Norwegian Institute of International Affairs

REPORT – 3 / 2025

EU-Norway Green Alliance between vision and reality: Exploring the potential and barriers in the critical minerals and battery sectors

Kacper Szulecki, Amalie Skaiå Larsen, Bendik Larsen and Philip Lømo Godal

Acknowledgements

Norwegian Institute of International Affairs

The Norwegian Institute of International Affairs is a leading research institute. Established in 1959, we provide research and recommendations of relevance to Norwegian foreign policy, with a strong position in the field of conflict resolution and peace operations.

This report has been written as part of the project 'Norway and the EU towards 2030', supported by the Norwegian Ministry of Foreign Affairs.

Photo credit: NTB

ISSN: 1894-650X

Visiting address: Rosenkrantz' gate 22
Address: PO box 7024 Pilestredet park 18
0176 Oslo, Norw

Internet: www.nupi.no
E-mail: post@nupi.no

Tel: [+ 47] 22 99 40 00

EU-Norway Green Alliance between vision and reality: Exploring the potential and barriers in the critical minerals and battery sectors

Kacper Szulecki, Amalie Skaiå Larsen, Bendik Larsen and Philip Lømo Godal

Contributors

Kacper Szulecki
Research professor, NUPI

Kacper Szulecki is a research professor in the Climate and Energy Research Group at the Norwegian Institute of International Affairs.

Amalie Skaiå Larsen
Project leader, Abelia

Amalie Skaiå Larsen is currently a project leader at Abelia. She defended an MA thesis at the Faculty of Social Sciences, University of Oslo, on the development of a Norwegian Battery Policy (2023).

Bendik Larsen
Advisor, Inventura

Bendik Larsen is currently an advisor at Inventura. In 2023, he defended an MA thesis at the Department of Political Science, University of Oslo, on the Norwegian mineral industry and the feasibility of the EU-Norway *Strategic Partnership*

Philip Lømo Godal
Consultant, EY

Philip Lømo Godal is currently a consultant at EY. He defended his MA thesis at the Centre for Development and the Environment (SUM) University of Oslo in 2023, analysing Norwegian battery producers' reactions to the European Green Deal.

Contents

Executive Summary

Faced with accelerating climate change as well as geopolitical turbulence created most importantly by the Russian invasion of Ukraine, the European Union (EU) and Norway seek to forge a strategic partnership aimed at advancing the green transition, with an important role played by critical minerals and battery sectors. This report delves into the potential and barriers of this alliance, mapping the regulatory landscape, the global geoeconomic context as well as crucial domestic level factors that will influence the future of Norwegian-EU collaboration.

The EU aims to lead global climate efforts by transforming its economy and energy systems towards carbon neutrality, as outlined in the 2019 European Green Deal and the subsequent legislation. This transformation necessitates a significant expansion of renewable energy sources and robust energy storage solutions, particularly batteries, which are crucial for balancing intermittent renewable energy and electrifying transport.

Battery demand is projected to rise dramatically, driven by the electrification of various sectors and the need for energy storage. Currently, the market is dominated by Asian countries, with China leading in production and sales. The EU's dependency on foreign supplies of key raw materials like cobalt, lithium, and nickel poses significant risks, prompting efforts to establish a local battery value chain.

However, the EU faces several challenges in developing its battery value chain, including financial incentives from other regions, rising raw material costs, and the need for timely ramp-up of production facilities. The EU's research and innovation efforts have not always met ambitious targets, highlighting the need for better alignment with technological roadmaps and funding.

The green transition will significantly increase the demand for critical minerals, some of which are as geographically concentrated as fossil fuels. The EU's dependency on imports for these minerals, particularly from China, underscores the need for diversified and secure supply chains. The EU has launched the Critical Raw Materials Act to address these challenges, setting benchmarks for domestic capacities and promoting sustainability. Obtaining politically stable and reliable sources of critical raw materials is a key priority and an important element of EU's "open strategic autonomy" idea – and Norway, which has significant mineral deposits and a growing battery industry, is therefore a preferred partner.

Norway's Role and Potential

Norway, a key supplier of hydrocarbons and clean energy, can play a pivotal role in the EU's green transition by providing critical raw materials and batteries. However, political and regulatory obstacles must be addressed to realize this potential. Norway's alignment with the European Green Deal and its commitment to sustainability initiatives make this easier on the onset, but challenges remain.

The EU's regulatory landscape, including the European Green Deal, Critical Raw Materials Act, and Battery Regulation, aims to create a sustainable and competitive battery industry. Norway's policies, such as the Green Industrial Initiative and the Mineral Strategy, align with these goals, focusing on efficient processes, circular economy, and sustainable industry development.

The report presents case studies of three significant mining projects in Norway: Nussir (copper), Nordic Mining (rutile and garnet) and Skaland Graphite. Both projects highlight the complexities of domestic mining, including regulatory hurdles, environmental concerns, and opposition from local communities and indigenous groups. These case studies underscore the need for balanced approaches that consider both economic benefits and environmental protection.

Policy Recommendations

To successfully navigate the complexities of the green transition and ensure the EU-Norway Green Alliance achieves its full potential, the following policy recommendations are proposed:

1. **Improve Regulatory Frameworks**
- *Streamline permitting processes:* Simplify and expedite the permitting processes for mining projects without compromising environmental and social standards. Establish clear guidelines and timelines to provide certainty for investors and developers.
- *Harmonize regulations:* Work towards harmonizing regulations across the EU and Norway to create a consistent and predictable regulatory environment. This will facilitate cross-border cooperation and investment.

2. **Address Socio-Political Challenges**
- *Inclusive policy-making:* Ensure that policy-making processes are inclusive and consider the interests of all stakeholders, including indigenous communities and local populations. Implement benefit-sharing mechanisms to ensure that affected communities receive a fair share of the economic benefits from mining projects.
- *Conflict resolution:* Develop frameworks for resolving conflicts that arise from mining activities. This includes establishing independent bodies to mediate disputes and ensure that all parties are treated fairly.

3. **Enhance Public Awareness and Engagement**
- *Educational campaigns:* Launch public awareness campaigns to inform citizens about the importance of critical minerals and their role in the green transition. Highlight the global environmental and local economic benefits of sustainable mining practices.
- *Stakeholder involvement:* Foster greater involvement of local communities, indigenous groups, and environmental organizations in the decision-making process. Ensure that their concerns are addressed and that they have a voice in shaping mining policies.

4. **Implement Stringent Environmental Standards**
- *Reduce mining waste:* Encourage the development and adoption of technologies that minimize waste production. Support initiatives that explore the use of mining tailings in other industries, such as construction materials, to promote circular economy practices.
- *Environmental protection:* Enforce strict environmental regulations to ensure that mining

activities do not cause irreversible damage to ecosystems. This includes rigorous impact assessments and continuous monitoring of mining operations.

5. Enhance Workforce Development

- *Skills training:* Invest in education and training programs to develop a skilled workforce for the critical minerals and battery sectors. Partner with academic institutions and industry to create specialized training programs.
- *Attracting talent:* Implement policies to attract and retain talent in the critical minerals and battery industries. This includes offering competitive salaries, benefits, and opportunities for career advancement.

6. Ensure Financial Support and Incentives

- *Funding mechanisms:* Provide financial support through grants, loans, and guarantees to encourage investment in the critical minerals and battery sectors. Ensure that funding mechanisms are accessible and transparent.
- *Tax incentives:* Offer tax incentives for companies that invest in sustainable mining practices, battery production, and recycling technologies. This will encourage private sector participation and innovation.

7. Strengthen the Strategic Partnership

- *Integrating Norway in EU policy:* Removing Norway´s categorization as a third party in terms of the Brexit agreement and any other EU legislation limiting access to the European market should be prioritized. This opens the possibility for Norwegian manufacturers to create batteries for EVs and unlocks opportunities for the Norwegian battery value chain to expand further.
- *International Cooperation:* Collaborate with international organizations and other countries to develop global standards for the extraction and trade of critical minerals. Promote transparency and accountability in supply chains.

8. Promote Circular Economy Practices

- *Recycling and reuse:* Invest in research and development of advanced recycling technologies to recover critical minerals from end-of-life products. Set ambitious recycling targets and provide incentives for companies to adopt circular economy practices.
- *Sustainable product design:* Encourage the design of products that are easier to disassemble and recycle. Implement regulations that require manufacturers to take responsibility for the end-of-life management of their products.

9. Support Innovation and Technological Development

- *Research and development:* Increase funding for research and development in the critical minerals and battery sectors. Support innovation in mining technologies, battery production, and recycling processes.
- *Public-private partnerships:* Foster collaboration between the public and private sectors to drive technological advancements and bring innovative solutions to market.

10. Monitor and Evaluate Progress

- *Performance metrics:* Establish clear performance metrics to monitor the progress of initiatives in the critical minerals and battery sectors. Regularly evaluate the effectiveness of policies and adjust as needed.
- *Transparency and accountability:* Ensure transparency and accountability in the implementation of policies. Publish regular reports on the progress of initiatives and engage stakeholders in the evaluation process.

Introduction

European Union's leaders have the ambition to lead global efforts in combating climate change, both as political champions of international climate governance and role models of climate action, as standard setters, technological innovators, and industrial leaders. The 2015 Paris Agreement establishes the ultimate goals, and European countries are determined to set collective targets in line with the Agreement's long-term goals: keeping global temperature rise below 2 and possibly below 1.5 degrees Celsius.

The EU seeks to achieve this while retaining economic competitiveness and maintaining its manufacturing industries. It also wants to safeguard its sovereignty and autonomy to act, and without compromising core values on which the liberal democratic European project rests – a capacity now labeled "open strategic autonomy". This ability to rely on the European market and the community of like-minded democratic states has moved up the priority list since the COVID-19 crisis, which put global supply chains under stress, and further in the context of the geopolitical turbulences caused by the Russian invasion of Ukraine. **European policymakers were quickly reminded that global markets are not free and open by default and that foreign powers are willing and able to use raw materials, manufactured goods and energy resources as tools of geoeconomic statecraft.**

This is the backdrop against which the fight against dangerous climate change must be conducted. To drastically reduce their emissions, EU countries need to transform their economies and energy systems towards carbon neutrality. In practice, that means an expansion of renewable energy sources, which are the quickest and most cost-effective tools for decarbonizing energy systems, including power, heating, and transportation. However, basing the energy system of the future on intermittent renewables requires not only the deployment of new sources, but also increasing the robustness of grids, transnational interconnectors, and finally – means of storing surplus energy and releasing it when renewables are not producing – batteries. Batteries will also be crucial for electrifying land and maritime transport, so it is not an exaggeration to say that energy storage is *the* energy challenge of the 21st century.

Battery demand is set to rise 14-fold, from 185 GWh in 2020 to over 2,000 GWh by 2030.[1] The growing demand sparked by the electrification of previously fossil-based sectors, the need to balance intermittent renewable production, and the proliferation of new technological tools has led to growing attention paid towards battery research and development. Meanwhile, the market is currently dominated by Asian actors like China, South Korea, and Japan. China dominates the industry, and in 2022 boasted a capacity of 893 GWh in 2022, accounting for 77% of global production and 52% of global sales (in 2021),[2] with Poland coming in second at a mere 72 GWh.[3]

1 Statista Research Department, 19 August 2024, 'Projected battery demand worldwide by application 2024-2028', https://www.statista.com/statistics/1103218/global-battery-demand-forecast/
2 Regarding cell manufacturing, not necessarily other parts of the battery value chain
3 Govind Bhutada, 'Visualizing China's Dominance in Battery Manufacturing (2022-2027P)', Elements by Visual Capitalist, 18 January 2023, https://elements.visualcapitalist.com/chinas-dominance-in-battery-manufacturing/.

The last years have demonstrated the fragility of global value chains as well as the risk of relying on authoritarian regimes for critical goods.[4] As the automotive industry is one of Europe's largest, establishing a local supply chain of batteries is considered important to remain competitive.[5] The EU increased its focus on establishing and developing a European Battery Value Chain to become more self-sufficient. However, partnerships between European and foreign, particularly Chinese companies at different stages of the supply chain are common and show how difficult an 'indigenous' European value chain would be to establish.

The EU's battery value chain is heavily dependent on foreign supplies of key raw materials such as cobalt, lithium, nickel, manganese, and natural graphite. This dependency poses a significant risk due to potential supply shortages and price increases driven by global demand and geopolitical factors. The EU's research and innovation efforts in battery technology have not always met the ambitious technical targets set, and there is a need for better alignment with technological roadmaps and assessment of the need for EU funding at the project level.[6] While the EU's battery production capacity is projected to increase significantly, the actual deployment of this capacity faces risks such as financial incentives from other regions, rising raw material and energy costs, and the need for timely ramp-up of new production facilities.

Meanwhile, large industrial players are racing to capture larger shares of the market, but that requires both know-how and material or to be more specific – *mineral* supply chains. While our current energy systems are largely *fossil-intensive*, systems based on renewables will be *mineral intensive.*

To reach the temperature goals set in the Paris Agreement, it will require four to six times more mineral inputs in 2040 than today.[7] For instance, the production of an electric car requires six times the mineral inputs of a conventional car, while an offshore wind plant requires nine times more mineral resources than a gas-fired power plant.[8] In essence, the green transition will entail a vast surge in mineral demand.

Research on the geopolitics of energy transitions has emphasized that most countries are better positioned to produce their energy from renewable technologies such as solar and wind power.[9] Yet, **the production of several of the minerals necessary for the transition is more geographically concentrated than the production of oil and gas.[10]**

Historically, the industrialization of Europe and North America was largely based on local mineral production, but decades of globalization have shrunk the domestic mining industries of many

4 Joris Baars et al., 'Circular Economy Strategies for Electric Vehicle Batteries Reduce Reliance on Raw Materials', *Nature Sustainability* 4, no. 1 (7 September 2020): 71–79, https://doi.org/10.1038/s41893-020-00607-0.
5 Martin Beuse, Tobias S. Schmidt, and Vanessa Wood, 'A "Technology-Smart" Battery Policy Strategy for Europe', *Science* 361, no. 6407 (14 September 2018): 1075–77, https://doi.org/10.1126/science.aau2516.
6 European Court of Auditors, 'Special Report 15/2023: The EU's Industrial Policy on Batteries | European Court of Auditors', 2023, https://www.eca.europa.eu/en/publications?ref=SR-2023-15.
7 IEA, 'The Role of Critical Minerals in Clean Energy Transitions' (Paris, 2021), 8, https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions.
8 IEA, 5.
9 Indra Overland, 'The Geopolitics of Renewable Energy: Debunking Four Emerging Myths', *Energy Research & Social Science* 49 (1 March 2019): 36–40, https://doi.org/10.1016/j.erss.2018.10.018.
10 Roman Vakulchuk, Indra Overland, and Daniel Scholten, 'Renewable Energy and Geopolitics: A Review', *Renewable and Sustainable Energy Reviews* 122 (1 April 2020): 8, https://doi.org/10.1016/j.rser.2019.109547.

advanced economies.[11] Acknowledging the complexities of domestic mining, the powerful countries scramble for influence in mining hotspots.[12] Local production has been replaced with cheap mineral imports. Global production is now focused within a handful of countries, again with China being the dominant force.[13]

Overproduction and price suppression by countries that already have a large presence on the global market are in turn investing in new mining, with its high upfront costs, unprofitable. For example, China has historically overproduced rare earth elements (REEs) such as dysprosium, neodymium, and terbium. By flooding the market with these minerals, China has been able to keep prices low, making it difficult for other countries to compete, as the low prices make it unprofitable for them to develop their own rare earth mining and processing capabilities. By controlling most of the global supply, China can exert significant geopolitical influence, as many advanced technologies, including military and renewable energy applications, depend on these minerals.[14] Similarly, Indonesia has rapidly increased its nickel production, and its global market share rose from 34% to 52%, while its share of refined nickel increased from 23% to 37%. This contributed to a significant drop in nickel prices, making it challenging for other producers to compete. Indonesia's aims were not geopolitical, but instead focused on attracting foreign investment in domestic downstream processing industries, such as battery manufacturing, thereby boosting national economic development as well as increasing its strategic importance in the global supply chain.[15]

11 Barton, "Building Resilience from the Ground Up: Local Supply and Demand Management with Renewables, Prosumers, Energy Efficiency, Critical Minerals, and the Circular Economy," in Resilience in Energy, Infrastructure, and Natural Resources Law: Examining Legal Pathways for Sustainability in Times of Disruption, ed. C. Banet et al. (Oxford: Oxford University Press, 2022), 327-341.

12 Hoggett, "Supply Chains and Energy Security," in New Challenges in Energy Security: The UK in a Multipolar World, ed. C. Mitchell et al. (Palgrave Macmillan, 2013), 161-18

13 'China's Threat on Mineral Exports Knocks EU off Balance', POLITICO, 6 July 2023, https://www.politico.eu/article/eu-brussels-freezes-as-china-beijing-hits-back-in-trade-fight-germanium-gallium-computer-chips/; Eric Onstad, and Mai Nguyen, 'China's Rare Earths Dominance in Focus after It Limits Germanium and Gallium Exports', *Reuters*, 21 December 2023, sec. Commodities, https://www.reuters.com/markets/commodities/chinas-rare-earths-dominance-focus-after-mineral-export-curbs-2023-07-05/.

14 US Department of Energy, 'Response to Request for Information on Critical Materials Market Dynamics', 20 May 2024, https://batterymaterials.org/wp-content/uploads/2024/07/BMTC-MESC-Critical-Materials-Market-Dynamics.pdf.

15 'Market Review – Global Critical Minerals Outlook 2024 – Analysis', IEA, accessed 23 January 2025, https://www.iea.org/reports/global-critical-minerals-outlook-2024/market-review.

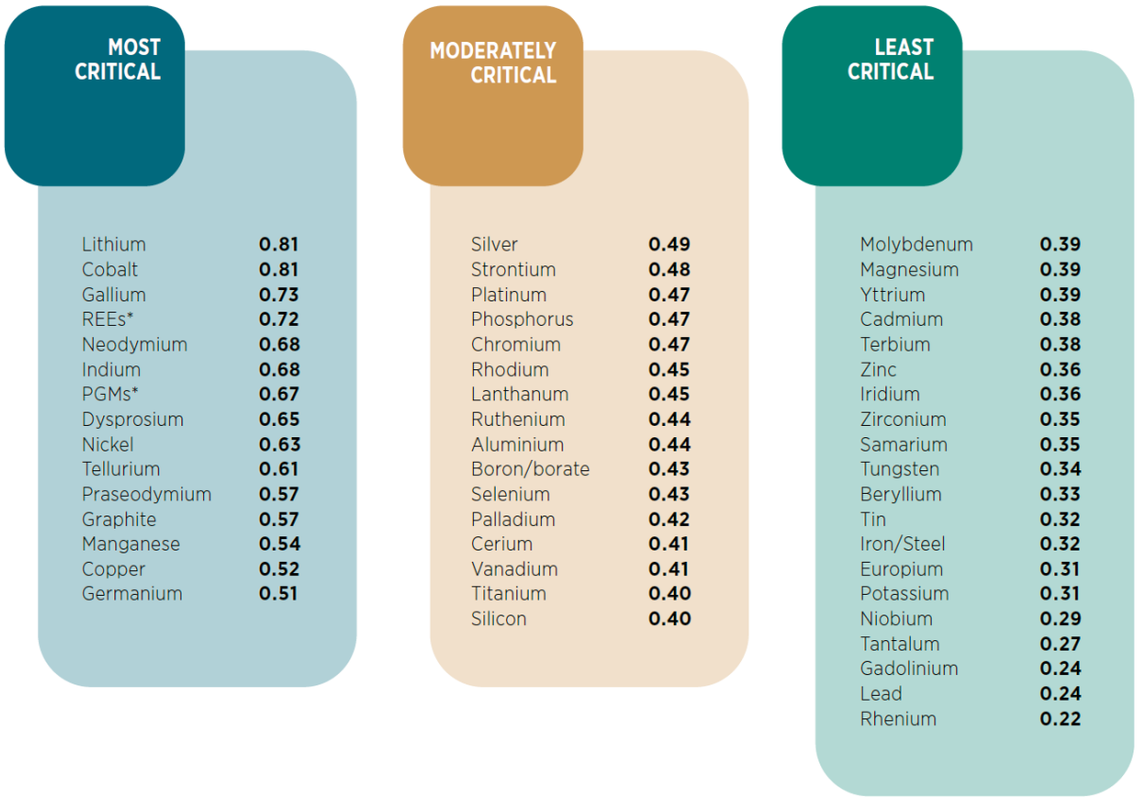

Figure 1: Global ranking of critical materials for renewable energy. Source: Overland et al, IRENA and NUPI Report 2024

The scramble for minerals is global, spanning Africa,[16] as well as South America.[17] In 2023, Chile, the world's second-largest producer of lithium (the most critical material for energy transitions, according to a recent IRENA and NUPI report),[18] announced plans to nationalize the production of the mineral that is essential for electric vehicle batteries.[19] The move – from a country that is also the world's leading copper producer - illustrates how resource nationalism could add to the supply uncertainty, and mineral-rich countries are likely to capitalize on their indigenous resources. Importing countries are thus still likely to be vulnerable to supply disruptions from a few large producers.

Concerns over the future mineral situation have propelled countries to assess possibilities to once again ramp up their own mining activities. However, mining projects in democratic countries face

16 Julia Ebner, 'The Sino-European Race for Africa's Minerals: When Two Quarrel a Third Rejoices', *Resources Policy* 43 (2015): 112–20, https://doi.org/10.1016/j.resourpol.2014.11.009.; Nguyen, Onstad, and Nguyen, 'China's Rare Earths Dominance in Focus after It Limits Germanium and Gallium Exports'.

17 Lu & Fabbro, "China's Latin American Gold Rush Is All About Clean Energy," Foreign Policy, February 27, 2023, https://foreignpolicy.com/2023/02/27/china-latin-america-lithium-clean-energy-trade-investment/.

18 IRENA and NUPI, 'Constructing a Ranking of Critical Materials for the Global Energy Transition' (IRENA, 2024), https://www.irena.org/Publications/2024/Oct/Constructing-a-ranking-of-critical-materials-for-the-global-energy-transition.

19 Villegas & Scheyder, "Chile Plans to Nationalize Its Vast Lithium Industry," Reuters, April 21, 2023, https://www.reuters.com/markets/commodities/chiles-boric-announces-plan-nationalize-lithium-industry-2023-04-21/.

enormous scrutiny. This resonates with the more general complexities of the energy transition. The biggest obstacles are not technical or economic in nature, they are socio-technical – they concern social, political, and regulatory aspects of energy technology regimes. Limited domestic supplies of strategic raw materials and energy resources make EU policymakers look for alternatives, beginning from the Union's closest neighborhood.

Technology	Minerals required
Solar (photovoltaic) cells	Bauxite & Alumina, Cadmium, Copper, Gallium, Germanium, Indium, Iron, Lead, Nickel, Selenium, Silicon, Silver, Tellurium, Tin, Zinc
Wind energy	Bauxite & Alumina, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Rare Earths, Zinc
Batteries in electric vehicles and energy storage	Bauxite & Alumina, Cobalt, Copper, Graphite, Iron, Lead, Lithium, Manganese, Nickel, Rare Earths, Silicon, Titanium

Table 1: Minerals required for different clean technologies.

Rationale of the report

In this report, we explore the role Norway can play in ensuring a secure and 'indigenous' supply of critical minerals and for maintaining uninterrupted battery supply chains, which are essential for Europe's grand vision and its *green* strategic autonomy.

Following the Russian invasion of Ukraine in 2022, Norway stepped up to become the EU's main supplier of natural gas and an increasingly important supplier of oil. As the EU's closest energy partner, it is also providing clean electricity, particularly through its extensive hydroelectric resources. But beyond these already existing and well-known roles, Norway can also be a source of critical raw materials (minerals) and a producer of batteries that will enable the decarbonization of the European energy system. For this to happen, political and regulatory obstacles must be identified and addressed.

While not an EU member, Norway is part of the European Economic Area and the European Common Market, while its security and defence collaboration with European partners is conducted under the auspices of NATO. In the context of the green strategic autonomy of the EU, Norway is particularly important as it supports the European Green Deal's vision and aligns its policies with the UN Sustainable Development Goals and the obligations of the Paris Agreement. This alignment implies that Norway should contribute to but also benefit from the EU's comprehensive sustainability initiatives.

This report is motivated by the ambitions of the European Green Deal and the emerging EU industrial strategy, where critical raw materials play an important role. Norway is an ideal source of certain

minerals, as a close (geographically and politically), stable, and reliable partner – but can it deliver, and can it indeed live up to the role that some of the EU policymakers envisage? On the other hand, understanding the EU's growing demand for batteries, Norway wants to be a major player in the battery market and is eager to expand a prospective industry based on high-tech know-how and with a higher added value. But what are the obstacles there and is the EU willing to grant Norway that role?

We provide an overview of the current EU legislation, and corresponding Norwegian regulation as well as the potential and current experiences of these two sectors in Norway and offer some policy recommendations.

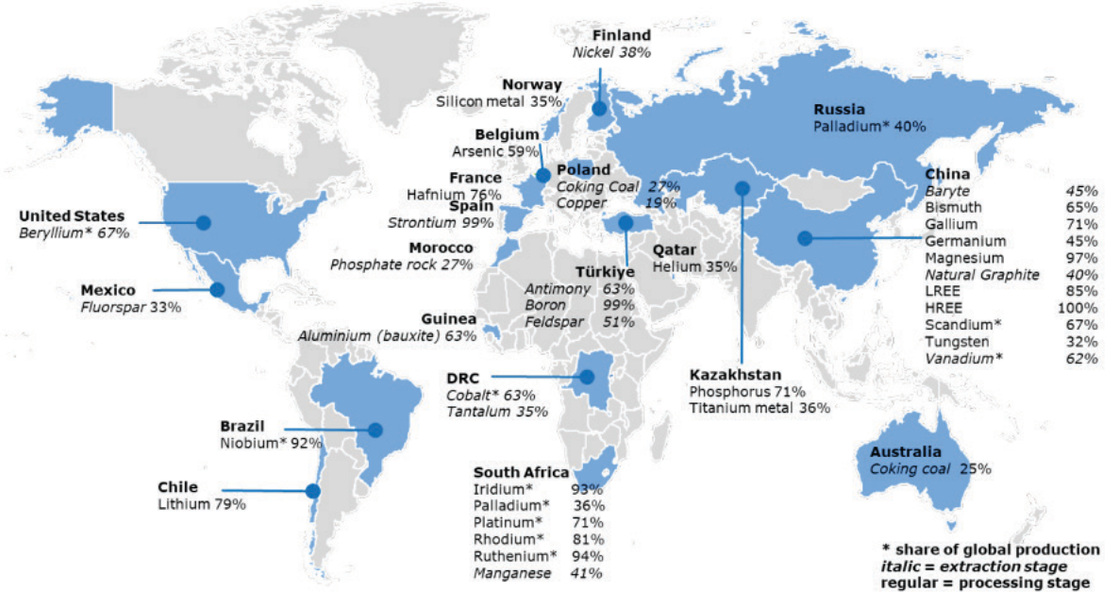

Figure 2: Major Suppliers of CRMs. Source: European Commission, Study on the Critical Raw Materials for the EU 2023 - Final Report, 2023

External Regulatory Context for Norway's Policy

EU Regulation

The first framework vision of a European Green Deal was put forward by the Commission in December 2019 as a strategy to reach the Union's goal of becoming carbon neutral by 2050. The plan touches on many socioeconomic and environmental aspects, aiming to create a "fair and prosperous society" where "economic growth is decoupled from resource use".[20]

As a member of the European Economic Area (EEA), Norway is closely integrated with the EU's Single Market. This integration means that many legislative proposals under the European Green Deal will also apply to Norway. As one of the key exporters of aluminium and electricity Norway is covered by the EU Carbon Border Adjustment Mechanism (CBAM) – however, being also part of the European Emissions Trading System (ETS), Norway is not suffering any direct negative consequences of the CBAM, which is meant as a protective mechanism for the strict climate regulations.[21]

Operationalized since 2020, the EGD is a broad strategy, itself entailing a wide set of further, sector-specific regulations to attempt to achieve its goals within various sectors. This covers also regulation on energy transition which is directly relevant for critical minerals and battery sectors, such as the Critical Raw Materials Act, the amended Battery Regulation, Important Projects of Common European Interest (IPCEI) and the revision of the Renewable Energy Directive (RED III).

Critical Raw Materials

Without access to "affordable, sustainable raw materials, the European Green Deal cannot be achieved".[22] However, the EU is heavily reliant on imports to meet its current mineral demands. For instance, China provides 98% of EU´s supply of rare earth elements (RREs). These are crucial in the manufacturing of batteries and wind turbines.

To address the situation, the EU has drawn up an *Action Plan on Critical Raw Materials* – materials that are considered economically and strategically important for the European economy but have a

20 European Commission. 'EU Green Deal' (11 December 2019): https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52019DC0640&from=EN

21 Kacper Szulecki, Indra Overland, and Ida Dokk Smith, 'The European Union's CBAM as a de Facto Climate Club: The Governance Challenges', *Frontiers in Climate* 4 (2022), https://www.frontiersin.org/articles/10.3389/fclim.2022.942583; Ida Dokk Smith, Indra Overland, and Kacper Szulecki, 'The EU's CBAM and Its "Significant Others": Three Perspectives on the Political Fallout from Europe's Unilateral Climate Policy Initiative', *JCMS: Journal of Common Market Studies* n/a, no. n/a (2023), https://doi.org/10.1111/jcms.13512.

22 Schäfer, "EU Green Deal cannot deliver without a strong raw materials industry." EURACTIV, June 21, 2022. https://www.euractiv.com/section/energy-environment/opinion/eu-green-deal-cannot-deliver-without-a-strong-raw-materials-industry/.

high-risk associated with their supply.[23] Launched in September 2020, the Action Plan aims to reduce the EU's dependency on third countries, diversify supply from both primary and secondary sources, and improve resource efficiency and circularity.[24] Key measures include developing resilient value chains for EU industrial ecosystems, reducing dependency on primary critical raw materials through sustainable product design and recycling, and strengthening domestic sourcing of raw materials within the EU. The plan also emphasizes the importance of research, innovation, and international partnerships to secure a sustainable supply of critical raw materials essential for the EU's green and digital transitions. The European Raw Materials Alliance (ERMA), announced in September 2020, was the first concrete action leading to the implementation of the Action Plan.

In the wake of Russia's invasion of Ukraine, the EU has once again been reminded of the vulnerabilities of import reliance. While the European countries look to end their dependence on Russian gas, the EU is equally determined to avoid new dependencies in the future. According to the president of the European Commission, Ursula von der Leyen, "lithium and rare earths will soon be more important than oil and gas".[25]

In March 2023, the EU launched the *Critical Raw Materials Act* (CRM Act), which aims to ensure the EU's access to essential raw materials necessary for strategic sectors such as renewable energy, digital technologies, aerospace, and defence.[26] Target setting was a key feature. The Act sets benchmarks for domestic capacities by 2030, strengthens all stages of the critical raw materials value chain, and promotes circularity and sustainability. For instance, at least 10% of the EU's annual consumption is to be extracted domestically. To reach the target, it must become easier to tap into domestic reserves. As argued by the Vice-President of the EU Commission Maros Šefčovič, "there is no one better placed than the EU to ensure that raw materials are sourced and processed under the highest sustainable standards… Yes, it is an economically complex, politically challenging, and socially sensitive task, requiring us to leave our comfort zone. But there is no alternative".[27]

In April 2024, The European Parliament and Council have also established a new Regulation which provides a framework for ensuring a secure and sustainable supply of critical raw materials,[28] amending several existing regulations and emphasizing the importance of coordinated measures across Member States to avoid undermining the internal market. The Regulation highlights the need for diversified imports, improved risk monitoring, and enhanced global engagement to develop and diversify investment, production, and trade with reliable partners.

23 European Commission, "Critical raw materials," European Commission, n.d.a, https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en.
24 European Commission, 'Commission Announces Actions on Critical Raw Materials', Text, 3 September 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1542.
25 European Commission, "Critical Raw Materials Act: securing the new gas & oil at the heart of our economy," Blog of Commissioner Thierry Breton, European Commission, September 14, 2022, https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_5523.
26 European Commission, "Critical Raw Materials: ensuring secure and sustainable supply chains for EU's green and digital future," March 16, 2023, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1661.
27 European Commission, "Keynote speech by Vice-President Maros Sefcovic at the Raw Materials Security of Europe Conference," September 12, 2022, https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_5484.
28 EUR-Lex, 'Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 Establishing a Framework for Ensuring a Secure and Sustainable Supply of Critical Raw Materials and Amending Regulations (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1724 and (EU) 2019/1020 (Text with EEA Relevance)', 11 April 2024, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401252.

Batteries

As a prelude to the EGD, the EU launched a *Strategic Action Plan for Batteries*, and with it, the European Battery Alliance (EBA). The Strategic Action Plan, launched in 2018, aims to make Europe a global leader in sustainable battery production and use. It focuses on developing a competitive and sustainable battery value chain within the EU, covering all stages from raw material extraction to battery recycling. The plan includes measures to secure access to raw materials, support research and innovation, and promote investment in battery manufacturing. It also emphasizes the importance of sustainability, aiming to reduce the environmental impact of batteries and ensure their safe recycling, thus supporting the EU's clean energy transition and enhancing the competitiveness of its automotive sector.[29]

Launched already in 2017, the European Battery Alliance is an industry-led initiative meant to "support the scaling up of innovative solutions and manufacturing capacity in Europe", as well as fostering cooperation between battery companies across the value chain. Member States and EU representatives are also partaking.[30] Its mission is thus to fulfill the battery aspirations of the EU, as set out in the EGD and the Strategic Action Plan. More precisely, its four main functions are 1) providing regulatory insights to its members, 2) providing market intelligence through gathering information from client companies, 3) Business development by putting companies in talks with investors, customers, and suppliers. And 4), providing input from its members to EU institutions.[31]

EBA is said to have succeeded in filling gaps in the battery value chain, as well as leading to major industry investments. Moreover, such a *cluster* has proven useful in coordinating among companies and between member states, to ensure a holistic value chain without unnecessary bottlenecks. Today it has more than 750 members across the value chain, including many Norwegian actors.[32] EBA also hosts ministerial meetings and industry conferences to foster cooperation within the value chain, provide updates on industry and regulatory developments, as well as joint statements on the needs of the industry. Norway is invited to the ministerial meetings of the Alliance.

In 2020, the Commission proposed a new battery law as a part of its action plan for a circular economy, set to replace an existing directive from 2006. The regulation was unique in that it tackled the whole life cycle of batteries,[33] from resource extraction to recycling. The regulation has ambitious criteria, which serve both to increase the sustainability of the value chain as well as limiting the inflow of cheaper foreign-produced batteries into the European market.[34]

The Batteries Regulation (EU) 2023/1542 came into force in July 2023.[35] The aims of this Regulation are manifold, including assuring the low carbon footprint of batteries produced, use minimal harmful

29 European Commission, 'Strategic Action Plan on Batteries (Report) | EESC', 22 March 2019, https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/strategic-action-plan-batteries-report.
30 European Commission. Ibidem.
31 European Battery Alliance 'About EBA 250' (2023): https://www.eba250.com/about-eba250/
32 Prosess 21 'European Green Deal Og Betydningen for Norsk Prosessindustri'. (November 2020): https://www.prosess21.no/contentassets/39713b28868a41858fc2c8a5ff347c0b/boldt-prosess21-oppdatering-231120.pdf.
33 European Commission, 'Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Concerning Batteries and Waste Batteries, Repealing Directive 2006/66/EC and Amending Regulation (EU) No 2019/1020' (2020): https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020PC0798&from=EN.
34 European Commission, Ibidem.
35 EUR-Lex, 'Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 Concerning Batteries and Waste Batteries, Amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and Repealing Directive 2006/66/EC (Text with EEA Relevance)', 2023, https://eur-lex.europa.eu/eli/reg/2023/1542/oj/eng.

substances, and that batteries are collected, reused, and recycled to a high degree within the EU. It covers all types of batteries, including portable, electric vehicle (EV), industrial, and light means of transport (LMT) batteries.[36] Additionally, the regulation introduces due diligence obligations for companies to address social and environmental risks associated with the sourcing, processing, and trading of raw materials used in batteries. It includes performance, durability, as well as safety criteria. From 2025, the regulation will gradually introduce requirements for the carbon footprint, performance classes, and maximum limits on harmful substances for EV, LMT, and industrial batteries. The regulation also emphasizes the importance of a circular economy by ensuring that all collected waste batteries are recycled and that high levels of material recovery are achieved, thus supporting the EU's strategic autonomy and competitiveness.[37]

In 2023, the European Court of Auditors published a special report entitled "The EU's Industrial Policy on Batteries: New Strategic Impetus Needed", evaluating the EU's efforts to promote a competitive and sustainable battery industry.[38] The report acknowledges the progress made but identifies significant challenges: apart from external ones, like those already mentioned (lack of stable access to raw materials), it highlights internal and governance related problems, such as insufficient coordination, monitoring, lack of reliable data along the value chain. There is a lack of a consolidated overview of the various EU and national funding sources, making it difficult to ensure that financial support is adequately coordinated and appropriately targeted. It calls for renewed strategic efforts to enhance the EU's battery value chain and ensure the achievement of climate neutrality goals.

Financial support mechanisms available for the battery industry

Several EU mechanisms collectively aim to support the development and scaling of the EU battery value chain, addressing various stages from research and innovation to manufacturing and deployment. Financial support aimed at boosting EU battery industry include funding for research and development as well as support for new manufacturing capacities. The former include, Horizon Framework research and innovation programmes providing grants for research, technological development, demonstration, and innovation activities. Horizon 2020 funded 307 battery-related projects worth approximately €873 million, while Horizon Europe, running up to 2027, continues this funding on a large scale. The European Regional Development Fund (ERDF) supports technological and applied research, research infrastructure, pilot lines, early product validation actions, advanced manufacturing capabilities, and first production. It contributed approximately €319 million to 459 battery-related projects in 14 member states during the 2014-2020 period.

The European Investment Bank (EIB) provides financing for eligible R&I projects and innovative investments, such as the development of metallurgical processes, pilot lines, and battery manufacturing facilities. With EU budget guarantees, the EIB contracted €495 million in loans for seven projects in the battery value chain during the 2014-2020 period. As for more mature projects, the Innovation Fund focuses on those with significant potential to reduce greenhouse gas emissions.

36 EUR-Lex, 'Sustainability Rules for Batteries and Waste Batteries', 2023, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=legissum:4704179.
37 EUR-Lex, 'Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 Concerning Batteries and Waste Batteries, Amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and Repealing Directive 2006/66/EC (Text with EEA Relevance)'.
38 European Court of Auditors, 'Special Report 15/2023: The EU's Industrial Policy on Batteries | European Court of Auditors'.

Between 2021 and 2022, the Innovation Fund awarded around €161 million to eight battery-related projects. We should also mention the Recovery and Resilience Facility (RRF), which supports the economic and social impact of the COVID-19 pandemic and stimulates recovery while promoting green and digital transformation. Although not central to the battery industry, the RRF can also support battery-related projects as part of wider investments in electric mobility, clean energy, and research.

A separate category are large infrastructural projects supported by the Important Projects of Common European Interest (IPCEI). Projects within IPCEI are exempt from state aid rules, which means that Member States are allowed to provide state aid to specific projects and companies, which is otherwise restricted under EU competition rules. IPCEIs involve multiple member states and require collaboration between various stakeholders, including companies, research institutions, and public authorities.

The eligible projects are supposed to fill 'market gaps' and 'address market failures. This entails that one can solve a deficiency in the market but is not able to access sufficient funding in the private market. Thus, IPCEI supports innovative projects which might be too risky for private investors.[39] Within a given IPCEI, there is also a goal of creating cooperation and synergy between key companies in the sector. For a business project to be eligible, it must demonstrate that it can lead to sustainable growth, solve systemic or market problems, and explain why results cannot be achieved without state aid.[40]

The Commission approved two IPCEIs in 2019 and 2021, authorizing state aid of approximately €6 billion for the battery industry, with 12 Member States involved, and with 53 companies developing 74 projects. The two IPCEIs are *IPCEI on Batteries* led by France, and *European Battery Innovation* (EuBatIn) led by Germany. The Commission expects these projects to generate total investments worth €14 billion by 2031. Approved in December 2019, the IPCEI on Batteries involves 17 companies from seven EU member states (Belgium, Finland, France, Germany, Italy, Poland, and Sweden). It focuses on ambitious research and development activities across the entire battery value chain. Coordinated by the German Federal Ministry for Economic Affairs and Energy, EuBatIn also supports transnational cooperation on advanced battery technologies, covering the entire value chain from raw material extraction to recycling. It involves multiple EU member states and associated countries, including Norway, and focuses on developing sustainable and high-performance batteries to support the EU's green and digital transitions. Norway was eventually allowed to join EuBatIn, in large part due to EBA management advocating for Norway's accession into the program, which the EU granted.

Renewable Energy

The first Renewable Energy Directive (2009/28/EC), adopted in 2009, set the first binding targets for renewable energy, aiming for a 20% share of renewable energy in the EU's total energy consumption by 2020. The Revised Renewable Energy Directive (EU) 2018/2001 (often referred to as RED II)

39 European Commisson, 'State Aid: Commission Adopts Revised State Aid Rules' (2022): https://ec.europa.eu/commission/resscorner/detail/en/ip_21_6245.
40 European Commisson, ibidem.

entered into force in December 2018, updating these targets, aiming for at least a 32% share of renewable energy by 2030.

With Europe's increasing decarbonization ambitions, a revision of the RED has been proposed as a part of the "Fit for 55" legislative package, which is a set of environmental laws proposed to ensure that the EU reaches its goal of cutting CO_2 emissions by 55% by 2030.[41] The Amending Directive (EU) 2023/2413 (known as RED III) entered into force on November 20, 2023. This latest revision sets a binding target of at least 42.5% renewable energy in the EU's final energy consumption by 2030. By setting ambitious targets for renewable energy consumption, these directives drive the demand for critical raw materials, as well as energy storage solutions, such as batteries, to balance intermittent renewable energy sources like wind and solar. Additionally, the directives encourage the development and integration of renewable fuels of non-biological origin (RFNBOs), which can be used in battery production processes.

The part of the RED directive with the most relevance to the Norwegian battery industry is arguably the proposed strengthening of the guarantees of energy origin. Originally a part of the EU renewable directive from 2001,[42] the guarantee allows any company in Europe to purchase documentation from renewable energy producers located within the EU which guarantees that the energy used for production is renewable. Its function is for companies to be able to declare that their product is based on clean energy, as well as providing renewable energy producers with an additional source of income.[43]

External shock: the US Inflation Reduction Act

An important new element to which Norwegian companies and regulation will have to respond is the Inflation Reduction Act (IRA) introduced by US President Joe Biden on August 16, 2022. As the name suggests, its ostensible goals were domestic economic stabilization: it aims to reduce the federal budget deficit, lower prescription drug prices, as well as making substantial investments in domestic energy production and clean energy initiatives. The latter part makes the IRA a key climate and decarbonization policy.[44] The IRA is essentially a scaled-down version of the earlier Build Back Better bill, focusing on climate change, healthcare, and tax reforms. It represents the largest investment in addressing climate change in U.S. history, with provisions to reduce greenhouse gas emissions and promote renewable energy sources.[45]

For external trading partners, particularly the European Union, the IRA has several important implications. The act's emphasis on clean energy and climate change aligns with the European Green Deal, potentially fostering greater transatlantic cooperation on environmental issues. However, the IRA also includes

41 European Council, 'Fit for 55' (29 March 2023): https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/.
42 European Parliament, 'Directive 2009/39/Ec of the European Parliament and of the Council of 21 April 2009' (2009): https://doi.org/10.1007/978-1-137-54507-7_21.
43 NVE, 'Opprinnelsesgarantier og varedeklarasjon for strømleverandører - NVE' (10 February 2015): https://www.nve.no/energi/virkemidler/opprinnelsesgarantier-og-varedeklarasjon-for-stroemleverandoerer/
44 US Department of Energy, 'Inflation Reduction Act of 2022', Energy.gov, 2022, https://www.energy.gov/lpo/inflation-reduction-act-2022.
45 Kelly Anne Smith, 'The Inflation Reduction Act Is Now Law—Here's What It Means for You', Forbes Advisor, 16 August 2022, https://www.forbes.com/advisor/personal-finance/inflation-reduction-act/.

significant subsidies and incentives for U.S.-based clean energy production, which could create competitive challenges for European companies.

This has raised concerns within the EU about potential trade imbalances and the need for a level playing field in the global clean energy market.[46] At the outset the Act was viewed favorably by the EU, as it seemed that the US also was heightening its climate ambitions. However, it soon became clear that the IRA would entail large subsidies for domestic industry, which could relocate green investments and resources away from Europe.

In total, the IRA mobilizes 360 billion USD (330 billion EUR) over the next decade.[47] In order to qualify for much of the tax credit volumes related to the green industry, around 60%, parts of the product need to be manufactured in the US or in a country with which the US has a free trade agreement.[48] As the EU does not have a free trade agreement with the US, European companies would need to partially relocate production to remain competitive on the US market. This could lead to outsourcing of the battery industry and qualified personnel from the EU, which directly undermines its goal of strategic autonomy and the establishment of a European battery value chain.

The IRA will also affect Norwegian actors as raw materials and qualified personnel will be harder to acquire, and investors will pressure for more US-based activity. The EU has responded with the Green Deal Industrial Plan, which seeks to simplify access to 250 billion EUR of existing EU funds for its green industry.[49] The plan will also make temporary exceptions from rules on state aid, a significant shift for the EU's strict competition policies.

Norway and the EU – the Green Alliance and the Green Industrial Initiative

To diversify its mineral supply, the EU highlights the importance of ramping up domestic production within Member States. They will never be fully self-sufficient, however. Consequently, the Commission seeks to establish strategic partnerships with third parties that can "turn economic opportunities into mutually beneficial realities",[50] and provide channels for the Union to achieve the diversification of supply. As of December 2024, the EU has established strategic partnerships on raw materials with Argentina, Australia, Canada, Chile, the Democratic Republic of Congo, Greenland, Kazakhstan, Namibia, Norway, Rwanda, Serbia, Ukraine, and Zambia.[51]

46 Smith. *Op cit.* Similar concerns arise in the health and pharmaceutical sectors, but this is beyond the scope of this analysis.
47 Bernoth, Kerstin, and Josefin Meyer. 'US Inflation Reduction Act Demands Quick Strategic Action from the EU'. *DIW Weekly Report*. (2023): https://doi.org/10.18723/DIW_DWR:2023-6-1.
48 Ibidem
49 European Commission, 'A Green Deal Industrial Plan for the Net-Zero Age'. (1 February 2023): https://commission.europa.eu/system/files/2023-02/COM_2023_62_2_EN_ACT_A%20Green%20Deal%20Industrial%20Plan%20for%20the%20Net-Zero%20Age.pdf.
50 European Commission, Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions - A secure and sustainable supply of critical raw materials in support of the twin transition, 2023.
51 European Commission, 'Raw Materials Diplomacy - European Commission', 2024, https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/raw-materials-diplomacy_en.

In February 2022, the EU and Norway committed to explore the possibilities of a Green Alliance, in which both battery production and minerals were mentioned as one of the specific areas of "mutual interest".[52] On 24. April 2023, the Green Alliance declaration was signed. In her statement, Ursula von der Leyen pinpointed the EU's commitment to cooperate on critical raw materials.

> *The very materials we need to build the North Sea wind turbines, (...), are these critical raw materials. They are a key strand of our Green Alliance to work together on a greater strategic autonomy in this area. Because we know how important these critical raw materials are for our green transformation. (...) Last year, we announced that we were working on a strategic partnership focusing on critical raw materials and the batteries value chain. This work is ongoing, and we hope to finalize it soon.*[53]

The Green Alliance declaration led the way to a *strategic partnership on sustainable land-based raw materials and battery value chains*, signed in March 2024, described as "beneficial to both parties, helping to achieve the green and digital transitions. In practice, it will support developing sustainable supply chains between both sides and enable furthering environmental, social and governance standards as well as exchange of knowledge on raw materials".[54]

However, apart from the positive climate of collaboration, Norwegian relationship with the EU in the battery sector has been unexpectedly impacted by other regulations. When a trade deal was struck between the United Kingdom and the EU in the aftermath of the UK leaving the Union, Norway as a non-EU-member was not considered. In the portion of the deal regulating the trade of EVs, it was decided to put a 10% tariff on car batteries produced outside either the UK or the EU.[55] The rationale for such a tariff on batteries from 'third countries' was allegedly to protect domestic industry from cheap Chinese-manufactured batteries. If by intention or not, Norway seems to be considered a third country in this instance.

This issue caught both Norwegian authorities and battery companies off-guard. In the new strategic partnership between Norway and the EU on batteries and critical raw materials, further discussion of the tariff has been one of the main interests from the Norwegian side. In a joint statement on the agreement, the issue was listed as an "initial area of action".[56] Whether the EU is prepared to renegotiate a trade deal with the UK at the behest of Norway is however uncertain. The tariff is set to take effect in 2027 and will be a disadvantage for Norwegian companies specializing in EV batteries.

The issue has been addressed in the 2024 strategic partnership, though not fully resolved. Jan Christian

52 European Commission, "EU-Norway Press Statement on Climate," February 23, 2022, https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_1302.
53 European Commission, "Statement by President von der Leyen with Norwegian Prime Minister Støre," April 24, 2023, https://ec.europa.eu/commission/presscorner/detail/en/statement_23_2414.
54 European Commission, 'EU and Norway Sign Strategic Partnership', Text, European Commission - European Commission, 2024, https://ec.europa.eu/commission/presscorner/detail/en/ip_24_1654.
55 NHO, 'Brexit skaper usikkerhet for batterieventyret – behov for politisk innsats'. (15 April 2021): https://www.nho.no/tema/eos-og-internasjonal-handel/brexit-truer-batterieventyret--behov-for-politisk-innsats/.
56 Regjeringen 'Joint statement by Maroš Šefčovič, European Commission Vice-President for Interinstitutional Relations and Foresight, and Jan Christian Vestre, Norway's Minister of Trade and Industry' (N.d): https://www.regjeringen.no/contentassets/efb5876e8cfa4f1c883ed9f69a42c886/joint-statement-eu-norway-batteries-and-raw-materials-270622.pdf

Vestre, Norway's Minister of Trade and Industry, emphasized that "Norwegian companies depend on having as equal access as possible to international markets as their competitors. Therefore, it is important that we have elevated the battery value chain as a cooperation area with the EU".[57]

Importantly, thanks to the strategic partnership, Norway will now participate in InvestEU, the European Raw Materials Alliance as well as the ministerial meetings in the European Battery Alliance. Since the establishment and functioning of the European value chain, of which Norway will be an integral part, are discussed and planned there, the Norwegian authorities hope it also entails discussions of the application of the rules of origin laid down in the EU-UK Trade and Cooperation Agreement for battery packs and battery cells of Norwegian origin.

57 Ministry of Trade, Industry and Fisheries, 'Norway and the EU Enter into a Green Strategic Industrial Partnership', Pressemelding, Government.no (regjeringen.no, 21 March 2024), https://www.regjeringen.no/en/aktuelt/norge-inngar-gront-strategisk-industripartnerskap-med-eu/id3031333/.

Critical Minerals

Norway is perceived as an attractive source of critical minerals, many of which are crucial for clean energy value chains. Geologically, Norway has great potential for increased extraction, and the Nordic countries could provide "almost all minerals necessary for the green transition".[58] Combined with the technical know-how stemming from decades of mining experience, it is certainly *technically feasible* for Norway to increase mining activities. But besides geology, governance and public acceptance account for the *political feasibility* of critical mineral extraction. Political and social constraints determine the extent to which Norway can ramp up their mining activity.

Absent any major technological advances, the minerals needed for the transition come from the mining sector.[59] While Norway historically has strong ties with the industry, the commissioning of new mining projects is highly complex. Projects are hard to come by, and those that are initiated are subject to vast scrutiny and contestation. As mines bring considerable degradation to land, there is a myriad of interests involved. High conflict levels entail that there are often decades between exploration and extraction. While political leaders agree to cooperate during meetings with foreign partners, be it EU, or individual Member States (Germany, France), domestic politics decide whether cooperations is feasible.

In the remainder of this section, we go through the current domestic regulatory and permitting landscape and then provide an overview of some projects which are in the pipeline to see what lessons can be learned from these experiences.

Norway's Policy

Since the election in 2021 – the Labor-Center government has repeatedly stressed that it looks to ramp up domestic production of minerals. In the "Hurdal Platform" (the governmental coalition program) the leaders of the coalition parties argued that the government will strive to "facilitate large-scale battery cell production in Norway, by securing the industry framework conditions that are more internationally competitive" and that Norway "has the opportunity to develop the world's most sustainable mineral industry".[60]

One of the steps towards the implementation of this vision is the Green Industrial Initiative (GII). Launched in June 2022, it focuses on seven areas/value chains: offshore wind, batteries, hydrogen, carbon capture and storage, the process industry, the maritime industry, forestry, and the timber industry, and other bioeconomy sectors[61]. The overall measures in the GII are:[62]

58 NFD, "Grønt Industriløft," Nærings- og fiskeridepartementet, 2022, https://www.regjeringen.no/contentassets/1c3d3319e6a946f2b57633c0c5fcc25b/veikart_skisse_uu_ja.pdf.
59 Church & Crawford. "Minerals and Metals for the Energy Transition." In *The Geopolitics of the Global Energy Transition*, edited by Manfred Hafner and Simone Tagliapietra, 279-304: Cham: Springer International Publishing AG, 2020.
60 Regjeringen, "Hurdalsplattformen," Statsministerens kontor, 2021, https://www.regjeringen.no/contentassets/cb0adb6c6fee428caa81bd5b339501b0/no/pdfs/hurdalsplattformen.pdf.
61 Ministry of Trade and Fisheries & Office of the Prime Minister, 2022, p. 8
62 Ministry of Trade and Fisheries & Office of the Prime Minister, 2022, p. 25.

- The Government's ambition is to strengthen the capacity of the power grid and to shorten license processing times. The Government will present a national strategy for the preparation of green industrial areas and industrial parks with international competitive advantages.
- The Government will prepare a mineral strategy with the goal of developing the world's most sustainable mineral industry in Norway.
- The Government will mobilize as much private capital as possible for the green transition, including through internationally competitive schemes for risk mitigation. The estimated need for government risk mitigation for the GII is NOK 60 billion by 2025.
- The Government will implement a broad skills reform for working life based on tripartite cooperation.
- The Government is concerned with how such a reform can be implemented with special emphasis on the industrial sector's future challenges.

In December 2022, the Norwegian government launched a fast track for critical mineral projects. Measures resembled those of the EU and aimed to accelerate exploration and extraction of minerals that are deemed crucial for the green transition.[63]

The fast track was followed by the long-awaited *Mineral Strategy* in June 2023. The overriding goal of the strategy was to create the world's most sustainable mineral industry, and five key areas were presented: (1) enabling more effective processes/shorter lead times for projects; (2) contributing to a circular economy; (3) developing a sustainable industry – both environmentally and socially; (4) ensuring access to (private) capital; and (5) becoming a reliable supplier of raw materials for the green transition.[64]

The justification of a 'fast track' solution is that permitting processes are often long, burdensome and involve plenty of red tape. Mining *permitting processes* in Norway differentiate between state-owned and land-owned minerals. What determines the category has to do with the weight of the mineral (minerals over 5 gram per cubic centimeter are categorized as state-owned).

The Mineral Act is the guiding legislation for companies who wants to extract minerals in Norway. In 2010, the current act came into force and revised and united what had previously been a number of fragmented legislations. The Directorate of Mining is responsible for granting companies authorization to begin extraction of minerals. However, other permits are also required. Essentially, there are three permits that determine whether companies complete the long road from exploration to extraction:

(i) a permit for land use from the municipality in accordance with the *Planning and Building Act;*
(ii) a discharge permit from environmental authorities in accordance with the *Pollution Control Act;*
(iii) a permit to operate from the mining authorities in accordance with the *Mineral Act*.

63 NFD, "Næringsministeren varsler hurtigspor for mineralvirksomhet i Norge," Nærings- og fiskeridepartementet, December 23, 2022, https://www.regjeringen.no/no/aktuelt/naringsministeren-varsler-hurtigspor-for-mineralvirksomhet-i-norge/id2952936/.
64 NFD," Norges mineralstrategi", Nærings- og fiskeridepartementet, June 21, 2023, https://www.regjeringen.no/no/dokumenter/norges-mineralstrategi/id2986278/

Figure 3 below illustrates the process of initiating a mining project for state-owned minerals. While the process for land-owned minerals is similar, there are some differences. Companies must first agree a deal with the *private owner* of the land. If no deal can be agreed, companies can apply for expropriationFurther, and in contrast to the process of state-owned mineral operations, companies apply to the County Governor to obtain an emission permit, not the Norwegian Environment Agency.

Figure 3 - Permitting process for state-owned minerals in Norway.

The three permits are handled sequentially by public authorities on both national and regional level, entailing that the processes often last for decades. The handling is subject to fierce debates. Companies argue that permits should be handled in parallel - under a coordinating actor - to speed up procedures. Municipalities, on the other hand, fear that a process under a coordinating actor would remove their autonomy and endanger local democracy. This question was center stage of the 2022 Official Norwegian Report (NOU) on amendments to the Mineral Act.[65]

There are also special rules related to mining in Norway's Northernmost county – Finnmark. Considerations of the interests of the indigenous ethnic group, the Sami people, in Finnmark are enshrined in the Mineral Act. In Section 17, it is stated that "one needs a special permit to begin explorations", and that such a permit "may be refused if granting the application would be contrary to Sami interests". While the Mineral Act incorporated considerations of Sami interests in Finnmark, the Sami Parliament and Sami organizations did not approve of the Act.[66] As the Sami areas extend far beyond the geographical confinements of Finnmark, they feel that the broader Sami interests are not properly safeguarded.[67] Importantly, a strengthening of Sami inclusion in the processes was a central topic in the 2022 NOU on amendments to the Mineral Act. On the question of whether consideration should be extended outside Finnmark, the conclusion was clear: "The special rules for Finnmark entail a discrimination of Sami interests outside Finnmark... Based on international law and

65 NOU 2022: 8, "Ny minerallov" (2022), https://www.regjeringen.no/contentassets/9a26c63cb36c42be83ae76e8589329b6/no/pdfs/nou202220220008000dddpdfs.pdf.
66 Allard & Curran. "Indigenous Influence and Engagement in Mining Permitting in British Columbia, Canada: Lessons for Sweden and Norway?". *Environmental management (New York)* (2021). https://doi.org/10.1007/s00267-021-01536-0.
67 Nygaard, "Samfunnsaksept og interessekonflikter knyttet til mineralnæringen" (N1/2018), Norut.

Norwegian law, it will be necessary to introduce similar rules in *all* traditional Sami areas".[68]

In sum, companies who embark on the journey from exploration to extraction in the Norwegian mineral industry are met by several institutional arenas, and controversial projects are likely to go six rounds following appeals.

Opposition to mining on land has tempted countries to explore the possibilities of deep-sea mining. Norway is among the countries who regard the deep-sea as a pathway to meet future mineral demand, and studies have shown that the Norwegian continental shelf is filled with critical minerals.[69] In 2019, the Deep-Sea Mineral Act entered into force, and an impact assessment has been out on public hearing. In June 2023, the government decided to open areas on the Norwegian continental shelf for mineral activity.

Given the opposition towards dumping of tailings in the fjords, it is no surprise that the plans to extract minerals from the seabed are fiercely opposed by a united environmental front. Plans are also opposed by much of the global community. In 2021, the International Union for Conservation of Nature (IUCN) voted on a global moratorium. 81 countries voted for the moratorium, while 18 voted against – amongst them Norway.[70] The debate around deep-sea mining in Norway has been intense, with strong arguments on both sides. Proponents argue that deep-sea mining is essential for securing critical minerals needed for the green transition, such as lithium, cobalt, and rare earth elements, which are crucial for renewable energy technologies.

Opposition is largely attributed to the lack of knowledge concerning the marine ecosystems and how these would be affected, with environmental scientists warning of potentially catastrophic consequences for marine biodiversity. Several countries, for instance France and Germany, have called for a precautionary pause for 15 years until more studies are done on the consequences.[71] Deep-sea mining is fraught with factual uncertainty, and it would take years to uncover the real consequences of such activity.

As of December 2024, Norway has paused its plans to open its seabed for commercial-scale deep-sea mining. This decision came after significant opposition from environmental groups and political parties, particularly the Socialist Left Party, which threatened to withdraw support for the government's budget unless the first licensing round, set for 2025, was scrapped. The pause is seen as a "temporary measure", with Prime Minister Jonas Gahr Støre stating that preparatory work on regulations and environmental impact assessments will continue. Norway's decision aligns with the already described broader global hesitation and widespread concerns, emphasizing the need for a balanced approach that considers both economic benefits and environmental protection.[72] It is important to note that the EU-Norway strategic partnership explicitly mentions "land-based raw materials".

68 NOU 2022: 8, "Ny minerallov" (2022), https://www.regjeringen.no/contentassets/9a26c63cb36c42be83ae76e8589329b6/no/pdfs/nou202220220008000dddpdfs.pdf.

69 OED, "Betydelig ressurspotensial for havbunnsmineraler på norsk kontinentalsokkel," Olje- og energidepartementet, January 30, 2023, https://www.regjeringen.no/no/aktuelt/betydelig-ressurspotensial-for-havbunnsmineraler-pa-norsk-kontinentalsokkel/id2961230/

70 Fjeld, "Forskere mener regjeringens plan for gruvedrift i havet er umulig," NRK, October 4, 2021, https://www.nrk.no/norge/forskere-mener-regjeringens-plan-for-gruvedrift-i-havet-er-umulig-1.15661820/

71 Guerrero, "Opposition Grows Among Countries as Seabed-Mining Efforts Push Ahead," PassBlue, January 2, 2023, https://www.passblue.com/2023/01/02/opposition-grows-among-countries-as-seabed-mining-efforts-push-ahead/

72 K Warner, 'Norway Reverses Deep-Sea Mining Decision', Metal Tech News, 2024, HTTPS://www.metaltechnews.com/story/2024/12/04/tech-metals/norway-reverses-deep-sea-mining-decision/2051.html.

Potential for development and current experiences

Copper mining - Nussir

The EU updated its list of critical raw materials in 2023. In the previous four lists, copper has not been included. In 2023, it was, albeit as a strategic - and not critical - raw material. While some sources argue copper cannot be considered critical due to a supply that is "very well diversified",[73] the 2024 IRENA & NUPI Report categorizes it as "most critical" for the energy transition in a global context.[74] The criticality of copper is due to its superior performance in electrical applications so it is needed in vast quantities as electrification of various sectors accelerates.[75] In essence, copper is integral to a functioning electricity system. It is used "extensively in the electricity transmission and distribution grids, and its conductive properties also make it an essential component for low-emission power generation technologies such as solar PV panels, wind turbines and batteries".[76] Globally, Chile, Peru, and China dominate extraction, while China is the predominant actor in terms of processing.[77] Poland has significant indigenous reserves within the EU, and its state company KGHM owns mines outside Europe.

One of the two most visible projects in the Norwegian mineral industry in recent decades is Nussir. The mining company Nussir ASA wants to commence operations on a copper deposit in Hammerfest municipality, Finnmark county. There was a copper mine in operation in the deposit area in the 1970s, but there has been no large-scale mining activity since then.[78] For centuries, the municipality has been the place of cross-cultural relations. Norwegians and coastal Sami have co-existed alongside migrating Sami reindeer herders, who use the area in the spring and summer.[79]

Nussir's concrete plans to extract began in 2005. As copper is classified as a state-owned mineral, they needed permits from the municipality, the environmental authority, and the mining authority. In 2012 they obtained the permit from Kvalsund municipality (merged with Hammerfest in 2020), a permit that was sustained by The Ministry of Local Government and Regional Development in 2014 following appeals. At the start of 2016, the company obtained the discharge permit, sustained later that year by The Ministry of Climate and Environment following appeals. In 2019, a permission to operate was granted by The Ministry of Trade, Industry and Fisheries. It was sustained later that year following appeals. In 2022 – following a joint appeal related to the 10-year-old land use permit from the municipality – the county governor of Finnmark ordered the municipality to reassess the permit. An updated feasibility study completed in May 2023 by SRK Consulting highlighted the project's

73 European Commission, Study on the Critical Raw Materials for the EU 2023 - Final Report, 2023 https://single-market-economy.ec.europa.eu/publications/study-critical-raw-materials-eu-2023-final-report_en
74 IRENA and NUPI, 'Constructing a Ranking of Critical Materials for the Global Energy Transition'.
75 European Commission, Study on the Critical Raw Materials for the EU 2023 - Final Report, 2023 https://single-market-economy.ec.europa.eu/publications/study-critical-raw-materials-eu-2023-final-report_en
76 IEA, World Energy Outlook 2022, 2022, https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf
77 IEA, The Role of Critical Minerals in Clean Energy Transitions, 2021 https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions
78 Dale, Brigt, and Dannevig, Halvor. "The Nussir Case And the battle for legitimacy: Scientific Assessments, Defining Power And political Contestation." In *The Will to Drill - Mining in Arctic Communities*, edited by Brigt Dale, Ingrid Bay-Larsen and Berit Skorstad. Springer Polar Sciences, 151-74. Switzerland: Springer Cham, 2017.
79 Ibidem.

potential, with substantial copper, gold, and silver resources identified.

Two actors are key in driving the project forward: the company itself and the municipality. From the early stages onwards, the interests of Nussir and Kvalsund municipality have aligned. Despite some internal controversy, the permit for land use was given in 2012 by a large majority of the municipal board.[80] Arguments related to activity weighed heavily in a municipality that had seen its population numbers steadily decline over the last decades. In 2020, the numbers had been halved compared to what they were in 1970 and were now down to around 1000 people.[81]

At the same time, there are two dimensions to the Nussir project that makes it highly conflictual. First, the copper deposit is in a Sami area. Kvalsund is an area where reindeers graze, meaning that the project endangers one of the most traditional industries of the Sami population – reindeer herding. The second dimension of opposition relates to nature conservation concerns. Nussir plans to dump several tons of tailings in the Repparfjord. This feature of the project is the primary reason for why the project has been opposed by a broad range of environmental interest groups and groups representing interests related to fisheries.

Rutile and garnet - Nordic Mining

The second project that has dominated the Norwegian mineral industry over the last decades is Nordic Mining ASA's rutile and garnet mining project in Sunnfjord municipality, Vestland county. The rutile deposit in the area is assumed to be one of the largest known in solid rock worldwide.[82] It is an accessory mineral that is primarily used as a white pigment for commercial products, for instance paint and toothpaste. It is not considered a critical mineral, but it is crucial for various everyday life necessities. Further, a realization of the project will establish the company as a long-term supplier to the titanium industry as rutile is a raw material for producing titanium.

Naustdal was long the relevant municipality before it was integrated into the larger Sunnfjord in 2020. The area is primarily dominated by farming, and there have not been any major interventions to nature in the past.[83]

Rutile is classified as a state-owned mineral. Nordic Mining began their journey towards extraction in 2007. In 2011, they obtained a permit for land use. The permit was appealed, but the appeals were dismissed in 2015, when the investor also obtained their discharge permit, which was sustained in 2016 following appeals. Two NGO's have summoned the Norwegian Government claiming that Engebø Rutile and Garnet's disposal permit granted by the Norwegian Government in 2015 is null and void, a hearing of the case took place in Oslo District Court in September 2023, with a verdict in November 2024. In 2020, The Directorate of Mining granted the company a permit to operate. In May 2022, the Ministry of Trade, Industry and Fisheries sustained the permit following appeals. The same year, Nordic Mining began construction work, and they began operations in the fall of 2024. First mineral concentrates were completed on 23 December 2024, meaning that the lead time was

80 Ballovara, "Går Inn for Gruvedrift I Kvalsund." *NRK*, 25. October 2012. https://www.nrk.no/sapmi/kvalsund-sier-ja-til-gruvedrift-1.8372501.
81 Bjåen, "Stridens Landskap." Vårt Land, 26. March 2022. https://www.vl.no/reportasje/2022/03/26/stridens-landskap/.
82 Kjelstad, "Ny gruveverksemd? Reguleringsplan for utvinning av rutil i Engebøfjellet i Naustdal," Vannforeningen, 2012, https://vannforeningen.no/wp-content/uploads/2015/06/2012_853069.pdf.
83 Kjelstad, "Ny gruveverksemd? Reguleringsplan for utvinning av rutil i Engebøfjellet i Naustdal," Vannforeningen, 2012, https://vannforeningen.no/wp-content/uploads/2015/06/2012_853069.pdf.

17 years from the first step taken.

Like Nussir, Nordic Mining plans to dump the mining tailings in the nearby national salmon fjord, the Førdefjord. Their emission permit allows them to dump 4 million tons per year – double what Nussir is allowed to dump.[84]

Again, the company itself and the municipality have been identified as the key actors in driving the project forward. Naustdal municipality supported the project from its early beginnings and continuously fought for it to go through. Rutile is not considered as crucial in the green transition, so proponents have struggled to connect arguments to the global level. However, the framing has increasingly been tied to arguments that transcend local borders. This has been done both by highlighting the benefits of domestic production, but also by underlining the costs that the current systems entail.

Opponents have challenged the narratives by questioning the benefits of the mine. A crucial difference between the opposition to the Nussir project and the Nordic Mining project is that the latter is not in a Sami area. Consequently, most opposition revolves around the dumping of mining tailings. However, the opposition on this dimension is identified to have been fiercer in this case, involving e.g. Friends of the Earth Norway, a well-networked and powerful environmental NGO. Further, local resistance has been more prominent.

The opposition in both cases has ensured that decision-makers were hesitant to conclude the permitting process. For Nussir, the permitting processes were considered the primary reason for why the project has taken so long. Further, the Nussir (and Nordic Mining) projects are the only new Norwegian mining projects in several decades. Combined with a new act (the new Mineral Act of 2010), decision-makers were unfamiliar with the industry and had not handled large-scale projects for a long time. Also, the handling of Nussir initially collided with the handling of the act that would determine who owned the land in Finnmark (the state or the Sami population). It has also scared investors, and the German company Aurubis backed out of a 10 billion NOK deal in 2020. Financial uncertainty is a crucial barrier for projects, and opponents have been skillful in targeting investors.

Graphite - Skaland Graphite

Natural graphite is on the critical raw material list as it is an essential mineral in the making of batteries (in particular lithium-ion batteries), ranked as “most critical” globally,[85] and the demand is assumed to increase around 25 times by 2040.[86] China dominates production and consequently the EU supply. However, Norway is a large supplier as well, providing 8% of the Union’s natural graphite.[87] Indeed, Skaland Graphite is the most important producer within Europe.[88] The company

84 Lindin, ”Derfor tillater Norge sjødeponi for gruveavfall,” Faktisk.no, February 25, 2022, https://www.faktisk.no/artikler/06eng/derfor-tillater-norge-sjodeponi-for-gruveavfall.
85 IRENA and NUPI, ‘Constructing a Ranking of Critical Materials for the Global Energy Transition’.
86 IEA, The Role of Critical Minerals in Clean Energy Transitions, 2021 https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions
87 European Commission, Study on the Critical Raw Materials for the EU 2023 - Final Report, 2023 https://single-market-economy.ec.europa.eu/publications/study-critical-raw-materials-eu-2023-final-report_en
88 NGU. ”Mineraler for det grønne skiftet.” Norges Geologiske Undersøkelse, NGU-Tema 1, 2019, https://www.ngu.no/upload/Publikasjoner/NGU-Tema/NGU_tema1_norsk.pdf.

extracts natural graphite from their mine in Senja municipality (formerly Berg), Troms county. Mining operations have taken place on the Skaland peninsula since 1918, and the current mine was opened in 2007.

The Skaland Graphite project differs significantly from the two previous projects. First, it is already in operation. As extraction began in 2007, the permitting processes took place at a time in which the Mineral Act was not yet in place. Further, as it is classified as a land-owned mineral, two out of three permits were granted on the municipal and regional level. Second, there was no notable opposition to the opening of the new mine. No appeals were submitted throughout the permitting processes. This is likely a consequence of long-term familiarity with the mining industry. The deposit has been mined for over a century, meaning that the risks often associated with opening new mines were less protruding.[89]

Graphite deposits in Senja extend far beyond the current mining area. In 2020, the Geological Survey of Norway further examined the geology of the northern counties. The findings solidified the notion that Senja is an area of geological importance and home to vast graphite deposits.[90] Skaland Graphite is acutely aware of these deposits and has entered into an agreement with the municipality to explore the deposits in Vardfjellet, Bukken and Hesten.

If Skaland Graphite moves forward with mining projects in the prospected area, they are likely to face fierce opposition. The area is considered important for reindeer herders, hunters, recreation, and fishing. The current mining activities have not generated significant opposition for three primary reasons. First, while the mine is in a Sami area, the peninsula has a peculiar geography. Thus, reindeer herders are not interested in the area between the fjords. Second, the deposition of tailings is significantly smaller than the two other projects. Further, the same area of the fjord has functioned as a deposition spot for many decades. Nature conservation groups focus on stopping new projects and aim to introduce a moratorium on all dumping in fjords, leaving existing depositions alone. Third, Skaland Graphite has in many ways built the surrounding community and maintains a very close relationship with it and the broader region.

Arguments related to the green transition have not been needed but would prove useful if Skaland Graphite wants to extend their operations into conflictual areas. Graphite is an essential part of the battery supply chain, and the Trælen mine is already a highly valued exporter to the EU. In June 2022, the Norwegian government presented *Norway's battery strategy*. Here, they underlined that "batteries are one of the new, major areas of opportunity that are of particular interest and relevance to Norway".[91] Skaland Graphite is mentioned several times in the document. For instance, it is noted that there is limited extraction of minerals in Norway that are relevant for batteries – Skaland Graphite being an important exception.[92] The proponents of the project can convincingly argue that a domestic battery industry would generate jobs, industrial growth, export revenues and foreign investment.

89 Katarzyna Guzik et al., 'Potential Benefits and Constraints of Development of Critical Raw Materials' Production in the EU: Analysis of Selected Case Studies', *Resources* 10, no. 7 (July 2021): 67, https://doi.org/10.3390/resources10070067.
90 Løvø, "Viktig grafitt er funnet i Nord-Norge." Forskning.no, July 21, 2020. https://forskning.no/geologi-geoteknikk-mineralogi/viktig-grafitt-er-funnet-i-nord-norge/1705776.
91 NFD, "Norges batteristrategi", Nærings- og fiskeridepartementet, 2022. https://www.regjeringen.no/contentassets/a894b5594dbf4eccbec0d65f491e4809/batteristrategien_web2.pdf.
92 Ibidem.

Batteries

Norway's Green Industrial Initiative has among its outlined goals to "contribute to the development of European value chains in critical raw materials, including extraction ... for instance through a strategic partnership with the EU".[93] The Norwegian battery value chain can be described to consist of minerals, raw materials, precursors, battery materials, components, battery cell production, battery packs, application use, second life and collection, and finally – recycling.[94] Therefore, the battery industry can not only be described as only one industrial field, but it is also multiple industries within one collective term.[95]

Norway's policy

As described earlier, there are possibilities able to achieve a full-scale Norwegian battery value chain, but why are batteries one of the seven areas the Norwegian government wishes to invest in? One of the reasons is that Norway has a uniquely long experience with the electric vehicle (EV) market. Back in 1989 the environmental NGO Bellona's president Frederic Hauge and pop-band A-ha frontman Morten Harket got a hold of an electric Fiat Panda and drove around in Oslo refusing to pay road tolls and parking fees, which created huge media attention.[96] In 2005 the domestic company ElBil developed Norway's first electric car, the Buddy, based on a 1991 Danish design, Kewet. While this might not be the reason why Norway had a Norwegian battery strategy in 2022, it shows that Norwegians' interest in EV's did not appear with Tesla's entrance into the Norwegian market in 2013.[97]

New EVs and their rapid spread thanks to state incentivization in different forms, led to an almost complete overtake of the automobile market: as of November 2024, EVs accounted for an impressive 94.9% of all new car sales in Norway.[98] This includes 93.6% for battery electric vehicles (BEVs) and 1.3% for plug-in hybrids (PHEVs). This growing domestic demand combined with the fact that Norway is a maritime nation,[99] allowing for competitive sea transport of goods produced in Norway, opened possibilities for the country to become a destination for foreign investors establishing production facilities within the battery value chain.

With the EU's increased attention and focus on establishing a European Battery Value Chain, Norway jumped on the wagon in the fall of 2021, at least officially, and started scoping the possibilities of creating a policy on batteries. In June 2022, saw the emergence of a Norwegian Battery Strategy and the already mentioned Green Industrial Initiative, allowing the country to sign up to the global

93 NFD, "Grønt Industriløft," Nærings- og fiskeridepartementet, 2022, https://www.regjeringen.no/contentassets/1c3d3319e6a946f2b57633c0c5fcc25b/veikart_skisse_uu_ja.pdf.
94 Ministry of Trade and Fisheries, 'Norges Batteristrategi' p. 17 (2022)
95 See a more detailed description of the Norwegian Batter Value chain here: https://www.prosess21.no/contentassets/39713b28868a41858fc2c8a5ff347c0b/prosess21_ekspertnotat_batteriverdikjeden_211220.pdf
96 Thronsen, 2022.
97 After the 2013 market entrance by Tesla, they sold 1521 Model S cars in March 2014 alone, making it the most of any car sold in the course of month in Norway (Tveit, 2014).
98 Brad Anderson, 'Norway Sets World Record for EV Sales With 94% Market Share | Carscoops', CarScoops, 2024, https://www.carscoops.com/2024/09/94-of-all-new-cars-sold-in-norway-last-month-were-evs/.
99 Because of Norway´s long coastline, this creates opportunities and innovations within the maritime EV market.

battery race, in record time.

The Strategy, prepared by the Ministry of Trade and Fisheries focuses on 10 actions for sustainable industrialization:[100]

1. Leadership in sustainability along the entire battery value chain.
2. Promoting Norway as an attractive host country for green investments.
3. Entering into industrial partnerships with key countries.
4. Providing capital, loans, and guarantees that mobilize private capital.
5. Improving access to relevant expertise.
6. Paving the way for greater access to renewable power.
7. Contributing to the provision of suitable sites and other central infrastructure.
8. Ensuring predictable, efficient, and coordinated public processes.
9. Supporting pilot municipalities during the growth phase.
10. Becoming a leader in tomorrow's battery solutions and leveraging the opportunities afforded by digital technologies.

The Strategy itself is not very specific in its measures; however, it is an important outlook document for the government to have. It also provides strategic action points, which are developed together with the industry, and these form a sound basis for future topics of conversation between the industry and the government.

The Norwegian battery industry at large was content with the European Green Deal, despite the rather drastic increase of new regulations they must navigate. They believed that strict environmental criteria would favor them in the competition against other European, as well as Asian battery producers. As Asia has a substantial advantage when it comes to costs, delivering on sustainability is seen as a major advantage Norway and Europe must utilize.

The EU Battery Regulation is in turn seen as a very comprehensive piece of legislation, yet, in the end, benefiting Norwegian actors. Strict environmental criteria such as carbon footprint were viewed as favoring the Norwegian companies both against competition from other European actors, as well as the established Asian actors. Furthermore, the industry was positive towards the steps taken by the regulation to address resource extraction, the most controversial part of the battery value chain due to poor conditions for miners.

Nevertheless, the regulation is both broad and detailed. A lot of capacity is needed to follow up its implementation. Over the next few years, around thirty secondary regulations will be added to the Battery regulation, many of which will serve as 'blueprints' for how to comply with criteria and report correctly. Even though the regulation is complex, newly established battery companies may have an advantage over legacy actors in some ways. Newly established actors can adapt to the new criteria from the start, whereas others might for instance have to re-negotiate contracts with suppliers and switch software programs. Moreover, though Norway enjoys some initial advantages when it comes to complying with the criteria of the regulation (such as carbon footprint), it might be harder for Norwegian actors to distinguish themselves as sustainable leaders in the long term, as

100 Ministry of Trade and Fisheries, *Norways battery* strategy (2022): 5.2022.

all battery actors wanting to establish themselves in Europe now must live up to the same criteria. Lastly, some Norwegian actors have shown concern over the possibility that the regulation will not be implemented and enforced with the same rigor across all the EU member states.

A similar situation occurs in the context of the RED III directive and its 'guarantees of origin'. Our interlocutors in the Norwegian industry all agreed the guarantee is a disadvantage for them as it nullifies some of the advantages of being based in Norway. Companies anywhere in the EU can purchase a certificate stating that their energy supply is green, regardless of the energy mix of the country they are located in, which makes it less important what sort of energy actually goes into production. Furthermore, Norwegian companies wanting to prove that their energy is sourced from renewables will have to pay for a redundant certificate, as the Norwegian energy mix is nearly 100% renewable. The Norwegian government has declared its intention on withdrawing from the scheme in its policy platform,[101] yet no action has been taken yet. In 2023, the center-left Agrarian Party has threatened to leave the coalition government if the EU's Clean Energy for All Europeans Package is implemented into Norwegian law.[102]

Potential for development and current experiences

Minerals and precursors

The already discussed mining enterprise, Skaland Graphite, extracting the world's richest flake graphite schist, and one of Europe's largest and cleanest sources of natural graphite, is an example of the first upstream part of the battery value chain.[103] The Nordic Council of Ministers shows that Nordic countries have great potential for increased critical mineral production,[104] so this part of the value chain can in principle still be strengthened, though reservations about the feasibility of this have already been mentioned.

Regarding raw materials focused on other uses, there are several other actors like Hydro, Glencore Nikkelverk, and Elkem. Elkem develops silicon products, silicon, and carbon solutions by combining raw materials, Glencore Nikkelverk produces nickel and is the largest nickel refinery in the Western world, and Hydro produces aluminum by retrieving bauxite and alumina.[105] Norway is a major exporter of these materials, but also cobalt and copper[106]. There are, however, no Norwegian actors within the precursor industry. Precursors are necessary to produce a cathode, which is one of four components of batteries, and the cathode determines the capacity and voltage of a battery[107].

101 Ask, Alf Ole. 'Støre-regjeringen ypper til strømstrid med EU'. Energi og Klima, (20 October2021): https://energiogklima.no/nyhet/brussel/store-regjeringen-ypper-til-stromstrid-med-eu/
102 Varg Folkman, 'Norway's Government Risks Crisis over EU Energy Row', POLITICO, 30 October 2023, https://www.politico.eu/article/norway-government-faces-collapse-over-eu-energy-row/.
103 Ministry of Trade and Fisheries."Norway's battery strategy".(2022): 18, Norway's battery strategy (regjeringen.no)
104 Ibidem.
105 Elkem." Elkem" (2023), Elkem | Elkem.com; Hydro. " Batteries",(2023), Batteries (hydro.com); Glencore Nikkelverk. " Glencore Nikkelverk"(2023), Glencore
106 Ministry of Trade and Fisheries."Norway's battery strategy", (2022):18, Norway's battery strategy (regjeringen.no)
107 Battery LAB. "A Better Life with Batteries - Precursors", (September 30th, 2022), A Better Life with Batteries - Precursor Battery LAB (lgensol.com)

Battery materials, components, and battery cell production

Norway has five industry actors within the production of battery materials: Vianode, Borregaard, Cenate, Cealtech, and Tiotech.[108] This part of the battery value chain is producing cathode and anode, which is a central part of battery cell production. Vianode produces anode graphite products,[109] Borregard manufactures additives for lead and lithium-ion batteries derived from Norwegian spruce,[110] Cenate produces silicon-containing anode materials,[111] Cealtech has created battery technology based on their Graphene,[112] and TioTech creates anode-materials for Li-ion batteries using lithium-titanate.[113].

Currently, there are no Norwegian actors producing battery components, however, there are three battery cell manufacturers: Freyr, Beyonder, and Morrow.[114] These cell manufacturers draw a lot of attention because of their large factories and the high need for workforce. Freyr was aiming to provide industrial-scale clean battery solutions and produce green battery cells to be able to decarbonize the energy and transportation systems[115]. Freyr also planned for their GigaArctic project to be in the city of Mo i Rana, Nordland County, with a capacity of 29 GWh.[116] Beyonder is a company based in Rogaland, Western Norway, turning sawdust into battery cell technology.[117] They are also participating in in the European Battery Initiative IPCEI.[118] The Arendal-based company Morrow is manufacturing battery cell technologies for mobility (NMC) and stationary storage (LFP), and are aiming to commercialize a new generation of battery technologies for these two markets but based on the high-voltage material Lithium Manganes Nickel Oxide (LNMO).[119]

However, changes on the global market, most importantly the implementation of the US Inflation Reduction Act and highly competitive cell production in China has verified these plans. In August 2024, Freyr announced that it needs to put on hold the construction of the Mo I Rana gigafactory and instead laid off a large part of the employees.[120] Their main “gigaplant” with a 34GWh capacity is now in Coweta County, Georgia, USA.[121] Beyonder opened an operational lab in Sandnes with plans for upscale production in the same area, but in October 2024 announced that it would move production to China.[122] Morrow Batteries opened their first factory in Arendal in 2024, but in January 2025 announced that its second factory construction is put on hold, and 60 employees have to be laid off

108 Ministry of Trade and Fisheries.”Norway’s battery strategy”,(2022):18, Norway’s battery strategy (regjeringen.no)
109 Vianode.” Our story as a synthetic graphite manufacturer”,(2023), About us | Vianode
110 Borregaard. ” Borregaard - the sustainable biorefinery”,(2023), Borregaard - The Sustainable Biorefinery - Borregaard
111 Cenate. ” About”,(2023), About - Cenate Centrifugal nanotechnology
112 Cealtech. ” Products & Services”,(2023), PRODUCTS & SERVICES - CealTech AS
113 TioTech. ” Technology” (2023), TioTech’s technology for Li-ion batteries
114 Ministry of Trade and Fisheries. “Norway‘s battery strategy“, (2022):19, Norway’s battery strategy (regjeringen.no)
115 Freyr. “About “,(2023), FREYR Battery Norway | About
116 Ministry of Trade and Fisheries. “Norway‘s battery strategy“(2022):19; Freyr. “Progress“, (2023), FREYR Battery Norway | Progress
117 Beyonder. “Game-changing technology“,(2023), Technology — Beyonder
118 Norwegian Ministry of Trade and Fisheries. “Norway signs up to European Battery Initiative“.(March 17th, 2023), Norway signs up to European battery initiative - regjeringen.no
119 Morrow. “About us“,(2023), About Us (morrowbatteries.com)
120 Trine Jonassen, ‘Freyr Stops Battery Production and Lays Off Employees’, *High North News*, 2024, https://www.highnorthnews.com/en/freyr-stops-battery-production-and-lays-employees.
121 ‘FREYR Battery Announces Plans for U.S. Gigafactory in Georgia’, FREYR Battery, accessed 23 January 2025, https://www.freyrbattery.com/news/freyr-battery-announces-plans-for-u-s-gigafactory-in-georgia.
122 Celina Ryssdal, ‘Norsk Batterisatsing: Henter Millioner Og «flytter» Til Kina’, 4 October 2024, https://www.finansavisen.no/industri/2024/10/04/8187533/beyonder-batteries-henter-60-millioner-kroner.

(administrative delays e.g. long waiting time for work permits for Asian specialists were cited as a major obstacle for ramping up production and increasing company profits).[123] In 2024, the company received a 1.5 billion Norwegian kroner loan from Innovation Norway, following statements from the management that the company needs support and that is a "to be or not to be" matter.[124]

Battery packs, collection, recycling, and second life

Within battery packs, there are four Norwegian industrial actors: Corvus Energy, Siemens Energy, ZEM, and Evoy.[125] Battery packs usually consist of hundreds of battery cells, which are connected in series. This means that the battery packs consist of several battery modules, which again contain multiple battery cells in series, parallel, or series-parallel[126].

Corvus Energy is a company founded in Canada, that focuses on creating battery packs for the maritime sector and is now the largest installed base of ESSs[127] with the largest number of projects completed.[128] Siemens Energy provides solutions for energy storage through the production of battery packs,[129] ZEM offers battery solutions for the maritime sector,[130] and Evoy manufactures electric boat motors.[131]

On the collection side, we find BatteriRetur and Norsirk.[132] BatteriRetur collects and recycles all battery types from across the entire country,[133], and Norsirk offers production responsibility for EE products, batteries, and packaging.[134]

Within recycling, we have actors like Hydrovolt, Glencore Nikkelverk, and ReSiTec[135]. Hydrovolt is a company owned by Norwegian Hydro and Swedish Northvolt, and they focus on recycling batteries from the EV sector.[136] Their battery recycling plant is based in Fredrikstad, and when fully operational they will recycle over 12,000 tons of battery packs every year which is more than enough to cover the entire volume of batteries being retired from the Norwegian EV Market.[137] Glencore Nikkelverk, who also delivers raw materials, focuses on the recycling of end-of-life electronics, lithium-ion batter-

123 Eivind Aakre, 'Morrow Batteries Sier Opp 50-60 Ansatte', *Finansavisen*, 15 January 2025, sec. Energi, https://www.finansavisen.no/energi/2025/01/15/8229937/morrow-batteries-sier-opp-50-60-ansatte.
124 Mikael Holter and Jonas Solgård, 'Morrow Batteries får statlig lån på 1,5 milliarder kroner', DN.no, 17 December 2024, https://www.dn.no/energi/morrow-batteries/batterier/innovasjon-norge/morrow-batteries-far-statlig-lan-pa-15-milliarder-kroner/2-1-1755064.
125 Ministry of Trade and Fisheries. "Norway's battery strategy",(2022): 19, Norway's battery strategy (regjeringen.no)
126 Li, Jianwei & Mazzola, Michael, S. "Accurate battery pack moduling for automotive applications". (2012): 215. Accurate battery pack modeling for automotive applications - ScienceDirect
127 ESS: Energy Storage System
128 Corvus Energy. "World Leader in zero-emissio solutions for the ocean space. (2023), Corvus Energy - Powering a clean future .
129 Siemens Energy. "Battery Energy Storage: Flexible, scalable design for efficient energy storage". (2023), Battery Energy Storage Solutions | BESS | Storage Solutions | Siemens Energy Global (siemens-energy.com)
130 ZEM. "Zero Emission Maritime solutions". (2023), Batterisystemer og elektrisk drivlinje til skip | ZEM | Norway (zemenergy.com)
131 Evoy. "Electric Boating Powered by Evoy".(2023), Evoy Electric Boat Motor - Inboard and Outboard - High Output .
132 Ministry of Trade and Fisheries. "Norway's battery strategy", (2022): 19, Norway's battery strategy (regjeringen.no)
133 Batteriretur. "Hva vi gjør", (2023), Hva vi gjør - Batteriretur
134 Norsirk. "NorSirk", (2023), Forside - NORSIRK
135 Ministry of Trade and Fisheries. "Norway's battery strategy" (2022):19, Norway's battery strategy (regjeringen.no).
136 EV: Electrical Vehicles
137 Hydrovolt. "About us", (2023), About us - Hydrovolt

ies, and other critical metal-containing products.[138] ReSiTec is specialized in handling, recovery, and treatments of powders, liquids, and suspenions.[139]

Beyonder, together with Morrow, Hydro, Vianode, and Cenate have applied to join EuBatIn, now as Norway has been invited to join the EBA IPCEI. The perceived importance of IPCEI varies among Norwegian companies. Those who are developing new battery chemistries and technologies found IPCEI to be of great importance, as it focuses on research and development. Those companies applying existing battery technologies show less interest. Nevertheless, the initial setup of IPCEI was perceived as slow, bureaucratic, and cumbersome, as thorough documentation was needed to make sure one did not break rules related to state aid. IPCEI was however reformed after the US passed the Inflation Reduction Act; first allowing for integrated projects, by coordinating several smaller projects as one. This opens for the involvement of more partners and cross-industry cooperation. The Commission has also clarified the rules regarding what projects are eligible for funding, specifying that upscaling of certain production facilities is within the scope of IPCEI.[140] This restructuring was one of the reasons why Norway was eventually allowed to join IPCEI.

138 Glencore Nikkelverk, "Nikkelverkets produksjon" (2023), https://www.nikkelverk.no/no/who-we-are/our-operations.
139 ReSiTec "About" (2023), https://www.resitec.no/about-resitec/
140 European Commisson,'State Aid: Commission Adopts Revised State Aid Rules' (2022): https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6245.

Conclusions and Policy Recommendations

In 2013, the Norwegian government launched the previous mineral strategy. An important measure was presented: to create a national mineral forum. The forum was meant to enable effective and inclusive processes and ensure the realization of the governmental ambitions.[141] Ten years later, the forum is yet to be seen. The analyses of the Nussir and Nordic Mining projects have given a clear indication as to why. Fierce contestation has made regional forums nearly impossible. For a national forum to be effective, it would need to contain the very same actors.

A decade later, a new strategy has been launched. An important component is the creation of fast tracks. In essence, the *fast track* is meant to prioritize critical mineral projects and make processes more effective. Among the presented measures is the creation of an "advisory tool" to identify and handle demanding and conflictual topics in projects.[142] Even if the Mineral Act is revised and stricter environmental standards applied, opposition is likely to persist. A fast-track sounds good on paper but will be challenging in practice and it is also likely to cause tradeoffs for democratic governance that could be exploited or hotly contested (or both). While the permitting processes clearly have room for improvement, efficiency should not come at the expense of thoroughness.

The political debate on mining in Norway has experienced a marked shift over the last decade. Until recently, local and regional arguments have dominated the policy area. The prospect of job creation and industrial growth has knitted mining companies and municipalities together – forming influential coalitions as local democracy and regional industrial development are key pillars of the Norwegian political system. Counterarguments have revolved around consequences for the local environment and communities. Over the last 10 years, however, legitimacy has increasingly been sought by connecting projects to the global level. The importance of minerals for the green transition and growing uncertainty over global supply chains has created a policy window and is now a prominent part of legitimacy-building. At the same time, the attention given to indigenous rights and nature conservation has augmented in the political sphere. In concert, polarization has been aggravated as the arguments of both camps are strengthened.

So far, Sami actors and nature conservation groups have not been able to stop projects. Nonetheless, they have severely slowed them down as decision-makers dread to make decisions and investors shy away. Consequently, those in opposition wield significant power. If Norwegian mineral ambitions are to be met by initiating projects along either of the two critical dimensions of opposition, the governmental hopes of launching *fast tracks* are likely to remain a political chimera.

141 NFD, "Strategi for mineralnæringen." Nærings- og fiskeridepartementet, 2013. https://www.regjeringen.no/contentassets/0f2cab4b8b0a4040af8276770649500f/mineralstategi_20130313.pdf.

142 NFD, "Næringsministeren varsler hurtigspor for mineralvirksomhet i Norge," Nærings- og fiskeridepartementet, December 23, 2022, https://www.regjeringen.no/no/aktuelt/naringsministeren-varsler-hurtigspor-for-mineralvirksomhet-i-norge/id2952936/.

As minerals are gradually drawn into the broader political debate and dilemma of climate versus nature, the cleavage amongst Norwegian environmental groups is one to keep an eye on. The changed stance of the growingly cooperative interest group Bellona is the clearest example. This shows that while the environmental front is broad and diverse, it is not necessarily united, and the tension between local costs and global benefits will further increase the fragmentation.

The challenges that the analyzed mining projects face are not unique, such conflicts arise across the globe. European countries are particularly sensitive to environmental opposition, and similar projects with high levels of tension are present all over the continent – for instance in Portugal, Spain and France.[143] The EU will face a growing dilemma as their mining ambitions coincide with increasingly rigorous environmental standards. Importantly, mining ambitions cannot be assessed in isolation. Ambitions have been raised *because* of the energy transition and decarbonization plans.

In March 2023, EU members agreed to raise the share of renewable energy in the Union's overall energy consumption to 42.5 percent by 2030.[144] This is roughly a doubling of today's share. The target is to be reached through streamlined permitting processes, financial support and revised legal frameworks – mirroring the measures implemented to reach the mineral targets. It is imperative to bear this in mind when assessing the political feasibility of EUs ambitions to become less dependent on mineral imports. As the EU wants the governments of its member countries to actively push through a myriad of large-scale industrial projects, backlash is likely to follow. The effect of the ties to the green transition is thus twofold. Yes, it increases the legitimacy of the projects, an important factor in political feasibility assessments. However, they will be regarded as pieces of an increasingly intolerable puzzle.

The EU will need to diversify their mineral supply by forming strategic partnerships. The target for domestic extraction is fraught with uncertainty, and the Union will be dependent on imports for the foreseeable future. This entails that efforts related to corporate due diligence and transparent supply chains must be continued. In Norway, the *Transparency Act* entered into force in July 2022. Companies are now obliged to control their suppliers. Today, it is not always easy to control where the minerals are extracted. A dilemma will arise: if you do not extract the minerals domestically, you must ensure that they are extracted responsibly. Strategic partnerships are likely to make controls easier, and transparency should play key roles in agreement drafts. That said, initiating new mining projects is inherently complex and time-consuming.

As demand is expected to skyrocket in coming years, the scramble for minerals will emerge to the forefront of geopolitical competition. Initiating strategic partnerships is a sound way to diversify, but it is one thing to draft an agreement in Brussels – mining projects must successfully travel the journey from exploration to extraction. Further, all the major players on the world stage are now initiating deals to secure their access. Thus, mining hotspots will be central arenas for future geopolitical tension. As argued by Ursula von der Leyen, "the race is on".[145]

143 Zimmermann, "Europe's Green Dilemma: Mining Key Minerals Without Destroying Nature." Politico, March 15, 2023. https://www.politico.eu/article/europes-green-dilemma-mining-key-minerals-without-destroying-nature/.

144 Ask, "Slik skal EU nå fornybarmålet: Hurtigbehandle ny vindkraft." Energi og Klima, March 30, 2023. https://energiogklima.no/nyhet/brussel/slik-skal-eu-na-fornybarmalet-hurtigbehandle-ny-vindkraft/.

145 European Commission. "Speech by President von der Leyen at the European Parliament Plenary on the preparation of the European Council meeting of 23-24 March 2023." March 15, 2023. https://ec.europa.eu/commission/presscorner/detail/en/speech_23_1672.

We have also seen that it will not necessarily be easy to create a Norwegian battery policy due to the complexity of the battery value chain. As described earlier, there are many industries within the collective term *battery industry*, and these have both the same and different needs. Therefore, a general battery strategy might be beneficial for the government in the early phases, but a more extensive policy may be needed to match the complexity of the industrial field.

As an example, if a cell manufacturer is to build a gigafactory, with 4000 or 6000 employees, they need a lot of components to make it work. They need enough power, they need bridging capital, people, competence, infrastructure, powerlines, and more. If they are to build the gigafactory in a more rural area, there is even more that needs to be fixed to make it work. Usually, few people locally, or even in Norway, possess the competence needed in a battery factory, and therefore they there is a need for importing human resources and competence, and at the same time securing future education within battery technology. This also means that a more rural area possibly will increase its population with thousands of people related to a single factory being established. The project will need housing, school and kindergarten places for children, work for spouses, and welfare arrangements. In addition, the industrial sites need to be up to speed with powerlines, the availability of roads, and other infrastructure to work for the factories. Another important aspect is also the host country's attractiveness. Attracting highly qualified workforce goes far beyond infrastructure and touches upon migration policy and the management of a flourishing culturally diverse and inclusive society. All these aspects are tied to policy, and not necessarily technical battery policy, but these aspects are common for the growth within multiple new, green industrial areas. Therefore, one may argue that these should be the prioritized policy areas for future policymaking.

The case of Beyonder shows that partnerships that involve European and Chinese actors are increasingly common, and the dependencies in the sector are more and more complex, with ownership blended and interests intertwined. China's ability to establish not only a manufacturing sector, based on domestic resources, but also a technological base enabling the export of know-how, means that in thinking about Europe's green strategic autonomy some earlier ideas about 'indigenous' value chains have to be revisited. The global competition between the US and China, which may be more pronounced with the new Trump presidency, will also require a new approach from European policymakers, including the Norwegian government.

Policy recommendations

- Mining will always have environmental consequences. Accordingly, stringent environmental protection orders need to play center roles in the approval of projects. The practice of dumping mining tailings in the fjords will continue to attract fierce opposition. For the environment, deposition on land is often even worse. Consequently, decision-makers should contribute financially and support efforts to reduce the amount of mining waste, and companies must also accept higher deposition costs. Tailings can also find use elsewhere, for instance, Bellona highlights its potential use in building materials.[146] Finding solutions to include the waste in circular systems will reduce the amount to be dumped, thus lowering the environmental impact and increasing political feasibility. The mineral strategy proposed several measures to address these issues, and it is now a case of implementing them.

146 Melvær, "Grønnere gruver." Bellona, May 12, 2022. https://bellona.no/nyheter/industri/2022-05-gronnere-gruver

- Measures must be implemented to increase the political feasibility of mining in Norway. In partular, the revised law must consider Sami demands but ensure that the Act is not a definite barrier for mining in Sapmi. There is a fine line between attracting Sami opposition and handing the local Sami population a veto right. An important strategy to ease the opposition is to legally extend the consultation and benefit sharing schemes to Sami populations outside of Finnmark. It remains to be seen whether revisions *can* sufficiently ensure an act that will be approved by the Sami Parliament. The effect on political feasibility is ambiguous, but decision-makers should go to great lengths to ease the conflict levels on this dimension.

- Decision-makers must include minerals in the holistic approach that is needed for the transition of current energy systems. It is imperative that all projects are considered according to their role in the broader picture. Cooperation will be key, and countries should prioritize areas where they can contribute the most. Importantly, geology determines where minerals can be extracted. Norway is home to vast mineral deposits and could become a significant producer. If so, ambitions in other areas that require land consumption may need to be relaxed. The security of supply chains can be enhanced without being self-sufficient, and the EU should form numerous strategic partnerships with reliable partners to diversify their access to minerals. Norway would be wise to do the same, and a tighter cooperation between the Nordic countries is an obvious place to start. Norway, EU and the "West" more broadly will also need to take into account the difficulties for new market entrants and the problems with establishing new mining projects given the high global competition and low prices in some mineral sectors. A joint fund which could support new projects may be an option to consider.[147]

- Our analysis of mineral extraction assessed the supply side, but one should not forget that supply hinges on demand, which is evidenced by the battery sector analysis. A key recommendation is to vastly improve efforts to reduce the demand growth that will follow the green transition. As argued by Barton, circularity is not the whole answer, but it is a "hugely important part of the solution and should be subjects of substantial policy and law reform efforts".[148] The recycling of some of the most critical minerals is non-existent, but CRMA included a target to recycle 15% of annual consumption by 2030.[149] That share must rapidly rise in the future decades. By ameliorating our recycling capacities, we ease the need to open new mines – thus reducing the opposition and increasing the political feasibility of ambitions. In terms of geopolitical risks, the circular economy will not eliminate these, but it will reduce them.[150]

147 Sagatom Saha et al., 'The Political Economy of Global Climate Action: Where Does the West Go Next After COP28?', Oslo Energy Forum Report (Oslo: NUPI, 20 February 2024), 18, https://www.nupi.no/en/publications/cristin-pub/the-political-economy-of-global-climate-action-where-does-the-west-go-next-after-cop28.

148 Barton, "Building Resilience from the Ground Up: Local Supply and Demand Management with Renewables, Prosumers, Energy Efficiency, Critical Minerals, and the Circular Economy." In Resilience in Energy, Infrastructure, and Natural Resources Law : Examining Legal Pathways for Sustainability in Times of Disruption, edited by Catherine Banet, Hanri Mostert, LeRoy Paddock, Milton F. Montoya and Inigo del Guayo. Oxford Academic, 327-41. New York, NY: Oxford University Press, 2022.

149 European Commission, "Critical Raw Materials: ensuring secure and sustainable supply chains for EU's green and digital future," March 16, 2023, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1661.

150 Nygaard, "The Geopolitical Risk and Strategic Uncertainty of Green Growth after the Ukraine Invasion: How the Circular Economy Can Decrease the Market Power of and Resource Dependency on Critical Minerals." Circular Economy and Sustainability, 2022. https://doi.org/10.1007/s43615-022-00181-x.

- In the short-term, however, new mining projects must be commenced. The regulatory handling must be improved, and decision-makers would be wise to dedicate more time and effort to explain why mineral ambitions are raised. This includes raising the public awareness of minerals and their role in the green transition. It also includes highlighting the dilemmas that are present in the current supply chains in terms of security, sustainability, and transparency. As of now, these dilemmas are largely unknown. Successfully managing the transition relies on an enlightened debate and clear understandings of the predicaments we are facing as the world shifts away from fossil fuels.

- The complexities of opening new mines on land should not rush countries into extracting minerals from the sea. Arguments against deep-sea mining for critical minerals primarily focus on the potential for severe environmental damage. Critics highlight that deep-sea ecosystems are fragile and largely unexplored, meaning mining activities could lead to irreversible harm, including the destruction of habitats and loss of biodiversity. Additionally, the process can release toxic substances and create sediment plumes that spread far beyond the mining sites, affecting marine life and food chains. As noted, the demand can at least to some extend be limited by improving recycling rates and developing new technologies that reduce the need for virgin minerals

- Even though Norway has an existing battery policy through the Norwegian battery strategy and Green Industrial Initiative, there is a need for the government to stay updated on what is going on in Brussels. The battery industry is characterized by a high degree of competition, where not only companies are trying to secure a spot as one of the main suppliers in a specific part of the battery value chain, but also countries and regions are competing. The experience of the three battery cell producers in Norway indicates, that state support might be necessary to onshore the production and maintain competitiveness. If the Norwegian government were to align its policy with the EU, it would benefit actors within the Norwegian battery value chain to grow and expand their businesses. This way they would be able to have access to the European market, which is beneficial in terms of future exports of products and services within the battery value chain.

- That said, to create a full-scale *Norwegian* battery value chain, there is a need for foreign investments. If the framework conditions in Norway matched the EU's, especially in terms of incentives, it would attract more foreign investors to the country and strengthen the Norwegian battery value chain. It is important to remember that because of the Norwegian labor regulations, it often results in increased costs for foreign companies adjusting to collective salary agreements, and immigration bureaucracy and long processing times are an obstacle for hiring foreign experts.

- In addition, removing Norway´s categorization as a third party in terms of the Brexit agreement should be a prioritized area for the government. This includes working towards the goal to include Norway in the agreement, which again opens the possibility for Norwegian manufacturers to create batteries for EVs. This in turn unlocks opportunities for the Norwegian battery value chain to expand further, and this will in long-term perspectives mean an increased export.

Norwegian Institute of International Affairs

Rosenkrantz' gate 22
PO box 7024 Pilestredet park 18
0176 Oslo, Norway

post@nupi.no

nupi.no