

Reality Check: The Regulatory Dimension of the EU De-risking Strategy for Critical Raw Materials and Semiconductors

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ABSTRACT

As global supply chains are exposed to mounting geopolitical shocks, the European Union is recalibrating its economic security strategy to reduce strategic dependencies and enhance indigenous industrial capacity. Two sectors stand at the heart of this effort: critical raw materials (CRMs) and semiconductors. Regulatory responses at the EU level include new benchmarks for extraction, processing, and recycling of CRMs, as well as efforts to bolster semiconductor production capacity through targeted funding and investment incentives. However, implementation gaps, internal fragmentation, and insufficient external coordination continue to hinder progress. Member states like Italy are taking steps to align national frameworks with EU objectives, focusing on CRM recycling and mature chip manufacturing. Strengthening partnerships with reliable third countries and fostering cross-sectoral policy coherence will be essential to secure Europe's strategic autonomy at a time of increased economic securitisation.

Critical raw materials | Semiconductors | European Union | Italy

keywords

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Introduction

In her 2011 book, Sheila Ronis questioned the role of nations' economic security strategies at a time when "borders [were] less important than ever".¹ Since then, much has changed. Borders have increasingly been heightened and thickened, with protectionist drives guiding governments over the years, from the United States to Argentina, to several countries in the European Union. Economic security, far from its long-gone state of "neglected dimension", has gradually gained a central position in the agenda of administrations across the world. Japan was first, building the pillars of its economic security strategy since the early 2010s. Later, the United States launched its ambitious project of decoupling from China.

The EU followed suit. The geo-economic shocks of the recent years – including the cumulative impacts of the Covid-19 pandemic, the Russian invasion of Ukraine and the consequent energy crisis, the Taiwanese chip crunch and the semiconductor shortage – have prompted the Union to define an approach of its own towards economic security. Those shocks highlighted the risks associated with a troubling concentration of supply chains in East Asia and with the EU's dependencies on one or a handful of suppliers in strategic sectors. During the days of "borders-less important than ever", the EU benefitted from decades of globalisation, assuming stable geopolitical alliances and secure supply chains. However, economic cooperation is giving way to securitisation.

¹ Sheila R. Ronis (ed.), *Economic Security. Neglected Dimension of National Security?*, Washington, National Defense University Press, 2011, p. viii, <https://apps.dtic.mil/sti/citations/ADA585192>.

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When talking about dependencies, some distinctions ought to be made. Traditional dependence refers to an economy's inability to function without a specific resource. Russian fossil fuels – accounting for about half of the EU's gas imports before the invasion of Ukraine² and constituting a quarter of Europe's total energy imports³ – fit this definition. The abrupt cut-off of Russian supplies posed an existential challenge for industries and households alike across the EU. It could be tempting to draw a comparison between this scenario and the EU's current dependencies on China for critical raw materials (CRMs)⁴ – especially rare earth elements (REEs)⁵ – and on strategic technologies underpinning its green and digital transition, such as semiconductors. However, the reality is more nuanced.

Europe's dependency on Chinese technologies has increased over the years, and in 2022, 38 per cent of the EU's high-tech imports from non-EU countries came from China.⁶ Additionally, China currently provides 100 per cent of the EU's supply of heavy REEs.⁷ Nonetheless, the greater risk faced by the EU is not an abrupt cessation of Chinese supply of processed CRMs. Rather, it is protracted series of disruptions to supply chains, which has been commonly referred to as "death by a thousand cuts". These minor shocks can materialise in the form of China imposing sporadic, targeted export restrictions, creating market volatility and disrupting the architecture of global supply chains. Similarly, the Trump's administration strategy and the looming over potential introduction of tariffs strategic sectors could heavily disrupt the configuration of global supply and production hubs.

To survive a potential "death by a thousand cuts", the EU has laid out an Economic Security Strategy, announced in June 2023, signalling growing awareness over the risks posed by geopolitical tensions, technological transformations and the weaponisation of economic dependencies.⁸ The Economic Security Strategy is

² Ugnė Keliauskaitė, Simone Tagliapietra and Georg Zachmann, "Europe Urgently Needs a Common Strategy on Russian Gas", in *Bruegel Analysis*, 2 April 2025, <https://www.bruegel.org/node/10783>.

³ Servet Yanatma, "Europe's 'Energy War' in Data: How Have EU Imports Changed since Russia's Invasion of Ukraine?", in *Euronews*, 24 February 2023, <https://www.euronews.com/green/2023/02/24/europes-energy-war-in-data-how-have-eu-imports-changed-since-russias-invasion-of-ukraine>.

⁴ "CRMs combine raw materials of high importance to the EU economy and of high risk associated with their supply." See European Commission DG for Internal Market website: *Critical Raw Materials*, https://single-market-economy.ec.europa.eu/node/279_en.

⁵ REEs "are a group of 17 elements, including the 15 elements of the lanthanide series on the periodic table of elements together with the transition metals scandium and yttrium". See Natural Resources Canada website: *Rare Earth Elements Facts*, last modified on 20 December 2024, <https://natural-resources.canada.ca/node/20522>. Their magnetic, electrical and optical properties make them vital components in various technologies, including electronics, energy and medical applications.

⁶ Eurostat, *EU Trade in High-Tech Products up in 2022*, 10 May 2023, <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20230510-2>.

⁷ Council of the EU, "An EU Critical Raw Materials Act for the Future of EU Supply Chains", in *Infographics/Explains*, last modified on 21 March 2025, <https://www.consilium.europa.eu/en/infographics/critical-raw-materials>.

⁸ European Commission, *European Economic Security Strategy* (JOIN/2023/20), 20 June 2023, <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52023JC0020>.

built on three key pillars – the so-called “Three Ps”: promote, protect and partner. The Three Ps provide the structure for actionable risk assessments in four critical risk areas: resilience of supply chains; security of critical infrastructure; technology security; economic coercion or the weaponisation of dependencies.

The EU paired its formally “country-agnostic” Economic Security Strategy with its De-risking Strategy, introduced by European Commission President Ursula von der Leyen in March 2023, stressing the importance of reducing overreliance on China for critical materials crucial for the green and digital transition.⁹ Under this strategic framework, many EU member states are at work to strengthen their national economic security strategies and design policy measures to reduce overconcentration of supply in strategic sectors, while boosting indigenous industrial capacity.

This paper focuses on two strategic sectors: CRMs and semiconductors, given their relevance for the EU’s strategic autonomy ambitions. It provides an analysis of the regulatory efforts undergone by the EU and by Italy to design strategies to de-risk and build more resilient supply chains. The two following sections will be dedicated respectively to CRMs and semiconductors – firstly, looking at the main risks and vulnerabilities of the respective supply chains and, secondly, at policy responses at the EU and Italian level, concluding with policy recommendations.

1. Critical raw materials

Critical raw materials have shifted from economic commodities to geopolitical assets. Used for a plethora of applications – from magnets to semiconductors and clean technologies – CRMs have become instrumental for the green and digital transition. The EU and its member states, including Italy, are grappling with a number of risks associated with CRM supply chains, trying to design measures to increase resilience and promote strategic autonomy.

1.1 CRMs: Challenges and risks

From an EU perspective, the greater challenge involving CRMs in the upcoming years is an exponential rise of demand, mostly driven by a record employment of green technologies, like solar panels and batteries.¹⁰

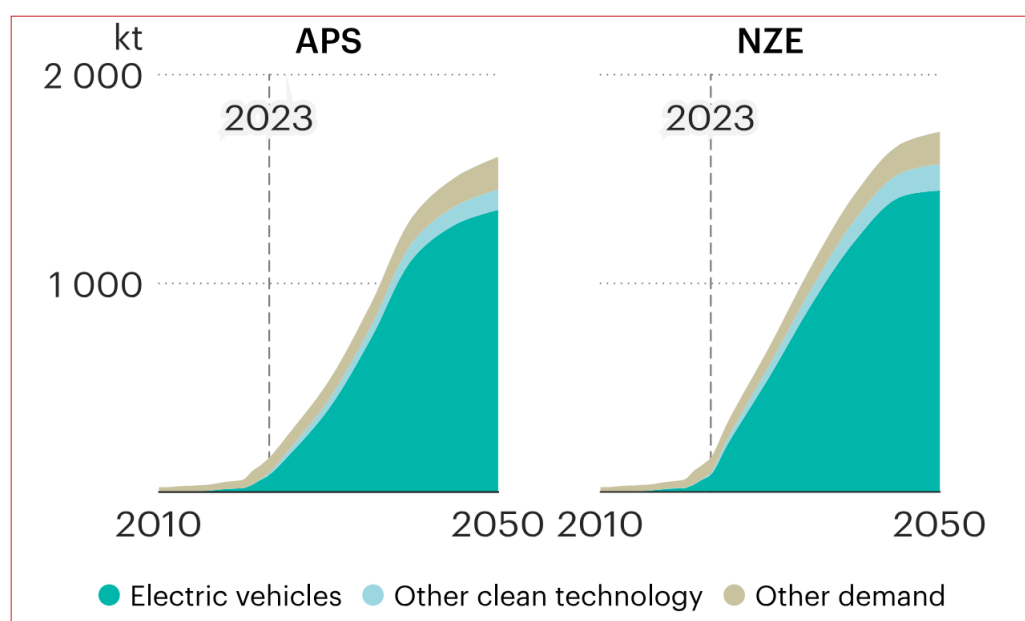
Over the next decades, demand is projected to grow further under the EU’s ambitious goals of carbon neutrality by 2050, outlined in the European Green

⁹ European Commission, *Speech by President von der Leyen on EU-China Relations to the Mercator Institute for China Studies and the European Policy Centre*, 30 March 2023, https://ec.europa.eu/commission/presscorner/detail/en/speech_23_2063.

¹⁰ Pier Paolo Raimondi, “EU and Italian De-risking Strategies for Energy Transition: Critical Raw Materials”, in *IAI Papers*, No. 25|09 (June 2025), <https://www.iai.it/en/node/20282>.

Deal.¹¹ Mineral demand for green technology is expected to grow between 400 and 600 per cent by 2040.¹² Demand for lithium – a mineral instrumental to produce lithium-ion batteries (among other applications), the most widespread type of batteries used for electric vehicles (EVs) – tripled in the span of five years, between 2017 and 2022.¹³ This trend is not likely to reverse (Figure 1).

Figure 1 | Demand outlook for lithium



Note: APS: Announced Pledges Scenario; NZE: Net Zero Emissions by 2050.

Source: International Energy Agency (IEA), *Global Critical Minerals Outlook 2024*, May 2024, p. 125, <https://www.iea.org/reports/global-critical-minerals-outlook-2024>.

Without secure access to CRMs supply, Europe's green transition, digital transformation and technological sovereignty are at risk. To face such a challenge, the EU needs to tackle a number of risks associated with CRM supply chains. Firstly, although mineral reserves are widespread across the globe, production is concentrated in a handful of countries, such as China, Australia, Chile. The European CRM value chain – exploration, extraction, refining, processing and recycling – is fragile at every segment. China, on the contrary, holds a very dominant position along the CRM supply chain, as a result of long-standing state policies to move ahead of its international competitors. Though China does not hold a near-monopoly on CRM reserves, it is the world's largest importer of raw

¹¹ European Commission DG for Climate Action website: *2050 Long-term Strategy*, https://climate.ec.europa.eu/node/56_en.

¹² Mario Draghi, *The Future of European Competitiveness. Part B*, September 2024, p. 45, https://commission.europa.eu/node/32880_en.

¹³ IEA, *Global EV Outlook 2023*, April 2023, p. 57, <https://www.iea.org/reports/global-ev-outlook-2023>.

materials,¹⁴ to then cement its leading position in the refining and processing segments.¹⁵

As CRMs become a market shaping tool, countries like China can exploit their heft and apply market restriction to stir supply chains or to suppress the competitors' industrial growth. This scenario materialised in 2020 when – as Europe was pushing to expand its battery component production – Swedish battery leader Northvolt was subjected to a Chinese export ban on graphite – a mineral needed for anode production.¹⁶ Securing these exports could have strengthened Europe's manufacturing capacity. Instead, by 2023, China's Putailai announced a 1.3 billion US dollars investment to build Europe's largest anode manufacturing plant in Sweden, with Northvolt – which eventually filed for bankruptcy in 2024 – set to become its customer.¹⁷

Another scenario looming over Europe involves the weaponisation of market restrictions. In response to tariff hikes on Chinese imports introduced by US President Donald Trump, China's Ministry of Commerce announced on 4 April 2025 new export controls targeting key REEs. The measure affects seven specific REEs¹⁸ – essential in sectors such as defence, energy and automotive manufacturing – and the derived permanent magnets.¹⁹ The regulatory framework required companies to obtain special export licenses to ship these materials and related magnet technologies abroad; with slower exports directly impacting the EU and US automotive sector, particularly that of EVs.²⁰

This move underscores the strategic value of REEs, with market dynamics poised to shift quickly if export disruptions occur or if delays in approving shipments to certain regions materialise. Stockpiling for CRMs could cushion the risk of weaponisation towards single countries and mitigate the risks of supply shocks.²¹ However, unlike for fossil fuels, the EU lacks an inventory stock of CRMs to this

¹⁴ International Trade Centre, "Trade in Critical Minerals by Processing Leve", in *Trade Briefs Spotlights*, September 2023, <https://tradebriefs.intracen.org/2023/9/spotlight>.

¹⁵ Zhou Weihuan, "Why China's Critical Mineral Strategy Goes beyond Geopolitics", in *World Economic Forum Opinions*, 19 November 2024, <https://www.weforum.org/stories/2024/11/china-critical-mineral-strategy-beyond-geopolitics>.

¹⁶ Economist, "Why Is China Blocking Graphite Exports to Sweden?", in *The Economist*, 22 June 2023, <https://www.economist.com/business/2023/06/22/why-is-china-blocking-graphite-exports-to-sweden>.

¹⁷ Richard Milne, Edward White and Gloria Li, "Chinese Group Putailai to Build Europe's Largest Anode Factory in Sweden", in *Financial Times*, 4 May 2023, <https://www.ft.com/content/80d34254-3e12-4fa7-8f02-fdceb1c2fa2e>.

¹⁸ Samarium, gadolinium, terbium, dysprosium, lutetium, scandium and yttrium.

¹⁹ Gracelin Baskaran and Meredith Schwartz, "The Consequences of China's New Rare Earths Export Restrictions", in *CSIS Critical Questions*, 14 April 2025, <https://www.csis.org/node/115778>.

²⁰ Edward White, Ryan McMorro and Harry Dempsey, "Global Supply Chains Threatened by Lack of Chinese Rare Earths", in *Financial Times*, 18 May 2025, <https://t.co/RMSVm8XyZM>.

²¹ Ivano di Carlo (ed.), "EU-China Relations at a Crossroads, Vol. III: Business Unusual", in *EPC Compendium*, 30 June 2024, <https://www.epc.eu/publication/EUChina-relations-at-a-crossroads-Vol-III-Business-unusual-5c8974>.

day. The geographical concentration of supply also introduces a higher risk of collusion among countries holding a strong position along the CRM supply chain. Countries could potentially coordinate to align to disrupt supply, raise prices or impose coordinated restrictions, as it happened with the Democratic Republic of Congo (DRC) and Indonesia for cobalt, from early 2025. This scenario, detrimental for highly dependent importers, such as the EU, is aggravated by the EU's reliance on countries with low governance rankings.²²

All of these risks contribute to the price volatility. Extreme fluctuations risk freezing capital flow along the entire value chain. Going back to the case of lithium, it appears clear how severe this can get: prices skyrocketed twelvefold in two years, then crashed by over 80 per cent.²³ Persistent volatility continues to deter investment decisions and could, in turn, reinforce market concentration and minimise the effort to diversify. In fact, the market share of top producers of CRMs worldwide has remained the same since 2022, and even cemented in sectors like nickel.²⁴

1.2 EU responses

First steps

The EU has introduced a rich tapestry of measures and initiatives to translate its de-risking strategy into tangible actions. Building on the 2008 European Raw Material Initiative²⁵ – which provides a framework to establish an integrated strategy to face the challenges related to access to CRMs – in 2020 the Commission presented an Action Plan on Critical Raw Materials to reduce Europe's dependency on third countries and diversify supply.²⁶

Over the years, the Commission has elaborated a list of raw materials critical for the EU's economy. The first list, released in 2011 with fourteen elements, has now expanded to 34 CRMs, and was lastly updated in 2023.²⁷ The list distinguishes between "critical" and "strategic" raw materials (SRMs).²⁸ "Criticality" is based on the

²² Understood as political stability, government effectiveness, rule of law, control of corruption, and voice and accountability, indicating higher potential risks of supply disruptions.

²³ Ahmed Mehdi, "Lithium Price Volatility: Where Next for the Market?", in *OIES Energy Insights*, No. 145 (February 2024), <https://www.oxfordenergy.org/?p=47018>.

²⁴ Mario Draghi, *The Future of European Competitiveness. Part B*, cit., p. 46.

²⁵ IEA website: *European Raw Materials Initiative*, last updated on 12 December 2023, <https://www.iea.org/policies/15696-european-raw-materials-initiative>.

²⁶ European Commission, *Commission Announces Actions to Make Europe's Raw Materials Supply More Secure and Sustainable*, 3 September 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1542.

²⁷ European Commission DG for Internal Market website: *Critical Raw Materials*, https://single-market-economy.ec.europa.eu/node/279_en.

²⁸ European Commission's Raw Materials Information System (RMIS) website: *Critical and Strategic Materials*, <https://rmis.jrc.ec.europa.eu/eu-critical-raw-materials>.

economic relevance of the raw material, its supply risk, potential for substitution, import reliance and the so-called Herfindahl-Hirschman Index (HHI), a measure to calculate the supply risk and production concentration.²⁹ SRMs are determined by their relevance to the green and digital transition, as well as for defence and aerospace purposes.³⁰

In 2020, the European Raw Materials Alliance was established, bringing together the most relevant stakeholders involved along the CRMs value chain, like the private sector, trade unions, research and technology organisations.³¹ Its workstream is channelled into two main objectives: value chain-specific consultation processes and investment channel for raw materials projects.³² Despite the commitment to valuable initiatives, such as launching a Raw Materials Investment Platform (RMIP), results are yet to materialise and the impact of the Alliance to this day remains very limited.

The Critical Raw Material Act

Building on the pillars of the EU's CRMs strategy laid out over the past decade, the EU cemented its de-risking regulatory effort with the release of the Critical Raw Material Act (CRMA), in April 2024. The CRMA was designed alongside the Commission's Net Zero Industry Act, which introduces measures to strengthen Europe's supply diversification and scale up manufacturing of carbon-neutral technologies for clean energy supply chains.³³

The CRMA sets concrete benchmarks for 2030. The EU intends to extract at least 10 per cent of its annual consumption of strategic raw materials domestically, process at least 40 per cent within its borders, and recycle at least 25 per cent of that total.³⁴ To support these targets, the Act introduces measures to streamline permitting processes for strategic projects, cutting approval times to a maximum of 24 months for extraction projects and 12 months for processing or recycling initiatives. Sustainability and circularity are key objectives of the Act, encouraging material recovery from waste and introducing certification schemes to ensure adherence to environmental and social standards. A Raw Materials Academy is being launched to build a skilled workforce for the sector.

²⁹ Gian Andrea Blengini et al., *Study on the EU's List of Critical Raw Materials (2020). Final Report*, Luxembourg, Publications Office of the EU, 2020, p. 50, <https://doi.org/10.2873/11619>.

³⁰ James Hackett et al., "Critical Raw Materials and European Defence", in *IISS Research Papers*, March 2025, <https://www.iiss.org/research-paper/2025/03/critical-raw-materials-and-european-defence>.

³¹ Ibid.

³² European Raw Material Alliance (ERMA) website: *Workstreams*, <https://erma.eu/workstreams>.

³³ European Commission DG for Internal Market website: *The Net-Zero Industry Act: Making the EU the Home of Clean Technologies Manufacturing and Green Jobs*, https://single-market-economy.ec.europa.eu/node/2089_en.

³⁴ European Commission DG for Internal Market website: *Critical Raw Materials Act*, https://single-market-economy.ec.europa.eu/node/2053_en.

Implementation of the CRMA is already underway at the national level. France, for example, has launched a 53 million euro resource mapping initiative and allocated 500 million euros under its France 2030 plan to boost domestic production and recycling.³⁵ Germany has created a Raw Materials Fund worth around 1 billion euros to support projects that enhance access to CRMs and reduce dependence on Chinese imports.³⁶ Spain is focusing on identifying and reactivating domestic sources, including lithium and rare earth elements,³⁷ while Sweden is leveraging its mining sector to develop rare earth supply for high-tech industries.

Under the CRMA, the Commission, in March 2025, approved 47 strategic projects across thirteen member states.³⁸ These projects are intended to boost the EU's capacity to extract, process, and recycle fourteen priority materials, all essential to the energy transition and economic security. The CRMA supports these efforts by ensuring faster regulatory approval and unlocking financial support from both public and private sources.

The cooperation dimension

A time of rising protective measures and growing protectionism across administrations worldwide begs the question on the difference between inward-looking protectionism and economic security strategies. One answer, and one stark difference, can be found in the cooperation dimension of economic security.³⁹ International cooperation remains a critical pillar of the CRMA, and the charted way to push supply diversification further.

The EU plans to strengthen partnerships with reliable third countries to diversify its raw material imports and avoid overdependence on any single nation, aiming for no more than 65 per cent of the EU's annual consumption of any strategic raw material relying from one country.⁴⁰ Over the years, the EU has secured a number of memorandum of understanding (MoUs) with mineral-rich countries, such as Canada (2021), Namibia (2022), Argentina (2023) and Chile (2023).⁴¹ However,

³⁵ BRGM, A New Programme to Identify French Mineral Resources, 13 February 2025, <https://www.brgm.fr/en/node/1796>.

³⁶ Kamil Kowalcze, "Germany Invests €1 Billion to Counter China on Raw Materials", in *Bloomberg*, 2 February 2024, <https://www.bloomberg.com/news/articles/2024-02-02/germany-to-channel-1-billion-to-critical-raw-material-needs>.

³⁷ SOS Suído-Seixo, *Lithium Mining in South Galicia, Spain. Critical Factsheets on Mining Projects*, December 2024, <https://eurmc.org/?p=2873>.

³⁸ European Commission, *Commission Decision (EU) 2025/840 of 25 March 2025 Recognising Certain Critical Raw Material Projects as Strategic Projects...*, <http://data.europa.eu/eli/dec/2025/840/oj>.

³⁹ Francesca Ghiretti, "Economic Security or Protectionism", in *Chinese Investments and the Economic Security Turn in Europe*, Bristol, Bristol University Press, 2025, p. 52-65.

⁴⁰ European Commission DG for Internal Market website: *Critical Raw Materials Act*, https://single-market-economy.ec.europa.eu/node/2053_en.

⁴¹ Bryan Bille, *Increasing Lithium Supply Security for Europe's Growing Battery Industry: Recommendations for a Resilient Supply Chain*, The Hague, The Hague Centre for Strategic Studies,

many of these mining projects are stuck at the MoU level. In summer 2024, for instance, the EU sealed an MoU with Serbia to start mining lithium and “enhance the development of value chains for raw materials, batteries and EVs”.⁴² This initiative has met the strong backlash from Serbian society, which has pushed back against the environmental impact of the mining facility. This case exposes the complexity of balancing climate as well as social sustainability into the EU’s de-risking equation – still unsolved.

The Commission has also intertwined its de-risking ambitions to the Global Gateway, the EU’s strategy to promote infrastructural investments in the digital, energy and transport sectors – ostensibly the counteract China’s Belt and Road Initiative.⁴³ Under the Global Gateway umbrella, some of the MoUs signed by the EU have been upgraded to Strategic Partnerships, thus securing imports of CRMs, as for the case of the agreement signed with the DRC in December 2024⁴⁴ or the case of Kazakhstan in March 2025.⁴⁵

However, the mining industry model has evolved over the years. Several countries with abundant mineral reserves are aiming to spur higher-value mineral industry, scaling up from mining to more profitable businesses, such as refining and processing facilities.⁴⁶ China has been able to meet those ambitions, putting forward investments packages that link mining operations with energy and infrastructural development. The rapid results and visible economic gains have been welcomed favourably by many administrations of mineral-rich African countries, like in the DRC. China’s footprint in Africa today outcompetes the EU approach to cooperation. In fact, EU investments projects cut across different Directorates-General (DGs), such as DG INTPA (international partnerships), DG GROW (internal market) and DG Trade (trade relations).⁴⁷ The complex articulation of the EU’s internal competences often reflects into a fragmentation of the EU’s external impact, hindering the overall scope of European Raw Material Diplomacy (RMD).⁴⁸

January 2024, <https://hcss.nl/?p=62768>.

⁴² European Commission DG for Neighbourhood, *EU and Serbia Sign Strategic Partnership on Sustainable Raw Materials, Battery Value Chains and Electric Vehicles*, 19 July 2024, https://enlargement.ec.europa.eu/node/4991_en.

⁴³ European Commission website: *Global Gateway*, https://commission.europa.eu/node/5445_en.

⁴⁴ European Commission DG for International Partnerships, *Global Gateway: EU Endorses Roadmap for Strategic Partnership on Raw Materials with the Democratic Republic of Congo*, 11 December 2024, https://international-partnerships.ec.europa.eu/node/3648_en.

⁴⁵ Assel Satubaldina, “EU Deepens Global Gateway Partnership with Kazakhstan with Deals in Critical Raw Materials and Transport”, in *The Astana Time*, 13 March 2025, <https://astanatimes.com/?p=98317>.

⁴⁶ Indonesia has successfully pioneered this model, by introducing export bans on nickel exports, thus attracting Chinese investments to establish processing facilities in the countries through joint ventures with local companies.

⁴⁷ Poorva Karkare, “The EU’s Partnerships Around Critical Raw Materials: Do Its Ambitions Match Reality?”, in *ECDPM Commentaries*, 26 March 2025, <https://ecdpm.org/work/eus-partnerships-around-critical-raw-materials-do-its-ambitions-match-reality>.

⁴⁸ European Commission DG for Internal Market website: *Raw Materials Diplomacy*, https://single-market-economy.ec.europa.eu/node/481_en.

Overall, the EU's strategy for securing CRMs has indeed evolved over the years, flagging mounting concern over potential supply disruptions, resulting in foresight studies issued by the EU Commission, strategic communications, parliamentary resolutions. However, these measures and the CRMA's goals have often been outpaced by geopolitical shocks, got stuck between the policy and the investment dimension, or are yet to materialise and be evaluated.

1.3 Italy's responses

Domestic level

Italy, like several other EU countries, has scaled up its effort to de-risk the national CRM sector, following the path charted by the EU. In June 2024, the Italian government overhauled its mining regulatory framework, which had previously been governed by the Royal Decree dating back to 1927. Italy's regulatory updates strongly align with the EU's CRMA, to reduce reliance on imports by tapping into domestic resources, strengthening indigenous mineral industry and diversifying imports.⁴⁹ Key measures include a register for supply chain bottlenecks and the streamlining of the permitting process for mining concessions, with licenses required to be issued within eighteen months. The new decree also allows for the reopening of abandoned mines in regions like the Alps, Tuscany and Sardinia.

Additionally, several initiatives have been launched at the national level to increase CRM supply chains resilience. Among these, in collaboration with research institutions such as the Italian Institute for Environmental Protection and Research (ISPRA),⁵⁰ the national institute for environmental research and protection, the government has launched a National Exploration Programme to map national mineral resources.⁵¹ One key initiative, ISPRA-GEMMA, has identified domestic CRM resources, including Europe's largest fluorite mine located in Silius, Sardinia. To spur investments, a government-backed fund, the National Fund for Made in Italy,⁵² has been announced in February 2024. The initial capital allocated to the Fund, 1 billion euros, is aimed at investments in strategic technological sectors, as well as investments along every segment of the CRM value chain.⁵³ Additionally,

⁴⁹ Italian Parliament Research Department, "Disposizioni urgenti sulle materie prime critiche di interesse strategico", in *Dossier*, No. 305 (1 July 2025), <https://documenti.camera.it/leg19/dossier/pdf/D24084.pdf>.

⁵⁰ Istituto superiore per la protezione e la ricerca ambientale.

⁵¹ ISPRA website: *Database Quarries and Mines Geological Service of Italy – GEMMA*, <https://www.isprambiente.gov.it/en/projects/soil-and-territory/mines-and-quarries/remi-project-national-network-of-italian-mining-parks-and-museums/the-data-bases/database-quarries-and-mines-geological-service-of-italy-gemma>.

⁵² Managed by Cassa Depositi e Prestiti and Invimit.

⁵³ Italian Government, *Fondo nazionale del Made in Italy – adottato il decreto attuativo, 6 March 2025*, <https://www.programmagoverno.gov.it/it/notizie/fondo-nazionale-del-made-in-italy-adottato-il-decreto-attuativo>.

the Italian Ministry of Environment and Energy Security (MASE), under the REpowerEU scheme, allocated 50 million euros from the National Recovery and Resilience Plan (PNRR, funded by the EU's post-pandemic recovery plan), to boost recycling of CRMs.⁵⁴

International level

Among the EU Strategic Projects launched under the CRMA umbrella, four are hosted on Italian soil.⁵⁵ Two of these projects focus on recycling – of platinum group metals, copper and nickel – and two on recovery – of lithium for battery production and of rare earth elements for magnets.⁵⁶ While mining projects face a seven-to-ten-year lag time, recycling facilities can be operational in two to four years, representing a big market opportunity for Italy.

Moving beyond the European borders, Italy signed an MoU with Kazakhstan in 2023 – under the framework of the EU's strategic partnership – including a joint declaration on rare earths.⁵⁷ Additionally, Italy's effort to diversify and secure CRM supply chains has been inscribed into the Mattei Plan,⁵⁸ the national infrastructural and development project promoting cooperation with Africa.⁵⁹ However, Italy faces challenges similar to those the EU is confronted by, when it comes to establishing partnerships with resource-rich countries in Africa. In particular, engaging the countries along the so-called Lobito Corridor (Zambia, the DRC and Angola) has proven difficult. As those regions have already been the recipient of China's vast investments to spur local industry, Italy struggles positioning itself in this competitive environment. The first shipment of CRMs mined along the Lobito Corridor was shipped from Angola's port in spring 2025, headed to China.

Up until this day, Italy's CRM strategy, articulated in frameworks like the Royal Decree and the Mattei Plan, remains trapped between aspiration and operational delivery, as no strategic mining project has been launched at a national level nor through international partnerships. Securing CRM supply is not just instrumental for Italy's mineral industry, but it is pivotal for another strategic sphere which Italy aims to de-risk, namely the semiconductor sector.

⁵⁴ MASE website: *M7 – Investimento 8: Approvvigionamento sostenibile, circolare e sicuro di materie prime critiche*, last updated on 23 June 2025, <https://www.mase.gov.it/portale/-/m7-investimento-8-approvvigionamento-sostenibile-circolare-e-sicuro-di-materie-prime-critiche->.

⁵⁵ European Commission, *Commission Decision (EU) 2025/840 of 25 March 2025*, cit.

⁵⁶ Alpha Project developed by Solvay Chimica Italia; LIFE-22-ENV- ITINSPIREE developed by Itelyum Regeneration SpA; Portovesme CRM Hub developed by Portovesme CRM Hub; RECOVER-IT developed by Circular Materials s.r.l.

⁵⁷ "Tajani in Kazakhstan: Joint Declaration on Rare Earths and Industrial Cooperation Signed in Astana", in *Agenzia Nova*, 6 September 2023, <https://www.agenzianova.com/en/news/?p=241644>.

⁵⁸ Named after the founder of Italy's energy giant Eni, Enrico Mattei.

⁵⁹ Italian Ministry of University and Research website: *Piano Mattei Ricerca e Alta Formazione*, <https://www.mur.gov.it/it/node/3647>.

2. Semiconductors

2.1 The EU semiconductor ecosystem

The global semiconductor industry has become a frontline in strategic competition, one wherein Europe is struggling to keep up. Chips underpin every critical technology, from artificial intelligence (AI) to defence systems, and control over their production is rapidly becoming a core metric of geopolitical leverage. The semiconductor market structured on a small number of large players: the United States is leading in the chips design sector,⁶⁰ Taiwan, South Korea and China in chip manufacturing, and Japan and some EU member states in key materials and equipment – optics, chemistry and machinery.⁶¹

Europe's position in the global value chain is weak and shrinking. The EU accounts for less than 10 per cent of global semiconductor production⁶² – down from 24 per cent in 2000. In contrast, the Asia Pacific region dominates production, with Taiwan's TSMC alone controlling over half the global foundry market.⁶³ The strategic implications of this dependency are increasingly evident. Semiconductor supply chains are already entangled in US-China tech rivalry and any disruption, particularly in the Taiwan Strait, would ripple across every European sector relying on advanced electronics, from automotive to defence.

Europe's strengths are not insignificant, but they are lopsided. The EU's semiconductor industrial base lacks front-end production of advanced chips. Dutch ASML, and other European firms, are involved in that segment of the chip value chain, providing equipment – extreme ultraviolet (EUV) photo machines, indispensable to produce chips below 7nm. However, the EU lags behind even on mature chip production, a sector where the bloc risks developing sticky dependence from China.⁶⁴ IMEC, headquartered in Belgium, is a global leader in pre-competitive research and development (R&D) and collaborates with leading US and Asian firms, as for the pilot testing launched in April 2025 in collaboration with Japanese semiconductor manufacturer Rapidus.⁶⁵ But neither equipment nor

⁶⁰ Aurelio Insisa, "Italy's De-Risking Efforts in the Semiconductor Industry, the European Chips Act, and Sino-American Geo-Economic Competition", in *IAI Papers*, No. 25|05 (June 2025), <https://www.iai.it/en/node/20190>.

⁶¹ Mario Draghi, *The Future of European Competitiveness. Part B*, cit.

⁶² Kjeld van Wieringen, "Global Semiconductor Trends and the Future of EU Chip Capabilities", in *ESPAS Ideas Papers*, 2022, p. 3, <https://www.espas.eu/files/Global-Semiconductor-Trends-and-the-Future-of-EU-Chip-Capabilities-2022.pdf>.

⁶³ Economist, "Taiwan's Dominance of the Chip Industry Makes It More Important", in *The Economist*, 6 March 2023, <https://www.economist.com/special-report/2023/03/06/taiwans-dominance-of-the-chip-industry-makes-it-more-important>.

⁶⁴ Tim Nicholas Rühlig, "Curbing China's Legacy Chip Clout. Reevaluating EU Strategy", in *EUISS Briefs*, 21/2024 (December 2024), p. 2, <https://www.iss.europa.eu/node/3313>.

⁶⁵ Atsuyoshi Koike, "Moving into Pilot Production for World-Leading 2nm Logic Chips", in *Rapidus website*, 1 April 2025, <https://www.rapidus.inc/en/interview/it0001>.

R&D leadership can compensate for the EU's inability to build and scale domestic chip design and industrial capacity.

The sector of chip design or "fabless design" – namely creating the layout of chips, to be manufactured in foundries or "fabs", accounts for 50 per cent of value-added in the industry, is in fact a critical blind spot.⁶⁶ Europe has no equivalent to US giants like NVIDIA, Qualcomm or AMD, nor the ecosystem to support them. Without strengthening its design base, Europe will build fabs that rely on foreign intellectual property, mirroring the dependency trap of CRMs.

Additionally, the fragmented nature of European stock market makes it a fraction compared to the one in the United States. Compounding all this, Europe is set to face a severe labour and talent shortage in the upcoming years. The European semiconductor industry faces an estimated shortfall of 50,000 to 70,000 high-skilled workers by 2030.⁶⁷ Without a rapid upskilling strategy, Europe will lack the pillars for the very infrastructure it is trying to build.

2.2 EU's de-risking measures

Promotive measures

Following the chip shortages of the chip crunch of 2021 and the supply shocks of the Covid-19 pandemic, the EU Commission proposed the European Chips Act, which entered into force in September 2023.⁶⁸ Aiming to double Europe's global semiconductor market share to 20 per cent by 2030, the Act rests upon three pillars.⁶⁹ The first, the Chips for Europe Initiative promotes innovation through R&D and pilot lines, to take the industry "from lab to fab".⁷⁰ The second pillar aims at "Security of Supply", supporting national manufacturing initiatives through Important Projects of Common European Interest (IPCEIs). The last pillar, "Crisis Coordination Mechanism" looks at potential supply shocks and aims at developing early-warning mechanisms, such as the Semiconductor Alert System.⁷¹

The EU Chips Act mobilises 43 billion euros coming from public funding from the EU and member states (15 billion euros) as well as from private investment and IPCEIs. Despite this significant cash injection, the EU's funding levels remain significantly lower than its competitors'. The US government, under the

⁶⁶ Hideki Tomoshige and Bailey Crane, "RAI Explainer: Strategic Importance of Continued U.S. Leadership in Chip Design", in *CSIS Blogs*, 19 January 2024, <https://www.csis.org/node/108957>.

⁶⁷ Raphaël Beaujeu, Léo Saint-Martin and Cédric Lebon, *Skills Strategy 2024*, European Chips Skills Academy, November 2024, <https://chipsacademy.eu/?p=1344>.

⁶⁸ European Commission website: *European Chips Act*, https://commission.europa.eu/node/5524_en.

⁶⁹ Ibid.

⁷⁰ European Commission DG for Communications Networks website: *European Chips Act*, <https://digital-strategy.ec.europa.eu/en/node/10695>.

⁷¹ Ibid.

Chips and Science Act of 2022, has authorised a total of 182 billion US dollars in investments allocated to the semiconductor ecosystem. Part of this funding, 174 billion, is destined to R&D, education and workforce development,⁷² while 53 billion of federal incentives are allocated to semiconductor manufacturing, with additional funding for the Department of Defense.⁷³ China, in 2022, pushing for semiconductor self-sufficiency, has unveiled a support package exceeding 1 trillion yuan (approximately 143 billion US dollars), to provide subsidies and tax incentives to domestic semiconductor firms.⁷⁴

Additionally, the EU Chips Act does not address some of the weaknesses of the bloc's industrial capacity, with limited focus on cutting-edge manufacturing (advanced nodes). Several countries have taken action to ramp up their indigenous industries (see table below). However, progress remains fragmented, with limited synergy across member states.

Table 1 | Member states' de-risking measures for semiconductors

Country	Strategy or initiative	Year
Italy	Chips Fund (3.3 billion euros), national design centre (Chips-IT)	2022
Germany	20 billion euros investment plan, support to Intel and TSMC, ESMC project in Dresden	2022–23
France	Support for STMicroelectronics expansion, IPCEI involvement	2022
Spain	PERTE Chip Plan (12.25 billion euros), national semiconductor strategy	2022
Poland	Joined EU Chips Coalition, investments in R&D and talent pipeline	2023
Czech Republic	National Semiconductor Strategy (aims to triple capacity by 2029)	2024
Portugal	National Chips Strategy (focus on training and R&D)	2023
Finland	Chips Coalition member, strong focus on microelectronics R&D	2023
Austria	National initiatives to attract semiconductor investments, Coalition participation	2023
Belgium	No formal act, but strategic leadership via IMEC	–
Netherlands	Coalition proposal and industrial leadership via ASML	–

⁷² David Young, John Gardner and Mallory Block, "The Future of the CHIPS and Science Act", in *CED Policy Backgrounders*, 13 March 2025, <https://www.conference-board.org/research/ced-policy-backgrounders/the-future-of-the-CHIPS-and-Science-Act>.

⁷³ Michelle Kurilla, "What Is the CHIPS Act?", in *CFR In Briefs*, 29 April 2024, <https://www.cfr.org/node/252105>.

⁷⁴ Julie Zhu, "Exclusive: China Readying \$143 Billion Package for Its Chip Firms in Face of U.S. Curbs", in *Reuters*, 14 December 2022, <https://www.reuters.com/technology/china-plans-over-143-bln-push-boost-domestic-chips-compete-with-us-sources-2022-12-13>.

In March 2025, industry groups ESIA and SEMI Europe – representing chipmakers and the broader industry respectively – have called for the Commission to elaborate a Chips Act 2.0, addressing previous shortcomings. Commissioner Henna Virkkunen – responsible for Tech Sovereignty, Security and Democracy – committed to approve a second version of the Chips Act by 2026.⁷⁵ To keep up with the challenges of an increasingly AI-driven economic and society, the EU launched its “AI continent action plan” in April 2025.⁷⁶ As Europe’s AI industry is dependent on hardware produced largely by the US company Nvidia, as well as from imports of germanium and gallium from China, a Chips Act 2.0 could be designed in closer alignment with the newly released “AI continent action plan” and the EU’s CRMs de-risking strategy.

Protective measures

In January 2024, the Commission proposed new initiatives to strengthen the bloc’s economic security, through trade and financial tools.⁷⁷ Among these, a revision of inbound foreign direct investment (FDI) mechanisms has been launched. Semiconductor manufacturing has been identified as one of the most sensitive sectors for screening, with a total of 6.6 billion US dollars in capital invested in 2022, coming from the United States (41 per cent), the United Kingdom (7.4 per cent), Japan and China (both per cent).⁷⁸ For outbound investments, screening mechanisms are instrumental in monitoring transfers of sensitive technological know-how or production capabilities. In January 2025 the Commission published a Recommendation to review outbound investments screening mechanisms to scrutinise three critical sectors: semiconductors, AI and quantum technologies.⁷⁹ Member states will report to the Commission on their findings and risk assessment by summer 2025, to be approved by summer 2026.⁸⁰ This consultation should feed into a policy proposal for a EU regulatory framework for outbound FDIs, whose approval is likely to be still several years away, if ever to materialise.

On the trade side – similarly to CRMs – export controls have turned semiconductor firms from a market asset into pawns of geopolitical leverage. In October 2022,

⁷⁵ Jacob Wulff Wold, “Virkkunen Confirms a Chips Act 2.0 and Outlines AI Action Plan”, in *Euractiv*, 26 March 2025, <https://www.euractiv.com/?p=2230455>.

⁷⁶ European Commission website: *Shaping Europe’s Leadership in Artificial Intelligence with the AI Continent Action Plan*, https://commission.europa.eu/node/38607_en.

⁷⁷ European Commission, *Commission Proposes New Initiatives to Strengthen Economic Security*, 24 January 2024, https://ec.europa.eu/commission/presscorner/detail/en/ip_24_363.

⁷⁸ Hannah Ahamad Madatali, “Revision of the EU Foreign Direct Investment Screening Regulation”, in *EPRS Briefings*, July 2024, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2024\)762844](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2024)762844).

⁷⁹ European Commission, *Commission Calls on Member States to Review Outbound Investments and Assess Risks to Economic Security*, 15 January 2025, https://ec.europa.eu/commission/presscorner/detail/en/ip_25_261.

⁸⁰ European Parliament, *Legislative Train Schedule: Outbound Investment Screening*, as of 21 May 2025, <https://www.europarl.europa.eu/legislative-train/theme-an-economy-that-works-for-people/file-outbound-investment-screening>.

the US Bureau of Industry and Security (BIS) introduced new export controls for advanced semiconductor manufacturing equipment technology to China, to gain competitive advantage over China's ascend of advanced semiconductor manufacturing.⁸¹ After bilateral talks between the United States and the Dutch government, in January 2023 the Netherlands – home to ASML firm – introduced advanced semiconductor equipment export controls to China. Japan followed suit, restricting Nikon and Canon's exports of critical lithography equipment to China.⁸² China did not retaliate directly, but introduced export bans on germanium and gallium later in 2023, exposing the intertwinement between de-risking the semiconductor and the CRM sector.

This episode shed light on two of the vulnerabilities of the EU approach towards protective measures. The first is represented by the uncoordinated postures of member states and the lack of integration of national measures at the EU level, as shown by the US-Dutch bilateral agreement on export controls. The second weak spot is the lack of coordination with other key players. Closer alignment with Japan, for instance, could have given greater leverage to EU-Japanese export controls or FDI screenings, to reduce overexposure to US geopolitical pressure and avoid getting entangled in the US-China tech competition.

2.3 Italy's de-risking measures

Italy's footprint in the European semiconductor ecosystem is growing, although not without challenges. In line with the EU regulatory framework, in August 2023 the Italian government introduced new measures to layout its chip national strategy, under the so-called Assets Decree,⁸³ approved in October 2023.⁸⁴ The most significant initiative at the Italian level is the launch of a national chip fund, which allocates 3.3 billion euros for investments in the semiconductor industry, spanned out between 2022 and 2030.⁸⁵ With these initiatives, Italy aims to spur industrial capacity, while attracting foreign capital, boost R&D and simplify the bureaucratic process for grant project approvals.

Italy's indigenous industry is indeed gaining momentum. Its strength relies on manufacturing of high-volume mature nodes (28nm, 40nm, 65nm) – critical for

⁸¹ US Bureau of Industry and Security, *Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)*, 7 October 2022, https://www.bis.doc.gov/index.php/component/docman/?task=doc_download&gid=3158.

⁸² Victor De Decker and Patrick Grady, "Fortifying Europe's Semiconductor Ecosystem", in *Egmont Policy Briefs*, No. 344 (June 2024), <https://www.egmontinstitute.be/?p=48338>.

⁸³ Decree-Law No. 104 of 10 August 2023: *Disposizioni urgenti a tutela degli utenti, in materia di attività economiche e finanziarie e investimenti strategici*, <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2023-08-10;104>.

⁸⁴ Italian Government, *Focus sul decreto-legge n. 104/2023 coordinato con la legge di conversione n. 136/2023 "Decreto Asset"*, 16 October 2023, <https://www.programmagoverno.gov.it/it/notizie/focus-sul-decreto-legge-n-1042023-coordinato-con-la-legge-di-conversione-n-1362023-decreto-asset>.

⁸⁵ Fondo nazionale per la microelettronica.

automotive, defence and industrial applications. Sicily-based⁸⁶ STMicroelectronics – producing silicon carbide chips, essential for electric vehicles and renewables – has announced an investment plan to expand the manufacturing facility worth 5 billion euros, 2.1 of which coming from public funding.⁸⁷ In Novara, in the Piedmont region, a construction plan for an advanced packaging⁸⁸ facility has been sealed, bringing together foreign investments from the Singaporean firm Silicon Box and an investment package from EU funding worth 1,3 billion euros.⁸⁹ The Italian government is also trying to promote R&D, allocating post-pandemic recovery funds to the Microelettronica 2, an IPCEI, bringing together Italy and other thirteen member states⁹⁰ to boost innovation.⁹¹

However, Italy's semiconductor growth remains tethered to fragile external raw material supplies. If Italy wants to de-risk its semiconductor supply chain and strengthen indigenous manufacturing capacity, it cannot overlook the risks involved in CRM supply. Italy must anchor its semiconductor expansion around legacy chip production, while embedding CRM resilience by securing recycled material flows domestically and within the EU.

Conclusions and recommendations

Economic security has moved from the periphery to the core of national and EU policymaking as geopolitical shocks – from the Covid-19 pandemic to Russia's invasion of Ukraine and rising US-China tensions – exposed the fragility of global supply chains. The EU, long reliant on stable trade flows and concentrated imports from East Asia, now faces acute vulnerabilities, particularly in CRMs and semiconductors.

In recent years, the EU has launched its Economic Security and De-risking Strategies, centred on supply resilience, technological sovereignty, and reduced overreliance on China, while designing policies and initiatives to de-risk two of the most critical sectors: CRMs and semiconductors. Several member states have followed suit, including Italy, who has expanded and better articulated its

⁸⁶ In Catania.

⁸⁷ "STMicroelectronics, Dagnino al tavolo Mimit: 'L'azienda vuole valorizzare ulteriormente il sito etneo'", in *CataniaToday*, 11 April 2025, <https://www.cataniatoday.it/economia/StMicroelectronics-piano-investimenti-catania-2025.html>.

⁸⁸ Integration of chiplets – produced through standard semiconductor fabrication processes – into a functional system.

⁸⁹ "Chip, ok dell'UE agli aiuti da 1,3 miliardi per l'impianto di Silicon Box a Novara", in *Il Sole 24 Ore*, 18 December 2024, <https://www.ilsole24ore.com/art/chip-ok-dell-ue-aiuti-13-miliardi-l-impianto-silicon-box-novara-AGBW9aqB>.

⁹⁰ Austria, Czech Republic, Finland, France, Germany, Greece, Ireland, Malta, the Netherlands, Poland, Romania, Slovakia and Spain.

⁹¹ Italian Ministry of Enterprises and Made in Italy website: *IPCEI Microelettronica 2 (ME/CT)*, last updated on 11 April 2025, <https://www.mimit.gov.it/it/incentivi/ipcei-microelettronica-2>.

regulatory framework to achieve greater strategic autonomy in these two sectors.

To maximise its de-risking regulatory effort, the EU must seize the opportunity presented by the ongoing review of its financial toolbox and trade restrictions to build stronger coordination mechanisms. This includes not only reducing internal divergences among member states but also deepening strategic alignment with like-minded partners such as Japan, which shares common challenges and ambitions in critical sectors like CRMs and semiconductors. As the EU advances its outbound foreign direct investment screening mechanisms, it must also pursue robust cooperation with key allies on the regulation of dual-use technologies.

Simultaneously, the EU must align its internal policy frameworks across interdependent strategic sectors. The disruptions of recent years have laid bare the vulnerabilities arising from fragmented approaches to sectors that are deeply interconnected – such as CRMs, semiconductors, and adjacent technologies like AI. To mitigate these risks, the EU should move away from compartmentalised strategies and, instead, develop integrated approaches – such as a coordinated “Chip Unit” – to address supply chain vulnerabilities from the raw material stage to AI application readiness.

At the national level, Italy is well-positioned to become a central player in the EU’s de-risking agenda through its potential in recycling and recovery of CRMs. To capitalise on this strategic advantage, Italy should prioritise regulatory and industrial efforts aimed at becoming Europe’s recycling hub, while expanding R&D cooperation with international partners. This would strengthen Italy’s position in the CRM and semiconductor value chains, while reinforcing the EU’s broader industrial resilience and strategic autonomy.

Updated 23 June 2025

List of acronyms

AI	Artificial intelligence
APS	Announced Pledges Scenario
BIS	US Bureau of Industry and Security
CRM	Critical raw material
CRMA	Critical Raw Material Act
DG	Directorate-General
DRC	Democratic Republic of Congo
ESIA	European Semiconductor Industry Association
ESMC	European Semiconductor Manufacturing Company
EU	European Union
EUV	Extreme ultraviolet
EV	Electric vehicle
FDI	Foreign direct investment
HHI	Herfindahl-Hirschman Index
IPCEI	Important Project of Common European Interest
ISPRA	Istituto superiore per la protezione e la ricerca ambientale
MASE	Ministero dell'ambiente e della sicurezza energetica
MoU	Memorandum of understanding
nm	Nanometre
NZE	Net Zero Emissions by 2050
PNRR	Piano nazionale di ripresa e resilienza
R&D	Research and development
REE	Rare earth element
RMD	Raw Material Diplomacy
RMIP	Raw Materials Investment Platform
SRM	Strategic raw material
TSMC	Taiwan Semiconductor Manufacturing Company
US	United States

References

Hannah Ahamad Madatali, "Revision of the EU Foreign Direct Investment Screening Regulation", in *EPRS Briefings*, July 2024, [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2024\)762844](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2024)762844)

Gracelin Baskaran and Meredith Schwartz, "The Consequences of China's New Rare Earths Export Restrictions", in *CSIS Critical Questions*, 14 April 2025, <https://www.csis.org/node/115778>

Raphaël Beaujeu, Léo Saint-Martin and Cédric Lebon, *Skills Strategy 2024*, European Chips Skills Academy, November 2024, <https://chipsacademy.eu/?p=1344>

Bryan Bille, *Increasing Lithium Supply Security for Europe's Growing Battery Industry: Recommendations for a Resilient Supply Chain*, The Hague, The Hague Centre for Strategic Studies, January 2024, <https://hcass.nl/?p=62768>

Gian Andrea Blengini et al., *Study on the EU's List of Critical Raw Materials (2020). Final Report*, Luxembourg, Publications Office of the EU, 2020, <https://doi.org/10.2873/11619>

BRGM, *A New Programme to Identify French Mineral Resources*, 13 February 2025, <https://www.brgm.fr/en/node/1796>

Council of the EU, "An EU Critical Raw Materials Act for the Future of EU Supply Chains", in *Infographics/Explains*, last modified on 21 March 2025, <https://www.consilium.europa.eu/en/infographics/critical-raw-materials>

Victor De Decker and Patrick Grady, "Fortifying Europe's Semiconductor Ecosystem", in *Egmont Policy Briefs*, No. 344 (June 2024), <https://www.egmontinstitute.be/?p=48338>

Ivano di Carlo (ed.), "EU-China Relations at a Crossroads, Vol. III: Business Unusual", in *EPC Compendium*, 30 June 2024, <https://www.epc.eu/publication/EUChina-relations-at-a-crossroads-Vol-III-Business-unusual-5c8974>

Mario Draghi, *The Future of European Competitiveness. Part B*, September 2024, https://commission.europa.eu/node/32880_en

Economist, "Taiwan's Dominance of the Chip Industry Makes It More Important", in *The Economist*, 6 March 2023, <https://www.economist.com/special-report/2023/03/06/taiwans-dominance-of-the-chip-industry-makes-it-more-important>

Economist, "Why Is China Blocking Graphite Exports to Sweden?", in *The Economist*, 22 June 2023, <https://www.economist.com/business/2023/06/22/why-is-china-blocking-graphite-exports-to-sweden>

European Commission, *Commission Announces Actions to Make Europe's Raw Materials Supply More Secure and Sustainable*, 3 September 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1542

European Commission, *Commission Calls on Member States to Review Outbound Investments and Assess Risks to Economic Security*, 15 January 2025, https://ec.europa.eu/commission/presscorner/detail/en/ip_25_261

European Commission, *Commission Decision (EU) 2025/840 of 25 March 2025 Recognising Certain Critical Raw Material Projects as Strategic Projects...*, <http://data.europa.eu/eli/dec/2025/840/oj>

European Commission, *Commission Proposes New Initiatives to Strengthen Economic Security*, 24 January 2024, https://ec.europa.eu/commission/presscorner/detail/en/ip_24_363

European Commission, *European Economic Security Strategy* (JOIN/2023/20), 20 June 2023, <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52023JC0020>

European Commission, *Speech by President von der Leyen on EU-China Relations to the Mercator Institute for China Studies and the European Policy Centre*, 30 March 2023, https://ec.europa.eu/commission/presscorner/detail/en/speech_23_2063

European Commission DG for Neighbourhood, *EU and Serbia Sign Strategic Partnership on Sustainable Raw Materials, Battery Value Chains and Electric Vehicles*, 19 July 2024, https://enlargement.ec.europa.eu/node/4991_en

European Commission DG for International Partnerships, *Global Gateway: EU Endorses Roadmap for Strategic Partnership on Raw Materials with the Democratic Republic of Congo*, 11 December 2024, https://international-partnerships.ec.europa.eu/node/3648_en

European Parliament, *Legislative Train Schedule: Outbound Investment Screening*, as of 21 May 2025, <https://www.europarl.europa.eu/legislative-train/theme-an-economy-that-works-for-people/file-outbound-investment-screening>

Eurostat, *EU Trade in High-Tech Products up in 2022*, 10 May 2023, <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20230510-2>

Francesca Ghiretti, *Chinese Investments and the Economic Security Turn in Europe*, Bristol, Bristol University Press, 2025

James Hackett et al., "Critical Raw Materials and European Defence", in *IISS Research Papers*, March 2025, <https://www.iiss.org/research-paper/2025/03/critical-raw-materials-and-european-defence>

Aurelio Insisa, "Italy's De-Risking Efforts in the Semiconductor Industry, the European Chips Act, and Sino-American Geo-Economic Competition", in *IAI Papers*, No. 25|05 (June 2025), <https://www.iai.it/en/node/20190>

International Energy Agency (IEA), *Global Critical Minerals Outlook 2024*, May 2024, <https://www.iea.org/reports/global-critical-minerals-outlook-2024>

IEA, *Global EV Outlook 2023*, April 2023, <https://www.iea.org/reports/global-ev-outlook-2023>

International Trade Centre, "Trade in Critical Minerals by Processing Leve", in *Trade Briefs Spotlights*, September 2023, <https://tradebriefs.intracen.org/2023/9/spotlight>

Italian Government, *Focus sul decreto-legge n. 104/2023 coordinato con la legge di conversione n. 136/2023 "Decreto Asset"*, 16 October 2023, <https://www.programmagoverno.gov.it/it/notizie/focus-sul-decreto-legge-n-1042023-coordinato-con-la-legge-di-conversione-n-1362023-decreto-asset>

Italian Government, *Fondo nazionale del Made in Italy – adottato il decreto attuativo*, 6 March 2025, <https://www.programmagoverno.gov.it/it/notizie/fondo-nazionale-del-made-in-italy-adottato-il-decreto-attuativo>

Italian Parliament Research Department, "Disposizioni urgenti sulle materie prime critiche di interesse strategico", in *Dossier*, No. 305 (1 July 2025), <https://documenti.camera.it/leg19/dossier/pdf/D24084.pdf>

Italy, Decree-Law No. 104 of 10 August 2023: *Disposizioni urgenti a tutela degli utenti, in materia di attività economiche e finanziarie e investimenti strategici*, <https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2023-08-10;104>

Poorva Karkare, "The EU's Partnerships Around Critical Raw Materials: Do Its Ambitions Match Reality?", in *ECDPM Commentaries*, 26 March 2025, <https://ecdpm.org/work/eus-partnerships-around-critical-raw-materials-do-its-ambitions-match-reality>

Ugnė Keliauskaitė, Simone Tagliapietra and Georg Zachmann, "Europe Urgently Needs a Common Strategy on Russian Gas", in *Bruegel Analysis*, 2 April 2025, <https://www.bruegel.org/node/10783>

Kamil Kowalcze, "Germany Invests €1 Billion to Counter China on Raw Materials", in *Bloomberg*, 2 February 2024, <https://www.bloomberg.com/news/articles/2024-02-02/germany-to-channel-1-billion-to-critical-raw-material-needs>

Michelle Kurilla, "What Is the CHIPS Act?", in *CFR In Briefs*, 29 April 2024, <https://www.cfr.org/node/252105>

Ahmed Mehdi, "Lithium Price Volatility: Where Next for the Market?", in *OIES Energy Insights*, No. 145 (February 2024), <https://www.oxfordenergy.org/?p=47018>

Richard Milne, Edward White and Gloria Li, "Chinese Group Putailai to Build Europe's Largest Anode Factory in Sweden", in *Financial Times*, 4 May 2023, <https://www.ft.com/content/80d34254-3e12-4fa7-8f02-fdceb1c2fa2e>

Pier Paolo Raimondi, "EU and Italian De-risking Strategies for Energy Transition: Critical Raw Materials", in *IAI Papers*, No. 25|09 (June 2025), <https://www.iai.it/en/node/20282>

Sheila R. Ronis (ed.), *Economic Security. Neglected Dimension of National Security?*, Washington, National Defense University Press, 2011, <https://apps.dtic.mil/sti/citations/ADA585192>

Tim Nicholas Rühlig, "Curbing China's Legacy Chip Clout. Reevaluating EU Strategy", in *EUISS Briefs*, 21/2024 (December 2024), <https://www.iss.europa.eu/node/3313>

Assel Satubaldina, "EU Deepens Global Gateway Partnership with Kazakhstan with Deals in Critical Raw Materials and Transport", in *The Astana Time*, 13 March 2025, <https://astanatimes.com/?p=98317>

SOS Suído-Seixo, *Lithium Mining in South Galicia, Spain. Critical Factsheets on Mining Projects*, December 2024, <https://eurmc.org/?p=2873>

Hideki Tomoshige and Bailey Crane, "RAI Explainer: Strategic Importance of Continued U.S. Leadership in Chip Design", in *CSIS Blogs*, 19 January 2024, <https://www.csis.org/node/108957>

US Bureau of Industry and Security, *Commerce Implements New Export Controls on Advanced Computing and Semiconductor Manufacturing Items to the People's Republic of China (PRC)*, 7 October 2022, https://www.bis.doc.gov/index.php/component/docman/?task=doc_download&gid=3158

Kjeld van Wieringen, "Global Semiconductor Trends and the Future of EU Chip Capabilities", in *ESPAS Ideas Papers*, 2022, <https://www.espas.eu/files/Global-Semiconductor-Trends-and-the-Future-of-EU-Chip-Capabilities-2022.pdf>

Zhou Weihuan, "Why China's Critical Mineral Strategy Goes beyond Geopolitics", in *World Economic Forum Opinions*, 19 November 2024, <https://www.weforum.org/stories/2024/11/china-critical-mineral-strategy-beyond-geopolitics>

Jacob Wulff Wold, "Virkkunen Confirms a Chips Act 2.0 and Outlines AI Action Plan", in *Euractiv*, 26 March 2025, <https://www.euractiv.com/?p=2230455>

Edward White, Ryan McMorow and Harry Dempsey, "Global Supply Chains Threatened by Lack of Chinese Rare Earths", in *Financial Times*, 18 May 2025, <https://t.co/RMSVm8XyZM>

Servet Yanatma, "Europe's 'Energy War' in Data: How Have EU Imports Changed since Russia's Invasion of Ukraine?", in *Euronews*, 24 February 2023, <https://www.euronews.com/green/2023/02/24/europes-energy-war-in-data-how-have-eu-imports-changed-since-russias-invasion-of-ukraine>

David Young, John Gardner and Mallory Block, "The Future of the CHIPS and Science Act", in *CED Policy Backgrounders*, 13 March 2025, <https://www.conference-board.org/research/ced-policy-backgrounders/the-future-of-the-CHIPS-and-Science-Act>

Julie Zhu, "Exclusive: China Ready to \$143 Billion Package for Its Chip Firms in Face of U.S. Curbs", in *Reuters*, 14 December 2022, <https://www.reuters.com/technology/china-plans-over-143-bln-push-boost-domestic-chips-compete-with-us-sources-2022-12-13>

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