unprocessed ore. The countries are Namibia, Nigeria and Zimbabwe. However, the effectiveness of such policies is yet to manifest, in part because the EU's import-focused CRM policies are not the only impediment to industrialisation. Reports show that there are other potentially more problematic challenges facing African governments, internally and externally. Three of the most important are discussed in paragraphs 3.3.3.1 to 3.3.3.3 below.

3.3.3.1 Perception of Poor Governance and Sovereign Risk

Given the lack of finance, technology, infrastructure and markets to succeed in mineral processing, Sub-Saharan Africa needs partnerships from the industrialised north to bridge the capacity gap. Historical trade links and proximity to the EU make the latter an obvious contender. However, from the perspective of EU importers, mineral processors and financiers, sovereign risk stemming from poor governance is increasingly making Sub-Saharan Africa uncompetitive. This is because, in some parts of Sub-Saharan Africa, mining occurs under politically and socially fragile conditions that are also associated with conflict. This has
given rise to the concept of *"conflict minerals"* and a call for *"responsible sourcing"*. Based on the latter, advocacy groups successfully called for a ban on investments and imports of goods from jurisdictions deemed non-compliant with certain principles of governance and sustainable development. These requirements impact investments in mineral-processing projects and exports of finished goods.

Recent coups and the appropriation of private property by some governments in the Sahel have heightened concern over Sub-Saharan Africa's sovereign risk, based on perceptions of regulatory instability and a weakening of public institutions and governance. This and alignment between the military leaders with Russia have created

tension between that part of Sub-Saharan Africa and some EU countries and reduced trade of some minerals, including gold and uranium.

3.3.3.2 Mining's Footprint and Social Impacts/Risk

For CRM demand to have positive impacts, the mining industry must mitigate unintended outcomes by continuously rethinking its relationship with the social and physical environment. This is because mining projects have a large physical footprint, which results in projects competing with other users for land, soil, forests and water. Depending on the scale of a project and method of extracting ore, mining's environmental impacts include deforestation, soil erosion, water contamination and air pollution. In addition, some mineral-processing methods release environmentally hazardous chemicals and other pollutants into the atmosphere, the ocean, and surface and underground water. On the other hand, mining is energy-intensive and produces significant scope 1 and 2 emissions. This means that, without a meaningful reduction in fossil-fuel energy usage, the industry's carbon footprint will increase as demand for CRMs grows. Therefore, in relation to trade with the EU, governance considerations increase risk for investors, who operate under the scrutiny of consumer watchdogs and regulators. This is especially true for consumer goods with visible brands in the Global North. A large part of Sub-Saharan Africa's ability to attract investment in mineral processing therefore requires a robust policy response to the challenges.

One of the main problems facing the Sub-Saharan Africa region's mining sector is the absence of policies to regulate artisanal small-scale mining (ASM). Yet, it is reported that ASM provides livelihoods to over 10 million people and is a major source of mineral production. For example, in the DRC, a significant proportion of cobalt production is from ASM. According to the US Geological Survey, an estimated 20%–30% (Clowes and Kavanagh 2020) of the 100 000 metric tons of cobalt produced in the DRC in 2019 came from ASM, providing an essential livelihood for 150 000–200 000 people. Also in the DRC, the SOE Gecamines accounts for over 60% of cobalt produced globally. In Rwanda, ASM employed 60 000 workers in all mining and quarrying activities in 2019, of which at least half are estimated to be ASM miners. ASM activities accounted for 70% of production and were mainly in tin, tungsten, and tantalum. Total mineral exports from Rwanda were worth US$377 million in 2017–2018.

> *"In Guinea Conakry, ASM mining revenues account for almost 16% of expenditure on health, education, water and infrastructure development, 80% of export revenues and 20% of the national GDP."* [66]

One of the main policy, legal and therefore regulatory frameworks in the ASM subsector is the absence of measures to implement health and safety standards, protect workers' and children's rights while unlocking the economic value of minerals. Another is conflict, women, between ASM activities mechanised mining, as well as its encroachment on agricultural land. The prevailing conditions raise human rights concerns. Following pressure from advocacy groups in the EU and Sub-Saharan Africa, the EU enacted laws to govern the activities of EU corporations conducting business outside the EU. The laws cover a range of issues, including corruption by public officials, illicit trade, human rights and reduction of carbon emissions, all of which put a spotlight on ASM.

One of the most recent laws is the EU's Carbon Border Adjustment Mechanism (CBAM), which will be effective in 2026. Through this, the EU will impose import charges on products such as steel, cement, and electricity, based on the carbon dioxide emissions embedded in their production. Though not seen by the EU as a form of tax, some analysts suggest that, while the charges may reduce global exports to the EU by around 0.4% while negatively affecting the output of some manufacturers within the EU, the long-term impacts on the transition to clean energy may be negligible.[67] In addition, while welcomed by some, the laws have unintended consequences because the law introduces higher market-entry barriers for exports from poor countries into the EU. For high emitters in Sub-Saharan Africa, this also potentially decreases prospects for trade in energy-transition technology parts and finished goods. It potentially eliminates some African suppliers of CRMs to EU industries because of a lack of compliance.

The challenges discussed in paragraphs 3.3.3.1 to 3.3.3.3 are not exhaustive, but, as can be deduced from the three examples above, they conver-

ge on sustainability principles and the integration of ESG standards into stock market regulations, conditions for project finance, overall impacts on brand reputation and social risk, which have raised additional sustainability requirements on the supply and demand side. The result is, while rich in raw materials and despite being a long-standing trade partner of the EU, examined through an ESG lens, Sub-Saharan Africa might not be the EU's supplier of choice. That is, unless the challenges above are addressed to pave the way not just for exports but for inward investment in beneficiation. EU interventions, though consistent with ESG standards, have the unintended consequence of doing little to address the EU's own security of supply.

SECTION 4

HIGH-LEVEL OBSERVATIONS

4. High-Level Observations

Given the nature and scope of the report, it is not possible to reach any credible conclusions on the geopolitics of decarbonisation in and between the two regions. However, there are some noteworthy developments, as discussed below.

4.1 A Window of Opportunity

The global competition for CRMs offers mineral-rich countries in Sub-Saharan Africa a window of opportunity to leverage demand and profit from the ensuing competition for supply between China, the US and the EU. However, it is unlikely that this will be a permanent situation. The industrialised world will continue to seek alternatives, the most likely being technological innovation and raw-material substitution. If this occurs, it will erode demand for and trade in CRMs and restrain other economic opportunities in mineral-rich Sub-Saharan Africa.

4.2 Benefaction and Value Addition

Based on the analysis in paragraphs 3.3.3.1 to 3.3.3.3, it appears that more than a skew towards the importation of raw materials by the EU, Sub-Saharan Africa's business environment might prove a greater obstacle and a disincentive for investors interested in downstream activities. This is especially true for the technologies, know-how and finance needed for industrialisation. Thus, the business and regulatory environments do not augur well for Sub-Saharan's minerals-processing-policy goals or the EU's partnership strategies.

4.3 State-Owned Enterprises

Whether discussions pertain to fossil fuels or minerals, SOEs in Sub-Saharan Africa could play a leading role in several ways. This includes contributing to decarbonisation plans, mineral beneficiation, responsible trade and partnerships with foreign investors. However, with a few notable exceptions, like the Nigeria National Petroleum Corporation (NNPC), which has taken a lead in strategies for renewable sources, in most countries the role of the companies with respect to the country's decarbonisation goals is unclear. For the most part, mandates have been limited to equity participation and production-sharing to generate state revenue. On the other hand, unless properly managed, additional investments by and in SOEs could add to state financial burdens, public finance mismanagement and sovereign debt.

4.4 Competition with China

When seeking partnerships in Sub-Saharan Africa, the EU needs to present a more attractive value proposition than has historically been the case. This might require envisioning a new trade order in which raw materials from Africa are not intended to benefit EU industries at the expense of beneficiation in Africa. This is especially true if partnerships are intended to counter China's expansion into Africa because China's advantage stems from the view of some African governments that that government offers better value. This is despite the fact that, in late 2023, China banned exports of mineral processing technology for REEs.[68]

4.5 Sub-Saharan's Emerging Investors

However, China is not the only country that the EU is competing with for Africa's minerals. Over the past few years, some countries in Sub-Saharan Africa have benefitted from a growing trend in which FDI in mining by the Gulf States has increased. For instance, the United Arab Emirates' International Resources Holdings (IRH) and Zambia's state-owned ZCCM-IH formed a strategic equity partnership in Mopani Copper Mines. Industrialists including Bill Gates and Jeff Bezos have also invested in copper-mining projects in that country. If sustained, the trend offers potential opportunities to be leveraged by African governments. However, it also increases competition for the EU and suggests the bloc should reconsider its trade policies in Sub-Saharan Africa.

5. Sources

1 Africa-EU - International trade in Goods Performance - AZA Finance
2 EU-Africa trade - statistics and facts | Statista
3 https://cinea.ec.europa.eu/programmes/life/clean-energy-transition_en#:~:text=
4 The Investment Case for Energy Transition in Africa
5 https://cinea.ec.europa.eu/programmes/life/clean-energy-transition_en#:~:text=
6 The EU-Africa partnership in a geopolitical context – ECDPM
7 aef_summit_energy-vs-climate.pdf (ibrahim.foundation)
8 https://www.carbonbrief.org/analysis-global-co2-emissions-from-fossil-fuels-hit-record-high-in-2022/#:~:text=
9 Annual CO_2 emissions from oil, 2022 (ourworldindata.org)
10 WB-GGFR-Report-Design-05a.pdf (worldbank.org)
11 Fuel for Thought, Africa oil and Gas Review 2019. Current Developments and a look into the Future. PWC Gas Review November 2019. Africa Oil & Gas 2019
12 Oil Reserves by Country - Worldometer (worldometers.info)
13 Oil Reserves by Country - Worldometer (worldometers.info)
14 Africa: countries with highest oil revenues 2020 | Statista
15 https://www.bing.com/search?q=Nigeria+annual+oil+production+%28bpd%29+2023&qs=n&form=QBRE&sp=-1&lq=0&pq=nigeria+annual+oil+production+%28bpd%29+2023&sc=11-40&sk=&cvid=A9270CF2EE8F4664B8125D36A17FC9EF&ghsh=0&ghacc=0&ghpl=
16 Ibid
17 https://ycharts.com/indicators/republic_of_the_congo_oil_production#:~:text =Republic%20of%20the%20Congo%20Oil%20Production%20Republic%20of,Congo%20Oil%20Production%20%28I%3ARCOP%29%20269.00K%20bbl%2Fd%20for%202022
18 https://citinewsroom.com/2023/04/ghanas-oil-production-drops-by-6-but-revenue-hits-record-high-in-2022/
19 https://ycharts.com/indicators/gabon_oil_production
20 https://ycharts.com/indicators/equatorial_guinea_oil_production
21 https://ycharts.com/indicators/chad_oil_production#:~:text=Chad%20Oil%20Production%20Chad%20Oil,Production%20%28I%3ACOPNUG4K%29%20124.00K%20bbl%2Fd%20for%202022
22 aeo_2021_-_chap2_-_en.pdf
23 Country List Government Debt to GDP | Africa (tradingeconomics.com)
24 Oil and Gas Investment: Navigating Recent Trends | DW Energy Group
25 https://www.eiu.com/n/energy-transition-will-move-slowly-over-the-next-decade/#:~:text=
26 https://ourworldindata.org/energy-mix#:~:tex
27 Oil import dependency at its highest in 2022 - Eurostat (europa.eu)
28 Energy policy: general principles (europa.eu)
29 https://eu-solidarity-ukraine.ec.europa.eu/eu-sanctions-against-russia-following-invasion-ukraine/sanctions-energy_en
30 Energy policy: general principles | Fact Sheets on the European Union | European Parliament (europa.eu)
31 https://www.nstauthority.co.uk/regulatory-information/licensing-and-consents/licensing/#:~:text
32 Full report – BP Statistical Review of World Energy 2020
33 EU targets aid to gas-rich Mozambique, Tanzania | Reuters
34 Angola Natural Gas: Exports, 1960 – 2024 | CEIC Data
35 https://www.strategyand.pwc.com/za/en/assets/pdf/africa-oil-and-gas-review-2019.pdf
36 Gas Flaring - Energy System - IEA
37 Biggest greenwashing exercise of all time': EU includes fossil gas in plans
38 The United States remained the largest liquefied natural gas supplier to Europe in 2023 - U.S. Energy Information Administration (EIA)
39 Scholz's Africa visit: Germany looks to boost economic ties – DW – 10/31/2023
40 Clean Coal Technologies in the ASEAN - FutureCoal
41 Coal reserves in Africa | TheGlobalEconomy.com
42 Botswana - Countries & Regions - IEA
43 South Africa - Countries & Regions - IEA
44 https://www.statista.com/statistics/265463/south-african-coal-production-in-oil-equivalent/#:~:text=

45 Coal - Minerals Council South Africa
46 https://www.mineralscouncil.org.za/sa-mining/coal
47 https://www.reuters.com/business/environment/us-eu-others-will-invest-speed-safricas-transition-clean-energy-biden-2021-11-02/
48 https://eu-solidarity-ukraine.ec.europa.eu/eu-sanctions-against-russia-following-invasion-ukraine/sanctions-energy_en
49 https://thecoalhub.com/report-presentation/south-africa-coal-exports#:~:text=Coal
50 Supply – Coal 2023 – Analysis - IEA
51 https://edition.cnn.com/2024/04/29/climate/g7-end-coal-fossil-fuels-climate-intl/index.html
52 Namibia's Ambitious Nuclear Vision: Strategic Uranium Investments with China
53 World Uranium Mining - World Nuclear Association (world-nuclear.org)
54 Europe doubled its import of Russian nuclear fuel for 2023, data say - Bellona.org
55 H.R.1042 - 118th Congress (2023-2024): Prohibiting Russian Uranium Imports Act | Congress.gov | Library of Congress
56 Global Energy Trends: Insights From The 2023 Statistical Review of World Energy (forbes.com)
57 Saudi Aramco could invest $50 billion to boost oil capacity this year | CNN Business
58 https://energycapitalpower.com/market-report-woodside-advances-oil-and-gas-projects-in-senegal
59 EU and partners launch Minerals Security Partnership Forum (europa.eu)
60 EU must close trade deals for raw materials to avoid being 'weaponized' - Thierry Breton | Euro-news
61 Agreement reached on Critical Raw Materials Act - Swisscore
62 https://www.csis.org/analysis/what-chinas-ban-rare-earths-processing-technology-exports-means#:~:text=
63 GSR welcomes Belgium's responsible deep-sea mining legislation - GSR (deme-gsr.com)
64 Research - The Metals Company
65 https://memsa.org.za/
66 https://www.lifegate.com/artisanal-small-scale-mining-africa
67 Asian Economic Integration Report (AEIR 2024) (adb.org)
68 China bans export of rare earths processing tech over national security | Reuters
https://www.intellinews.com/tanzania-s-mining-sector-is-about-to-take-off-despite-government-interference-325383/#:~:text

6. References

- https://www2.bgs.ac.uk/mineralsuk/mineralsYou/whatAre.html.
- Fuel for Thought, Africa oil and Gas Review 2019. Current Developments and a look into the Future. PWC Gas Review November 2019.
- Grace Goodrich https://energycapitalpower.com/top-10-africas-leading-oil-producers-in-2021/
- https://www.afdb.org/sites/default/files/2021/03/09/aeo_2021_-_chap2_-_en.pdf
- BP Statistical Review of World Energy 2020 | 69th edition
- https://www.reuters.com/article/ozabs-eu-mozambique-aid-20120719-idAFJOE86I07520120719
- https://www.researchgate.net/figure/Natural-gas-reserves-estimates-in-various-geopolitical-areas-percentage-of-total_fig2_237338604
- Fuel for Thought, Current Developments, and a look into the Future. PWC Gas Review November 2019.
- The U.S. Energy Information Administration
- https://miningafrica.net/natural-resources-africa/coal-mining-in-africa/
- https://www.bbc.com/news/world-africa-47232268
- https://www.mineralscouncil.org.za/sa-mining/coal
- https://www.kitco.com/news/2021-09-16/World-s-largest-uranium-producing-countries-in-2020-report.html
- https://www.kitco.com/news/2021-09-16/World-s-largest-uranium-producing-countries-in-2020-report.html
- https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/primary-energy.html
- https://www.worldbank.org/en/topic/extractiveindustries/publication/global-gas-flaring-tracker-report
- https://www.pnas.org/doi/10.1073/pnas.2006774117
- https://www.devex.com/news/world-bank-boosts-climate-funding-but-activists-fret-over-gas-deals-100205
- https://www.worldcoal.org/coal-facts/coals-contribution/
- https://www.worldcoal.org/clean-coal-technologies/
- https://www.lenntech.com/periodic/elements/u.htm.
- https://www.eia.gov/energyexplained/nuclear/nuclear-power-and-the-environment.php
- https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report.pdf
- https://www.investmentweek.co.uk/news/4044423/biggest-greenwashing-exercise-eu-includes-fossil-gas-plans
- https://edition.cnn.com/2022/03/21/energy/saudi-aramco-investment/index.html
- https://energycapitalpower.com/market-report-woodside-advances-oil-and-gas-projects-in-senegal
- https://www.bbc.com/news/world-europe-60767454
- https://www.oecd-nea.org/upload/docs/application/pdf/2020-12/7555_uranium_-_resources_production_and_demand_2020__web.pdf
- https://energycapitalpower.com/wp-content/uploads/AES_Africa_Renewables_2021.pdf
- AGA Malaria and PublicPrivate Partnerships in Ghana's Health Sector A CASE STUDY African Natural Resources Center, African Development Bank, 2016
- https://www.lifegate.com/artisanal-small-scale-mining-africa
- https://www.industriall-union.org/calls-to-formalize-artisanal-and-small-scale-mining-in-africa
- https://www.trafigurafoundation.org/programmes/pact-drc/
- State of the Artisanal and Small-Scale Mining Sector 2020
- Author(S): Daniel Limpitlaw* and James McQuilken**Using A Market-Driven Approach to Improve Economic Returns and Mine Safety organization(s): *Limpitlaw Consulting, **Pact
- https://www.sciencedirect.com/science/article/abs/pii/0892687589900873
- https://www.iisd.org/publications/women-artisanal-and-small-scale-mining-challenges-and-opportunities-greater

- women in mining in south africahttps://www.mineralscouncil.org.za › 3-factsheets
- Khama, Sheila, Boardrooms Need Local Voices, Royal Institute of International Affairs, October 2019
- https://www.sanews.gov.za/south-africa/strategy-women-mining-pipeline
- https://internationalwim.org/

7. LIST OF FIGURES

8. ABBREVIATIONS

ASM	Artisanal Small-Scale Mining
AfDB	African Development Bank
AFC	Africa Finance Corporation
CBAM	Carbon Border Adjustment Mechanism
CNG	Compressed Natural Gas
CO2	Carbon Dioxide
COPs	Conference of the Parties
CRMs	Critical Raw Materials
DFIs	Development Finance Institutions
DRC	Democratic Republic of the Congo
EIA	Energy Information Administration
EIB	European Investment Bank
EIU	Economist Intelligence
ESG	Environment Social and Governance
EU	European Union
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment
FEC	Federal Executive Council
FCPF	Forest Carbon Partnership Facility
GDP	Gross Domestic Product
GGFR	Gas Flaring Reduction Partnership
GMC	Ghana Manganese Company
IFC	International Finance Corporation
IMF	International Monetary Fund
ISA	International Seabed Authority
IOCs	International Oil Companies
JV	Joint Venture
LDCs	Least-Developed Countries
LNG	Liquid Natural Gas
LPG	Liquefied Petroleum Gas
MEMSA	Mining Equipment Manufactures of South Africa
MoU	Memorandum of Understanding
MSP	Minerals Security Partnership
NAMCOR	National Petroleum Corporation of Namibia
NDCs	Nationally Determined Contributions
NNPC	Nigerian National Petroleum Corporation
NSTA	North Sea Transition Authority
OPEC	Organisation of the Petroleum Exporting Countries
PGMs	Platinum Group Metals
REE	Rare Earth Elements
R&D	Research and Development
SADC	Southern African Development Community
SOEs	State-Owned Enterprises
TMI	Ningxia Tianyuan Manganese Industry Group
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UK	United Kingdom
US	United States
TMI	Ningxia Tianyuan Manganese Industry Group
WNA	World Nuclear Association
WWF	World Wildlife Fund
ZRF	Zero Routine Flaring

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