**Opportunities for economic development in critical minerals producer countries: analyzing the role of local content policies for the lithium industry in Chile, Bolivia, and Argentina**

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**Overview**

The low-carbon energy transition is giving rise to a process of structural transformation of energy production and consumption systems, unprecedented since the first industrial revolution, bringing with it various technical, economic, social, and political implications that must inevitably contribute to the reconfiguration of the geo economy of energy and natural resources in the terms in which it is understood today (Clavijo 2021).

Although the technological routes that will dominate this transition are not yet fully defined and, therefore, it is impossible to predict in a concrete way all its geoeconomic impacts, some trends that are being observed in the sector allow us to discuss changes that should accelerate in the coming years. In this sense, the diffusion of new renewable energy sources associated with electrification and the positive perspectives on the increase in the participation of these technologies in the energy matrix, should encourage the demand for critical minerals in a sustained manner during the coming decades (Almeida et al., 2019).

Among this group of technological options, the one that appears as the main driver of the demand for critical minerals is the electric car. According to estimates by the International Energy Agency (2021), the manufacture of electric cars requires six times more mineral inputs than conventional cars and a greater variety of resources (Bauxite and alumina, cobalt, copper, graphite, iron, lead, lithium, manganese, nickel, rare earths, silicon, titanium).

Because of the increase in demand for critical minerals, different producer and consumer countries have been adopting public policies to expand supply capacity and improve the security of supply of these resources (Nakano, 2021). As part of these efforts, some national experiences have also incorporated initiatives aimed at encouraging value addition to productive activities associated with the extraction of critical minerals as a way of promoting national economic development. Likewise, the pressures on the effects of these productive activities on the environment and local communities have encouraged some countries to adopt public policies aimed at developing more sustainable extraction techniques (Bainton et al., 2021).

In Latin America, some of the most emblematic cases of these efforts are associated with countries with large endowments of lithium reserves. According to data from the United States Geological Survey (USGS), Bolivia is the country with the largest lithium reserves with 21 million metric tons, followed by Argentina (21 million) and Chile (9 million). On the other hand, according to IEA projections (2021), in the sustainable development scenario, by 2040 the current demand for lithium has the potential to multiply by 42% (IEA, 2021). For this reason, in the current context of expansion of the supply chains of critical minerals to lead the low-carbon energy transition and guarantee the security of the supply of these natural resources, Bolivia, Argentina and Chile become relevant in the energy industries, especially in the storage sector from batteries for electric cars.

Considering the above, the objective of the following article is to examine the national economic development strategies based on the promotion of local content policies for the industrialization of lithium, from a comparative perspective of the cases of Chile, Bolivia, and Argentina.

**Methodology**

To meet the objectives of the article, an exploratory research with a qualitative approach was carried out based on a comparative study of the cases of Chile, Bolivia and Argentina. Among the methodological instruments adopted, the documentary research, the semi-structured interview and the content analysis were used. In this way, the work analyzes the technical and economic characteristics of the lithium industry. As part of this effort, the research describes the organization of production chains associated with the extraction, processing, and use of lithium, with emphasis on the production of batteries for electric cars. Next, there is reviewed the main contribution of the literature on local content policies as tools to promote economic development in countries that produce natural resources. Based on the contributions of the literature, the study analyzes the public policy plans to encourage the industrialization of lithium in Bolivia, Chile, and Argentina.

**Preliminary results**

Among the preliminary results, the research identifies different strategies, in terms of design and scope, in the countries analyzed to promote the expansion of lithium extraction activities and the addition of value to the productive activities associated with that industry. In the Bolivian case, the extraction, processing and refining activities are directly conducted by the State through its state company. In Chile and Argentina, exploration and production activities are conducted by mixed regulatory schemes that allow the participation of public and private actors.

In the Chilean and Argentine cases, the study identifies the introduction of contractual clauses that contemplate the sale at a preferential price of percentages of lithium production as an incentive for the installation of foreign companies with the capacity to produce products based on those resources. Among the preliminary results, it was also identified the inclusion of contractual clauses in the Chilean case that contemplate the obligation of investments in research and development (R&D) in the country with the objective of developing extraction techniques with less impact on the environment and the local communities.

Finally, among the preliminary results, it is observed that the orientation of public policies to lead the industrialization of lithium in Chile and Argentina have had more positive results in terms of increased production of this resource, while in the Bolivian case the Results in terms of production have been affected by the orientation of government policies to maintain control over the entire production chain.

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