

Lithium Governance in Chile: Challenges and opportunities in the decades of energy transition

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INTRODUCTION

Lithium is crucial for the global energy transition and is a strategic resource for Latin America, especially in the lithium triangle of Bolivia, Argentina, and Chile. As Anaya (2024) highlights, it is vital for lithium-ion batteries used in decarbonizing transportation and renewable energy storage, potentially driving industrial and technological growth in local economies.

In his study, Anaya (2024) suggests that the market expects a significant increase in lithium demand globally, driven by changes resulting from the current energy transition process. The current energy transition involves shifting from fossil fuels to renewable energy sources, emphasizing electrification, decarbonization, and energy efficiency. Lithium demand is rising due to its vital role in batteries for electric vehicles and energy storage, which is essential for integrating renewables and achieving climate goals. Furthermore, the author highlights that according to the International Energy Agency (IEA), lithium consumption will multiply 42 times between 2020 and 2040 in a sustainable development scenario that meets the Paris Agreement's objectives. By 2040, a demand of 1,160 kilotons of lithium is projected, with approximately 92% intended for electric vehicles and energy storage (IEA, 2021a and 2021b).

The growing demand for lithium-ion batteries in electric vehicles and portable electronic devices primarily drives the lithium market. This market supplies countries like China, Japan, and South Korea, which are the world's leading producers of lithium-ion batteries (Portal et al., 2022, cited in Anaya, 2024). Additionally, lithium has applications in glass and ceramics manufacturing, grease and lubricant production, steel and aluminum alloy creation; it is also used as a desiccant in the refrigeration industry, and the production of elastomers, polymers for the plastics industry, and pharmaceuticals (Anaya, 2024).

Chile is a key player in global lithium production, especially from the Salar de Atacama (the largest sea flat in Chile), which holds about 30% of the world's reserves (USGS, 2022). The rising demand has attracted major investments, notably from Chinese companies seeking lithium for batteries and electric mobility (Morales Estay, 2023).



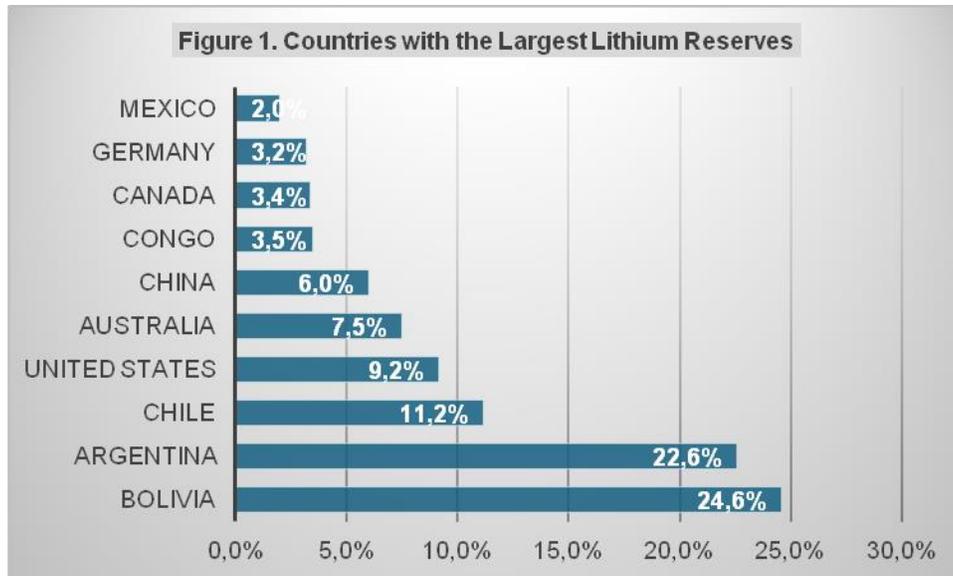
Salar de Atacama. Photo courtesy of: reporteminero.cl

However, for Chile to fully capitalize on its strategic position in the lithium value chain, it is essential to develop a robust governance framework that maximizes economic benefits and minimizes environmental and social impacts. Lithium governance in Chile must address significant challenges, such as the volatility of global demand, international competition, and the need to establish sustainable resource and waste management practices.

This essay focuses on analyzing the governance structures currently governing the lithium industry in Chile, assessing their effectiveness, and proposing recommendations to improve the management of this strategic resource in the context of a global economy transitioning towards cleaner energy.

CONTEXT OF LITHIUM IN CHILE

Chile is one of the leading players in the global lithium industry, with a significant presence of private companies operating under concessions granted by the State. Lithium extraction is concentrated in the Atacama, Maricunga, and Pedernales salt flats. The prominent companies leading this industry in Chile are SQM and Albemarle, which have leasing contracts for lithium extraction until 2030 and 2043, respectively (Rehner et al.; F., 2023). The Chinese company Tianqi also participates in the industry through its shareholding in SQM. The regulation of lithium extraction is managed by the National Geology and Mining Service and the Chilean Copper Commission, which establish strict environmental requirements to protect the environment and ensure the industry's sustainability. Additionally, the Chilean state plays a fundamental role in overseeing mining concessions and operations through the Production Development Corporation.



Own elaboration with data from Sondelo LR.

The Government has launched the National Lithium Strategy to manage lithium reserves sustainably and responsibly, aiming to guide exploitation through agreements and regulations. While not directly involved in major private companies, the strategy seeks to coordinate public-private efforts, boost national production, attract new players, and expand the industry.

The bidding process for lithium exploitation in Chile is governed by Law No. 20.551. This law stipulates that all mining operations must have a closure plan approved by the National Service of Geology and Mining, which has been criticized by some sectors arguing that the State should have a more significant role in the exploitation and commercialization of lithium, considering its strategic importance. In addition to the major private players, smaller companies, known as juniors, are engaged in the exploration and development of mining projects (Rehner et al.; F., 2023). These companies often sell their projects to larger operators once they reach the extraction phase. An example is Minera Salar Blanco, which CODELCO acquired 100%.

Unlike the models in Argentina and Bolivia, Chile's National Lithium Strategy allows the state to develop lithium projects in partnership with state-owned companies like CODELCO, highlighting the government's intention to take a more active role in managing this strategic resource.

THE REGULATORY FRAMEWORK AND INVOLVED ACTORS

The recent National Lithium Strategy, presented by the Government of Chile in 2023, seeks to reform this framework to address emerging challenges. The strategy includes measures to enhance environmental sustainability, strengthen community participation, and ensure that the economic development of lithium benefits local communities (Government of Chile, 2023). This integrated approach is based on five pillars. Table 1 provides a description of them.

Table 1. Pillars of Chile's National Lithium Strategy

PILLARS OF THE STRATEGY	DESCRIPTION
Dialogue and Community Participation	Initiate an inclusive dialogue process with all relevant stakeholders, including local communities, companies, and the government, to ensure that decisions reflect broad consensus.
Environmental Protection	Create a network of protected salt flats and promote the use of low environmental impact technologies.
Institutional Modernization	Update regulations and institutional capacities for more effective oversight.
Capacity Building and Knowledge Development	Establish a public technological and research institute to promote research in sustainable technologies.
State Involvement in Production	Create a National Lithium Company to ensure greater state participation in the exploitation of the mineral.

Own elaboration with data from Estrategia Nacional del Litio, Chile 2023.

CHALLENGES IN THE IMPLEMENTATION OF GOVERNANCE POLICIES

The main challenge lies in balancing the economic development of lithium with the preservation of saline ecosystems and respect for the rights of local communities. Lithium extraction, particularly in the Salar de Atacama, can have significant adverse effects on the environment, including decreased water levels in the salars (a type of salt flats) and impacts on local biodiversity. The current economic growth driven by lithium has led to an expansion in the quantity and intensity of its extraction, guided by the laws of supply and demand, without considering that the atmosphere is a common good and that carbon emissions do not depend on their source. However, capitalist logic persists: some are sacrificed to benefit others, with subordinate territories acting as raw material providers, assuming serious socio-environmental consequences (Azócar, 2022). Additionally, indigenous communities, such as the Atacameños, have expressed concerns about the impact of mining on their territories and traditional ways of life (Mongabay, 2023). Mining can negatively impact indigenous communities by disrupting their traditional lands, depleting water resources, and causing environmental degradation.

Strengthening the institutions responsible for regulating and overseeing lithium extraction is paramount to ensure that environmental and social standards are adhered to. These institutions are critical in managing the complex and often high-impact activities associated with lithium mining. Ensuring these regulatory bodies are robust, well-resourced, and equipped with the necessary expertise is essential for effective oversight. Despite various efforts and initiatives to modernize the institutional framework, significant deficiencies in monitoring and control capabilities still need to be addressed. These gaps in regulatory enforcement can lead to suboptimal implementation of policies and regulations, potentially

resulting in adverse environmental and social outcomes that undermine the sustainability of lithium extraction activities.

Moreover, transparency in decision-making processes is fundamental to effective governance of the lithium sector. It is essential that all stakeholders, including local communities, industry players, and civil society organizations, have access to clear and comprehensive information about decisions and policies that affect them. This transparency helps build trust and accountability among all parties involved.

Effective participation of all stakeholders is also vital. This includes ensuring that community engagement is conducted and that such participation is meaningful and substantive. For indigenous communities and other local groups directly impacted by lithium mining, their involvement should go beyond mere consultation. Their opinions, concerns, and traditional knowledge must be actively incorporated into decision-making. This approach helps ensure that decisions are more inclusive and better reflect the needs and rights of those affected by lithium extraction.

Addressing these issues requires a concerted effort to strengthen regulatory institutions, enhance transparency, and foster genuine stakeholder participation. By focusing on these areas, it is possible to improve the governance of lithium extraction and ensure that the associated benefits are achieved in a manner that respects environmental and social standards.

CONCLUSIONS

Governance of lithium in Chile involves balancing economic growth, environmental protection, and community rights. Effective management is crucial to maximize benefits while minimizing impacts, with the National Lithium Strategy providing a framework that requires practical implementation to succeed.

Achieving sustainable lithium exploitation involves several critical components. First and foremost, it is essential to fortify the institutions charged with regulating and overseeing the lithium industry. These institutions must be equipped with the resources and authority needed to enforce environmental and social standards effectively. However, the most relevant component is the meaningful and effective participation of our local communities. Their insights and concerns are not just important, but integral to our decision-making processes. Local communities are concerned about environmental impacts, such as water depletion and pollution, as well as cultural disruption and inadequate economic benefits from lithium mining. We must ensure that their rights and interests are fully respected, and their voices are heard.

Moreover, equitable distribution of economic benefits is a critical factor in promoting sustainability. The wealth generated from lithium extraction must be shared fairly among all stakeholders, including local communities, to prevent inequality and social unrest. Environmental protection should remain a top priority, with measures such as establishing protected networks of Salars and implementing sustainable technologies to mitigate ecological damage.

Chile stands at a pivotal moment with the opportunity to develop and showcase a model for lithium governance that could serve as a benchmark for other nations. By effectively integrating economic development with robust environmental and social responsibility, Chile can demonstrate how to manage critical resources in a way that promotes long-term sustainable development and set a precedent for global resource management.

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