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INTERNATIONAL LEGAL THEORY

# The third wave of critical minerals

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**Abstract**

For the third time in a century, the concept of critical minerals has become a central theme in international trade and security debates. Materials criticality discourse first arose in the late 1930s and 1940s. It was taken up again from the mid-1970s through to mid-1980s and has become ubiquitous in post-pandemic debates concerning the global energy transition in a context of escalating geopolitical volatility. This article examines the evolution of critical minerals discourse over a century, with a focus on these three periods. It seeks to identify the contexts in which criticality claims have emerged and to examine the politics of critical minerals discourse in this third wave. It argues that critical minerals discourse has evolved in response to geopolitical instability understood by the US to threaten its hegemony; and that critical minerals discourse in its third wave has thus far served four major political functions. First, critical minerals discourse has served as a rhetorical device for asserting that the security of the US and its allies lies in the defence of US hegemony, and not in the defence of international institutions and trade norms. Second, critical minerals discourse has served as an effective means of leveraging geopolitical instability in favour of extractive interests. Third, critical minerals discourse has worked to re-mystify the economics of market speculation and the predictability of state intervention in markets. Finally, critical minerals discourse has been used to leverage the existential urgency of the climate crisis in favour of elite and extractive interests and against local communities and ecosystems.

**Keywords:** climate change; critical minerals; international trade; national security; US hegemony

## 1. Introduction: Examining criticality claims

For the third time in a century, the concept of critical minerals has become a central theme in international trade and security discourse.[1] Minerals criticality first arose as a theme in the United States (US) defence and foreign policy circles in the 1930s and 1940s, as the interwar settlement disintegrated.[2] Minerals criticality returned to prominence from the mid-1970s through to mid-

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[1]See, for example, International Energy Agency, *The Role of Critical Minerals in Clean Energy Transitions: World Energy Outlook Special Report* (May 2021); United States Department of State, *Minerals Security Partnership* (Media Note, 14 June 2022); P. Kowalski and C. Legendre, *Raw Materials Critical for the Green Transition: Production, International Trade and Export Restrictions* (April 2023); United Nations, *Background Paper for the UN Secretary-General's Panel on Critical Energy Transition Minerals* (April 2024).

[2]This article uses the label 'critical minerals' to refer to a contextually contingent category of primary resource or raw material that (i) may include non-mineral resources, often metals, and (ii) tends to attract differential labels in different

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1980s in the wake of the early 1970s' oil crises, as a sub-theme of Cold War realism within the US and its allies. In the post-pandemic era, the concept of minerals criticality has become all but ubiquitous in international debates concerning the global energy transition on the one hand and increasing geopolitical instability on the other.[3] Critical minerals strategies, outlooks and alliances have become routine features of trade, security, and industrial policy platforms in the Global North, across the political spectrum.[4]

This article examines the evolution of critical minerals discourse over these three key periods, with a focus on the dynamics of the current 'third wave'. It does so in order to identify the contexts in which the concept of minerals criticality has emerged as a vehicle for debate about the objectives of industrial and foreign policy in the Global North, and to examine the politics of critical minerals discourse in this third wave. The resurgence of minerals criticality is one thread in a much larger contemporary history of retreat from neoliberal norms of multilateralism and toward economic nationalism. The nature and extent of this shift is the subject of energetic debate, particularly in international economic law, which has tended to focus on the relationship between state sovereignty and multilateral trade obligations.[5] This article focuses on critical minerals discourse as one manifestation of that shift that warrants analysis in its own right. It aims both to historicize minerals criticality and to interrogate its contemporary effects. I argue that in each wave, critical minerals discourse has been taken up in reaction to geopolitical instability understood by the US defence and foreign policy establishment to threaten its hegemony. Perceived threats to US hegemony have been framed as threats to both national and international security by the US and by its allies; and it is the construction of 'security' that, at any given point in time, has defined the scope of minerals criticality.[6] The adoption of minerals criticality in industrial and foreign policy is thus best understood as an attempt to securitize certain forms of extractive activity.[7] Designation

temporal and political contexts. Alternative labels include 'strategic materials', 'critical raw materials', and 'critical energy transition materials'. This definitional imprecision is explained in the article as an effect of the construction of national security to which the category responds.

[3]See, for example, S. Burke and C. Doyle, 'U.S. Governance on Critical Minerals', (2023) *New Security Brief No. 4, Woodrow Wilson International Center for Scholars*; V. Crochet and W. Zhou, 'Critical Insecurities? The European Union's Strategy for a Stable Supply of Minerals', (2024) 27(1) *Journal of International Economic Law* 147; S. Dou et al., 'Critical Mineral Sustainable Supply: Challenges and Governance', (2023) 146(5) *Futures* 103101; International Institute for Sustainable Development, Key Considerations for Defining Critical and Strategic Minerals in the ASEAN Context, Report (2023); P. Utama Manggala, 'Indonesia's Critical Minerals Strategy Needs Critical Ambition', *East Asia Forum*, 20 July 2024; K. Vekasi, 'The Geoeconomics of Critical Rare Earth Minerals', (2021) 22(2) *Georgetown Journal of International Affairs* 271.

[4]See, for example, Australian Trade and Investment Commission, Unlocking Australia–India Critical Minerals Partnership Potential, Report (1 July 2021); Canada, The Canadian Critical Minerals Strategy (2022); Government of Chile, National Lithium Strategy for Chile and its People (2023); United Kingdom, UK and South Africa Working in Partnership on Minerals for Future Clean Energy Technologies, Policy Paper (23 November 2022); see US Department of State, *supra* note 1. Lorenzo Cotula provides a global survey of hard and soft law instruments and policies in L. Cotula, '"Critical Minerals": International Economic Law in a Global Resource Rush', (2023) 15(2) *Trade, Law and Development* 19, at 25–31.

[5]See, for example, A. Lang, 'Protectionism's Many Faces', (2018) 44 *Yale Journal of International Law* 44; A. Roberts et al., 'Toward a Geoeconomic Order in International Trade and Investment', (2019) 22(4) *Journal of International Economic Law* 655; A. Lang, 'Heterodox Markets and "Market Distortions" in the Global Trading System', (2019) 22(4) *Journal of International Economic Law* 677; H. G. Cohen, 'Nations and Markets', (2020) 23(4) *Journal of International Economic Law* 793; and A. Orford, 'How to Think about the Battle for the State at the WTO', (2023) 24(1) *German Law Journal* 45.

[6]For analyses of criticality, see T. E. Graedel and B. K. Reck, 'Defining the Criticality of Materials', in S. E. Offerman (ed.), *Criterial Materials: Underlying Causes and Sustainable Mitigation Strategies* (2019), 103; and S. M. Hayes and E. A. McCullough, 'Critical Minerals: A Review of Elemental Trends in Comprehensive Criticality Studies', (2018) 59 *Resources Policy* 192.

[7]Earlier iterations of this argument include S. Kalantzakos, 'Between Rocks and Hard Places: Geopolitics of Net Zero Futures and the Tech Imperium', in S. Kalantzakos (ed.), *Critical Minerals, the Climate Crisis and the Tech Imperium* (2023), 3. Hailes observes in the context of lithium that 'securitization of supply chains is hardly a novel phenomenon': O. Hailes, 'Lithium in International Law: Trade, Investment and the Pursuit of Supply Chain Justice', (2022) 25(1) *Journal of International Economic Law* 148, at 149. In a seminal formulation, Buzan, Waever, and de Wilde define securitization as an 'intersubjective process between actor and audience', in which political actors make rhetorical moves to frame certain issues

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of a given material as 'critical' is effectively a state undertaking to intervene in global resource markets on security grounds, whether by stockpiling listed resources, imposing export restrictions or import tariffs, or by providing debt financing, subsidies or tax incentives to domestic extractive industry.

Drawing from critical security studies, this article observes further that the construction of security that defines the scope of minerals criticality has expanded significantly over the last century.[8] In the 1930s and 1940s, minerals criticality was defined by reference to a narrow concept of national security focused on military industrial provision and 'essential civilian need' during wartime.[9] In this third wave of minerals criticality, constructions of national security have expanded to include the protection of a sprawling if not indeterminate field of economic activity.[10] As a result, the field of extractive activity susceptible to securitization, and thus designation as 'critical', has also expanded dramatically. Whilst third wave criticality claims have tended to invoke the global energy transition as justification – at least until the second Trump presidency – critical minerals policies have come to encompass the upstream and downstream supply chains of a sprawling field of end uses, from battery and electric vehicle production, to robotics, to defence, to artificial intelligence (AI) infrastructure. As such, the seemingly dramatic shifts in US climate policy under President Trump have, at least as far as minerals criticality is concerned, simply brought to the surface what was already the case: third wave criticality claims have ultimately been organized not around the pursuit of climate objectives, but around the pursuit of military and commercial competitive advantage in a phase of rapid geoeconomic reordering. The scope of any given critical minerals list is just as likely to be defined by reference to pursuing competitive advantage in global digital and military technology sectors, and to strengthening strategic alliances, as to decarbonization of the global energy economy.[11]

Given their increasingly diffuse scope, criticality claims can seem to dissolve into meaninglessness. However, the second argument this article makes is that critical minerals discourse in this third wave has a clear politics in which four major trends can be identified.[12] First, critical minerals discourse has served as a vehicle for equating the national security of the US and its allies with the

and objects of governance as matters of existential risk, in order to remove them from the sphere of legitimate political debate. See B. Buzan, O. Wæver, and J. de Wilde, *Security: A New Framework for Analysis* (1998), 30. See also O. Waever, 'Securitization and Desecuritization', in R. D. Lipschutz (ed.), *On Security* (1995), 46; cf. M. McDonald, 'Securitization and the Construction of Security', (2008) 14(4) *European Journal of International Relations* 563. For a survey of the limitations of securitization studies, see S. J. Baele and D. Jalea, 'Twenty-Five Years of Securitization Theory: A Corpus-Based Review', (2023) 21(2) *Political Studies Review* 376. Previous uses of the concept of securitization in international law include S.V. Scott, 'The Securitization of Climate Change in World Politics: How Close Have We Come and Would Full Securitization Enhance the Efficacy of Global Climate Change Policy', (2012) 21(3) *Review of European, Community & International Environmental Law* 220; A. Hood, 'Ebola: A Threat to the Parameters of a Threat to the Peace?', (2015) 16(1) *Melbourne Journal of International Law* 29; and E. Cusato, 'Of Violence and (In)visibility: The Securitisation of Climate Change in International Law', (2022) 10(2) *London Review of International Law* 203.

[8]Key interventions include A. Rana, 'Who Decides on Security?', (2012) 44(5) *Connecticut Law Review* 1417; J. B. Heath, 'The New National Security Challenge to the Economic Order', (2020) 129 *Yale Law Journal* 1020; J.B. Heath, 'Making Sense of Security', (2021) 116(2) *American Journal of International Law* 289; and M. Jamshidi, 'Whose Security Matters?', (2022) 116 *AJIL Unbound* 236.

[9]See Section 2, *infra*.

[10]See Heath (2020), *supra* note 8, at 129; and M. Paulsen, 'The Past, Present, and Potential of Economic Security', (forthcoming 2025) 50 *Yale Journal of International Law*, available at papers.ssrn.com/sol3/papers.cfm?abstract_id=4604958. See generally Section 4, infra.

[11]See, for example, Government of Canada, Canada's Critical Minerals, available at www.canada.ca/en/campaign/critical-minerals-in-canada/critical-minerals-an-opportunity-for-canada.html; Indian Ministry of Mines, Critical Minerals for India; Report of the Committee on Identification of Critical Minerals (2023), at 13 *et seq*.

[12]Existing analyses of the politics of critical minerals include O. Ogunbadejo, *The International Politics of Africa's Strategic Minerals* (2018); T. Kramarz et al., 'Governing the Dark Side of Renewable Energy: A Typology of Global Displacements', (2021) 74 *Energy Research & Social Science* 101902; T. Wijaya and L. Sinclair, 'An EV-Fix for Indonesia: The Green Development-Resource Nationalist Nexus', (2025) 34(2) *Environmental Politics* 252.

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maintenance of US hegemony. Critical minerals policies and alliances in this third wave have been used as proxy announcements by the US and its allies of strategic departures from previously dominant neoliberal trade norms and obligations, in favour of building trade alliances anchored in ideology, patronage, and military interdependence with the US. Second, at the domestic level, critical minerals discourse has served as a vehicle for recalibrating resources policy – from environmental to tax settings – in favour of extractive industry. The third wave of critical minerals discourse has effectively provided a pretext to both governments and extractive industry for rebranding mining *as* climate action.

Third, critical minerals discourse has worked to re-mystify the economics of market speculation and the effects of state intervention in global markets. Critical minerals discourse thus aggravates the inherent tendency of the global resources sector towards exaggerated cycles of boom and bust, and uses public money to do so. Fourth and finally, in rebranding mining as climate action, the third wave of critical minerals discourse has been used to leverage the existential urgency of the climate crisis in favour of elite and extractive interests, and away from – if not against – local communities and ecosystems.[13]

Sections 2, 3, and 4 sketch the contours of the first, second, and third waves of critical minerals discourse, tracing the uptake of criticality claims within the US and its historical allies in response to threats, real and perceived, to US hegemony. The history of international trade law over this period – and particularly of the constitutive tension between multilateral trade norms and security exceptions – has been expertly covered elsewhere.[14] This article's focus is not on the international trade rules that apply to security claims, of which criticality claims are a subset. It is rather on the *contexts* in which criticality claims have tended to emerge, and the *functions* such claims tend to serve. Section 5 accordingly examines the politics of this third wave of critical minerals discourse, with a focus on the functions and interests served by criticality claims for the US and its major allies. The differential valence of criticality claims in the Global South, and particularly for producer countries seeking to leverage the critical minerals rush to achieve broader social and economic objectives – a prominent example being Indonesia's prohibition of nickel ore exports in 2020 – is a crucial dimension of this third wave, but is not the focus of this article.[15] Thea Riofrancos, Lian Sinclair, Lorenzo Cotula, and others have all offered critical analyses of the political economy of critical minerals discourse in producer countries; and scholarly and activist movements organized around concepts of green extractivism, climate justice, and a just transition are building on older materialist critiques of global political economy and development ideology to map the upstream effects of critical minerals discourse.[16]

Section 6 concludes that critical minerals discourse just as readily serves the second Trump administration's zero-sum mercantilist agenda as it did the Biden administration's green industrial agenda.[17] I further conclude that the future of critical minerals discourse – as with

[13]See generally Section 5, *infra*. For a similar argument, see G. C. Leonelli, 'Critical Raw Materials, the Net-Zero Transition and the "Securitization" of the Trade and Climate Change Mitigation Nexus: Pinpointing Environmental Risks and Charting a New Path for Transnational Decarbonization', (2025) 24(2) *World Trade Review* 237, at 241.

[14]See, for example, M. Pinchis-Paulsen, 'Trade Multilateralism and U.S. National Security: The Making of the GATT Security Exceptions', (2020) 41(1) *Michigan Journal of International Law* 109.

[15]On Indonesia, see I.G.N.P. Widiatedja, 'Indonesia's Export Ban on Nickel Ore: Does It Violate the World Trade Organization (WTO) Rules?', (2021) 55(4) *Journal of World Trade* 667; and M. M. Fang, 'Climbing up the Critical Mineral Value Chains: The Global South and Green Industrialization in an Era of Disruption', (2024) 57(3) *Vanderbilt Journal of Transnational Law* 795.

[16]T. Riofrancos, *Extraction: The Frontiers of Green Capitalism* (2025); L. Sinclair, *Undermining Resistance: The Governance of Participation by Multinational Mining Corporations* (2024); L. Cotula, '"Green Developmentalism" and the Role of International Law in Negotiating the Energy Transition', (2025) *Global Policy* 1. See also generally Section 5, *infra*.

[17]This was borne out in early 2025 with the US' impulsive grabs for control over critical minerals projects in Greenland and Ukraine. On Greenland, see E. Antsygina, 'The Legal Debate Surrounding Greenland and Denmark: Unpacking Donald Trump's Statements', *EJIL:Talk!*, 24 January 2025, available at www.ejiltalk.org/the-legal-debate-surrounding-greenland-and-denmark-unpacking-donald-trumps-statements/; and C. Schwobel-Patel, *Green Frontiers: The Laws of Extraction in the Green*

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international trade norms more broadly – depends on whether the US' historical allies continue to locate their own security in the defence of US hegemony at the expense of international institutions, rather than in the renewal of international institutions anchored in foundations other than US dominance, and the pursuit of collective action against climate change.

## 2. The first wave: Critical minerals and national security in the 1930s and 1940s

The concept of materials criticality first arose at the intersection of US defence and industrial policy in the later 1930s. However, the problem that criticality claims seek to address had its origins in what was labelled at the 1919 Paris Peace Conference as the 'raw materials problem'.[18] In the immediate aftermath of the First World War, the phrase 'raw materials problem' was used to refer to wartime interruptions to world resource markets. However, the phrase soon came to refer not to war as an exception to the 'normal' functioning of the world economy, but to what was popularly understood as the *cause* of war: the unequal geographical distribution of natural resources necessary to industrialization. In October 1920, the newly formed Council of the League of Nations directed its Economic and Financial Committee to inquire and report on 'the difficulties experienced by numerous countries in assuring the import of raw materials essential to their welfare and security'.[19] The inquiry was framed as an empirical one, masking the normative question it begged: given the unequal geographical distribution of resources basic to industrialization, what norms should govern international trade in those resources? The Economic and Financial Committee construed the problem as one of rule and exception. On one hand was the 'incontestable' proposition that 'raw materials produced by one country being in many cases essential to the economic life of other States should not, unless in exceptional cases, be the object of restrictions or of differential regulations of such a nature as to injure the production of such States, or to impose on them a systematic inferiority'.[20] On the other, sovereignty necessarily included the power to subject domestic natural resources to 'a regime in conformity with their natural economy', and states had the 'incontestable right' 'in exceptional circumstances' to reserve their natural resources to themselves.[21] The Committee thus framed the 'raw materials problem' as one of delimiting the scope of permissible exceptions to the liberal ideal of universal free trade: '(i)t is undesirable, particularly, that measures of restriction taken by producing countries to meet exceptional situations should be so prolonged or altered as to change their character, and from being acts of precaution or defence to degenerate into measures of economic aggression'.[22]

The Committee's reworking of its remit resulted from its failure to discharge its original terms of reference. Six months into the inquiry, the Committee's rapporteur, Italian statistician Corrado Gini, reported to the League Council that it had proved impossible to discharge its first term: to report back on 'the extent and nature' of states' requirements for 'import of raw materials essential to their welfare and security'.[23] Gini reported that the Committee's only means of gathering the necessary production, trade and economic data was via questionnaires to League member states. Of the few states that returned questionnaires, the data provided was incomplete or obsolete, and Belgium was the only state with colonial territories to provide data on colonial production and trade.[24]

*Transition* (2025). On Ukraine, see M. Baranowski et al., 'From the Russian Invasion of Ukraine to the Battlefield of the Future: The Geopolitical Fight for Ukraine's Mineral Wealth', (2025) 123 *Energy Research & Social Science* 104043.

[18]G.A. Roush, 'Strategic Mineral Supplies 15. Strategic and Critical Minerals', (1938) 30 *The Military Engineer* 370, at 371.

[19]League of Nations Provisional Economic and Financial Committee, Report on Certain Aspects of the Raw Materials Problem (1921), at 5.

[20]Ibid.

[21]Ibid., at 9.

[22]Ibid.

[23]Ibid., at 19.

[24]Ibid., at 21.

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Furthermore, Gini reported that, over the course of 1921, the 'raw materials problem' had rapidly reversed from one of shortage to glut. In his view, 'the crisis of under-production' during the war had soon given way to a 'crisis of markets': 'the outstanding factor as regards raw materials is no longer the difficulty experienced by consuming countries in securing supplies, but the difficulty experienced by producing countries in finding outlets for their products … (t)he exaggerated demand for certain raw materials and half-manufactured products created a certain disproportion between production and actual requirements'.[25] 'Richer' states which had imposed export restrictions on key materials during the war had reacted to this post-war resources glut not only by lifting export restrictions but also by extending lines of cheap credit to foreign nations to fund purchases of domestic excess product.[26]

Working with a vacuum of data and reversed economic conditions, Gini opted to redirect the Committee's inquiry away from empirical analysis and towards mapping the spectrum of solutions to the raw materials problem. The first option offered in the final Report was 'the nationalist solution', whereby states would strive for economic independence or resource nationalism, a solution Gini regarded as sensible only in times of war.[27] Second was the 'socialist' or 'state' solution, whereby a group of states would form a central organization that would equitably distribute the raw materials of all – an option that, for Gini, was prime for executive abuse.[28] Last was the 'liberal' or 'free trade solution', whereby all states would agree to remove all export restrictions according to universally agreed principles, thus preventing states with superior resource endowments from 'abusing their power to the detriment of others'.[29] Gini concluded that while the free trade solution was the preferable one, it could only be realized through a 'super-State organisation' far beyond the capacity of the League.[30] In the absence of a radical solution to the raw materials problem, Gini made a range of modest recommendations, including League advocacy for the establishment of customs unions between groups of states, and for the introduction of mechanisms for the consideration of third parties in trade and investment treaties.[31]

The League's early attempt to solve the 'raw materials problem' thus failed on its own terms. But those failures presaged what would become persistent issues in constructions of minerals criticality over the following century. The Committee concluded that the problem was ultimately one of delimiting justifiable exceptions to free trade on the basis of essential domestic need. It identified two obstacles to achieving that task. First, collating the data needed to project domestic supply and demand – and therefore justifying trade exceptions on the basis of 'essential domestic need' – was difficult. Second, demand and supply projections directly affect the markets they purport to predict.

Over the 1920s, the League powers' framing of the raw materials problem as a matter of trade policy was increasingly challenged by Germany, Italy, and Japan. Each of the Axis powers was then contending with rising populations, customs barriers, and deficits of foreign exchange, which all compounded the economic disadvantages of poor natural resource endowments. Over the late 1920s and early 1930s, Germany, Italy, and Japan mounted increasingly strident challenges to the League powers' attempts to quarantine trade debates from the Axis powers' attempts to reopen the territorial settlement. The Axis powers insisted that the League powers' monopolization of colonial and imperial territories was fatal to the legitimacy of the post-war order.[32] From the early 1930s, debates over the 'raw materials problem' and the 'colonial claims' of the 'dissatisfied powers' began to merge into one ideological battleground. The League powers insisted that free

[25]Ibid., at 6–7.
[26]Ibid., at 26.
[27]Ibid., at 33.
[28]Ibid., at 34.
[29]Ibid., at 36–8.
[30]Ibid., at 40.
[31]Ibid., at 52–5.
[32]Royal Institute of International Affairs, *Raw Materials and Colonies* (1936), 5–10.

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trade in colonial and imperial territories was a fair solution to the conflict. The Axis powers demanded territorial 'adjustment' in their favour.[33]

It was in this volatile geopolitical context that the concept of 'strategic and critical materials' first emerged within the US defence establishment. The US' hegemonic status was not yet clear but its economic power was. Following the First World War, the US together with Britain through its empire controlled over 75 per cent of the world's mineral resources, and 60 per cent of the world's industrial output.[34] As the interwar settlement disintegrated and the Axis powers withdrew from the League and from trade and defence treaties, it became common practice in US defence circles of the mid-to-late 1930s to designate certain materials as 'strategic' and others 'critical' on national security grounds.[35] The purpose of listing a material as strategic or critical was to facilitate appropriation of public funds for state intervention in that market, in anticipation of supply chain disruption due to war. Early proposals for market intervention were limited to establishing national stockpiles of listed materials from foreign sources. Within a few years, however, proposals for public subsidization of industrial development of the domestic resource base gained traction, largely due to lobbying by the US mining industry.[36]

In the mid-1930s, the US Committee on Military Affairs attempted to define the difference between 'strategic' and 'critical' materials. As used in US defence circles, 'strategic materials' referred to materials necessary to wartime military operations, the domestic reserves of which were *presently* insufficient; and 'critical materials' referred to materials necessary to wartime military operations, the domestic reserves of which were *projected* to prove insufficient in future.[37] Distinguishing between strategic and critical materials thus entailed at least three categorical dilemmas from the outset: how to distinguish between war and peace; how to distinguish between military and civilian use; and how to accurately project demand and supply.

The US Strategic and Critical Materials Stock Piling Act of 1939 avoided all three issues by stating its purpose as follows:

> . . . the natural resources of the United States in certain strategic and critical materials being deficient or insufficiently developed to supply the industrial, military and naval needs of the country for common defense, it is the . . . purpose and intent of this Act to provide for the acquisition of stocks . . . and to encourage the development of mines and deposits of these materials within the United States, and thereby decrease and prevent wherever possible a dangerous and costly dependence of the United States upon foreign nations for supplies of these materials in times of national emergency.[38]

Criticality was thus defined not by war, but by national *emergency*; and not by military need alone, but by military *and* industrial need.[39] Despite this early concept creep, first wave US critical materials policy remained domestic in ambit. Policy makers insisted on defining 'national security' as confined to contexts of military conflict, and explicitly rejected the use of stockpiles or subsidies for economic or other collateral purposes.[40]

This narrow construction of national security during the first wave accords with Paulsen's account of subsequent US participation in 1940s' negotiations over the International Trade

[33]Ibid., at 51–8.

[34]A.E., Jr. Eckes, *The United States and the Global Struggle for Minerals* (1979), 58.

[35]See Roush, *supra* note 18, at 370–1.

[36]See Eckes, *supra* note 34, at 76.

[37]US Committee on Military Affairs, 'Acquiring of Stocks of Strategic and Critical Minerals Essential to the Need of Industry and Common Defense', Report submitted to the US House of Representatives, 23 March 1939, 76th Congress, 1st Session, Report No 283, at 2. See also Roush, *supra* note 18, at 370–1.

[38]Strategic and Critical Materials Stockpiling Act of 1939 (US), section 1.

[39]Ibid., Sections 2–4, 7.

[40]Ibid., Section 4. See also Eckes, *supra* note 34, at 181.

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Organization (ITO) and the General Agreement on Tariffs and Trade (GATT) – a process over which the US, in an early exercise of post-war dominance, exerted 'overwhelming influence'.[41] Paulsen examines the tensions between the US Department of State and the defence establishment over the scope of national security exceptions to signatories' obligations of trade liberalization. Whereas defence representatives argued for broad security exceptions to allow trade restrictions and discrimination for defence and military purposes – including export, import and supply of raw materials – the US Department of State insisted that broad security exceptions were more likely to be invoked by other nations *against* the US; and that national security would thus be better served by multilateral trade obligations.[42] The general security exception ultimately included in Article XXI(b) of the GATT was consistent with the Strategic and Critical Materials Stock Piling Act of 1939. It protected the right of a contracting party to 'tak(e) any action which it considers necessary for the protection of its essential security interests ... (ii) relating to the traffic in arms, ammunition and implements of war and to such traffic in other goods and materials as is carried on directly or indirectly for the purpose of supplying a military establishment'; or '(iii) taken in time of war or other emergency in international relations'.[43]

As the Cold War settled into shape during the Korean War, the Truman administration began to approach foreign policy as a tool for hegemonic norm-building. In the early 1950s, US critical materials policy began turning outward from its domestic purview to include measures aimed at securing transnational supply chains with allies that would endure in times of conflict. Echoing Gini's earlier conclusions, consensus emerged in US policy circles that even in times of open war, resource independence through strict economic nationalism was not only practically impossible but strategically undesirable. In 1951, Truman established the President's Materials Policy Commission. In 1952, the Commission issued its first report, *Resources for Freedom*, also known as the 'Paley Report' after its chairman William Paley.[44] The Paley Report revived the language of the raw materials problem, and proceeded from the presumption that resource independence was a facile objective for US trade and security policy. The US was already the world's largest consumer of resources and was fast outpacing its own production capacity. Paley recommended that the aim of strategic and critical materials policy should therefore *not* be to decrease global economic interdependence or reliance on foreign suppliers, but rather to strengthen the *ideological* bases of economic interdependence between the US and its allies, around US-defined values of growth, private enterprise, and anti-Communism.[45] The Paley Report was thus a comprehensive sectoral working through of what were to become the ideological objectives of US aid and development policy throughout the Cold War.[46]

## 3. The second wave: Critical minerals and national security in the 1970s and 1980s

Critical minerals discourse fell dormant over the two decades following the Korean War as the US secured its status as hegemon. Between the 1950s and 1970s, mineral prices remained largely stable, and global supply steady. Following the formation of the Organization of Petroleum Exporting Countries (OPEC) at the first Arab Petroleum Congress in 1960, the world oil price

[41]See Pinchis-Paulsen, *supra* note 14, at 140; and T. Voon, 'The Security Exception in WTO Law: Entering a New Era', (2019) 113 *AJIL Unbound* 45.

[42]See Pinchis-Paulsen, *supra* note 14, at 140.

[43]1947 General Agreement on Tariffs and Trade, 55 UNTS 187 (GATT), Art. XXI(b). See also Pinchis-Paulsen, *supra* note 14.

[44]President's Materials Policy Commission, *Resources for Freedom, Volume 1: Foundations for Growth and Security* (1952).

[45]Ibid., at 3.

[46]Paulsen's case study on the US-initiated International Monetary Conference in the years 1950–1953 makes similar observations of US foreign policy during this period: see Paulsen, *supra* note 10, at 47–64. See also S. Pahuja, *Decolonising International Law: Development, Economic Growth and the Politics of Universality* (2011), 59–94.

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stabilized for a decade, which in turn stabilized global commodity prices.[47] Over the 1950s and 1960s, the US government deprioritized critical minerals policy to such an extent that early in 1973, an embattled President Nixon authorized the selling down of national resource stockpiles to fight inflation. Nixon's move was criticized within defence and extractive industries as antithetical to the aims of stockpiling.[48] His timing was also poor: in October 1973, global resource markets lurched precipitously when OPEC asserted control over world oil prices, and the Organization of Arab Petroleum Exporting Countries (OAPEC) imposed oil embargoes on states that supported Israel's occupation of the Gaza Strip, the West Bank and the Sinai Peninsula.[49] World oil prices quadrupled, prompting reactive price surges in global markets for zinc, tin, and copper.[50]

The 1970s' oil crises exposed the extent of the US' vulnerability to global resource markets.[51] As the Paley Report had anticipated, the US had shifted between the 1950s and 1970s from net exporter to net importer of minerals and metals. The oil crises, and the resignation of Nixon in a context of persistent inflation, prompted an about-face in US resources and energy policy. Critical minerals discourse resurged in trade and foreign policy debates within both the US and its allies, in response to newly apprehended security threats that extended beyond the confines of war.[52] During this second wave of critical minerals discourse, the US perceived both the Soviet Union and the New International Economic Order (NIEO) campaigns spearheaded by the Non-Aligned Movement through the UN General Assembly as threats to national security, and often conflated the two.[53] From the early 1970s, new US security concerns included the nationalization of resources by decolonizing states, following oil nationalizations by Chile, Libya, Iraq, and Venezuela; 'copy-cat' cartel formation in other resource markets following the 1973 OPEC crisis; mineral supply chain disruption due to conflict between South Africa and Angola and Namibia; and above all, Soviet leveraging of the dependence of Northern economies on resource imports from the decolonizing Global South.[54]

In 1976, the Ford administration adopted a policy of 'energy independence'.[55] The goal that had for decades been understood within US trade and defence circles as both practically impossible and strategically undesirable had become a populist trope in US electoral politics in the wake of the early 1970s oil crises, and the NIEO and Permanent Sovereignty over Natural Resources (PSNR) declarations. President Ford's plan for energy independence included using the existing US Naval Petroleum Supply for short-term domestic commercial use; establishing a National Strategic Petroleum Reserve from foreign supplies; and subsidizing domestic oil and gas mining, especially in Alaska.[56] At the same time, the US invested in rapid rebuilding of stockpiles of an expanded list of critical materials.

[47]See G. Garavini, *The Rise and Fall of OPEC in the Twentieth Century* (2019), 112–5; and B. Mommer, 'The Shocking History of Oil', in E. Bini et al., (eds.), *Oil Shock: The 1973 Crisis and Its Economic Legacy* (2016), 26.

[48]J.A. McClure, 'Stockpiling of Strategic and Critical Materials', (1983) 19 *Idaho Law Review* 417, at 448–9.

[49]See, generally, A. A. Attiga, *The Arabs and the Oil Crisis, 1973–1986* (1987); C. R. W. Dietrich, *Oil Revolution: Anticolonial Elites, Sovereign Rights, and the Economic Culture of Decolonization* (2017); and F. Venn, *The Oil Crisis* (2002).

[50]M. D. Lax, *Selected Strategic Minerals: The Impending Crisis* (1992), 180.

[51]See, for example, C. F. Bergsten, 'The Threat from the Third World', (1973) 11 *Foreign Policy* 102; cf. S. D. Krasner, 'Oil is the Exception', (1974) 14 *Foreign Policy* 68.

[52]See, for example, L. L. Fischman, *World Mineral Trends and US Supply Problems* (1980); P. W. Roberts and T. Shaw, *Mineral Resources in Regional and Strategic Planning* (1982); R. Weston, *Strategic Materials: A World Survey* (1984); and L. H. Bullis and J. E. Mielke, *Strategic and Critical Materials* (1985).

[53]On permanent sovereignty over natural resources and the New International Economic Order, see M. Bedjaoui, *Towards a New International Economic Order* (1979); A. Anghie, *Imperialism, Sovereignty and the Making of International Law* (2005), 223; and N. Schrijver, *Sovereignty over Natural Resources: Balancing Rights and Duties* (2009), 82–119.

[54]See, for example, J. Santini, 'The Growing Crisis in the Strategic and Critical Minerals of the United States', (1980) 7 *Journal of Legislation* 63, at 72–7.

[55]For a contemporaneous analysis, see M. Willrich, 'Energy Independence for America', (1976) 52(1) *International Affairs* 53.

[56]Energy Independence Act of 1975 (US); National Strategic Petroleum Reserve (Civilian) Act of 1975 (US).

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Criticality in this second wave thus came to be defined by reference to a new concept of 'energy security', which went far beyond the narrow definition of security that had defined criticality in the first wave.[57] As a result, security claims expanded beyond wartime provision to include meeting the energy demands of 'normal' domestic economic activity. US critical minerals policies duly expanded in the later 1970s to include increased funding for state geological surveying and increased subsidization of the domestic resources industry, in both production and processing of minerals.[58] These second wave changes to the scope of minerals criticality were later ratified by Congress in the Strategic and Critical Materials Stockpiling Revision Act of 1979.[59]

From the mid-1970s, minerals criticality was taken up as an object of analysis by a new generation of realist international relations (IR) scholars who rejected liberal models of international order. The Cold War generation of realist IR scholars was largely concentrated in the US, Australia, the UK, and Canada and included Hedley Bull, Kenneth Waltz, Robert Gilpin, and Steven Krasner. All were centrally concerned with redefining and advancing national security objectives in an international order perceived as inherently anarchic.[60] Realist analyses of the international order – and in particular, Gilpin and Krasner's development of hegemonic stability theory – came to exercise significant influence within US defence and foreign policy circles over the late 1970s and 1980s.[61] In his 1979 monograph, *Defending the National Interest: Raw Materials Investments and U.S. Foreign Policy*, Krasner concluded that US critical minerals policy served objectives well beyond simply protecting the security of resource supply chains against the risk of conflict-related disruption.[62] Instead, the US government was using critical minerals policy to secure *general* foreign policy objectives, including maximizing its competitive advantage in global markets.[63] Realizing these objectives, Krasner argued, required more than building stockpiles and subsidizing domestic production and processing. It required subsidizing the capacity of US-domiciled mining companies to cultivate superior geological, technological, and economic expertise, and to develop and control resource projects wherever required to meet future demand – including *within* foreign jurisdictions.[64] Krasner noted that US critical minerals policies had by the late 1970s begun to include state support not only for direct investment by US companies in foreign resource projects, but for direct debt financing and subsidization of foreign-owned resource projects within allied states.[65]

The second wave of critical minerals discourse was thus defined by reference to an expanding construct of national security that extended well beyond first wave definitions of essential need during national emergency to include the routine energy needs of the US economy. As a result, critical minerals policy over the 1970s and 1980s began to include a much broader range of interventions in global resource markets. These included direct subsidization and debt financing of foreign resource projects, and broader policies of cultivating cultural and ideological alignment with US objectives along mineral supply chains. This second wave was to peak in the mid-1980s

[57]See, for example, D. A. Deese, 'Energy: Economics, Politics and Security', (1979–1980) 4(3) *International Security* 140; J. S. Nye, 'Balancing Nonproliferation and Energy Security', (1978–1979) 81(3) *Technology Review* 48; Energy Security Act of 1980 (US).

[58]J. P. Albers et al., Demand for Nonfuel Minerals and Materials by the United States Energy Industry 1975–90, US Department of the Interior Geological Survey Professional Paper 1006 – A,B (1976).

[59]J. A. McClure, 'Stockpiling of Strategic and Critical Materials', (1983) 19 *Idaho Law Review* 417, at 451.

[60]See, for example, R. G. Gilpin, 'The Richness of the Tradition of Political Realism', (1984) 38(2) *International Organization* 287; R. O. Keohane (ed.), *Neorealism and Its Critics* (1986).

[61]R. Gilpin, *War and Change in World Politics* (1981).

[62]S. D. Krasner, *Defending the National Interest: Raw Materials Investments and U.S. Foreign Policy* (1978). For a contemporaneous critique of Krasner's text, see J. Ruggie, 'Defending the National Interest: Raw Materials Investments and U.S. Foreign Policy by Stephen D. Krasner', (1980) 74 *American Political Science Review* 296.

[63]See Krasner, ibid., at 330.

[64]Ibid., at 349. Krasner was later appointed by Director of Policy Planning in the State Department by the administration of George W. Bush.

[65]See also S. J. Randall, 'Raw Materials and United States Foreign Policy', (1980) 8(3) *Reviews in American History* 413.

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during the Reagan administration, following the release of its Strategic and Critical Nonfuel Minerals Report in 1983.[66] The 1983 Report echoed the 1952 Paley Report, again emphasizing that stockpiling and subsidization of domestic production were effective short-term measures for protecting national security during times of national emergency, but that mitigating the vulnerabilities created by the US' increasing dependence on mineral and metal imports required longer term strategies.[67] The Report made a raft of recommendations, including diversifying foreign sources of supply, releasing public lands to resource exploration, increasing public funding for industry research and development – and above all, refocusing on general foreign policy initiatives, including through international development and aid programs, and direct diplomatic and military intervention in contexts of foreign political instability that could threaten US hegemony.[68]

## 4. The third wave: Critical minerals and the geopolitics of the energy transition

Critical minerals discourse receded between the collapse of the Soviet Union and the 2008 global financial crisis (GFC), a period of neoliberal ascendancy in which US hegemony was effectively unchallenged. The US and its allies regarded the proliferation of multilateral trade agreements in this period – and most crucially, the creation in 1995 of the World Trade Organization (WTO) and the establishment of the WTO dispute settlement mechanism – as mitigating if not curing the risk of supply chain disruption.[69]

After the GFC, however, the self-evidence of US hegemony began to erode.[70] The economic growth of China challenged the neoliberal orthodoxies that had dominated international institutions for the preceding decades, and its Belt and Road investments across the Global South steadily amassed counterweight to US power.[71] Critical minerals discourse began to re-emerge in US trade and defence debates after the GFC. Its use escalated sharply in reaction to China's imposition in 2010 of an unofficial embargo on exports of rare-earth elements (REE) to Japan, following a maritime incident in disputed waters near the Senkaku Islands. China's embargo of a key US ally in the Asia Pacific laid bare its long-planned dominance of the global REE sector. By 2010, China had established strategic dominance in the processing of REEs and metals vital to the manufacture of semi-conductors, digital technologies, renewable energy infrastructure, and electric vehicles. The embargo further exposed the near-total dependence of global military and renewable energy supply chains on Chinese REE exports.[72] And above all, it signalled China's willingness to leverage its dominance of REE supply chains for geopolitical ends, a use of economic power the US had since the 1950s regarded as its prerogative alone.

In the years following the Senkaku Islands dispute, tensions between China and the US began to unravel the trade norms that had defined the post-Cold War era. At the same time, distinctions between climate, trade, and national security as objects of governance began to break down.[73] The

[66]Congress of the United States Congressional Budget Office, Strategic, and Critical Nonfuel Minerals: Problems and Policy Alternatives (1983).

[67]Ibid., at 67–72.

[68]Ibid., at 72–7.

[69]R. Howse and J. Langille, 'Continuity and Change in the World Trade Organization: Pluralism Past, Present, and Future', (2023) 117(1) *American Journal of International Law* 1; and A. Roberts et al., 'Toward a Geoeconomic Order in International Trade and Investment', (2019) 22(4) *Journal of International Economic Law* 655, at 658–9.

[70]See, for example, G. Gerstle, *The Rise and Fall of the Neoliberal Order: America and the World in the Free Market Era* (2022).

[71]For a more nuanced account, see Lang (2019), *supra* note 5, at 677.

[72]See Y. Zhang et al., 'The Geopolitics of China's Rare Earths: A Glimpse of Things to Come in a Resource-Scarce World?', Discussion Brief, Stockholm Environment Institute (2014), at 1; and S. Kalantzakos, *China and the Geopolitics of Rare Earths* (2018), 45–7.

[73]See, for example, T. Riofrancos, 'The Security–Sustainability Nexus: Lithium Onshoring in the Global North', (2023) 23(1) *Global Environmental Politics* 20.

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US and its allies moved to adopt broad-based trade and defence policies aimed at 'containment' of China, many focused in the Pacific region where climate diplomacy was fast becoming inseparable from geopolitical manoeuvring and rising territorial tensions.[74] In this context, minerals criticality was taken up again in the Global North as a justification for alliances, strategies, and policies that departed from neoliberal trade norms to counter China's leveraging of its REE supply chain dominance. As Espa has noted of the 2010s, however, a growing number of countries began to impose export restrictions on materials designated as critical, even as China's trade restrictions dominated the attention and rhetoric of the Global North.[75]

In 2014, the US, the EU, and Japan brought a series of disputes to the WTO Dispute Settlement Body over China's REE export restrictions. The Dispute Settlement Body ultimately held that China's export restrictions were in breach of its trade obligations.[76] Sino–US relations were to deteriorate rapidly after the 2016 South China Sea Arbitration Award, hastened by the bellicose anti-China rhetoric of the first Trump administration. President Trump reframed multilateral trade norms anchored in US hegemony as a 'bad deal' for the US and a threat to the national interest, and revived Fordist tropes of economic protectionism.[77] Over the later 2010s, the scope of the security exception in Article XXI(b) of the GATT became the focal point of escalating tensions within the WTO system. In WTO proceedings brought against the US in 2018 by the EU, China, Norway, and others, the US invoked national security to justify tariffs on steel and aluminium. It subsequently prevented Appellate Body review by blocking the appointment of new members. Soon after in 2019, Russia invoked the security exception to justify blocking transit of Ukrainian goods through Russian territory, prompting the first Panel Report on the scope of Article XXI(b).[78]

With the WTO system already weakened, the third wave of critical minerals discourse became a flood as the COVID-19 pandemic took hold in 2020. Amid severe global supply chain disruptions and rampant anti-China rhetoric, the US and its allies released a rash of critical minerals-branded trade policies, bilateral and multilateral alliances.[79] Many post-2020 critical minerals policies were concluded outside the framework of existing multilateral trade institutions, and dovetailed with the rise of green industrial policy in the US, spearheaded by the Biden administration.[80] Such initiatives included the EU's 'European Raw Materials Alliance' launched in 2020; the US, Australia and Canada's 'Critical Minerals Mapping Initiative' (2020); and Australia, Japan, and India's 'Supply Chain Resilience Initiative' (2020).[81] At the same time, major international

[74]For recent analyses, see D. Guilfoyle, 'The Rule of Law and Maritime Security: Understanding Lawfare in the South China Sea', (2019) 95 *International Affairs* 999; and W. Morgan, 'Oceans Apart? Considering the Indo-Pacific and the Blue Pacific', (2020) 16(1) *Security Challenges* 44.

[75]I. Espa, *Export Restrictions on Critical Minerals and Metals: Testing the Adequacy of WTO Disciplines* (2015), 77–83.

[76]Appellate Report China – Measures Related to the Exportation of Tungsten, Rare Earths, and Molybdenum, adopted 7 August 2014, WT/DS431/AB/R, WT/DS432/AB/R, WT/DS433/AB/R. See also J. Shi and X. Yang, 'Reconciling Environmental Protection with Natural Resources Trade in International Law: A Perspective from China – Rare Earths', (2015) 10(3) *Frontiers of Law in China* 537.

[77]Again, for a more nuanced view, see Lang (2018), *supra* note 5.

[78]Useful analyses include Paulsen, *supra* note 10 at 19–20; see Voon, *supra* note 41; O. Hrynkiv, 'Export Controls and Securitization of Economic Policy: Comparative Analysis of the Practice of the United States, the European Union, China, and Russia', (2022) 56(4) *Journal of World Trade* 633; M. Pinchis-Paulsen, 'Let's Agree to Disagree: A Strategy for Trade-Security', (2022) 25(4) *Journal of International Economic Law* 527; L. Borlini, 'Economic Interventionism and International Trade Law in the Covid Era', (2023) 24(1) *German Law Journal* 1, at 5. See also C. Henckels, 'Whither Security? The Concept of "Essential Security Interests" in Investment Treaties' Security Exceptions', (2024) 27(1) *Journal of International Economic Law* 114.

[79]For a contemporaneous analysis, see Cotula, *supra* note 4.

[80]On green industrial policy, see S. Amarnath et al., 'Varieties of Derisking', *Phenomenal World*, 17 June 2023, available at www.phenomenalworld.org/interviews/derisking/; M. Mazzucato et al., 'A Green and Just Planet: The 1.5°C Agenda for Governing Global Industrial and Financial Policies in the G20. Independent Report of the G20 TF-CLIMA Group of Experts', October 2024, available at www.ucl.ac.uk/bartlett/sites/bartlett/files/independent_report_tfclima_group_of_experts.pdf.

[81]For a survey, see D. Shiquan and X. Deyi, 'The Security of Critical Mineral Supply Chains', (2023) 36(3) *Mineral Economics* 401.

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institutions released a spate of reports on global demand and supply of critical minerals and metals in the context of the global energy transition. These included the World Bank's 2020 report, Minerals for Climate Action; the International Energy Agency's 2021 report, The Role of Critical Minerals in Clean Energy Transitions; and the OECD's 2023 report, Raw Materials Critical for the Green Transition.[82] From 2021, critical minerals discourse became a touchstone of the Biden administration's foreign and industrial policy. Biden-era green industrial policy was anchored in its flagship Inflation Reduction Act of 2022 (IRA), which sought to build US manufacturing capacity in renewable energy, digital and defence infrastructure.[83]

In 2022, the US State Department launched its Minerals Security Partnership (MSP), administered by the US Export Import (EXIM) Bank.[84] The MSP's primary aims included diversifying US critical minerals supply chains by investing directly in the development of resource projects within 'partner' states, of which there are currently 14.[85] In context of the IRA, the MSP's objectives appeared a product of post-pandemic geopolitics. But the MSP was consistent with Krasner's call some 40 years earlier for US critical minerals policy to include direct debt financing and subsidization of foreign resource projects. Whilst EXIM Bank claimed – at least during the Biden era – to prioritize projects with strong environmental, social, and governance (ESG) credentials, MSP project funding was conditional on Chinese ownership limitations.[86] In 2023, Australia and the US announced the 'Australia-United States Climate, Critical Minerals and Clean Energy Transformation Compact'.[87] Whilst the Compact claimed to 'establish climate and clean energy as a central pillar of the Australia-United States Alliance', its aims were clearly security-oriented, and included 'deepening bilateral collaboration on the critical minerals and materials that are vital to clean energy as well as defence supply chains'.[88]

Criticality claims in this third wave have thus expanded beyond even second wave concepts of energy security as a precondition for 'normal' economic activity.[89] Critical minerals policies have been packaged by governments across the political spectrum as a panacea for everything from the climate crisis, to domestic unemployment, to rising inflation, to slumps in productivity and loss of competitive advantage, to geopolitical volatility, to military vulnerability, and to escalating First Nations and regional inequality. Australia's 'Future Made in Australia – National Interest Framework' released in 2024 is a useful example.[90] Australia's critical minerals list is currently defined to include minerals 'essential to our modern technologies, economies and national security', which are 'in demand from our strategic international partners', and 'vulnerable to

[82]K. Hund et al., *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition* (2020), available at documents.worldbank.org/en/publication/documents-reports/documentdetail/099052423172525564; see International Energy Agency, *supra* note 1; and Kowalski and Legendre, *supra* note 1.

[83]Inflation Reduction Act of 2022 (US).

[84]According to the US State Department, the MSP 'aims to accelerate the development of diverse and sustainable critical energy minerals supply chains through working with host governments and industry to facilitate targeted financial and diplomatic support for strategic projects along the value chain'. See US Department of State, 'Minerals Security Partnership', available at www.state.gov/minerals-security-partnership/. This page was removed soon after President Trump retook office and replaced with the following page: www.exim.gov/about/special-initiatives/ctep/critical-minerals#:~:text = EXIM%20actively%20participates%20in%20the,and%20industry%20to%20facilitate%20targeted.

[85]Ibid.

[86]V. Vivoda, 'Friend-shoring and Critical Minerals: Exploring the Role of the Minerals Security Partnership', (2023) 100 *Energy Research and Social Science* 103085.

[87]Prime Minister of Australia, 'Australia-United States Climate, Critical Minerals and Clean Energy Transformation Compact', Joint Statement, 20 May 2023, available at www.pm.gov.au/media/australia-united-states-climate-critical-minerals-and-clean-energy-transformation-compact.

[88]Ibid.

[89]For an earlier prediction of this definitional collapse, see E. W. Anderson and L. D. Anderson, *Strategic Minerals: Resource Geopolitics and Global Geo-Economics* (1998), 4.

[90]Australian Government Department of Treasury, 'Future Made in Australia', 14 May 2024, available at treasury.gov.au/publication/p2024-526942.

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supply chain disruption'.[91] Dispelling any misconception that minerals criticality is necessarily tied to the energy transition, Australia's list of 'critical technologies' – which in turn defines the scope of criticality claims – currently includes advanced manufacturing, AI technologies, autonomous systems and robotics, advanced information and communications technologies, and biotechnologies, in addition to clean energy generation and storage technologies.[92]

In this third wave, then, critical minerals discourse has been deployed by governments across the political spectrum toward multiple and even conflicting ends.[93] During the Biden era, criticality claims proved particularly useful for centrist governments in liberal democratic states as a dual response to electoral pressure from the left to act on climate change, and from the right to act on defence. But such claims proved equally useful to right wing and authoritarian governments advancing populist platforms of improving terms of trade and building defence capacity.[94] Third wave criticality claims thus evidence the effective collapse of distinctions between security, trade, industrial, and climate agendas in the post-pandemic era.

This post-pandemic efflorescence of critical minerals discourse bears out longstanding insights of critical security studies which have been taken up in international law. Scholars including Shirley Scott have observed the securitization of international climate change discourse for over a decade.[95] Aziz Rana argued, again over a decade ago in the context of the US war on terror, that the ambit of national security claims are inherently indeterminate; such claims ultimately reveal an underlying contest over 'who decides on issues of war and emergency'.[96] J. Benton Heath has recently built on these analyses, diagnosing a 'new' dominant construction of national security as 'a growing collection of security practices agnostic to the source or nature of a threat, unbounded by time and space, and decentered from any overriding great-power or interstate conflict'.[97] For Heath, the 'new' national security demonstrates the inherent unsustainability of distinctions between ordinary commerce and national security. Building on Rana, Heath argues that the conceptual instability of contemporary security claims reflect their character as assertions of epistemic authority. Heath concludes that security claims reflect underlying struggles over 'whose knowledge matters in security policy and how that knowledge is deployed'.[98]

[91]Australian Government Department of Industry, Science, and Resources, 'Australia's Critical Minerals List and Strategic Materials List', 20 June 2023 (last updated 20 February 2024), available at www.industry.gov.au/publications/australias-critical-minerals-list-and-strategic-materials-list.

[92]Australian Government Department of Industry, Science and Resources, 'List of Critical Technologies in the National Interest', 19 May 2023, available at www.industry.gov.au/publications/list-critical-technologies-national-interest.

[93]For a consideration of the critical minerals strategies of the BRICS+6, see V. Vivoda et al., 'A Critical Minerals Perspective on the Emergence of Geopolitical Trade Blocs', (2024) 89 *Resources Policy* 104587.

[94]For example, the Milei government in Argentina has signed critical minerals deals with India and France. See Government of India Ministry of Mines, 'India and Argentina Sign Agreement for Exploration and Mining of 5 Lithium Blocks in Argentina's Catamarca Province', 15 January 2024, available at mines.gov.in/webportal/newsdetail/india-and-argentina-sign-agreement-for-exploration-and-mining-of-5-lithium-blocks-in-argentinas-catamarca-province; and Editorial Team, 'Milei and Macron Sign a Strategic Alliance on Critical Minerals and Nuclear Energy', *La Derecha Diario*, 9 June 2025, available at derechadiario.com.ar/us/argentina/milei-and-macron-sign-strategic-alliance-on-critical-minerals-and-nuclear-energy.

[95]See Scott, *supra* note 7. See also Cusato, *supra* note 7.

[96]See Rana, *supra* note 8, at 1422.

[97]See Heath (2020), *supra* note 8, at 1024. Roberts, Choer Moraes, and Ferguson also argued in 2019 that 'the US concept of "economic security" bridges—and potentially collapses—the rule against economic nationalism and the exception for national security, creating an exception that has the potential to swallow the rule': see *supra* note 69, at 665. See also Orford, *supra* note 5.

[98]See Heath (2021), *supra* note 8, at 311. Heath's conclusion draws on earlier analyses within critical security studies on the politics of security, which as Browning and McDonald observe, have examined 'the role of representations of security in encouraging sets of policy responses, legitimating the roles of particular actors or indeed constituting political communities in particular ways'. C. S. Browning and M. McDonald, 'The Future of Critical Security Studies: Ethics and the Politics of Security', (2013) 19(2) *European Journal of International Relations* 235, at 237.

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## 5. The politics of critical minerals discourse in its third wave

Criticality claims are therefore productively understood as assertions of epistemic authority in times of structural instability in the geoeconomic order, which over the last century have coincided with challenges to US hegemony. Critical minerals discourse is used to justify moves to securitize certain forms of extractive activity, and to assert the authority – whether on behalf of the state or otherwise – to decide which forms of activity should be securitized, and what measures securitization should involve. To summarize the argument made over the last three sections: over the last century, critical minerals discourse has risen to prominence in international trade and security debates in three waves. The concept of minerals criticality is inherently unstable because it is defined by constructions of national security, which are themselves both indeterminate and expanding. Critical minerals discourse has proven a highly effective device for conflating climate, trade and security objectives in foreign policy, particularly but not only for liberal democratic governments in the Global North. This is not to say that current critical minerals policies treat climate, trade and security imperatives equally. They clearly do not. As argued below, critical minerals discourse in this third wave has worked to subsume climate action within the goal of securing competitive advantage in the global economy of the post-pandemic era.[99]

Examining the politics of critical minerals discourse in this third wave is a complex task, to say the least. Analysis diverges as between the Global North and the Global South; between net exporters and producers and net importers and consumers; between states; between successive governments in the same state; between specific resource sectors; and ultimately, between individual projects on the ground. Accepting the risks of oversimplification and reiterating the present focus on the US and its allies, this article identifies four trends in the politics of third wave critical minerals discourse to date.

First, critical minerals discourse has served as a response to challenges to US hegemony, and specifically as a vehicle for locating the national security of the US and its allies in the defence of that hegemony. Third wave critical minerals initiatives have been used by the US and its allies as signals of strategic departures from neoliberal trade norms, in favour of trade alliances anchored in ideology, patronage, and military interdependence with the US. This last decade of recalibrations in international trade and security practices – and ultimately, in the role of the state in the global economic order – has attracted a rash of diagnoses and labels, from 'deglobalisation',[100] to 'onshoring',[101] to 'friendshoring',[102] to 'dis-integration'.[103] Such diagnoses are useful; and at the same time, it is important to recall that diplomatic rhetoric does not necessarily map onto reality. As Arbeláez-Ruiz argues, despite perceptions of, and arguments for, dis-integration of critical minerals supply chains, advanced manufacturing supply chains remain complex, interdependent, and highly resistant to top-down orchestration.[104] It is also important to recall, as Lang notes, that nationalist challenges to neoliberal trade norms are hardly unprecedented, and not necessarily indicative of systemic disintegration in the global economy.[105] Rather, the tension between trade and security is constitutive to projects of international ordering, as well as to debates over the role

[99]See Leonelli, *supra* note 13, at 244 et seq.

[100]G. Sacerdoti and L. Borlini, 'Systemic Changes in the Politicization of the International Trade Relations and the Decline of the Multilateral Trading System', (2023) 24(1) *German Law Journal* 17, at 21–3.

[101]See Riofrancos, *supra* note 73, at 20.

[102]US Department of the Treasury, 'Remarks by Secretary of the Treasury Janet L. Yellen on the Biden Administration's Economic Approach Toward the Indo-Pacific', 2 November 2023, available at home.treasury.gov/news/press-releases/jy1872. See also Vivoda, *supra* note 86.

[103]L. Cotula, '(Dis)integration in Global Resource Governance: Extractivism, Human Rights, and Investment Treaties', (2020) 23(2) *Journal of International Economic Law* 431.

[104]The author acknowledges a conference paper delivered orally by Diana Arbeláez-Ruiz at the Critical Minerals Conference in Brisbane on 20 August 2024 in which a similar assertion was made.

[105]See Lang, 'Protectionism's Many Faces', *supra* note 5.

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of the state in a system of liberalized trade.[106] Invocations of the security exception within the WTO system has fed animated debate on these themes within international economic law over the last decade.[107] Orford has long identified the tension between trade and security agendas as constitutive of what she describes as the 'battle for the state' and has further cautioned against any perception that the current erosion of neoliberal trade norms is novel or driven only by China. As she observes, 'the US has been strikingly effective at destroying the sense of inevitability and necessity that for decades underpinned the operation of the WTO'.[108]

Given the above, third wave critical minerals discourse is arguably less effective as a basis for reordering transnational supply chains than as the contemporary lexicon in which the US has rebranded, to allies and rivals alike, a much older position: that US observance of multilateral trade norms is contingent on the maintenance of US hegemony. As such, while President Trump is antagonistic to the green tropes the Biden administration used to package its foreign and industrial policy, this renewed antagonism to climate objectives does not signal the end of third wave critical minerals discourse. The first two waves of criticality claims indicate that such claims are easily stripped of their current association with the energy transition and regrounded in conservative defence and security agendas. Critical minerals discourse may therefore prove just as effective a vehicle for Trump's zero-sum mercantilist version of US hegemony as it did for Biden's green industrial version.

The second trend to emerge is that critical minerals discourse has proven an effective vehicle for recalibrating domestic resources policy squarely in favour of extractive industry. Mining companies operating in volatile critical minerals sectors have leveraged critical minerals discourse to assert unity between the public interest in securing substantive action on climate change and their own interests in securing competitive advantage in the renewable energy economy. This is but one dimension of the broader co-optation of the global climate agenda by corporate interests. But its consequences are worth spelling out. To take the Australian example: the federal Labor government and the mining sector have realigned closely around critical minerals discourse, after 15 years of conflict over climate policy. Australia's current Critical Minerals Strategy is part of its 'Future Made in Australia' policy, which attempts to stimulate domestic production and processing of critical minerals and to build advanced manufacturing capacity in strategic sectors, in order to feed into US supply chains.[109] The Strategy is a shared platform of the Australian government and the Minerals Council of Australia, the peak lobby group of Australian mining companies which includes BHP and Rio Tinto, the world's two biggest mining corporations by market capitalization.[110] It includes public debt financing of critical minerals projects within Australia; direct industry subsidies and grants for critical minerals start-ups and projects; and tax incentives for both critical minerals R&D and production costs.[111] Critical minerals discourse has thus allowed both the Australian government and Australian extractive industry to rebrand mining *as* climate action. The Australian government has earmarked over AUD$7 billion of public funding for the mining sector to 'mine toward net zero', a current slogan of the Minerals Council

[106]See Cohen, *supra* note 5.

[107]See for example, Pinchis-Paulsen, *supra* note 78; and Borlini, *supra* note 78.

[108]See Orford, *supra* note 5, at 66. See also A. Orford, 'Food Security, Free Trade and the Battle for the State', (2015) 11(2) *Journal of International Law and International Relations* 1.

[109]Commonwealth of Australia, 'Australia has a New Economic Plan called the Future Made in Australia Policy', available at futuremadeinaustralia.gov.au/. For an analysis of EU critical minerals initiatives that attempt to align with the IRA, see Leonelli, *supra* note 13, at 16.

[110]Minerals Council of Australia, 'Mining Toward Net Zero', available at minerals.org.au/policies/energy-and-climate-change/mining-towards-net-zero/.

[111]Australian Government Department of Industry, Science and Resources, 'Critical Minerals Strategy 2030–2030', Australian Government, 20 June 2023 (last updated 7 July 2023), available at www.industry.gov.au/publications/critical-minerals-strategy-2023-2030.

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of Australia.[112] The current federal Minister for Resources, Madeleine King, has proclaimed that 'the road to net zero runs through Australia's resources sector'.[113]

To be clear, the aim here is not to deny that the energy transition is urgent, or even that legitimate national security concerns exist with respect to resource supply chains.[114] It is rather to argue that criticality has thus far proven a poor basis for defining – let alone achieving – transition- and/or security-related objectives. Two related points are worth making. First, applying the insight of critical security studies that security claims function as assertions of epistemic authority, critical minerals discourse confers authority on the knowledge and expertise of extractive industry, which is thereby granted significant power – if not indirect control – over policy design. Second, critical minerals discourse is inherently susceptible to co-optation towards diffuse agendas, including agendas indifferent if not hostile to climate objectives. Such agendas include economic nationalism, military build-up, competitive advantage in global resource sectors, and feeding the skyrocketing energy demands of AI. Most concerningly, such agendas also include increased fossil fuel production and consumption. To return to the Australian example: despite repeated association of critical minerals policy with net zero emissions targets, the federal government continues to approve new coal and gas developments and to subsidize the fossil fuel industry.[115] Critical minerals discourse thus aggravates the risk of 'both-and', or what Cohen and Riofrancos have described as a 'Prius economy': of increased extraction of minerals and metals, without a corresponding reduction in carbon emissions from the burning of fossil fuels.[116] Indeed, global production and consumption of fossil fuels has sharply increased after the pandemic.[117] Many argue that short-term increases in fossil fuel production and consumption are not antithetical to long-term transition to renewables and are in any event required to meet existing levels of global energy consumption. It is equally true, however, that the current rush on critical mineral production, processing and manufacture bears no necessary relation to renewables uptake; and that the window for reducing carbon emissions to curtail catastrophic climactic systems collapse is vanishingly narrow. And yet global resource markets have entered an era of hyper-extraction in the post-pandemic era, without any guarantee of effective transition.[118] The third wave of critical minerals discourse has directly fed this shift into hyper-extraction in reframing resource extraction as climate action, and competitive advantage in a transitioning economy as a proxy for progress on emissions reduction.

Third, critical minerals discourse re-mystifies the economics of market speculation and the predictability of state intervention in markets. In each wave, criticality assessment boomed as a field of study, collapsing boundaries between corporate commercial data, defence and security policy, and academic knowledge production. Over the last decade, criticality analysis has exploded as an interdisciplinary sub-field that pulls in knowledge, data and research funding from

[112]Ibid.

[113]The Hon Madeleine King MP, 'Support for WA Rare Earths Project to Boost Jobs and Commitment to Net Zero', Media Release, 17 January 2023, available at minister.infrastructure.gov.au/m-king/media-release/support-wa-rare-earths-project-boost-jobs-and-commitment-net-zero.

[114]Mona Paulsen argues for renewed diplomatic effort to define and incorporate concepts of economic security within international trade law. See Paulsen, *supra* note 10, at 87–9.

[115]Australia Institute, 'Coal Mine Tracker', available at australiainstitute.org.au/initiative/coal-mine-tracker/; Australia Institute, 'Fossil Fuel Subsidies in Australia 2024', available at australiainstitute.org.au/report/fossil-fuel-subsidies-in-australia-2024/.

[116]D. Aldana Cohen and T. Riofrancos, 'Biden Left Us With a "Prius Economy". It's Time for Something Different', *The New York Times*, 7 January 2025, available at www.nytimes.com/2025/01/07/opinion/electric-vehicles-tax-credits.html.

[117]R. Perkins, 'Fossil Fuel Use Hits New Highs in 2023 despite Renewable Energy Boom', *S&P Global*, 20 June 2024, available at www.spglobal.com/energy/en/news-research/latest-news/crude-oil/062024-fossil-fuel-use-hits-new-highs-in-2023-despite-renewable-energy-boom. See further D. Shapovalova, 'Climate Change and Oil and Gas Production Regulation: An Impossible Reconciliation?', (2023) 26(4) *Journal of International Economic Law* 817.

[118]See Cotula, *supra* note 4, at 23.

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geoscience, finance markets, engineering, international relations, and development economics.[119] In this overheated context, the market projections that gain the most authority – which in this third wave have been those produced the International Energy Agency and the World Bank – are treated by governments and pundits alike as truth.[120] This is despite the fact that the methodological bases for market speculation, particularly over the longer term, are known to be unreliable, not least because speculation directly impacts markets.[121] Criticality claims thereby serve as a classic form of mystification of market dynamics.

At the same time, criticality claims aggravate the volatility of global resource markets in two major ways. First, such claims are a mode of market signalling. In adopting particular market projections as a basis for policymaking, states contribute to the risk of such projections being treated as gospel, despite the fact that global resource markets are notoriously prone to price volatility. Critical materials markets are even more so, because projects tend to involve novel or difficult extraction and processing methods at comparatively small scale. Critical minerals projects tend to require significant up-front capital investment despite long lead times to production, during which market conditions can change dramatically.[122] The global lithium market is a notorious example.[123] Second, as discussed above, criticality claims enable particular forms of market intervention, from stockpiling, to public investment in domestic extractive industry through tax incentives and direct subsidization, to public debt financing of domestic companies investing in projects in foreign jurisdictions. There is a burgeoning pipeline of publicly subsidized critical minerals projects in development around the world, which will themselves rapidly render obsolete the market projections used to justify that public investment. Recalling Gini's 1922 observation of the tendency of the 'raw materials problem' to transform from shortage to glut, critical minerals discourse thus aggravates the tendency of the global resources sector towards exaggerated cycles of boom and bust and uses public funds to do so. The short-term benefits to resource companies leveraging criticality claims to their own competitive advantage are clear. The long-term benefits to climate, biodiversity, and the global public are not.

The fourth and final trend is unsurprising: in rebranding mining as climate action, critical minerals discourse has functioned less as a means of speeding up the global energy transition than as a means of leveraging the urgency of the climate crisis in favour of elite and extractive interests, and away from local communities and ecosystems. A diverse and growing groundswell of scholars and activists have warned for decades about the risks posed by critical mineral and REE extraction to local ecosystems and communities.[124] Criticality claims have frequently been used as a pretext for winding back existing environmental, social, and local protections in the name of climate action; as Riofrancos has observed, 'the mining imperative appears to pose a zero-sum choice

[119]See, for example, P. Christmann and G. Lefebvre, 'Trends in Global Mineral and Metal Criticality: The Need for Technological Foresight', (2022) 35 *Mineral Economics* 641.

[120]See note 82, *supra*.

[121]On critical minerals markets, see L. Fletcher et al., 'Green Light or Gaslight? The Transition Minerals Dilemma for Australia', Jubilee Australia Research Centre, April 2023, available at www.jubileeaustralia.org/storage/app/uploads/public/645/2cc/90a/6452cc90a05b2016702864.pdf.

[122]Current analyses include K. Sohag et al., 'Volatility Transmission from Critical Minerals Prices to Green Investments', (2023) 82(2) *Resources Policy* 103499; and J. Considine et al., 'The Effects of a Shock to Critical Minerals Prices on the World Oil Price and Inflation', (2023) 127 *Energy Economics* 106934.

[123]See, for example, A. Mehdi, 'Lithium Price Volatility: Where Next for the Market?', *Oxford Institute of Energy Studies Energy Insight: 145*, February 2024, available at www.oxfordenergy.org/wpcms/wp-content/uploads/2024/02/Insight-145-Lithium-Price-Volatility.pdf.

[124]See Paulsen, *supra* note 10. See further J. Barandiarán, 'Lithium and Development Imaginaries in Chile, Argentina and Bolivia', (2019) 113 *World Development* 381; T. Riofrancos, *Resource Radicals: From Petro-Nationalism to Post- Extractivism in Ecuador* (2020); S. Mejia-Muñoz and S. Babidge, 'Lithium Extractivism: Perpetuating Historical Asymmetries in the "Green Economy"', (2023) 44(6) *Third World Quarterly* 1119; N. Bruna, 'A Climate-Smart World and the Rise of Green Extractivism', (2022) 49(4) *The Journal of Peasant Studies* 839; and D. N. Scott, 'Infrastructural (Dis)Entitlement: Tactics of Dispossession on the Critical Minerals Frontier', (2025) 5(1) *Journal of Law and Political Economy* 38.

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between decarbonization and the protection of ecosystems and communities'.[125] The risk posed to local communities and ecosystems by critical minerals discourse is underscored by the fact that the global distribution of known critical minerals deposits and projects is heavily concentrated on land over which Indigenous peoples exercise some recognized form of rights.[126] According to a recent study, around 54 per cent of critical minerals projects are located on such land, with a further 33 per cent located on or near the land of peasant communities.[127] With respect to Australia, Burton et al. warn that critical minerals projects and known deposits are concentrated in the country's most economically and socially disadvantaged local government areas, with the highest First Nations populations.[128] This unequal – and clearly racialized – distribution of the harms of critical mineral development is only aggravated by the post-pandemic shift into hyper-extraction, which has seen aggressive increases in the production of resources basic to industrial production, including copper, iron ore, bauxite, and aluminium.[129]

These four trends in the politics of third wave critical minerals discourse point towards an underlying conclusion. Critical minerals discourse is one dimension of the broader subversion of the climate agenda to the interests of capital. But that subversion has been enabled by governments of the Global North which, in adopting ineffectual climate policy over the last two decades, have ultimately sought less to harness the power of the private sector and the market toward climate action than to abrogate their own political responsibility to act.

## 6. Conclusion: The past, present, and future of critical minerals discourse

This article has examined the evolution of critical minerals discourse in international trade and security debates in the Global North over the past century. It has identified three distinct waves in critical minerals discourse, in which the scope of criticality claims has been determined by reference to dominant constructions of national security in the US. Well into its third wave, critical minerals discourse is being used to advance multiple agendas of governance in the Global North which are not necessarily aligned with any particular position across the political spectrum. Such agendas include incentivizing the energy transition toward renewables and away from fossil fuels – the most palatably liberal justification for criticality claims, and the one that dominated the Biden administration's green industrial agenda; securing commercial competitive advantage in global renewable, robotics and digital technology markets; feeding the surging energy needs of AI; and supporting the recalibration of defence alliances and military build-up.

The article has argued that third wave critical minerals discourse has to date had a clear politics, shaped by four trends. First, critical minerals discourse has been used as a rhetorical device for asserting that the national security of the US and its allies lies in the defence of US hegemony, and not in the defence of international institutions and trade norms. Second, critical minerals discourse has served as a highly effective means of leveraging geopolitical instability in favour of extractive interests. Third, critical minerals discourse has worked to re-mystify the economics of market prediction, and thus to aggravate the volatility of resource markets. And finally, critical minerals discourse is being used to leverage the existential urgency of the climate crisis in favour of extractive interests, and against local communities and ecosystems.

[125]See Riofrancos, *supra* note 73, at 21.

[126]J.R. Owen et al., 'Energy Transition Minerals and their Intersection with Land-Connected Peoples', (2023) 6 *Nature Sustainability* 203.

[127]Ibid. See also Kramarz et al., *supra* note 12.

[128]J. Burton et al., 'A Socio-Spatial Analysis of Australia's Critical Minerals Endowment and Policy Implications', (2024) 88 *Resources Policy* 104448. See also A. Hine et al., 'Critical Minerals: Rethinking Extractivism?', (2023) 54(3) *Australian Geographer* 233.

[129]See, for example, A. Gluyas, 'Iron Ore Could Collapse 30pc as Rio Tinto Floods Market', *Australian Financial Review*, 20 January 2025, available at www.afr.com/markets/commodities/iron-ore-could-collapse-30pc-as-rio-tinto-floods-market-20250120-p5l5od.

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To conclude: critical minerals discourse just as readily serves the second Trump administration's mercantilist version of US hegemony as it did the Biden administration's green industrial version. As Orford has noted of the current juncture, 'powerful states and their consiglieres are seeking to establish the credibility of new visions for a planned global economy through the twinned languages of securitization and climatization'.[130] Criticality claims are an effective rhetorical tool for advancing such gambits for epistemic authority in the wake of neoliberal consensus. As this article has sought to map, this third wave of critical minerals discourse has come at significant cost: to the evolution of understandings of security anchored otherwise than in the defence of US hegemony; to the state's policy making capacity relative to extractive industry in the context of the energy transition; to the stability of global resource markets; and ultimately, to the interests of local communities and ecosystems.

A groundswell of scholars, activists, and not-for-profit organizations have long warned of the risks that unchallenged criticality claims pose to geopolitical stability, to effective minerals and environmental governance, and to local communities.[131] Those campaigns are gaining ground in the responses of international institutions to critical minerals discourse. In September 2024, the UN Secretary-General's Panel on Critical Energy Transition Minerals released a report outlining guiding principles for critical minerals governance grounded in human rights, planetary integrity and justice and equity.[132] In May 2025, the Inter-American Court of Human Rights, in its Advisory Opinion on the Climate Emergency and Human Rights, drew attention to the need 'to protect human rights from violations that may occur due to the extraction of the crucial rare-earth minerals needed for the energy transition'.[133] International trade lawyers, for their part, have been contributing proposals for navigating the current impasse in the WTO system in ways that maintain the longer term viability of multilateral co-ordination on global issues.[134] Such pragmatic approaches to the current geopolitical juncture that accept the realities of great power conflict whilst insisting on the possibility of international institutional renewal are far more generative, and historically informed, than approaches that stop at mourning the death of multilateralism. Ultimately, however, the trajectory of this third wave of critical minerals discourse largely depends on whether the US' historical allies – the EU, the UK, Canada, Australia, India, and Japan among them – continue to locate their national security in the defence of US hegemony, rather than in the renewal of international institutions and the pursuit of effective multilateral action against climate change. Critical minerals discourse serves the former agenda. It does not serve the latter.

[130]See Orford, *supra* note 5.

[131]In addition to the works listed at *supra* note 16, see also D. Soto Hernandez and P. Newell, 'Oro Blanco: Assembling Extractivism in the Lithium Triangle', (2022) 49(5) *The Journal of Peasant Studies* 945; C. A. Johnston et al., 'The Unbearable Lightness of Lithium Governance: Legitimizing Extraction for a Just and Sustainable Energy Transition', (2025) 23 *Earth System Governance* 100235; and Mining Watch Canada, 'Turning Down the Heat: Can We Mine Our Way Out of the Climate Crisis?', Conference Report, November 2020, available at miningwatch.ca/sites/default/files/miningwatch_review_page.pdf.

[132]UN Secretary-General's Panel on Critical Energy Transition Minerals, *Resourcing the Energy Transition: Principles to Guide Critical Energy Transition Minerals Toward Equity and Justice*, 11 September 2024, available at www.un.org/sites/un2.un.org/files/report_sg_panel_on_critical_energy_transition_minerals_11_sept_2024.pdf.

[133]*Advisory Opinion on Climate Emergency and Human Rights*, Advisory Opinion AO-32/25 of 29 May 2025, [2025] IACHR, at Para. 342.

[134]See Howse and Langille, *supra* note 69, on returning to the essential 'pluralism' of the WTO system; see Pinchis-Paulsen, *supra* note 78; see Leonelli, *supra* note 3, on the urgent need for a 'radically different outward-looking, constructive, and long-term approach to the governance of the trade and climate change mitigation linkage is urgently needed' (at 20); and Cohen on the adoption of a best practice approach to invocations of the Art. XXI(b) security exception in H. G. Cohen, 'Toward Best Practices for Trade-Security Measures', (2024) 27(1) *Journal of International Economic Law* 93.

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