TRACES OF GEOLOGY

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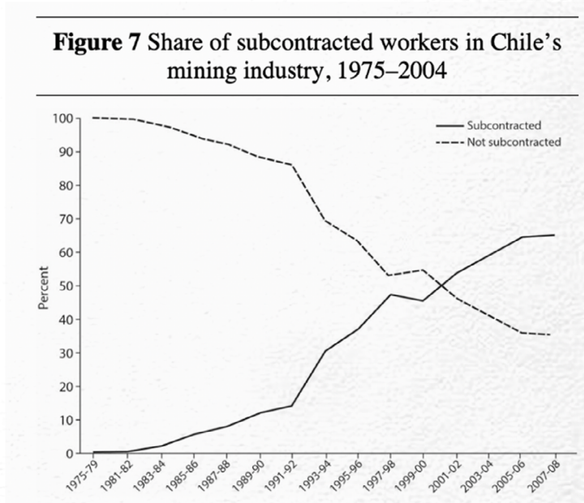

Figure 7 Share of subcontracted workers in Chile's mining industry, 1975–2004

Source: Arias et al., "Large mining enterprises," 86; Miguel Atienza, Marcelo Lufin, and Juan Soto, "Mining Linkages in the Chilean Copper Supply Network and Regional Economic Development," Resources Policy, *February 13, 2018.*

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The digital promises a world that is cleaner, slicker, sharper and less tarred with the carbon intensity of our industrial past and present. At a time of rapidly unfolding climate change, and an increasingly ubiquitous acknowledgement of the need to curb emissions and build green infrastructure, this seems welcome. Decoupling economic and social activity from fossil fuels and extracting ourselves from the dirty trails of plastics and hydrocarbons by furthering the digital revolution and mediating life through cyberspace goes hand in hand with a low emissions regime. Central to making this possible is a green energy transition, which shifts from reliance on burning carbon to a more sustainable future, of harvesting energy from the sun and the wind, amongst other sources. And alongside cleaner production is the need for new, clean ways to create and store energy.

This is where lithium comes in. The periodic table's third element and first metal, lithium's lightness and energy density makes it a vital component in batteries. It is used in the production of all major smartphones, and is crucial to electric vehicles becoming the mainstream choice of private transport rather than a niche exercise in status signalling. The global lithium ion (Li-ion) battery market is expected to reach $100.4bn by 2025, compared to a market size of $30.2bn in 2017[1]. Over half of the Li-ion market in this period is expected to be used for the automotive market. Within consumer electronics, mobile phones are expected to be the largest application for these batteries.[2]

However, the processes that produce this clean, green and sustainable future are often anything but. As with other rare earth material, like copper and cobalt, that provide the ingredients for digital infrastructure, the practices involved in the production of white oil[3], lithium's slick nickname, are rife with environmental and social harms that are conveniently overlooked in the marketing and promotion of the renewable futures they facilitate.

The techniques of extracting earth materials to fuel energy regimes differ from source to source. Each comes with its own particularities and leaves its own traces on the earth, environment and people involved. It has been argued that capital perpetually seeks cheaper labour and cheaper nature, and energy regimes are no different.[4] Yet the different techniques and pathways of extraction, production, processing and distribution often reveal certain political relationships and possibilities. The weak and widely dispersed solar energy reaped from cutting down trees and burning wood created vastly different power regimes to those created by the 'buried sunshine' of coal and oil, which concentrated and decentralised energy networks respectively.[5]

One area of particular interest in the clamour for renewable energy is Chile, and its neighbouring Andean regions in Bolivia and Argentina. Estimates vary, but the so-called lithium triangle is said to hold at least 50% of the world's lithium[6], much of it relatively easy to access owing to the brine pools of the Atacama desert and its surrounding arid areas. Lithium itself rarely occurs freely in nature, but appears as compounds, commonly obtained from ores and brines. Ores are more concentrated in lithium but more energy intensive to extract (it's actual mining) whereas brines

you just pump out and leave to dehydrate. In fact, the naturally-occurring lithium-rich brines the Salar de Atacama mean that lithium is harvested rather than mined, in a 'process that is more akin to agriculture than a classic extractive process or an industrial process of transforming raw material into a finished product (Bustos-Gallardo et al, 2021)'.[7]

The 'fields' of lithium, otherworldly, placid and picturesque turquoise and green brine pools, paint a very different picture to those of coal mining or oil speculating, yet belie a sophisticated and grim nexus of extraction and exploitation in Chile. The vast quantities of water needed to pump to the surface is swallowing up water from the edges of the desert, where rural, agrarian and communitarian indigenous communities live and rely on the little water there is.[8] Satellite research shows an inverse correlation between water reservoir levels at mining ponds and the 'natural' lagoons upon which local ecological systems depend, resulting in widespread habitat destruction.[9]

The effects of extractive infrastructure don't just affect the surrounding 'natural' ecosystems, but also social systems, such as the economic structures of lithium mining. As Thea Riofrancos puts it, 'the margins of the world systems are far from backwards, but sites of novel techniques of exploitation'.[10] For example, the status and conditions of mining work itself. Martín Arboleda has written about how the share of subcontracted workers in Chile's mining industry has risen hugely since the 1970s, from virtually zero to over 60%.[11]

The make up of this group of informal and precarious workers, known locally as faneros, tend to 'come from various locations on a temporary basis, have no attachments to the host town, are usually underpaid, and face overcrowded accommodations. As a result, social ills that were uncommon before the commodity boom, such as sex work, theft, street fights, drug abuse, and sexual assaults, are now common'.[12] This is not so much the case for the higher status engineers and managers who work in lithium mining, who tend to live in Santiago or other Latin American capitals cities, and stay in luxury hotel campsites when visiting the mines.

The social hierarchies are a reflection of industrial policy. Two private firms, Albemarle and SQM, are the only entities currently exploiting brines for lithium production in the Salar de Atacama, with permission and license from the state. In the case of SQM, Julio Ponce Lerou, a former son-in-law of the dictator Augosto Pinochet, acquired 93% of the state's shares - at very favourable price - in the company during its privatisation in the 1980s under the military dictatorship and even today is the company's primary shareholder. The white collar workers and engineers live in the cities, and with access to international investors, indigenous communities endure assaults on their agro-pastoralist practices and local environment alongside the precarious, often undocumented, mine workers.[13] These domestically held tensions are still locked in to international markets and capital; volatility in price of lithium as a commodity has knock on ramifications at home.

The story of lithium in Chile is important and instructive for how the energy transition and transfer to renewables may unfold. Most of the world's hard rock reserves of lithium are in Australia and China, although deposits elsewhere, including discoveries in Portugal [14] and Cornwall[15], England, are expected to come online in the coming years. Chile is the world's second largest producer, however, and the largest of the lower-cost brine reserves. It is interesting that Chile, as a critical nexus in the supply of one of the new economy's most in-demand yet commercially volatile resources, has become a site of cyber-waste. The shape of Chilean mining industry infrastructures – from the displacement amid protests of indigenous people and effects on local ecologies through to its impact on local urban economies – reflects an internationally familiar process of 'flexible' labour and economic coordination through private capital and supply chain management. If a transition to a renewable and sustainable energy future is to be designed for the greatest benefit, these harms need addressing.

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Endnotes

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14. Wise P (2020), 'Lithium fever' grips Portugal as mining project raises hackles, Financial Times, link
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