IN-DEPTHGLOBAL

The Green Energy Transition Has an Extractivism Problem

Teresa Kramarz Nov 15, 2022

An aerial view of the Fenix Mine, run by the Swiss-based Solway Investment Group, in El Estor, Guatemala, Oct. 26, 2021 (AP photo by Moises Castillo).

A key component of the current energy transition taking place around the world involves a shift away from our dependence on fossil fuels toward different forms of renewable energy technologies. We're seeing that trend develop with the uptake of solar and wind power as well as battery storage solutions in many different countries. This is a crucial shift: According to the International Renewable Energy Agency, meeting the Paris Agreement goal of keeping global temperatures below 2 degrees C of preindustrial levels—and limiting the worse effects of climate

change—is going to require increasing the total primary energy supply of renewables from 15 percent in 2015 to 66 percent by 2050 on a global scale.

In this transition to renewables, two clear storylines have emerged. The first, and better known, is one of political urgency to make up for lost time. This is evident in downstream state policies and subsidies such as this year's passage of the Inflation Reduction Act in the United States, which includes tax credits for the adoption of clean energy technologies, among other measures, or Australia's Climate Change Act 2022, which codifies greenhouse gas emission targets and enshrines them into domestic law. Even in the absence of direct legislation, countries like Canada are creating roadmaps, like the 2030 Emissions Reduction Plan, which includes billions of dollars of proposed investments for electric vehicle adoption, clean technology development and net-zero electricity generation.

This is the story that often plays out in the triumphant narratives of consumer products like electric vehicles, whose sales are soaring in several countries. But there is another story. Urgently decarbonizing energy use by shifting to renewables relies on intensifying global supply chains, beginning with the extraction of minerals and metals that are primarily found in lower-income countries or fragile states. Renewable energy triumphalism relies on the supply of "critical minerals" that are essential for developing low-carbon energy options, such as solar panels, wind turbines and batteries. States are particularly concerned with dependable access to these minerals and avoiding potential disruptions to manufacturing supply chains.

According to the International Energy Agency, 50 minerals are considered critical, including nickel, copper, rare earths, lithium and cobalt. And some of the largest reserves of these critical minerals are found in countries with high levels of violence and corruption. Guinea, for example, contains 28 percent of the world's reserves of bauxite and alumina, which are necessary for clean technologies such as wind and solar energy, electric vehicles and energy storage. But despite its abundant mineral resources, the country faces severe poverty and development problems, has experienced several coup attempts—the most recent early this year—and has weak natural resource governance systems.

What does it take to access these critical minerals in places like Guinea and elsewhere? That question takes us to what we might call the dark side of the green transition, which is also the less researched and discussed side of renewable energy.

The Displacement Effects of Extraction

Put succinctly, mining has a troubling history of generating environmental, social and labor harms that have created conflicts or exacerbated existing ones. For example, since 2015, Peru's Las Bambas project—one of the largest copper mines in the world—has been the site of mobilizations and road blockages by farmers and Indigenous groups protesting soil contamination, loss of livelihood, militarization and police presence, land dispossession, violence and human rights violations. Clashes between protesters and government security forces have resulted in injuries and fatalities, ultimately leading the government to declare a state of emergency in the area.

Similarly, the rush on cobalt in the Democratic Republic of Congo, or DRC, has increased human and environmental exposure to contamination, while expanding militarization, corruption and modern slavery. It has also sparked conflict between artisanal miners and large international mining firms, reportedly resulting in killings of artisanal miners by state or private security forces. Meanwhile, lithium mining in Argentina and Chile threatens to dry up scarce water sources and damage biodiversity in some of the rarest ecosystems on earth.

Indeed, an extensive review of the academic literature documenting the social, cultural, economic and environmental impacts of onshore wind, solar photovoltaic and battery storage technologies reveals the pervasive harms that affect communities living in the resource-rich areas where industrial mining for critical minerals takes place. And such harms, in turn, lead to three different types of displacement effects: dispossession, degradation and commodity-dependent development.

The supply of critical minerals required for renewable energy infrastructure is both the answer for a sustainable transition, but also a major problem.

First, through the expropriation of land for resource exploitation, local communities and populations are essentially evicted from their land—and thus their means of subsistence. For example, local and Indigenous communities that lack strong territorial rights have been forced off their land and the sources of their livelihoods to accommodate mining concessions as well as solar panel and wind turbine manufacturers. This dispossession can be facilitated by investor protection agreements or state regulations that favor mining companies over local communities.

Further downstream, the land used for the installation of renewable energy technologies also competes with other forms of land-use, including agriculture and community access to common-

pool resources like water and pasture that are typically available for use by everyone. The Moroccan Agency for Sustainable Energy, for instance, established one of the largest solar farms in the world on land that was previously held communally by the Berber clan of Amazigh. Operational since 2016, the plant has pushed these rural communities away from their sources of livelihood and dismantled common property institutions in what used to be a traditional commons.

Second, pollution and degradation of local ecosystems at different stages of the life cycle of renewable energy can displace communities from their land or threaten their health when they are forced to remain in contaminated environments. Resource extraction, the dumping of pollutants from manufacturing processes, transporting or disposing renewable energy waste products and a range of other activities deteriorate ecosystems, leading to degradation of the environment and human health. A site in Ghana, for instance, that receives e-waste flows of discarded low-carbon technologies from Europe—including disposed smart meters and batteries from electric vehicles—has become an extremely toxic environment. While some residents may be able to relocate away from the facility's documented health hazards, many residents living in the adjacent slum of Agbogbloshie don't have that choice, or are dependent on work at the scrapyard burning copper and other hazardous materials to make a living.

Perhaps the most insidious type of harm, however, is displacement through commodity-dependent development, which emerges when strong importing states and multinational companies are able to shape the terms of trade and investment agreements with raw material exporting economies in the Global South. By locking these countries into long-term patterns of unequal exchange, commodity-dependent development in turn entrenches the other dynamics surrounding extractive industries that drive displacement.

If previous experience with mining can tell us anything about the future of the new "green economy," it is that a spike in demand for critical minerals will bring about fresh cycles of boom and bust that lock countries like the DRC—a resource-rich country with high levels of poverty—into harmful development dependencies that include primary extraction for export, land expropriation, elite capture and the unsafe disposal of toxic and hazardous waste.

The corrosive effect of extractivism is not news. There is considerable scholarship documenting the so-called resource curse—also known as the paradox of plenty—which reveals the extent to which states endowed with natural resources are also among the poorest in the world. But as demand for minerals to fuel the energy transition skyrockets, the future impacts of

extractivism will too. As a measure of what to expect, in order to achieve a 2 degrees C warming scenario, the World Bank estimates that the production of lithium, graphite and cobalt for battery storage will have to increase by 500 percent by 2050.

In other words, the supply of critical minerals is both the answer for a sustainable transition, but also a major problem. Renewable infrastructure is necessary to decarbonize energy systems, but that infrastructure is built on very intensive and extensive levels of extraction that undermine the environment and create significant localized human costs.

Gaps in the Governance of Critical Minerals

In recognition of the material intensity required for renewable energy production—as well as the fact that achieving it is supposed to be a green transition and not one that causes environmental harm or displacement—an expanding landscape of transnational regulations and accountability standards have sought to provide environmental and social protections across the supply chain of critical minerals. While these initiatives offer opportunities for improved governance, there are significant gaps that need to be addressed. A forthcoming assessment I have been carrying out with colleagues on who designs these initiatives; who is held to account to whom and for what; and what sanctions exist to enforce compliance reveals four broad governance gaps.

The first area where governance needs to be improved is in the nature of the standards themselves, most of which are currently voluntary. Governments, corporations and civil society actors have expanded their efforts to regulate critical mineral extraction, transportation, processing and recycling. However, the majority of the resulting initiatives lack regulatory teeth to ensure a uniform application of the rules across companies and to guarantee enforcement in cases of poor compliance or noncompliance.


A solar farm in Mona, Utah, Aug. 9, 2022 (AP photo by Rick Bowmer).

One exception is the German Supply Chain Due Diligence Act that will take effect in January 2023, which requires German companies to conduct due diligence checks across their supply chains to safeguard human rights and the environment. However, the overall global trend is toward self-regulation through voluntary standards, meaning that despite the ever-expanding number of accountability initiatives, private actors can decide if they want to follow a standard, choose which standard they prefer and remain generally unaffected by meaningful—or any—sanctions in the case of poor compliance.

The second issue is that accountability standards are often too broad or too narrow.In this largely voluntary ecosystem, many companies prefer to claim adherence to meta-agreements, like the Sustainable Development Goals, which were not designed to regulate supply chains in general and critical minerals in particular, and lack specific accountability metrics for the responsible governance of critical minerals. On the other hand, the initiatives that have been more narrowly designed for critical mineral supply chains and have the regulatory force of the state behind them tend to focus on conflict minerals—those whose extraction is connected to financing and benefiting armed groups. Yet these are a very small subset of the minerals required for renewable energy.

A third governance gap is in the end-of-life stage of the supply chain. There are an increasing number of initiatives that aim to create protections at the extraction and production stages of the

supply chain, even if there are still gaps in terms of mine waste safety, access to clean water and Indigenous rights protection, among others. However, the most glaring absence of protective standards is around the disposal of renewable energy equipment—even as the first generation of solar panels is approaching its end of life and depleted batteries continue to accumulate. This raises the issue of hazardous waste, as solar panels include heavy metals like lead, tin and cadmium, which can damage the environment and threaten human health if the panels are improperly recycled. The possibility of recovering renewable energy materials such as copper makes recycling such devices even more important. Furthermore, considering the widespread adoption of such technologies in recent years, waste accumulation is a clear and rising threat. According to one estimate, end-of-life solar panels could amount to almost 10 million tons of waste by 2050.

Finally, the sheer number of standards that exist is itself a problem. Having a fragmented landscape propagates a lenient approach to governing supply chains, rather than the stricter enforcement that is required to mitigate known harms. Additionally, in the absence of clear rules backed by states, corporate actors face a large and changing number of reporting requirements that can create audit fatigue among producers across the supply chain of renewable energy technologies. A proliferation of standards and certification schemes can also create consumer confusion and enable greenwashing.

Better Governance Practices

States can and should play a larger role in regulating the raw materials required for the massive overhaul of global energy systems, as well as regulating their own mining companies' operations overseas by putting in place policies for home-state accountability. This could include measures such as withholding state financing and political support for projects that do not comply with environmental and social impact assessments or other international guidelines for extractive projects, for example.

Alternatively, states could require overseas extractive projects to comply with a set of provisions derived from United Nations Human Rights and International Labor Organization conventions, as the U.K.'s Export Credit Guarantee Department, or ECGD, did until 2010. The ECGD also assessed each project's environmental and social impact before approving it for funding, making its support contingent on environmental and human rights considerations. Though this assessment method was regarded as an example of best practices while it was in effect, the U.K.

government eventually chose to cancel it in favor of nonmandatory evaluations after heavy lobbying from U.K. exporters.

Reallocating state subsidies from laggards to better-performing companies can also provide incentives for stricter adherence to environmental and human rights standards. Another tool that states like France and Norway have used to allocate funding to companies with better social and ecological performance records is by building clear investment guidelines for fund managers into their states' sponsored pension programs.

International organizations and importing states should also help develop the monitoring capacity of producer states, which often lack human resources, technical expertise and equipment to conduct environmental and social impact assessments. International development agencies, meanwhile, should focus on building the capacities of affected communities and civil society organizations in producer states to help them secure land rights and legal protections that would provide some security against wholesale dispossession for extractive projects.

Taking sustainability seriously in the renewable energy transition would entail moving beyond the dominant, triumphant storyline in which there are no tradeoffs, no winners and losers, no hard decisions and no strategic choices to be made.

These are some potential levers for accountability, but what would it mean to take sustainability seriously in the renewable energy transition more broadly? First, it would entail moving beyond the dominant, triumphant storyline in which there are no tradeoffs, no winners and losers, no hard decisions and no strategic choices to be made. Instead, what is needed is some sort of political agreement on the principles of this transition that addresses what should be valued and prioritized, and who makes these decisions. Devising post hoc accountability mechanisms to work around the margin of harms caused by a transition that displaces vulnerable ecosystems and communities to mitigate climate change is not sustainable.

Inevitably, some will ask how much worse is mining to mitigate climate change than extracting oil? Unfortunately, this line of thinking takes us down the wrong path. The question is not if we should decarbonize, but how to do it while being true to the principles of a sustainable transition. Some extraction is required to meet the urgent decarbonization timeline that our previous political inaction has created. However, given how damaging mining is to ecosystems, local communities and national economies, it needs to be limited and regulated, so that it looks very different from the commodity boom cycles that currently characterize extractive sectors.

For that to happen, demand for extraction must be more strategic. We don't need electric vehicles—which require huge supplies of lithium, cobalt and nickel, among other minerals—in every driveway. We could instead expand our public transportation systems and contain urban sprawl, which would have several positive spillover effects in addition to limiting mining projects.

In the end, there is no single pathway to decarbonization. The paths we choose must consider the distribution of benefits and harms; enable and empower informed decision-making by affected stakeholders; recognize multiple worldviews and value systems; and build, rather than devastate, the livelihoods and rights of people and places. Above all, we need to take stock of the lessons already learned, so that in charting a path forward, we do not replicate all the same harms but at much larger scales through a business-as-usual model. Only then will we be speaking about a truly sustainable transition.

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