Redirecting Energy Transition Minerals from the Pentagon Fleet to the Public Good

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One of the key tenets of the energy transition is the need to "electrify everything." As it stands now, "everything" means not just homes and cars, but sectors less often addressed by climate policy—like militaries and the industries that supply them. For example, Biden's federal sustainability targets instructed the Pentagon to achieve 100 percent zero-emission vehicle acquisitions within its non-tactical vehicle (NTV) fleet (that is, non-combat vehicles like sedans, SUVs, and buses) by 2035. However, the allocation of minerals to military applications diverts supply from more socially useful sectors and undermines transition objectives. **Electrifying the military's NTV fleet would require a huge volume of resources due to the sheer size of the US war machine—resources that ought to be redirected away from death and destruction and towards preserving life. Electrification efforts should promote genuine human security while reducing the Pentagon's dominance of federal government priorities.**

That is not to say that the military, along with every other branch of government and sector of the economy, does not need to decarbonize. It very much does. The Department of Defense (DoD) accounts for more than three-quarters of all Federal Government greenhouse gas emissions, and the Pentagon has played an outsized role in the creation and maintenance of the global fossil fuel economy. Given the sprawling size of the US military and its bloated budget, the most straightforward way to facilitate military decarbonization is through strategic military spending cuts that reduce the material footprint of the military, and in turn, alleviate military demand for resources. And yet, a disproportionate share of the federal government's greening investments have gone to the military, where vehicle electrification has been a focal decarbonization strategy, if only because of the vast size of DoD's fleet.

[1] While this target was set by executive order in 2021 and has since been revoked by the Trump administration, the military has often been at the forefront of decarbonization experiments within the Federal Government. The pace of Pentagon EV acquisition may slow, but the overall direction of travel is unlikely to change significantly.

Transportation is the number one source of carbon emissions in the United States—making the sector's rapid decarbonization crucial to limiting the climate crisis. At the same time, the transition to zero emissions transportation is also creating new demand for metals such as cobalt, nickel, lithium, and copper, with global implications for climate, environmental, labor, and Indigenous justice. Large-scale mining produces social and environmental harm, in many cases irreversibly damaging landscapes, with devastating impacts on the health and livelihoods of nearby communities. Because of the inevitable damages of any new mining project, electrification efforts must be balanced with a reduction in total demand for new materials (and enhanced recycling of already-mined materials). That means minimizing demand for superfluous ends and ensuring that materials are deployed toward equitable climate solutions.

As it stands now, a massive volume of resources are directed toward sustaining the Department of Defense—easily the largest and most robustly funded US federal agency. In fact, so-called "critical minerals" designations originate in relation to national security priorities and retain a militaristic association with supply chain control and dominance. From military gear to weapons systems, virtually every military system requires mineral components. The importance of securing these resources for the continued production of weapons platforms and munitions has spurred the Pentagon to make substantial investments in new mining and refining facilities both domestically and in allied countries—an imperative that has been accelerated by the US's voluntary entry into a new cold war with China, resulting in reduced access to key materials mined and refined in China. Taken together, hostile trade policy coupled with the Pentagon's sprawling footprint drives new mining demand while simultaneously contributing to scarcity of key materials needed to decarbonize more socially useful sectors.

In this analysis, we assess the volume of minerals required to electrify the military's non-tactical vehicle fleet and alternative applications with the same quantity of minerals: namely the electrification of US Postal Service trucks, National Park Service vehicles, and on-site battery storage for federal buildings. We found that with the same volume of energy-transition minerals (ETMs) needed to electrify the Pentagon's non-tactical vehicle fleet, the federal government could fully electrify all of the US Postal Service trucks and the entire National Park Service vehicle fleet with enough ETMs leftover to equip of over 7,600 federal campus buildings with on-site battery storage. Note that our analysis only includes the military's non-tactical vehicles, both because NTVs have been the subject of federal sustainability targets that parallel broader civilian vehicle electrification efforts, and also because data related to non-tactical vehicles is more publicly available than tactical vehicles.

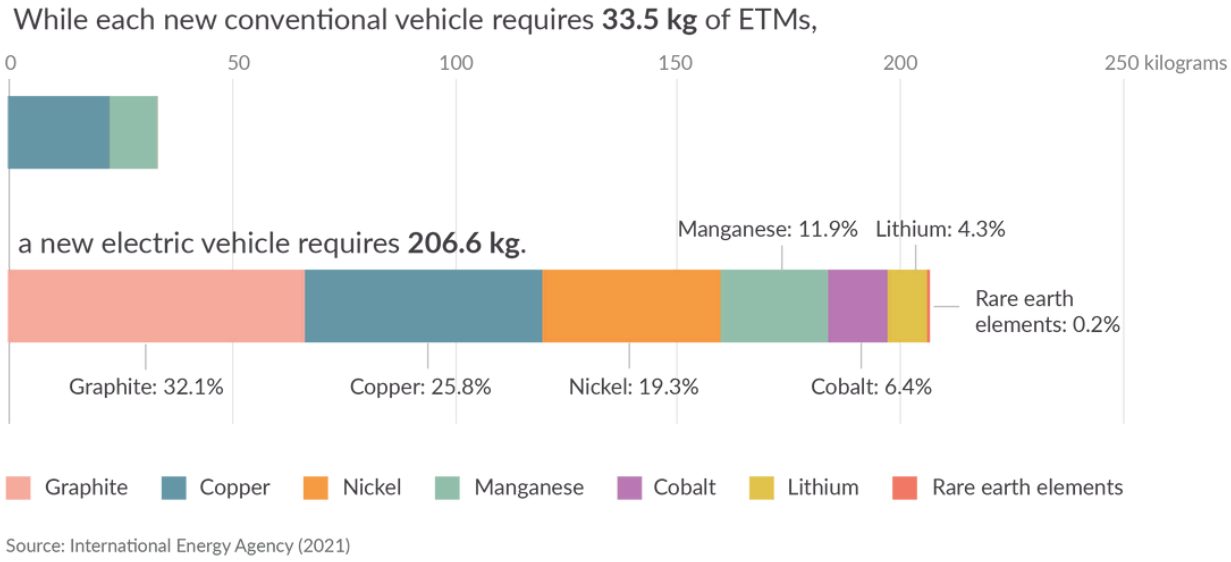
Building new, zero-emissions energy, industrial, and transportation systems will necessarily require some level of mining, but the volume of extraction is not a given. Under conditions of relative

resource constraint, minerals are better used for critical public services rather than for the Pentagon. **In order to plan a rapid and just clean energy transition, the federal government should utilize its procurement power to support critical civilian-serving agencies and essential services to meet human needs and combat the climate crisis.**

Minerals used in electric vehicles

While electric vehicles produce significantly fewer greenhouse gas emissions than other vehicles, the transition to electric vehicles implies a significant increase in demand for minerals. A typical electric vehicle requires six times the mineral inputs of a conventional, gas vehicle: 206.6 kg versus 33.5 kg.

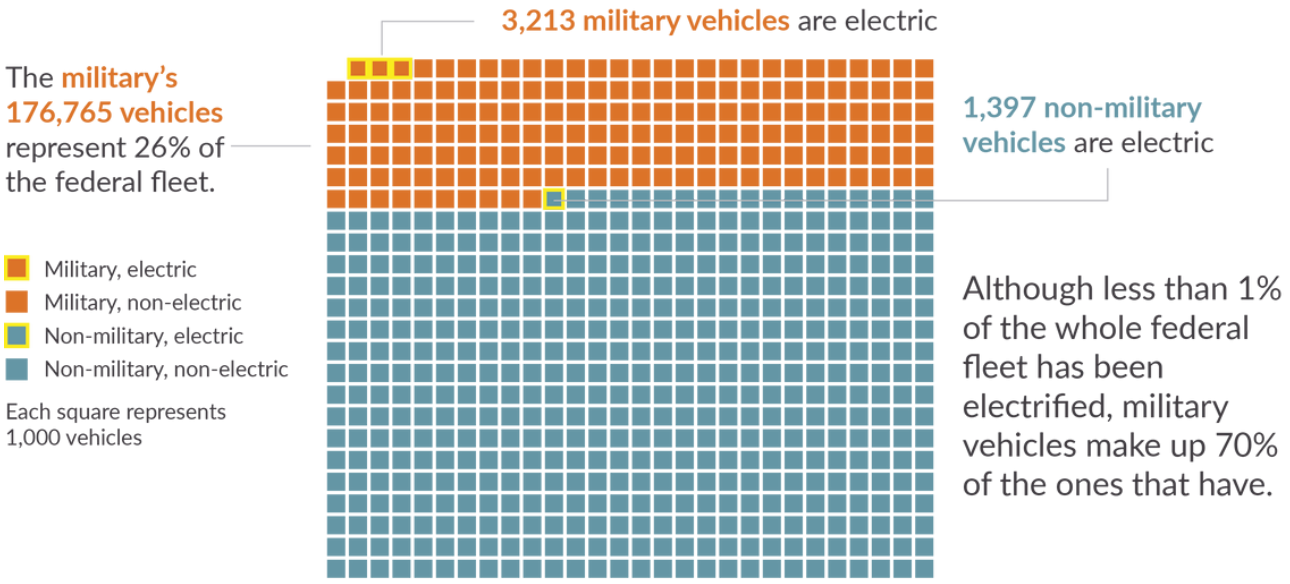
Energy transition mineral (ETM) requirements of gas versus electric vehicles



Source: International Energy Agency (2021)

Electrification of the government's military and non-military vehicles

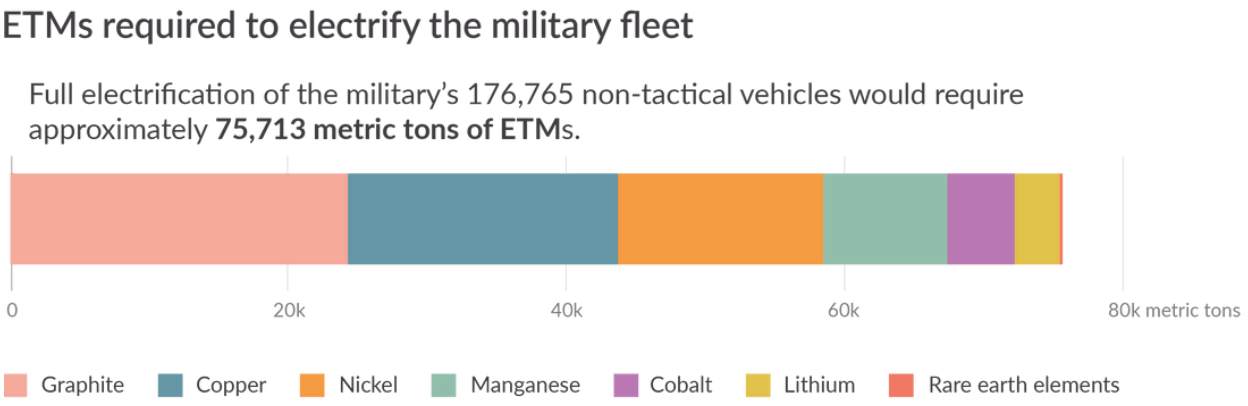
The Pentagon maintains a large fleet of vehicles. With 176,765 vehicles, **the Department of Defense's non-tactical fleet accounts for more than a quarter of all motor vehicles in the federal fleet.** As of 2023, the Pentagon reported 3,213 electric vehicles in its NTV fleet. **While this represents less than one percent of the entire federal fleet, it accounts for 70 percent of all electric vehicles in the entire fleet**. In other words, a disproportionate share of the federal government's greening investments are going to the military.



Source: U.S. General Services Administration (2024)
Notes: Electric vehicles include "battery-electric" and "low-speed electric" vehicles.

Minerals required to electrify the military fleet and alternative uses

We calculate that full electrification of the military's 176,765 non-tactical vehicles, including the 3,213 that are already electric, would require more than 75,000 metric tons of key energy-transition minerals.

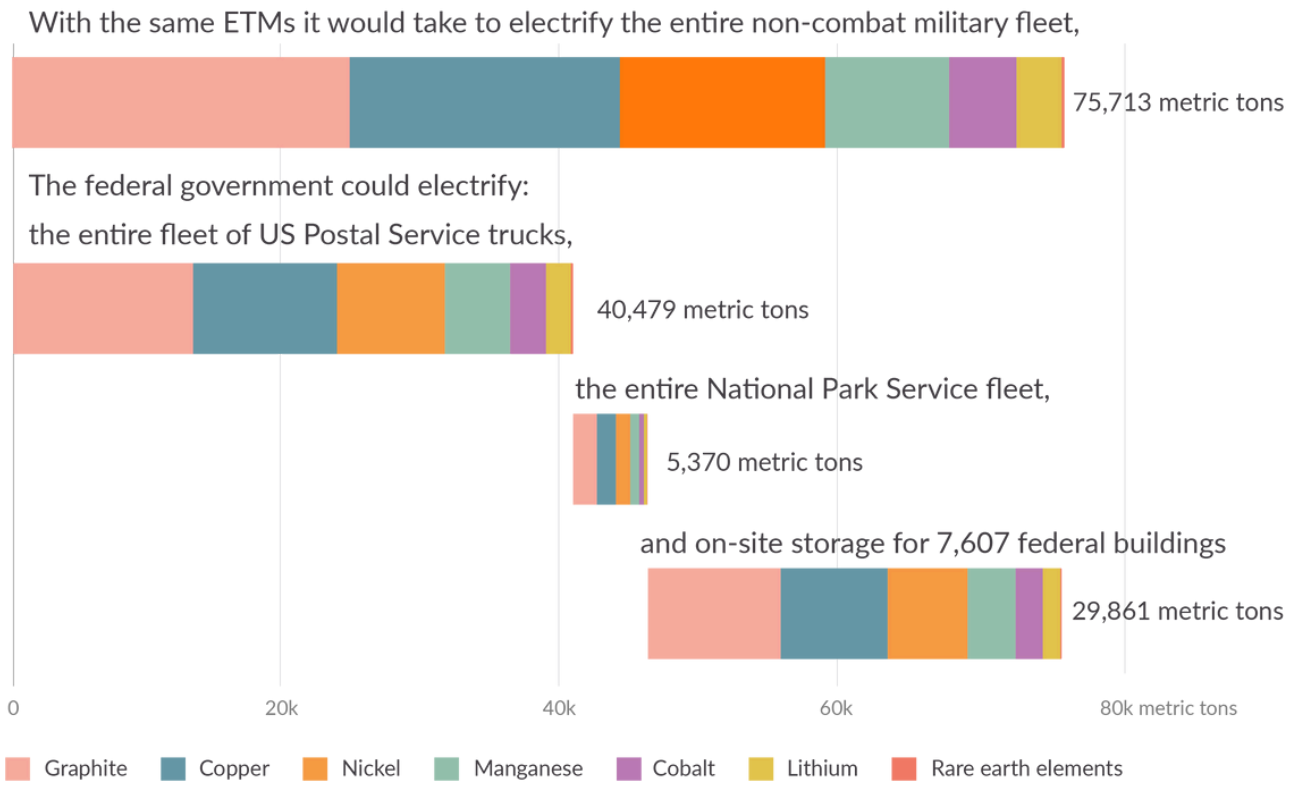


Sources: International Energy Agency (2021), U.S. General Services Administration (2024)
Notes: Battery size is scaled based on average battery size for each vehicle weight category.

The mining required to extract these minerals comes with a variety of social and environmental injustices. Mining is a significant contributor to the climate crisis, with estimates as high as 17 percent of global greenhouse gas emissions attributable to mining. Industrial-scale mining requires significant physical disturbances to a given area, damaging ecosystems and permanently altering landscapes. Clearing land to make way for mines and mining infrastructure may necessarily involve deforestation and direct or indirect harm to local flora and fauna due to habitat degradation. Digging out massive quantities of earth to access mineral deposits can create sinkholes, landslides, earthquakes, and other geological hazards, and it can deplete or pollute freshwater stores. And mining waste, called tailings, can leach toxic chemicals into surrounding soil and water.

Moreover, mining is often associated with human rights violations and labor exploitation, as with cobalt extraction in the Democratic Republic of the Congo. When nearby communities resist proposed and existing mining projects, they are frequently subject to violent reprisals, state repression, and land dispossession—especially in the Global South and on Indigenous territory. In 2023, over 160 land defenders were killed in Latin America alone, many of whom were resisting mining activities. In addition to ensuring minerals are sourced in a way that better protects marginalized communities and the environment, mineral extraction must be limited to necessary and socially useful ends.

ETM requirements to electrify the military fleet versus other uses



Sources: International Energy Agency (2021), U.S. General Services Administration (2024), National Park Service (2023), U.S. Department of Energy (2024a, 2024b)
Notes: Battery size is scaled based on average battery size for each vehicle weight category. The USPS fleet includes 195,929 light duty trucks. The National Park Service vehicle fleet includes 11,774 vehicles of various vehicle types. On-site storage calculations assume ETM quantities for a 1,425 kWh battery.

With the same volume of ETMs required to electrify the military's non-tactical vehicle fleet, the federal government could redirect its purchasing power to fully electrify the entire fleet of US Postal Service trucks and the entire National Park Service vehicle fleet with enough ETMs left over to equip over 7,600 federal campus buildings with on-site battery storage. In addition to EVs, on-site or building battery storage systems are an important component of resilient electrification while also being a major force for mineral demand.

Policy directions

The Pentagon is overfunded and over-resourced relative to other Federal agencies. Its near trillion-dollar annual budget is more than what the government will spend on climate action through the Inflation Reduction Act over a decade, if those funds are even ultimately released. Meanwhile, ETMs are limited resources that should be prioritized for more socially useful ends while protecting manufacturing jobs and the sensitive landscapes that will be transformed by mining to dig up these materials. Several policy steps can be taken to achieve these objectives:

1. **Rein in the Pentagon's budget.** Senator Bernie Sanders' proposal to cut 10 percent of military spending is an example of this approach, but must have binding ratchets to ensure military spending continues to fall.

2. **Close bases.** One reason for the huge number of NTVs is the huge network of US bases—both in the United States and overseas. There must be a new round of Base Realignment and Closure (BRAC), reducing the volume of materials that are needed to maintain the sprawling global network of bases.

3. **Decarbonize essential services.** Meanwhile, the more socially useful departments of government must be decarbonized much more rapidly, putting these ETMs to more broadly useful and beneficial ends, while enhancing mineral recycling that reduces the volume of new mining needed to achieve decarbonization goals.

4. **Strengthen procurement rules.** As part of accelerating government decarbonization, rules for procuring ETM-based products must be strengthened, including the enforcement of community rights for those impacted by mining projects, expanding and enforcing environmental regulations (for example, by updating the US's woefully insufficient 1872 law that governs hardrock mining), and strengthening human and environmental protections for ETMs in trade agreements.

Appendix

Sources

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Notes

For the purpose of this analysis, we apply IEA’s method of modeling mineral usage. Steel and aluminium are not included. The values for vehicles are for the entire vehicle including batteries, motors and glider. The volumes for an electric vehicle are based on a 75 kWh NMC (nickel manganese cobalt) 622 cathode and graphite-based anode. While this analysis reflects the mineral composition of a NMC battery, different types of batteries for electric vehicles have different mineral compositions.

Data tables and methodology

You can find tables of the data included in this memo as well as an explanation of methodology in this spreadsheet.