# EXTRACTION: THE FRONTIERS OF GREEN CAPITALISM

*By Thea Riofrancos*
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## I. INTRODUCTION

Electric vehicles have increased in popularity worldwide as the world grapples with addressing the climate crisis and escalating demand for vehicles. In her book, *Extraction: The Frontiers of Green Capitalism* (2025), Thea Riofrancos, a political science professor, spurs readers to examine the extraction of lithium, an essential element of electric vehicle batteries, through a geopolitical, economic, and environmental lens.[1] *Extraction* is reminiscent of Rachel Carson's twentieth century battle with pesticides threatening environmental and human health in *Silent Spring*. Through captivating first person experiences and well-explained scientific and historic context, she draws much needed attention to the emerging social, political and environmental issues of the twenty-first century climate crisis and trumpets an urgent call to action. She argues that reducing overall lithium demand through better transit and urban planning is a more just path forward than "green capitalism" or simply greening the same extractive model. While many countries and cities are moving towards better public transportation and planning, Riofrancos does not consider the practical implications of implementation, such as funding and potential government seizure of private land to execute this solution. Her "one-size-fits-all" generalization also does not address the differences in cultures, geography, climate, and existing economic and government structures worldwide. *Extraction* provides a compelling argument for implementing better planning and public transportation while leaving the practical implications of tackling the complexities of the climate crisis to governments and individuals.

## II. CONTEXTUALIZATION OF LITHIUM

In Part I: Extraction, Riofrancos provides background on lithium mining and the importance of lithium in our daily lives. The book opens with the author's journey through the Andean mountains to the salt flats of Salar de Atacama, home of the world's largest lithium reserves. Surrounded by imposing mountains and buffeted by sand and rainstorms, Riofrancos juxtaposes the seemingly barren and inhospitable conditions of the salt flats with the region's biodiversity and long

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1. Riofrancos is a political science professor at Providence College and the Strategic Co-Director of the Climate and Community Institute as of the date of the book publication.

history of human inhabitation and mineral extraction, beginning with copper in the nineteenth century. The author interweaves the geologic, ecological, climatic, social, and economic factors at play as she contextualizes the lithium mining process, and the impacts of the mining on the inhabitants and environment.

She explains that the area's natural forces—extreme weather conditions and geology—result in the "economical" concentrations of lithium so valued by mining companies. Unlike mining for other minerals which may occur deep underground, lithium is mined on the earth's surface by pumping water into evaporation ponds and allowing natural evaporation to concentrate the lithium over the course of ten to twenty-four months depending on weather conditions. This extraction is touted as more environmentally friendly and economical than many other extraction methodologies; however, the author explores the hydrological, geological, biological, and social impacts of pumping water from underground reservoirs to the surface and creating these vast evaporation ponds.

The author blends her descriptions of how the abundance and chemical properties of lithium allow for its varied uses in consumer products as well as the growing need to reduce carbon emissions to avoid climate catastrophe. To address climate change and meet energy needs, the author describes the staggering volume of mines and raw materials, including lithium as well as other metals, needed to complete the energy transition to net-zero carbon. She argues that "green capitalism" does not mean environmentally sustainable companies or activities, but rather it is a marketing scheme chosen to label economic activities that may or may not address the climate crisis. For example, purchasing an electric vehicle falls into this category—it addresses one aspect, carbon emissions while driving, but does not account for the environmental damage or carbon emissions of extracting raw materials, manufacturing the car, and producing electricity to power the car. Instead, the overall impact should be considered.

She also acknowledges the geopolitical tensions surrounding the extraction of raw materials and the unpredictability of estimating demand and supply with emerging technologies and economic factors at play. She emphasizes both the United States' and European Union's emerging policies on national security and self-reliance for extraction through consumption as major drivers in how extraction of these "critical materials" will evolve. She notes that this "new" policy is merely history repeating itself as the markets globalized in late twentieth century, blurring the lines between the importance of where extraction, manufacturing, and ultimate consumption occurs.

In Part II: Frontiers, the author focuses on global economic and political trends driving resource extraction before narrowing into the politics and history surrounding Chilean resource and lithium extraction. The author summarizes her view of historical trends of resource extraction globally—more powerful, wealthier nations with fewer natural resources exploit the natural resources of less powerful nations. She addresses the regional trend in South America, where countries have embraced "resource nationalism," beginning in the twentieth century. Next, she moves to describing the United States' twentieth century waffling between its quest for energy independence following the second World War and its desire to consume the cheapest commodities through the importation of natural resources in response to the environmental movement.

The book then dives into the history of the development of lithium batteries, tracing its way through a mélange of geopolitical and economic pressures and scientific innovation. For example, as Exxon strategized how to remain profitable during the oil crisis in the 1970s and 1980s, it poured resources into battery research, allowing researchers in the United States and Japan to develop the first lithium-ion batteries in 1986. The first retail electronic use of a lithium-ion battery, Sony's camcorder, debuted in 1991. However, China's mass production of these batteries and its air pollution issues as well as worldwide increasing demand for vehicles catalyzed the electrification of transportation with lithium-ion batteries. In response to the invention, countries began mining lithium at ever-escalating rates to meet this demand. Although mining in the 1940s supplied lithium for other uses such as ceramics and nuclear weapons, the race for lithium extraction continued between the United States and China. China's natural resources alone did not fuel its rise to electric vehicle market dominance. Rather, it is a top importer of lithium from other countries where China continues to outright or partially own mining companies. More recent forces—including the climate crisis, the global pandemic, local resistance to new mines, technologic advancements in extraction and battery efficiency, national security and energy independence concerns, finance, and governmental policy responses to these forces—continue to shape the electric vehicle market. Lastly, the author quantifies and compares the effects of production and use of traditional versus electric vehicles, analyzing waste, emissions, and other environmental impacts. She describes the way forward through the climate crisis as relying on fewer individual vehicles and creating more walkable and bikeable living spaces rather than touting the electric vehicle as the sole solution to the climate crisis.

Continuing to narrow her focus, the author explores the tumultuous history of modern Chile and how political choices impact regulation of lithium extraction today. She describes the President Pinochet-era lithium extraction policies, allowing only two corporations to extract lithium in Chile, and water laws, which do not define "brine" as water, exempting much of the extraction process from environmental laws. She details human rights violations and other corporate investigations over the years. She then turns to the 2019 Chilean uprising and the subsequent proposed Constitutional amendments, including lithium extraction nationalization. Although the constitutional proposal was ultimately shot down in 2023, the Chilean government established a new lithium policy, granting the Chilean government significant control over mining companies and designating certain areas as "strategic" for mining while setting others aside for environmental protection.

## III. LITHIUM: SAVIOR OR FALSE PROPHET?

In Part III: Green Capitalism, Riofrancos shifts her focus to the geopolitical and corporate aspects of the energy transition, discussing how the energy transition has been shaped by the efforts of wealthy countries and corporations to dominate lithium value chains in the name of sustainability. The section begins with the author's conversation with Peter Handley, the head of the European Commission's Raw Materials Unit in Brussels, in which Handley outlined the European Commission's strategy of "onshoring" lithium value chains as a matter of

environmental, economic, and national security policy. Riofrancos makes a striking analogy between the ambitions of Chilean policymakers to ascend the value-added production chain and those of European bureaucrats, each looking at the other as if through an inverted mirror.

The author traces the revival of industrial policy in the United States and European Union, both of which have embraced government-directed investment in lithium mining, battery manufacturing, and EV supply chains as a means of competing with China. The author describes how a series of crises, including the 2008 financial crisis, the rise of China as a major source of rare earth minerals, and the Russian invasion of Ukraine, have all led to a loss of confidence in the free market among policymakers in the U.S. and has led to a bipartisan consensus in favor of developing domestic mineral resources. In the U.S., this resulted in landmark legislation in the form of the Inflation Reduction Act and the CHIPS and Science Act, which together allocated hundreds of billions of dollars to the development of battery supply chain infrastructure in the U.S. It is worth noting, however, according to Riofrancos, although the Trump and Biden administrations were united in their promotion of "onshoring," each had a somewhat different rationale, with the former seeking to use it to counter the rise of Chinese power, and the latter to address the issues of climate change and supply chain security simultaneously. In Europe, a similar strategy was being followed through the EU's Battery Alliance, Critical Raw Materials Act, and investment of billions of euros in public funding, accompanied by a commitment to sustainability initiatives, such as the Sustainable Battery Regulation. The author argues, however, that in both cases the drive for "green dominance," securing technological and economic supremacy over new energy systems — increasingly overshadowed the original goal of addressing climate change.

The book examines the attempt of the lithium industry to present itself as a "sustainable industry," and to what extent this claim can be considered valid. The chapter opens at the 2019 Lithium Supply & Markets Conference in Santiago, where industry executives debated whether lithium was a commodity or a bespoke specialty chemical, a question with significant implications for how its price would be set and who would control the market. Riofrancos goes on to describe the wild fluctuation of lithium prices in the following years, shifting rapidly from a period of excess lithium to a period of shortage and back again, and how this can be understood in terms of the inelasticity of raw materials markets. She then turns to the proliferating ecosystem of sustainability certifications, Environmental, Social and Governance (ESG) consultants, and multi-stakeholder governance initiatives that have emerged around lithium mining. Using Volkswagen's supply chain audit efforts in the Atacama as a central case study, the author illustrates how corporations have developed sophisticated reputational risk management strategies, commissioning scientific studies, signing up for voluntary certification programs, and dispatching sustainability managers to mining regions, while stopping well short of demanding structural reforms. The Initiative for Responsible Mining Assurance ("IRMA") is given particular attention as an exemplary model of the contradictions inherent in voluntary, industry-financed certification schemes, which have increasingly developed into strict criteria even while the best score yet earned by the organization went to SQM, a company with

a well-documented record of regulatory offenses, financial fraud, and overuse of water in the Atacama. Riofrancos concludes that as "sustainability" becomes essential to corporate branding, it risks losing its ethical meaning entirely, becoming instead a commodity bought and sold on the market like any other—a phenomenon she links to the broader logic of green capitalism itself.

In Part IV: Beyond Green Capitalism, Riofrancos turns her attention to the people and communities on the receiving end of the lithium boom and to the growing movement pushing back against it. The section opens not in a boardroom or a government office, but in a small café in Covas do Barroso, Portugal, during a brutal summer heat wave, where the author meets Aida Fernandes, a farmer whose family has worked the same land for decades. The company Savannah Resources wants to put an open-pit lithium mine on the mountain just across the river from her village. For Fernandes, the math is simple: the mine and her community cannot *coexist*. It would mean losing the river, the farmland, and the landscape that her family's livelihood depends on. Only one can prevail.

Riofrancos travels to what she has come to call a "*new geography*," from rural Portugal and northern Spain to Nevada's high desert, to explore the new frontiers of extractivism created by the EU's onshoring strategy, frontiers that did not exist a decade ago. Everywhere she travels, she finds the same *"No a la mina"* sentiment, the same complaints about water, land, and the permanence of what is left behind after a mine is built. She follows the global connections between these movements, a loose but real coalition of people working together under banners such as *"Yes to Life, No to Mining."*

To conclude the book focuses on the Lithium Americas mine, which has become a flashpoint in the Thacker Pass region of Nevada. The permitting process was rushed through during the final months of the first Trump administration; its environmental impact statement described by one expert as among the worst he had ever seen. The land itself is the site of a nineteenth-century massacre of the Paiute people, and it also falls within the unceded territory of the Northern Paiute and the Western Shoshone. Riofrancos meets Daranda Hinkey, a twenty-three-year-old descendant of massacre survivors who co-founded the People of Red Mountain, and John Hadder of Great Basin Resource Watch, who has spent decades scrutinizing the environmental impact statements that mining companies and government agencies produce. Their message, from different perspectives, is the same: consultation does not mean consent, and the green designation for the mine does not change the fact that it remains a mine, with the same effects on the land, the water, and the people.

Riofrancos also wrestles with the tensions inside the environmental movement itself. Some in the climate movement are concerned that any opposition to lithium mining is playing into the hands of the fossil fuel industry and holding back the transition. This has certainly been true for Riofrancos; however, she resists the *either/or* binary thinking. The chapter builds toward a harder question: if mines in the United States and Europe are supposed to be more responsible than those in Chile or Argentina, who bears the costs, and who decides? Environmental harms in the Global North fall disproportionately on Indigenous communities and marginalized populations: the Thacker Pass project sits across the valley from landscapes scarred by a century of mercury mining, and

79% of the US's known lithium reserves lie within thirty-five miles of Indigenous reservations.

Continuing, Riofrancos stops cataloging problems and starts thinking about what a fundamentally different future might look like. It begins with her own process of grappling with the uncomfortable realization that even a just and publicly controlled energy transition would require batteries, and batteries require mines. Working with a climate think tank, Riofrancos and her colleagues built their own model, comparing a future in which every American drives an electric car against one in which more people ride buses, bikes, and trains, with smaller batteries, denser cities, and robust recycling. The results surprised even her. The best-case scenario: more transit, more density, more recycling, requires 66% less lithium than the worst case. By 2050, the difference in lithium demand between the two scenarios is 92%. The supposed trade-off between climate action and protecting communities from extraction, she argues, is not inevitable. It is a choice: baked into planning models that assume the only path to zero emissions is a Tesla in every garage.

The book concludes with Riofrancos advocating for a supply chain based on justice rather than profit, which brings together the Indigenous land defenders of Nevada, the workers of the American urban transit systems, the battery recycling activists, and the urban cyclists. These groups are already connected, according to Riofrancos, through the global supply chain of green capitalism. However, the problem lies in whether they can become aware of this fact and organize across these boundaries. The book ends not with a neat answer but with a call to action: demand supply chains organized around justice rather than profit, push for policies that reduce car dependency and promote denser cities, and build coalitions across the communities already connected by the global operations of green capitalism — Indigenous land defenders, transit workers, recycling advocates, and climate activists — so they can fight together for an energy transition that doesn't simply replicate the extractive harms it was meant to leave behind.

## IV. CONCLUSION

*Extraction: The Frontiers of Green Capitalism* is a timely and well-researched book that challenges the reader to think beyond the obvious attraction of electric cars and the green energy revolution. Riofrancos skillfully blends geology, geopolitics, corporate interests, and resistance movements to show that the transition from fossil fuels is not just a technological revolution, but also a profoundly political and social one. The main premise of the book—that *green capitalism* is simply a continuation of the extractive and unequal patterns of the fossil fuel economy—is convincing and well-argued.

The book's greatest strengths are its scope and balance. Riofrancos effortlessly shifts from the molecular level of lithium chemistry to the grandiose ambitions of the United States' Inflation Reduction Act and the E.U.'s Critical Raw Materials Act without sacrificing clarity. The reporting from the salt flats of Atacama, and the protest movements in Portugal, Nevada, and Spain, adds depth and weight to what could have been an otherwise dry debate. The quantitative modeling in the final chapter is particularly well-done, showing concretely that the real debate is over transportation system choices, not just the chemistry of the

battery itself. The book is also strengthened by Riofrancos' willingness to sit with contradiction. She is herself an advocate for a rapid and just energy transition, yet she refuses to look away from the harms that transition requires. That intellectual honesty gives the book a credibility that more polemical treatments of the subject lack.

Where the book is less successful is in its prescriptive dimension. Riofrancos is better at diagnosing than at prescribing solutions. Her advocacy of a justice-centered supply chain, though well-motivated, remains vague in its implementation, its political viability, and its tempo in light of the urgency of the climate crisis. The coalition she envisions is a compelling idea, but the path from vision to political reality is left largely to the reader's imagination. In a moment when climate policy is being rolled back and the window for action is narrowing, readers hungry for a roadmap may find the conclusion more inspiring than actionable.

Nevertheless, *Extraction* makes a significant contribution to the debate over the energy transition, the governance of resources, and the environment. The implications of *Extraction* are substantial in the real world: all actors, from policymakers and corporations to citizens, are compelled to think through the fact that the route to zero net emissions has its own associated costs and that the question of who bears these costs is not predetermined but is, in fact, a choice. That reframing alone is valuable. In a public conversation dominated by techno-optimism on one side and outright climate denial on the other, Riofrancos carves out a third position: one that takes the climate crisis with full seriousness while insisting that the communities most exposed to its solutions deserve a seat at the table. Whether or not readers agree with every argument she makes, the questions she raises about power, justice, and what we are willing to sacrifice, and for whom are ones that any honest reckoning with the energy transition must eventually confront. For anyone who wants to understand the complexity of the green energy transition, Riofrancos' *Extraction* is a must-read.