No More Mining for War

Disarmament for Energy Abundance

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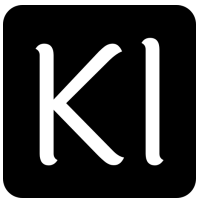

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This brief is part of a series examining how to advance the energy transition without reproducing extractivism. The full series is available at https://climateandcommunity.org/research/beyond-extractivism.

Summary

The global energy transition away from fossil fuels is directly threatened by rising militarism. Materials essential for low-carbon energy—copper, lithium, cobalt, aluminum, and rare earth elements—are increasingly diverted into weapons systems, undermining climate goals and exposing producing regions to complicity in armed conflict. This brief outlines how disarmament is a prerequisite for material sufficiency in the energy transition and proposes governance mechanisms to ensure that energy transition materials (ETMs) are used for planetary benefit rather than destruction.

Current challenges include:

- **Unprecedented military-driven mining**: Increasing weapons production for wars drives unnecessary expansion of mining and related social and environmental harms.
- **Material diversion risk**: ETMs flow freely between civilian and military uses, with no mechanisms to restrict end-use in weapons systems.
- **Direct competition in mineral and financial resources**: Rising military spending ($2.7 trillion in 2024) competes directly with energy transition investments (~$2.4 trillion), diverting both materials and finance.[1]
- **Long-standing governance gap**: Existing "conflict-free" mineral legislation regulates origin but not end-use, allowing certified materials to be used in weapons.
- **Shared harms**: Mining and warfare impact landscapes and livelihoods in the same ways, including environmental contamination, displacement, labor exploitation, long-term ecological damage, and intergenerational harm.

[1] Diego Lopes da Silva et al., "3. Military Expenditure," in *SIPRI Yearbook 2025*, Stockholm International Peace Research Institute (Oxford University Press, 2025), https://www.sipri.org/yearbook/2025/03; Shengzi Li et al., "Global Landscape of Energy Transition Finance 2025," International Renewable Energy Agency and Climate Policy Initiative, November 17, 2025, https://www.climatepolicyinitiative.org/publication/global-landscape-of-energy-transition-finance-2025/.

- **Persistent producer disempowerment and potential liability**: Mineral-producing regions do not exercise authority over how extracted materials are ultimately used, implicating them in war crimes perpetrated by others.

Tackling these challenges is also an unprecedented opportunity to achieve energy abundance and reduce unnecessary mining through disarmament:

- **Build a global disarmament-for-climate framework**: This can ensure that the material basis of energy system decarbonization and fossil fuel non-proliferation serves civilian life, ecological repair, and shared prosperity rather than war and extractivism.
- **Reduce and repurpose material demand from militarism**: Strategic stockpiles and public procurement mechanisms should be designed to support civilian decarbonization and energy access, not deepen competition between military sectors and climate-critical uses.
- **Establish a climate designation assurance**: For extractive industries, this can track whether materials produced serve climate-critical or climate-hostile purposes, which would help prevent extraction justified in the name of the energy transition from being redirected to petrochemical or military applications.
- **Abolish sacrifice zones**: Close loopholes that allow military-linked or strategic mineral projects to bypass environmental safeguards, labor protections, and community rights, thereby ending the doctrine that some places must be permanently damaged for the benefit of others.
- **Establish end-use governance**: Producing regions can define and adopt producer principles that restrict the use of their materials in weapons systems that violate international law and undermine international climate commitments.

Introduction: Why disarmament matters for ETM security

The global push toward decarbonization is unfolding alongside escalating geopolitical conflict. This convergence reflects the shared material foundation between low-carbon energy technologies, fossil fuel infrastructure, and weapons systems. The same extractive systems that sustain fossil fuel economies also supply modern warfare, which is capturing an increasing share of mineral and financial resources.[2] Global military spending reached $2.7 trillion in 2024, outpacing investments in key segments of the energy transition. Military operations themselves contribute an estimated 5.5 percent of global emissions, a figure that excludes emissions from conflict-related destruction and reconstruction and does not account for the impacts of militarism-related mining.[3]

Energy transition materials (ETMs) are central to this tension. These materials enable renewable energy systems, electrification, and storage—but are equally critical to weapons manufacturing. Without effective governance mechanisms in place, producing regions cannot control whether their resources support wind turbines or weapons of mass destruction banned by international treaty.

This creates a structural contradiction: without directly addressing the competing resource demands of rearmament, climate policy risks promoting extraction without ensuring climate-aligned use. The rise of global militarism has been enabled by the longer-term failure of existing international treaty frameworks to address militarism's larger patterns of resource consumption, financial diversion, climate impacts, ecosystem destruction, and human rights abuses. The UN Framework Convention on Climate Change does not require countries to report their militaries' carbon emissions, including under the 2015

[2] United Nations Secretary-General, "The Security We Need: Rebalancing Military Spending for a Sustainable and Peaceful Future," United Nations, 2025, 76, https://front.un-arm.org/Milex-SDG-Study/SG_Report_TheSecurityWeNeed.pdf.

[3] Patrick Bigger, et al., "Less War, Less Warming: A Reparative Approach to US and UK Military Ecological Damages," Common Wealth and Climate and Community Institute, November 6, 2023, 30, https://www.common-wealth.org/publications/less-war-less-warming-a-reparative-approach-to-us-and-uk-military-ecological-damages; Stuart Parkinson and Linsey Cottrell, "Estimating the Military's Global Greenhouse Gas Emissions," Scientists for Global Responsibility and Conflict and Environment Observatory, November 2022, 16, https://ceobs.org/wp-content/uploads/2022/11/SGRCEOBS-Estimating_Global_Military_GHG_Emissions_Nov22_rev.pdf.

Paris Agreement, while existing reporting remains limited, voluntary, and in decline.[4] Military consumption of metals is even less transparent than fossil fuel use or greenhouse gas emissions.[5] Furthermore, despite existing—and admittedly weak—regulations about "conflict mineral" sourcing, there are no comparable regulations addressing whether certified "conflict-free" minerals are ultimately used for war.[6] As a result, materials deemed "critical" for climate mitigation are simultaneously used to destroy climate-resilient infrastructure, including energy systems, water facilities, and agricultural land in warzones around the world.

Disarmament means less destruction, not only by reducing the incidence of war, but also by reducing war-driven mining and greenhouse gas emissions. Disarmament is therefore inseparable from climate mitigation.

Competing uses: energy transition versus warfare

Competition between civilian and military uses of ETMs is already measurable across supply chains and technologies. Military resource demands have historically driven extractivism and colonialisation—from the 16th century European decimation of its own forests to build ships and fuel iron and copper foundries for guns, cannons, and other arms, to the 20th century nuclear arms race that redoubled colonial mining ventures in Africa and Latin America to

[4] Ellie Kinney et al., "How increasing global military expenditure threatens SDG 13 on Climate action," Conflict and Environment Observatory, May 2025, https://ceobs.org/how-increasing-global-military-expenditure-threatens-sdg-13-on-climate-action/; Patrick Patrick Bigger et al., "The Climate Crisis and the US War Machine," Climate and Community Institute, February 2025, 5, https://climateandcommunity.org/wp-content/uploads/2025/02/The-Climate-Crisis-and-the-US-War-Machine-1.pdf; Grace Alexander, "New Data Reveals the Military Emissions Gap Is Growing Wider," Conflict and Environment Observatory, November 6, 2025, https://ceobs.org/new-data-reveals-the-military-emissions-gap-is-growing-wider/.

[5] Claudiu C. Pavel and Evangelos Tzimas, "Raw materials in the European defence industry," European Commission, 2016, 126, https://setis.ec.europa.eu/system/files/2021-02/raw_materials_in_the_european_defence_industry.pdf; Benedetta Girardi et al., "Strategic raw materials for defence: Mapping European industry needs," The Hague Centre for Strategic Studies, January 2023, 54, https://hcss.nl/wp-content/uploads/2023/01/Strategic-Raw-Materials-for-Defence-HCSS-2023-V2.pdf; Lorah Steichen, "Mining for War: Assessing the Pentagon's Mineral Stockpile," Transition Security Project, December 2025, 17, https://climateandcommunity.org/research/mining-for-war/.

[6] Catherine Coumans, "Conflict Minerals, Conflict Mines and Critical Minerals for War: Mining, Human Rights and Canadian Foreign Policy," in *Hand in Hand? Canada at the Human Rights and Peacebuilding Nexus*, ed. Kirsten Van Houten and Alex Neve, Canada and International Affairs (Springer Nature Switzerland, 2024), https://doi.org/10.1007/978-3-031-72182-3_12; Kali Rubaii et al., "When 'Conflict Free' Minerals Go to War," *Political Geography* 123 (December 2025): 103425, https://doi.org/10.1016/j.polgeo.2025.103425.

produce uranium and rare earth elements.[7] Today's wars are increasingly material-intensive, driven by the same extractive access to foreign lands and negligence for waste that undergirds the fossil fuel industry, while capturing many of the same ETMs and electrification technologies needed for a just transition. Meanwhile, the proliferation of mineral "deals," deregulation of extractive industries, and increasing warfare is derailing decades of progress toward peace, security, and better social and environmental standards governing mineral and metal supply chains.

To illustrate the direct competition between ETMs used in low-carbon technologies and in weapons systems, we analyzed the aluminum contained in MK-series bombs and Joint Direct Attack Munition (JDAM) kits—supplied by the United States to the Israeli Defense Forces (IDF) since October 2023 and used in high-profile attacks on civilian areas and climate-critical infrastructure, including renewable energy, water, and agricultural systems.[8] Aluminum comprises roughly 20 percent of the explosive material in these bombs, as well as key structural components in JDAM casings and fins.[9] In February 2025, the United States announced a sale of 35,529 MK-84/BLU-117 and 5,000 MK-83/BLU-110 bombs to Israel.[10] The explosive fill in just these bombs consumes 3,254 tonnes of aluminum, enough to produce 19 wind turbines.[11] Bauxite, the primary ore for aluminium, is primarily produced by Guinea, Australia, and China, with major mining operations also in Brazil, India, and Indonesia.[12] This shows how

[7] Extractivism is an economic development model based on largely unfettered resource exploitation with highly unequal distributions of benefits and impacts; François Jarrige and Thomas Le Roux, *The Contamination of the Earth: A History of Pollutions in the Industrial Age*, trans. Janice Egan (MIT Press, 2020).

[8] United Nations Office of the High Commissioner for Human Rights, "Thematic Report - Indiscriminate and Disproportionate Attacks During the Conflict in Gaza (October – December 2023)," United Nations Office of the High Commissioner for Human Rights, June 19 2024, 17, https://www.ohchr.org/sites/default/files/documents/countries/opt/20240619-ohchr-thematic-report-indiscrim-disprop-attacks-gaza-oct-dec2023.pdf ; World Bank, European Union, and United Nations, "Gaza and West Bank Interim Rapid Damage and Needs Assessment," World Bank, European Union, and United Nations, 2025, 92, https://thedocs.worldbank.org/en/doc/133c3304e29086819c1119fe8e85366b-0280012025/original/Gaza-RDNA-final-med.pdf.

[9] "MK80 Series General Purpose and BLU-109 Tritonal Bomb Kits," SAM.gov, last updated May 15, 2021, https://sam.gov/opp/733dace3ff2e4d3e9de31ffe0d8eae37/view; "MK84," Federation of American Scientists Military Analysis Network, last updated April 23, 2000, https://gulflink.health.mil/al_muth/al_muth_refs/n58en036/mk84.htm; Steven C. Medeiros, "Failure analysis of an aluminum casting," Advanced Materials & Processes 155, no. 4 (1999): 42, https://link.gale.com/apps/doc/A54517297/AONE?u=anon~8ebcca5f.

[10] Defense Security Cooperation Agency, "Israel – Munitions, Guidance Kits, and Munitions Support," Defense Security Cooperation Agency, February 28, 2025, https://www.dsca.mil/Press-Media/Major-Arms-Sales/Article-Display/Article/4088252/israel-munitions-guidance-kits-and-munitions-support; Defense Security Cooperation Agency, "Israel – Munitions and Munitions Support," Defense Security Cooperation Agency, February 28, 2025, https://www.dsca.mil/Press-Media/Major-Arms-Sales/Article-Display/Article/4088258/israel-munitions-and-munitions-support.

[11] To calculate these numbers, we multiplied the net explosive weight published for both bombs by 0.2 (aluminum content of the explosives), then by the February 2025 sales' bomb quantities. We divided the total metric tonnes by the 166 tonnes of aluminum/aluminum alloy in a wind turbine from this industry analysis (p. 46): Sagar Mali and Peter Garrett, *Life Cycle Assessment of Electricity Production from an Onshore V136-4.2MW Wind Plant*, (Vestas, March 2022), 133, https://www.vestas.com/content/dam/vestas-com/global/en/sustainability/reports-and-ratings/lcas/LCA%20of%20Electricity%20Production%20from%20an%20onshore%20V136-4.2MW%20Wind%20Plant_Final.pdf.coredownload.inline.pdf.

[12] US Geological Survey, "Mineral Commodity Summaries 2025," US Geological Survey, https://doi.org/10.3133/mcs2025.

extractive regions are materially implicated in the trade-offs between renewable energy deployment and the expansion of warfare.

These same weapons include miniature wind turbines, lithium batteries, and rare earth permanent magnets, demonstrating that competition for ETMs between energy transition and weapons applications occurs not only in the upstream supply chain but also in the ways renewable technologies are deployed.[13] At mining as well as military manufacturing, testing, and conflict sites, metals enter human bodies and surrounding environments, creating multiple exposure pathways and multigenerational health and environmental impacts across weapons supply chains.[14] Whether caused by warfare or underregulated mining, this pollution and its impacts persist long after the conflict ends.

Although the United States maintains the largest global military in terms of spending, the materials for its weaponry are sourced through the same global supply chains that provision essential civilian sectors and energy transition technologies.[15] This means that warfare both impacts and depends on extractive industrial systems far from where it occurs.

Pathways forward: global disarmament for energy abundance

The Fossil Fuel Non-Proliferation Treaty process provides a unique opportunity to embed disarmament within climate governance. Military activity should no longer be treated as external to climate mitigation, adaptation, or transition planning. To align ETM flows with climate goals, governments must integrate disarmament into energy,

[13] Vincent Aiello, "Understanding the FMU-139 and Its Employment Options," The Fighter Pilot Podcast, last modified September 21, 2020, https://www.fighterpilotpodcast.com/post/understanding-the-fmu-139-and-its-employment-options; "Joint Direct Attack Munition (JDAM) Design," GlobalSecurity.org, page last modified July 7, 2011, https://www.globalsecurity.org/military/systems/munitions/jdam-design.htm; Defense Logistics Agency, "Fiscal Year 2025 Budget Estimates," Defense Logistics Agency, March 2024, 84, https://comptroller.war.gov/Portals/45/Documents/defbudget/FY2025/budget_justification/pdfs/03_RDT_and_E/RDTE_DLA_PB_2025.pdf.

[14] Anatoly V. Skalny et al., "Environmental and Health Hazards of Military Metal Pollution," *Environmental Research* 201 (October 2021): 111568, https://doi.org/10.1016/j.envres.2021.111568; Mark Griffiths and Kali Rubaii, "Late Modern War and the Geos: The Ecological 'Beforemaths' of Advanced Military Technologies," *Security Dialogue* 56, no. 1 (2025): 38–57, https://doi.org/10.1177/09670106241265636.

[15] Xiao Liang et al., "Trends in World Military Expenditure, 2024," Stockholm International Peace Research Institute, April 2025, 12, https://doi.org/10.55163/AVEC8366.

mineral, and land use governance. Four pathways are outlined here to enable intervention across the supply chain—from extraction to end-use—providing a concrete strategy to take on militarism as a major driver of emissions, material demand, ecosystem destruction, and financial diversion.

Producing regions can lead in defining and implementing this framework. Their leverage lies not only in supplying materials, but in defining the political terms under which those materials are traded and used.[16] A disarmament-for-energy-abundance initiative would bolster existing climate and just transition initiatives by linking mineral governance, climate policy, and peacebuilding around a common objective: ensuring that the material basis of energy system decarbonization and fossil fuel non-proliferation serves civilian life, ecological repair, and shared prosperity rather than war and extractivism.

Reduce and repurpose material demand from militarism

A credible climate strategy cannot coexist with rising weapons expenditures. Addressing the material and financial demands of militarism requires standardized reporting of military emissions and material consumption, closing a major blind spot in climate governance. Without this transparency, it remains impossible to assess the scale at which ETMs are diverted from renewable energy systems into weapons production.

Public finance must also be redirected. Military spending and procurement currently absorb resources that could otherwise support renewable energy infrastructure, grid resilience, and public electrification.[17] Strategic stockpiles and procurement mechanisms should be redesigned to prioritize civilian decarbonization and energy

[16] Isabel Estevez et al., "Building Leverage for Green Industrial Transformation in Latin America and the Caribbean: Procurement Clubs, Production Clubs, Investment Clubs, and Beyond," i3T, September 2025, 17, https://www.i3-t.org/documents/Building%20Leverage%20for%20Green%20Industrial%20Transformation%20in%20Latin%20America%20and%20the%20Caribbean_%20Pr.pdf.

[17] Lorah Steichen et al., "Redirecting Energy Transition Minerals fromthe Pentagon Fleet to the Public Good," Climate and Community Institute, February 2025, 7, https://climateandcommunity.org/wp-content/uploads/2025/02/Redirecting-Energy-Transition-Minerals-from-the-Pentagon-Fleet-to-the-Public-Good_2-19-25.pdf.

access, rather than deepening competition between military sectors and climate-critical uses.

Establish a climate designation assurance for extractive industries

Preventing the diversion of ETMs into military supply chains requires stronger alignment between extraction and end-use. A climate designation assurance for extractive industries would create a site-level transparency system to track whether materials are ultimately used for climate-critical or climate-hostile purposes. This would help ensure that extraction justified in the name of the energy transition is not redirected toward weapons production.

Such a framework would also strengthen accountability across the supply chain by improving transparency around offtake agreements, financing arrangements, and end buyers. Governments and communities would be better equipped to assess whether projects align with stated climate and development goals, reinforcing meaningful oversight and strengthening processes such as free, prior, and informed consent (FPIC).

Abolish sacrifice zones

Any just energy transition must reject the premise that some regions can be permanently damaged for the benefit of others. In many cases, such sacrifice zones are sustained through militarized forms of protection which threaten or enact violence against environmental, land, and water defenders.[18] Policies aimed at aligning ETMs with climate goals should prohibit forms of extraction and processing that generate long-term contamination, occupational harm, or irreversible ecosystem damage—particularly where these activities are tied to military supply chains.

This principle is especially urgent for uranium and other strategic minerals linked to both energy and weapons systems. Renewed military and nuclear competition is expanding patterns of nuclear

[18] See for example: Krista Shennum and Margareth Aritonang, "Does Anyone Care?: The Human, Environmental, and Climate Toll of Indonesia's Nickel Industry," Climate Rights International, October 2025, https://cri.org/reports/does-anyone-care/; Alexander Dunlap, "The Self-Reinforcing Cycle of Ecological Degradation and Repression: Revealing the Ecological Cost of Policing and Militarization," in *Enforcing Ecocide: Power, Policing & Planetary Militarization*, ed. Alexander Dunlap and Andrea Brock (Cham, Switzerland: Springer International Publishing, 2022), 153–76, https://doi.org/10.1007/978-3-030-99646-8_6.

colonialism and creating new sacrifice zones under the banner of security. Member states should close regulatory loopholes and resist exemptions that allow military-linked or strategic mineral projects to bypass environmental safeguards, labor protections, and community rights.

Establish end-use governance

Current mineral governance focuses largely on where certain minerals come from, not where they go. That is a major gap that leaves producing regions open to complicity in war crimes and climate-hostile activities. Producing regions can define and adopt producer principles that restrict the use of their materials in weapons systems and other forms of warfare that violate international law. These principles could serve as the basis to align bilateral and multilateral mineral agreements with climate goals, human rights, and international legal norms.[19]

This shift also requires new systems of end-use traceability. Existing "conflict-free" certification regimes do not prevent minerals from entering military supply chains after extraction and refining. Governments, regulators, and firms should therefore develop disclosure and tracking systems that identify whether ETMs are destined for climate-critical versus climate-hostile applications. Trade and investment agreements should incorporate end-use clauses that prioritize climate-critical uses and limit diversion into war-making industries.

[19] Julie M. Klinger, Gwendolyn K. Murphy, and Coryn Wolk, "A nationally determined contribution framework for energy transition minerals." Nature Energy 9, no. 12 (2024): 1452-1454, https://doi.org/10.1038/s41560-024-01661-0.