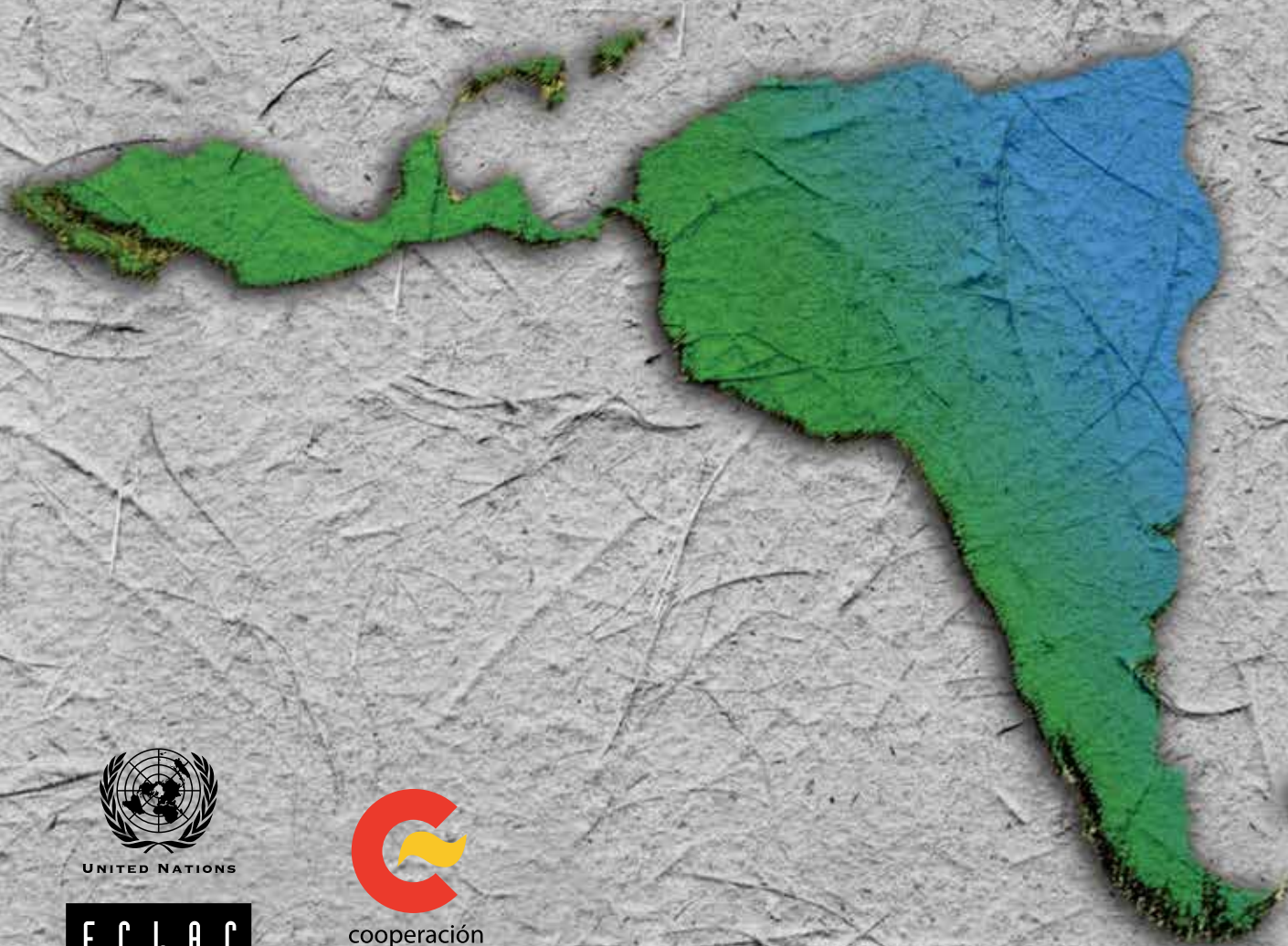


GOVERNANCE OF STRATEGIC MINERALS IN LATIN AMERICA: THE CASE OF LITHIUM

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This document has been prepared by Remco Perotti, Consultant of the Economic Commission for Latin America and the Caribbean (ECLAC) and Manlio F. Coviello, Chief of the Natural Resources and Energy Unit of ECLAC, within the framework of the cooperation programme between ECLAC and the Spanish Agency for International Development Cooperation (AECID).

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Introduction

The United Nations Economic Commission for Latin America and the Caribbean (ECLAC) annually publishes a study on the economic development in Latin America and the Caribbean. The latest edition of this study (ECLAC, 2015) reveals that there has been a slight growth of fiscal revenues¹ as a percentage of the GDP in Latin-American states. However, the study also shows that this growth is threatened by the weakness in revenue from non-renewable natural resources.

This is cause for concern because of the relative importance of the natural resources sector to the region; Latin American states still rely heavily on the exports of natural resources for successful integration in the global economy (Singh, 2013; ECLAC, 2015). The appropriation and efficient investment of resource rents from natural resources is an important determinant of development in these countries, where the resource extraction industry (REI) is of such importance.

Important international organizations such as the Organization for Economic Co-operation and Development (OECD), G20 and International Monetary Fund (IMF) are advising developing countries to increase their tax collection (Von Haldenwang, 2011).

The relatively low international mining prices during the 1992s² led Latin American governments to believe that mining would not be a significant source of fiscal revenue. Mining was generally seen as an instrument to bring variety to the types of Foreign Direct Investment (FDI, and to achieve a more geographically balanced growth-pattern. This led to governments in the region establishing very attractive fiscal regimes,³ or fiscal agreements with private firms, in order to incentivize FDI. However attractive for private firms, the lenient fiscal regimes led to an imbalance in the division of the resource rents between host-governments and private firms.

Mineral commodities prices have risen significantly in the past decade —mineral prices grew by over 300% since 2003 (NSI, 2013)— which led to growth in the mining sector of the region of Latin America and the Caribbean (LAC). However, host-governments have not been able to benefit equally from the rise in mineral prices. Old regressive fiscal regimes in the region partially explain why host-

¹ Fiscal revenue is the total state-income through taxation.

² For example: gold and silver were approximately US\$ 10,500 and US\$ 175 per kilogram during the 1990s, while in 2012 they were respectively US\$ 41,200 and US\$ 1,100 (NSI, 2013).

³ A fiscal regime, in this document, refers to a broad variety of tax and contractual arrangements, including signature bonus payments, royalties, income tax, production-sharing, resource-rent taxes, and state participation, among others (IMF, 2012b).

governments—in large part— were not able to capture the revenues from the increasing commodity prices. Another explanation is that the fiscal administration is often difficult and badly executed.

The IMF (2012) comments that the, often excessive, variety and complexity of REI fiscal regimes have often posed serious challenges to developing states; important tax rules have often been complex, unclear, or open to abuse. This has led to inefficient taxation, which is reasserted by the ECLAC's research as indicated earlier, showing weakness in revenue from renewable resource sectors.

Developing a successful national policy for the development of a strategic mineral involves many considerations. When it comes to public policies there is more to consider than just the national economy; there are often environmental issues related to mineral-exploitation, and local communities affected by the mining industry. A measurement of success thus depends on the definition thereof. Success might be measured in the sustainable growth of an industry, exports, contribution to the national GDP, or it might include socio-economic development, collected revenue, or locally adding value to the industry.

With regard to the national economy, there are long-term policies and short-term policies, respectively focusing on industry development and maximal rent extraction, for example. Long-term policies might also benefit intergeneration-equality.

Either way, it is important to develop a policy that is broadly supported by a country's citizens, and fairly shares in the economic resource rent. A country can chose to develop its own resource extraction companies, but this often involves a high level of expertise, and high levels of investment. Another way is through taxing private firms that extract minerals or resources. A solid fiscal regime, for a great deal, depends on effective institutions.

These issues are explored in this report, with analyses of public policies that stimulate, or facilitate, national economic growth, through sharing the economic resource rent. The public policies regarding issues of environmental damage, or local communities affected by mining projects—although equally important—are not emphasized in this report. They will however be briefly addressed in this document, with regard to the policy proposal of the Chilean National Lithium Commission.

I. The lithium industry

States in the LAC region are home to some of the world's most extensive mineral reserves, with great reserves of copper, iron, silver, and tin. Another non-renewable resource that is gaining salience is lithium. The lithium-industry has a significant growth-potential, due to the application of lithium in Li-ion batteries. Li-ion batteries are widely used for various forms of energy-storage, from smart-grid systems to batteries for electronic vehicles.

The furthering of the non-fossil fuel-dependent automotive industry would be welcome in highly urbanized Latin America, where air pollution is a critical issue, and where motor vehicle density is escalating (ECLAC, 2014). The LAC region contains approximately 65% of the global lithium resources (COCHILCO, 2014; SERNAGEOMIN, 2014b; ECLAC, 2014).

The three states with the highest amount of available lithium resources are Bolivia, Chile, and Argentina, see Appendix 1 for a representation of what is known as the lithium triangle. Of the three, only Chile and Argentina are significant lithium producers. Bolivia is in the process of developing its lithium-industry.

Chile, one of the biggest lithium producers in the world, is the only state that has classified lithium as a non-concessible strategic mineral of national interest. This means that lithium is linked to the national interest, and can therefore only be exploited by the state (COCHILCO, 2014). There are, however, two mining firms that were granted lithium-concessions either before the metal was declared strategic, or through a Chilean state institution. These two mining firms are the only lithium producers in Chile at the moment.

In June of 2014, Chilean President Michelle Bachelet and Aurora Williams —the current Mining Minister of Chile— created a Ministerial Advisory Committee; the National Lithium Commission (NLC). The NLC is tasked with proposing a new national policy on lithium governance. The national policy on lithium governance is concerned with the sustainable development of the lithium industry, by addressing social, economic, and environmental issues. The NLC has met with stakeholders, experts, lithium producing companies, and other relevant parties, in order to evaluate the Chilean and global perspective of lithium exploitation. The final goal is to improve the current concession system to stimulate the exploration and exploitation of lithium while making it easier for new actors to enter the market (Mining Lithium, June 2013). The ECLAC has been asked to participate in this commission to contribute through expertise on natural resource governance. The NLC has presented its lithium policy proposal to the Chilean government in January 2015.

A. Objective and structure of the report

The objectives of this report are twofold: The first objective is to provide an integrated overview of the governance of strategic minerals, focused on sharing the economic-resource rent. The second objective is to provide a context for the policy proposal of the NLC. The collected data, and information, on the various fiscal regimes can be used as a reference for further research. Further research might deepen the insight into revenue collection, and the use of those revenues to stimulate development, for example.

The objectives in this report are met by analyzing distinct aspects of strategic mineral governance, in three different parts. The lithium-industry serves as a case study for this report, as an example of a strategic mineral.

The first part analyses various resource governance issues. One essential element of lithium governance, and strategic mineral governance in general, is the encompassing fiscal regime. Effective tax-instruments are key in translating resource rents into governmental revenue. This element has not yet been thoroughly addressed in the NLC policy proposal, and will therefore be developed by the Chilean government in the months to come. This report explores the current issues relating to the taxation of the Resource Extraction Industry (REI)

This section discusses: the various forms in which a state can collect revenue from the REI; the changing bargaining-positions between governments and private firms when establishing a fiscal regime; and the issue of transparency, with a discussion on the potential benefits of transparency in fiscal regimes, and the potential detriments of its obscurity.

This report emphasizes the need for transparency of fiscal regimes with regard to the visibility of collected revenues, and fiscal agreements between governments and private firms. Unfortunately it has been too difficult—in the limited scope and timeframe of this report—to obtain dependable data on collected revenue from the lithium industries in the analyzed states.⁴ This is an indication of the obscure nature of fiscal regimes on mining.⁵ Because the data on collected revenue from lithium-producers is this difficult to obtain, it is equally difficult to demonstrate a local lithium industry's contribution to the national GDP, and to the economic growth of a state. This is problematic because it hinders transparency, and might decrease legitimacy.

The second part starts with an introduction to lithium, and the global lithium industry. This includes a mapping out of the global distribution of lithium resources, the global demand, and the active producers. The international benchmarking presents a brief examination of lithium industries in the major lithium-producing states: Australia and China.⁶ These international benchmarks are

⁴ None of the institutions that promote mineral revenue disclosure (EITI; IMF; World Bank; ICTD) have any data on collected revenue from the lithium industry at the moment of writing. As a consequence hereof, this report occasionally relies on data from other sources, dating from 2013 and earlier. Most of the data has not been updated annually. Analysts at COCHILCO and Geoscience Australia confirm that production figures aren't regularly updated anymore, due to the decreasing transparency of the global lithium market. For example: Talison Lithium does not report annual production of spodumene concentrates anymore, since it was acquired by the Chinese Tianqi, Galaxy Resources hasn't published any figures either.

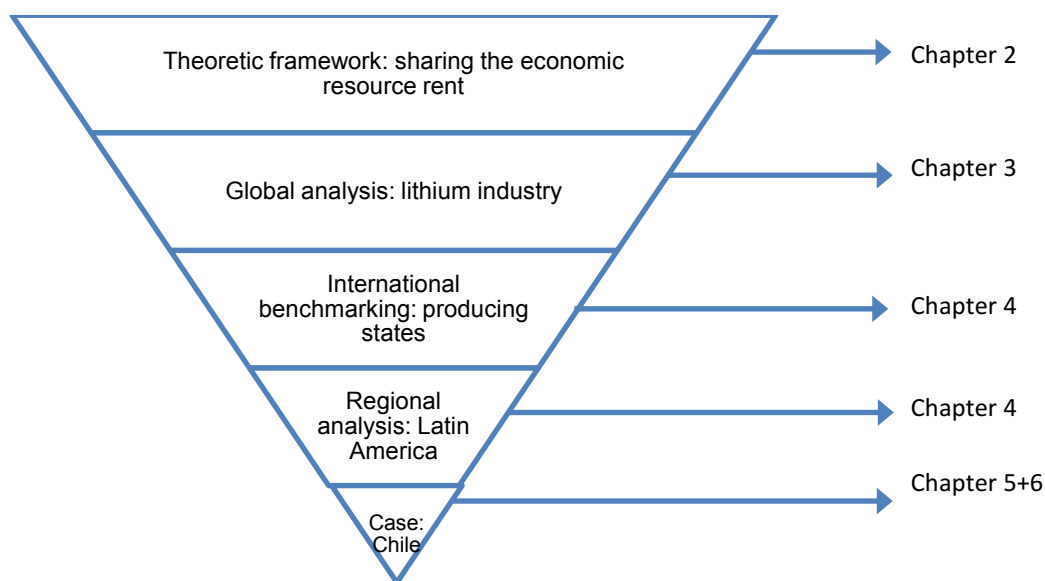
⁵ NB: The export of lithium or LCE is a relatively small market, meaning that the publicly published information by governments on lithium production and revenue is often aggregated with other minerals. This partially explains why these figures are difficult to obtain. Another reason for the unavailability of revenue data is because of privacy-laws. In Australia, for example, the government is not allowed to disclose any information on paid taxes through which taxpayers can be identified. Furthermore, the lithium producers who have responded to the author's inquiries mentioned that they consider their values of production as commercially confidential.

⁶ The USA also holds, and produces, a significant amount of lithium. The figures on production, reserves, and resource availability have all been classified. There is only one active commercial lithium brine operation in the USA Rockwood Lithium, located in Silver Peak, Nevada. They report their annual lithium production to the USGS, but Rockwood Lithium has always requested that the USGS do not publish their proprietary production data. As they are the only domestic lithium operation, the USGS is obligated to carry out their instructions. For these reasons the lithium industry in the USA will not be included in this analysis.

followed by a regional analysis of lithium in Latin America, with profiles on Argentina and Bolivia. Bolivia contains the largest share of the world's lithium resources⁷, but is not yet producing significantly. Bolivia is, however, developing its local lithium-industry through a joint-project with the Netherlands. These countries are profiled for their lithium-production, lithium-availability, and obtainable fiscal regulations for lithium mining.

This framework of the lithium industry lays out the context for the analysis of the Chilean lithium industry, in the third part of this report. The analysis of Chile's lithium industry concludes with a summary of the national lithium policy, as proposed by the NLC. The report concludes with a synopsis and analysis of the history of lithium-policy and the encompassing legal-framework in Chile. Chile's classification of lithium as a strategic mineral has made for a complicated situation of conflicting legislation.

Figure 1
Structure of analysis



In order to arrive at dependable and unbiased conclusions, the authors conducted a series of interviews, used various sources of information such as; newspapers; published academic articles; and studies from; intergovernmental organizations, mining enterprises, governmental scientific agencies, and international economic organizations. The potential bias of each source has been taken into account by the authors.

⁷ Bolivia contains approximately 24,4% of the global lithium resources (COCHILCO, 2013: 3-14; SERNAGEOMIN, 2014b).

II. Sharing the economic resource rent

A. The resource extraction industry

The United Nations Economic Commission for Latin America and the Caribbean deems good governance of natural resource sectors essential for socio-economic development. The ECLAC defines good governance as:

“(…) the effective capacity of the State to take the political action needed to ensure that natural resources are exploited in a way that contributes effectively to inclusive economic development, generating production linkages with the rest of the domestic economy, driving the development of appropriate infrastructure to avoid enclaves of natural resource-based exports and combining the growth of these sectors with safeguards for the environment and the rights of the peoples and communities, among other goals” (ECLAC, 2014).

The ECLAC recommends resource rich countries that extraction of those natural resources should be combined with progress towards a more diversified production structure, promoting technological innovation and linkages with other sectors in the stage development of the natural resource sector. The other stage represents efficient government investment of natural resource rents and the proper use of the associated tax revenues; by creating employment opportunities, infrastructure, social protection, building human capacities and investing in education and training. This should sustain societies with greater equality and opportunities for development, as concluded by the ECLAC: “The ultimate objective is to leave future generations the production capacities and means to achieve sustainable development” (ECLAC, 2014).

Thus, dealing with governance of strategic minerals, and non-renewable natural resources in general, there are a lot of political and legal matters involved with resource governance. In the end, from the perspective of state-development, resource governance should contribute to economic growth and security. This chapter explores the current issues on resource governance, and how a state can benefit from the exploitation of these natural resources.

Most states own the non-renewable natural resources within their continental and oceanic territory, on behalf of its citizens. These resources are usually —though not exclusively— explored and exploited by private firms. These exploitation projects have the capacity to generate surplus

revenues in excess of all costs of production; economic resource rents.⁸ Governments of resource-rich states aim to obtain a fair share of the resource rents emanating from mining projects, and citizens may thus reasonably expect that this would benefit local socio-economic development. However, there is no automatic positive link between resource extraction (RE) and socio-economic development (ECLAC, 2013: 271). Many developing resource-rich states do not have the financial resources, or the expertise, to explore for and develop mineral resources (NSI, 2013). The exploration and exploitation of minerals in developing states therefore generally relies on foreign investment. One significant determinant for a positive relation between RE and socio-economic development is an effective fiscal regime, through which REI revenue can be accrued to a host-government. Taxing the extraction of non-renewable resources is a highly political matter, where policymakers often deal with powerful domestic and international actors, in both the public and the private sector.

A state often treats the REI differently than other economic activity, because of its unique characteristics. One motive for the special treatment of the REI is that a host-government wants to be compensated for the declining stock of finite resources due to its exploitation. As many resource-rich governments own all its subsoil assets, companies are often required to pay a fee—in the form of a royalty—for the right to exploit the state-owned deposits. Royalties are used as an addition to taxes on all business operations.

Other important features that characterize the REI are its short-term and long-term benefits—or rents—for the extraction firms. In the short term, REI can generate substantial rents through, for example, windfall profits – caused by global commodity price hikes. Long-term benefits of the REI are owed to the market entry barriers experienced by new firms. These market entry barriers are partially caused by what are known as ‘sunk costs’.

RE requires high initial investments in the exploration and development phase, and generally involves long production periods. The exploration phase is lengthy and costly, and there is no income during this phase. Besides this, the profitability tends to be uncertain at the start. One last consideration is the Dutch Disease. The term ‘Dutch disease’ is derived from a phenomenon observed after major increases in wealth in the Netherlands in the 1960’s, following the discovery of large gas deposits in the North Sea. The Dutch gulden became stronger, thereby making non-oil exports less competitive. The syndrome associated with this phenomenon is known as the Dutch disease.

The term can be applied to any development that triggers a large inflow of a foreign currency (Ward, 2009). The Dutch disease causes increases in the value of the currency and it reduces the competitiveness of other exports (Kohl & Farthing, 2012). Manufacturing might decline and inflation might increase as a result of increases in natural resource revenues exerting a knock-on effect on exchange rates (Ward, 2009).

For these reasons, the REI is unique in its essential qualities, which is why many states manage and regulate this industry carefully.

B. Designing a fiscal regime for mining

Governments with a large amount of non-renewable resources play a pivotal role in the design and implementation of regulatory and fiscal frameworks, and in macroeconomic management, strategic

⁸ The pure economic rent of the mineral resource is the difference between the value of the output in international prices and the cost of production of the ore at the minehead. The following cash streams are derived from this economic rent: (i) the fiscal payments received by the state in the form of taxes, royalties or other levies; (ii) the private earnings of the extractive companies; and (iii) payment of the factors of production used beyond the extraction stage, which mostly consists in remuneration of personnel employed by the extractive companies (ECLAC, 2013: 25). This rent is calculated as the margin realized after netting off from the gross mineral revenue all the costs of production—recurrent and capital recovery costs—as well as a minimum return on capital high enough to attract capital and retain it in the project (IMDC, 2012).

planning, public policy design and implementation (ECLAC, 2013). Deciding upon the functioning of fiscal regime for mining⁹ implies many trade-offs for a government.

A government has to consider; attracting foreign investment to explore and exploit minerals; maximizing fiscal revenues in order to ensure local citizens receive a fair share of the mineral wealth; and, enhancing development in the REI. A government looking for a sustainable development of the local REI needs to balance these considerations, which often involves bargaining between the state and the private sector—including major transnational corporations—.

Sustainably developing local REI's, and ensuring public revenue collection from those industries, requires substantial administrative capacity, public infrastructure, and political commitment. The government of a resource-rich state has broadly three instruments at its disposal for participating in mining rents.

1. Participation of the State

The most direct approach is through the exploration and exploitation of natural resources by state-owned enterprises; the Chilean state-owned copper-mining enterprise CODELCO is an example of direct state involvement. However, as indicated earlier, many states do not have the financial resources or the technical expertise to endeavor into mineral exploration and exploitation. State-owned enterprises often respond to the particular interests of powerful groups in states with a weak governance framework, a low level of state capacity, and unsophisticated state institutions. This affects the sector's productivity and future investment levels. Often encountered problems by states participating in the REI are:

- Boom and bust cycles: where commodity prices rise sharply and then plunge (Kohl & Farthing, 2012). Short-term extractive booms also make sustainable development more difficult because they reduce the incentive to invest in other activities (Sachs & Warner, 1999). These boom and bust cycles might encourage unsustainable spikes in government social spending, and it might even deteriorate democratic checks and balances as a result of increased corruption (Collier & Hoeffler, 2009; Heinrich, 2011).
- The resource curse: when relatively poor countries have an abundance of natural resources this might become the cause of their poverty and economic instability (Auty, 1993). In those countries the abundance of natural resources can cause that; manufacturing is lacking behind; rent-seeking is very common; governments are continuously unstable; their institutional capacity isn't strong; an educated workforce develops more slowly; and, that economic inequality is greater than more balanced economies (Karl, 1997). The resource curse also refers to stagnation and conflict as a result of the resource abundance. This occurs when the revenues from these resources are misappropriated by corrupt leaders and officials, rather than being to support growth and investment (Palley, 2003).

A However, state-led RE in more institutionally strong states can be an effective way of collecting resource rents, as it has shown potential in some parts of the world. A resource boom in a nation where the resources have been nationalized can considerably benefit society when state institutions are competent, and accountable even if only to a small group as is the case in some of the OPEC states (McPhail, 2009). The small OPEC states like Qatar been able to diversify their economic if not productive activity (Kohl & Farthing, 2012). Another example of successful nationalization is Norway. Norway has successfully been using revenues from North Sea oil to subsidize social democratic benefits to its citizens (Eifert, Gelb & Tallroth, 2003).

⁹ Because this is a report on lithium governance, the literature on fiscal management will be discussed in relation to the mining industry. Although most concepts apply to other extractive industries as well, such as the petroleum industry, there are different academic approaches to the analysis of fiscal policies for petroleum and fiscal policies for minerals (IMF, 2012a: 12).

Besides the participation of the state through state-owned enterprises, there are two more distinct types of state participation; (i) the state can contribute to some of the project costs of mining by providing infrastructure, or lump sum subsidies, for example; and, (ii) the state can share in the project benefits, through receiving equity for cash on private investor terms, for example. Other examples of the second type of state-participation are contractual-based systems; these can be subdivided in two types of contracts: production sharing contracts (PSA's) and service agreements (SA's).

The PSA and SA contractual-based systems are not very common in the mineral-industry concessions are the norm (Johnston, 2007; ICMM, 2009). A concession is granted by the state to a holder, who has a real right to the concession or the use of the resource, but not to the resource itself (ECLAC, 2013). One reason for the preference for concessions lies in the marketability of minerals and mineral products. When a government is the owner of the extracted mineral product—as is the case with PSA's and SA's—it is also responsible for the distribution and sale of this product. PSA's and SA's are therefore useful when a government can rather easily sell products domestically or on the international market, as with fossil fuels for example.

For mineral products, such marketing is more difficult; private enterprises generally are more experienced in these matters. Transnational firms therefor play an important role in the REI, precisely because of their marketing experience, technical expertise, and their available capital. A host-government is, however, still able to share in the revenues generated by the local—privatized—REI. The most widely applied mechanism for rent sharing in the REI is through tax-concessions. Concessions allow companies to take full control of the entire production process. The owner of natural resources—usually the state—gives these concessions. When a host-government decides to concess a mineral, or a deposit, it can tax these private RE firms through profit- and production-based taxation, both forms are discussed below.

2. Production-based taxation

Most host-governments do not treat REI's as any other economic activity, but rather create specific tax regimes for the REI. A state can levy production-based taxes on local REI's. A common production-based tax is the royalty.¹⁰ Royalties can be charged as a share of produced value or as a fixed amount per product unit. Production-based royalties are usually regressive;¹¹ which implies that lower productivity equals a higher tax burden. Other production-based taxes are sales taxes and foreign trade duties. The advantage to royalties is that they are able to generate revenue regardless of company profits. However, the disadvantage is that royalties potentially affect investment or production levels for the present or future profitability of mining projects might be reduced.

Production-based taxes are administratively not as strenuous as profit-based taxes, but they may lead to market distortions and lower investment in the future. The academic literature on resource taxation seems to support a move towards greater reliance on profit or income based direct tax instruments,¹² and less reliance on regressive taxation. Most mine-hosting governments apply a mixture of the progressive and regressive tax instruments, for they often wish to receive revenue on both the short term and the long term.

Even if progressive tax instruments could generate more revenue, political pressures can move a government's interest to receiving resource revenue sooner rather than later—through regressive—production based-taxation.

¹⁰ Royalties are technically 'rents' and not taxes, as their logic follows the notion of a firm paying a state for the right to extract the non-renewable natural resources that the latter owns (NSI, 2013).

¹¹ A regressive tax system is where the marginal tax rate decreases proportionally with income.

¹² Proposals for progressive tax instruments for the taxation of the resource rent include the Resource Rent Tax (RRT) and the Brown tax (Garnaut and Ross, 1983; Fraser and Kingwell, 1997).

3. Profit-based taxation

When private companies extract and explore mineral resources, a government can choose to levy taxes on corporate income, profits, or cash flow. Profit-based taxes are able to reflect, address, and tax the distinct features of REI's through, for example, resource rent taxes or windfall taxes. From a theoretical perspective, profit-based taxation should not excessively affect investment or production in a negative way; the mining-activity is still profitable.

A government looking for a progressive tax regime¹³ on mining, in order to minimize investment disincentives, generally levies profit-based taxes. One of the main forms of profit-based taxation is through corporate income taxation (CIT). The state seizes a percentage of the profits that firms make from their commercial activities through CIT's.¹⁴ The taxable income is calculated on the surplus that comes from subtracting all operation costs plus the depreciation of assets involved in production from the revenues obtained in a given period of time. A downside of the CIT is that revenue tends to be cyclical, and dependent on mineral prices. This is a problem because governments often need to be able to spend more during economic downturns than they need during economic booms.¹⁵

Another option is to link a royalty amount to a benchmark that is a proxy for the profitability of the operation. This turns royalty payments into the equivalent of a specific tax that marginally increases the normal tax burden paid by a company on its reported profits (ECLAC, 2014). A report of the IMF (2012) reiterates the benefits of progressive, profit-based, taxation as opposed to regressive taxation:

“A key objective is (...) to maximize the present value of net government revenues from [the extractive industry], an objective best served by taxes explicitly targeted on rents: by definition, any other tax leads to distortion that reduce those rents, and hence the amount of revenue that can be raised”.

The general assumption is that private-sector companies also favor this form of progressive —profit-based— taxation. One major consideration therein is that profit-based taxes protect exorbitant taxation in the development phase of a mining-project. This type of taxation, however, is difficult to design and monitor for it requires tax authorities to independently estimate the profits (ECLAC, 2014).

Fiscal regimes generally rely on private firms to report their profits, after which the government audits these filing. The general assumption is therefore: the simpler the taxation system, the simpler it is to audit these filings. For a government to audit tax-filings, they often need very specific information, which might be difficult to obtain (IMF, 2012); the assessment of the quality and value of the mineral ores, and the accompanying royalties, for example.

This information asymmetry between government and private firm can lead to transfer pricing.¹⁶ Moreover, developing states can have an especially hard time dealing with multinational firms and their sophisticated legal and accounting services. These legal and accounting services can reduce a firm's tax burden by exaggerating costs and artificially reducing taxable profits. CIT is also vulnerable to tax evasion, through transfer pricing for example.

Governments require independent mechanisms and specific indicators to ensure that profits and costs are transparent throughout price cycles (ECLAC, 2014). One way of combatting these

¹³ A progressive tax regime, in this document, refers to where the marginal tax rate increases as the taxable base amount increases.

¹⁴ For a detailed account of CIT issues with special importance for the REI, see IMF (2012)

¹⁵ There are mechanisms to deal with economic downturns and negative mineral prices cycles, through the use of adequate institutions to save income from boom periods to be used in crises times such as the Chilean Economic and Social Stabilization Fund (ESSF).

¹⁶ Transfer pricing refers to instances where prices for project inputs and outputs are expressed in ways that minimize a company's tax liabilities. Examples of transfer pricing are; inflating the reported costs of tax deductible inputs purchased from overseas affiliates, or by reporting sales values to overseas affiliates at a lower level than would be expected given global market conditions (ICMM, 2009; IMF, 2012).

negative externalities is through a state-owned mining enterprise, the reporting of which can ensure transparency in profits and costs (ECLAC, 2014; IMF, 2012a). Saínz, argued on this topic:

“The existence of public enterprises should not be excluded as a principle. On the contrary they may constitute an excellent operative reference to judge the conduct and profitability of FDI enterprises and open the possibility to participate in the levels of production, (...)” (Saínz, 2007).

Finally, progressive taxation usually generates little revenue in the initial years of production. This is why developing governments looking for a rapid, and more easily monitored, inflow of revenue usually rely on production-based taxes.

Table 1 contains an overview of the most-used profit- and production-based taxes.

Table 1
Main tax types

Profit-based taxes	Production-based taxes
Corporate income tax	Royalty; unit based (flat-rate) and value based (ad valorem)
Profit tax on dividends	Sales and excise tax
Royalty based on profit / income measure	Payroll tax
Withholding tax on remitted dividends	Export duty
Resource rent tax	Import duty
Excess profit tax / Windfall tax	Value added tax (VAT)
	Applications / Issuing / Registration fees and stamp duty
	Land rents
	Withholding tax on loan interests and services
	Property tax

Source: Constructed by the authors from: ICMM, 2009; IMDC, 2012; IMF, 2012.

The excess profit tax—or the windfall tax—has lately received more attention, because of the recent rise in global demand and prices for minerals and metals. The excess profit tax is an effective way of capturing higher profits, because it is a progressive tax instrument. Unit-based, or flat-rate, royalties refer to the application of fixed monetary rates to a physical rather than a financial base such as per ton. Value-based, or ad valorem, royalties refer to the uniform percentage—the rate—of the value—the base—of the mineral in the products sold by the miner (IMDC, 2012). The use of royalties as tax instruments for REI’s is a topic of intellectual debate.

One argument against the use of royalties is that royalties do not necessarily generate steady payments; investors might cut back production the most at the largest sites, which have higher per-unit costs. Mining companies are incentivized to extract only the easily recoverable resources; leaving the developing host-country with the resource-deposits that are difficult to extract. The scope of this report is, however, too limited to deal with this debate in a comprehensive manner; Otto et al. (2006), and the ICMM (2009), ECLAC (2014) and NSI (2013) reports provide detailed accounts of the issues and experiences with the use of royalties.

C. Government and private firm bargaining and transparency

For a developing resource-rich state, choosing an approach to make a profit from the exploitation of its non-renewable resources presents various challenges. The institutional environment in developing states is generally not as defined and restricted by formal regulation as in developed states. When dealing with mineral RE, developed states tend to unilaterally legislate the fiscal terms through either

a mining code or in other pertinent legislation. Developing governments occasionally make specific, ad-hoc, deals with private mining firms, bypassing the existing fiscal legislature. Although this does prove useful when trying to attract foreign investment, it does potentially harm the process of developing a coherent, effective industry-wide fiscal regime.

Those privately negotiated contracts and agreements between governments and RE firms are generally not passed by the legislature. Governments argue that the terms of the contracts should not be publicly available; in order to enhance the government's negotiating power with different companies. This also means that the RE firms involved are unable to publish detailed information on their revenue payments. These firms are often stressing transparency-related issues, for this is an opportunity to make citizens aware of the fiscal contribution, and how this revenue is spent (ICMM, 2009).

A lack of transparency can translate into higher financing cost, lower level of investment, and fewer opportunities for tax-collection in the future. The closed nature of ad-hoc deals between host-governments and RE firms therefore does not only create openings for illicit behavior, it potentially impedes the establishment of an effective fiscal regime. Transparency can also aid greater coordination and harmonization of tax treatment among investment-receiving countries. This helps preventing tax competition between resource rich states attempting to attract FDI's (ECLAC, 2013). The IMF (2012) affirms that transparent and effective administration of fiscal regimes for the REI is critical for both revenue, and investor confidence.

Scholars have argued that a state's credibility is one of its key resources. This credibility "(...) arises where the rules and regulations governing the sector are clear and the funds collected are used transparently in the common interest" (Von Haldenwang, 2011). This sentiment is reaffirmed once more with the creation of the Extractive Industry Transparency Initiative (EITI). The EITI is an initiative by a coalition of governments, companies, and civil society.

The initiative pleads that governments should make their revenue incomes, and fiscal agreements, publicly available, so citizens can see the contribution of the natural resources to the national development. It is important to note that none of the countries discussed in this report —Australia, Argentina, Bolivia, China, and Chile— are implementing the EITI at the moment of writing this report. Transparency is often associated with effective sectorial regulation, institutions such as the European Commission and the OECD therefore press for country-by-country reporting by multinational RE firms.

The IMF also recognizes the lack of transparency as a vital issue; they claim that the data on government revenues from the REI are poor; "One-off confidential agreements make the law opaque, and the negotiation process is open to abuse" (2012). For this reason, the IMF devised an initiative to make these data more transparent, through a standard template to collect data on government revenues from natural resources (IMF, 2014). Another initiative for the disclosure of revenue data comes from the International Centre for Tax and Development (ICTD, 2014).

Promoting transparency therefore also benefits the long-term perspective of sectorial development. This also requires stakeholder involvement, and the disclosure of information, in order to gain local legitimacy.

In previous decades, at the outset of extraction projects, private resource extracting enterprises had a strong bargaining position with respect to host-governments. This strong bargaining position stemmed from a combination of; high investment needs; under-exploration of natural resources; and poor domestic capacities in finance, infrastructure, technical expertise, and project management. Moreover, developing states often had trouble defining the quality and value of their unexploited natural resources. With a relatively small tax base, governments were incentivized to offer lenient fiscal regimens in order to attract private capital.

At present, the distribution of bargaining power situation has changed a great deal. The commodity-market is more demand-driven, which leads to governments having a stronger bargaining position, for there are likely to be more interested private parties competing for access to the natural

resources. Despite the changing bargaining positions of the host-government and the interested private firms, there is still an information asymmetry between the two, normally to the disadvantage to the host-government (IMF, 2012a). Land (2007) notes that host-governments often lack the capacity to negotiate effectively with international companies. Land indicates that host-governments often did not consider progressive taxation instruments in their attempt at attracting investment. This lack of capacity, and poor coordination among different government entities are common sources of incoherence in fiscal and other sector relevant policies (Land, 2007).

Ultimately, private enterprises hold three alternatives: first, they can refrain from investing; second, they can accept higher risks or lower profits by offering better deals than the competitors; or third, they can try to externalize risk and costs. In a weak governmental institutional environment, private firms often prefer the third alternative. Risk and costs externalization can be achieved through legal action. Examples are; political risk coverage, such as public export credit guarantees; investment protection, through bilateral investment treaties; and international contract enforcement.

The bargaining positions change once more when a mining-project starts production, after the exploration and development phases have finished; private RE firms have then invested significant sunk costs. Private firms are therefore less mobile—or captive even—in this position of ‘obsolete bargaining’, which makes them vulnerable for unilateral government action.

Ex-post unilateral government action, in a time of obsolete bargaining, may create serious disincentives for future investments (IMF, 2012a). Ex-post unilateral government action has taken place since the rise in demand—and the associated price hike—of many minerals and metals. Citizens of mine-hosting states often demand to see immediate results through revenue collection. These political pressures influenced governments to implement more regressive forms of taxations, in order to accrue immediately visible benefits.

D. Considerations

One key reflection is that, for ECLAC, assets in the public domain should come under a special regime consisting primarily of the attributes of inalienability, inextinguishability and unseizability. Another ECLAC principle for the designing a fiscal regime is the application of progressiveness; a proportionately greater state share during price booms that generate extraordinary revenues for the sector (ECLAC, 2013). It is important to note, however, that it is unlikely that there is one sole, universally applicable fiscal regime, or a single definition of tax-bases, or a series of tax rates that are fitting under all circumstances. It is complicated to balance all legitimate interests at all times, under a single correct tax.

However, on the basis of an analysis of academic literature, and reports by organizations active in the REI, it is possible to outline a general approach, from an economic perspective. A prudent government could try to maximize revenue from the its mineral REI by concentrating on the long term development, by taxing the tax-base progressively.

In a progressive fiscal regime, the state’s participation becomes proportionality greater during price boom cycles that generate windfall earnings, for example (ECLAC, 2013). Progressive fiscal regimes for mining are likely to be more stable in the long run. In developing nations, where there is no strong ex-ante mining code, it is prudent to re-assess its fiscal regime periodically and collaboratively; governments and companies need to work in partnership with others to accomplish this. Transparency and cooperation prevent perverse tax-competition between states in order to attract FDI’s, and it can be beneficial to the establishment of a comprehensive, coherent, fiscal regime (Garnaut & Clunies Ross, 1983; Garnaut & Clunies, 1975; ICMM, 2009).

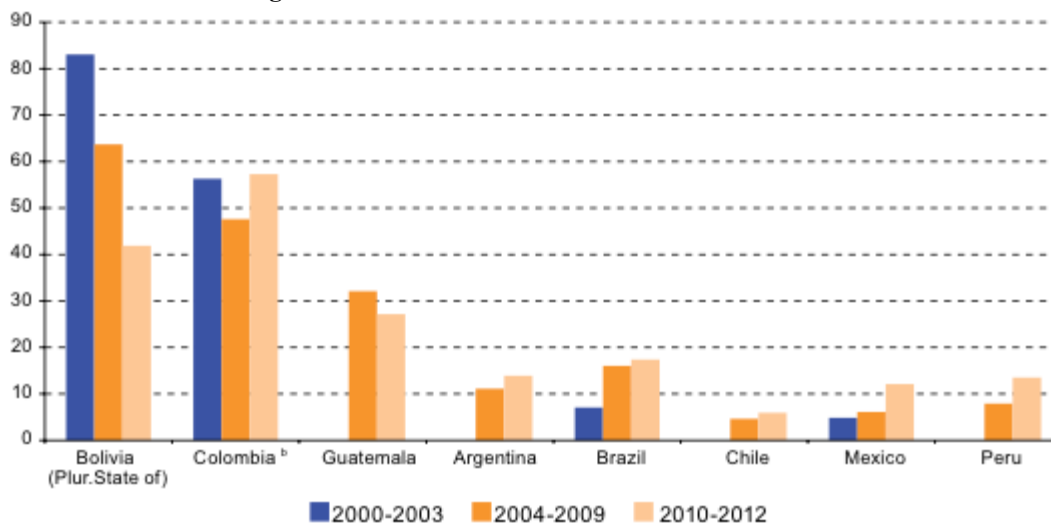
Furthermore, a resource-extracting firm considers more than a country’s fiscal regime, when analyzing the investment-possibilities. Tax incentives, such as tax holidays or accelerated capital cost

allowances,¹⁷ could even be less decisive than tax disincentives. Disincentives include political risk and tax uncertainty (IMF, 2012a). For these reasons a host-government would do well to concentrate on creating a stable fiscal regime and institutional environment. Stable fiscal regulation could come in the form of ex-ante established mining codes, focusing on strengthening the tax-administration. Host-states still have the possibility of applying different tax rates for different resources, while using uniform tax instruments.

E. Observations from Latin America and the Caribbean

Governments from resource-rich states in Latin America have been using royalties, in order to profit from the extraction of the state-owned natural resources. Royalty rates were drastically lowered during the peak of the Washington Consensus at which time governments believed that developing countries should reduce corporate taxes in order to incentivize FDI. Royalty rates were lowered from 10-15% of revenues to 1-5% of revenues. The specific advice for lowering the royalties came from the World Bank and the IMF (NSI, 2013).

Figure 2
Share of royalties in total fiscal revenues from mining (taxes and royalties)
in eight countries in Latin America 2000-2003 to 2010-2012



Source : ECLAC, 2013.

¹⁷ For a comprehensive discussion of the possible tax incentives in fiscal regimes for mining, see ICMM (2009).

III. The lithium industry

A. The application of lithium

Lithium¹⁸ is the first, and lightest, metal on the periodic table. Lithium is a soft, silver-white metal that belongs to the alkali metal group of chemical elements. More than 50 percent of the consumed lithium compounds are used in the manufacturing of glass, ceramics, and aluminium. Industrially, lithium is used in manufacturing synthetic rubber, greases and other lubricants. Lithium is also gaining importance due to its function in nuclear fusion (Ebensperger et al., 2005).

Perhaps most importantly is the use of lithium in batteries. Lithium batteries are proving to be an effective and affordable alternative to traditional batteries, through new battery applications such as the lithium ion (Li-ion) battery (website Minerals Education Coalition). Secondary, rechargeable batteries are widely used in hybrid cars and fully electric automobiles. The increasing salience of lithium in the global economy is therefore partially explained by the global search for more environmentally friendly, or less fossil fuel-dependent modes of transportation (ibid. 227), and various national alternative energy programs (USGS, 2014; USGS, 2012).

Lithium is found all over the world, including in the oceans, and is not a rare earth element. However, lithium is difficult to extract. Lithium requires both favourable environmental surroundings—due to the metal's volatile nature—and scientific expertise, for efficient extraction and production (U.S. Geological Survey, 2013). Lithium is found, successfully extracted, and produced in significant numbers in the following countries: the United States of America (USA), Argentina, Australia, Brazil, Chile, China, Portugal and Zimbabwe (U.S. Geological Survey, 2013).

B. Global demand of lithium

Lithium demand is growing steadily. In 2000, lithium demand was approximately 71 kMT Lithium Carbonate Equivalent (LCE).¹⁹ In 2010, lithium demand was estimated between 125 and 130 kMT.

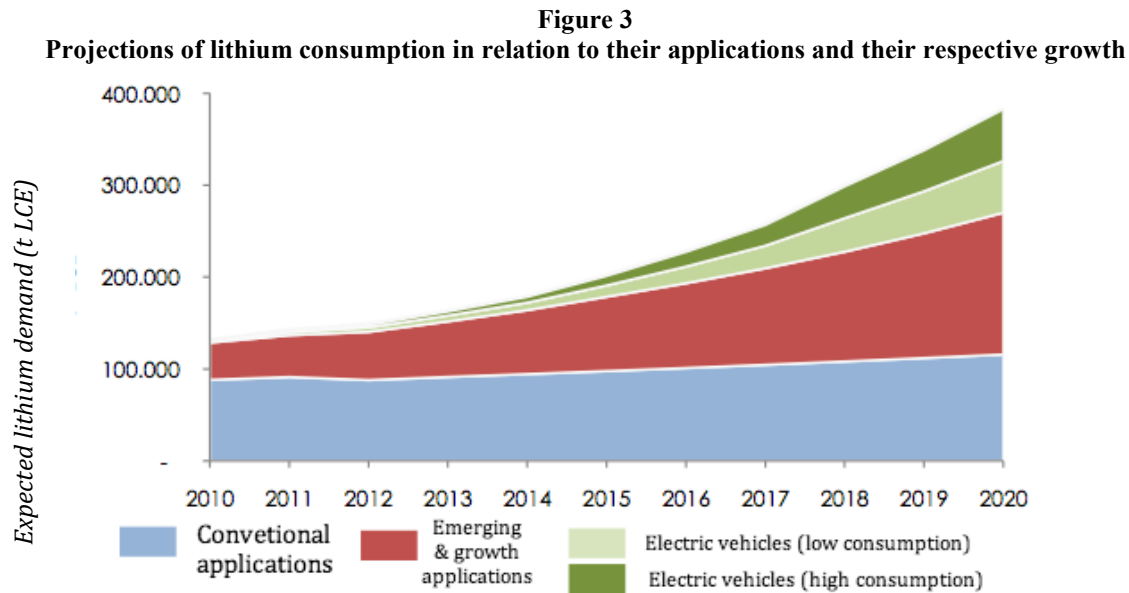
¹⁸ Chemical symbol Li, atomic number 3.

¹⁹ Lithium Carbonate (Li₂CO₃) is the main chemical of consumed lithium, used in applications such as batteries, glass, and others. LCE stands for Lithium Carbonate Equivalent, which is 5,323 x Li. For more information on Lithium compound conversion rates, see: website Western Lithium.

By 2012 demand reached an approximate 130 kMT LCE which amounted to a market size of US\$ 600 million. SQM (2013b) estimated global LCE demand at between 155 and 160 kMT in 2013.

Estimates on future demand vary; some argue lithium demand will grow roughly to 400 kMT LCE by 2020 (Western Lithium, 2010), an increase of more than 207%. Others predict a more modest growth in demand, with estimates between 230 and 280 kMT LCE in 2020 (SERNAGEOMIN, 2014; SQM, 2013a; TruGroup, 2011; Li3 Energy, 2013), which would mean a growth of between 72 and 115 percent. SQM predicts a lithium demand of 440 kMT by 2030 (SQM, 2011: 8).

Figure 3 shows the expected growth, as calculated by Talison Lithium (2012) and COCHILCO (2013), based on current market conditions and pricing.



One of the reasons lithium consumption is expected to grow is because of the growth of the electric vehicle industry (FMC, 2013) as also displayed in figure 3, above. By way of illustration: Tesla—one of the world’s biggest electric vehicle manufacturer—is planning to build a “gigafactory”. This gigafactory could become the biggest battery factory in the world. This would significantly increase production of li-ion batteries. Tesla stated it will be manufacturing more li-ion batteries in this factory by 2020, than were made in 2013 worldwide. This will not only lower the cost of battery packs, but also significantly increase lithium demand. An increase in demand will have a great impact on big lithium producers such as SQM (CNBC, 2014).

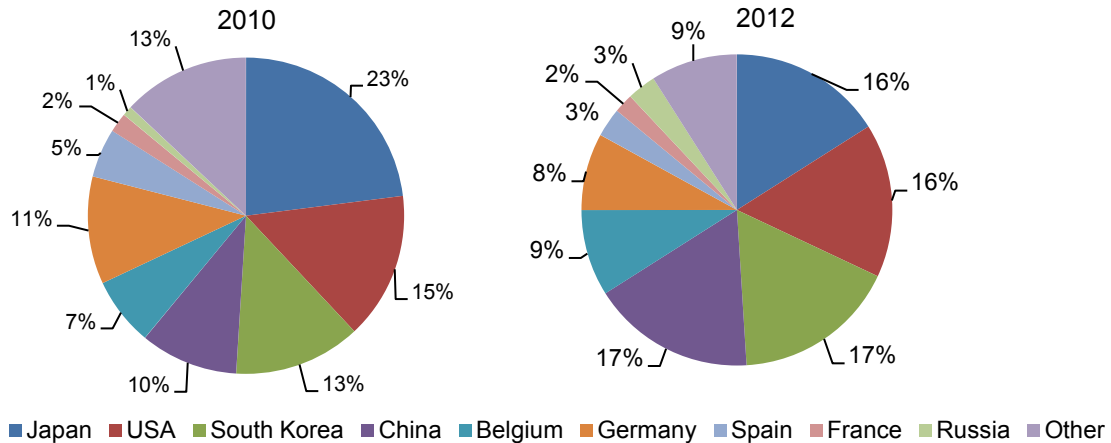
Another reason lithium demand is expected to grow, according to experts on the lithium industry, is because of considerable growth in the Asian market. Especially the lithium used for rechargeable batteries has a lot of growth potential in the Asian market, with increasing demand in South-Korea, Japan, and—perhaps most importantly— China (Interview Desormeaux, 2014; website ChinaGoAbroad). The Chinese market is particularly interesting due to the Chinese government’s financial support for manufacturers of autos with alternative energy sources (Fox-Davies Resource Specialist, 2013: 8).

It is expected that the Chinese will buy increasingly more lithium and lithium-using products, as the Chinese market grows. The main importers of lithium carbonate are displayed in figure 4.

With growing global demand for lithium, and predictions of increasing global demand (Vikström et al, 2013), this light metal is of great interest to any government, or private business, looking to make a profit of it. The prices for lithium metals and compounds are not published, but

according to the USGS and Fox-Davies, the prices for battery-grade²⁰ lithium carbonate are between US\$ 6,500 and US\$ 7,000 per metric ton (USGS, 2014; Fox-Davies Resources Specialist, 2013).

Figure 4
Main importers of lithium carbonate



Source: COCHILCO, 2013.

Lithium carbonate is therefore not what makes li-on batteries for electric vehicles expensive; its high price is due to the technological cost to make these batteries. If this price lowers, lithium batteries for EV's will be in higher demand, therefore encouraging lithium exploration.

There are two matters that might negatively influence future lithium carbonate demand: (i) someone might come up with a new, better, safer, cheaper form of energy storage than lithium-batteries, and; (ii) lithium batteries can be recycled, and chances are these recycling technologies will advance as well, this could cause a significant decrease in the demand for raw lithium.

The lithium-industry in Latin America is especially interesting since it holds approximately 65% of the lithium-resources. For a geographic representation of the global distribution of lithium resources, see Appendix 1.

C. Global availability of lithium resources

The economically recoverable global lithium reserves are estimated to be between 69,199 kMT LCE (USGS, 2014) and 100,000 kMT LCE (SQM, 2011; Ministerio Minería, 2010). The global lithium resource availability is estimated at between, 195,460 kMT LCE (COCHILCO, 2013), 207,600 kMT LCE (USGS, 2014) and 300,000 kMT LCE (SQM, 2011; Ministerio Minería, 2010). The estimated figures on available resources and reserves are constantly changing. These numbers are not fixed as the calculation of reserves is based on the economic profitability of extraction, which means that the figures on the reserves change as extraction technology develops and improves.

The worldwide sources of lithium are found in various ore-deposits; approximately 70% of the lithium is found in brines, 20% in pegmatite minerals, and the rest of the lithium is found in clays, and other ore-deposit types (SERNAGEOMIN, 2014; USGS, 2014). The vast majority of lithium is currently extracted in two ways. The first extraction-method is from continental brines in salt lakes. Continental brines in salt-lakes are high salt content waters, which store lithium below or at the surface.

²⁰ Battery grade lithium carbonate is a high-grade lithium. See appendix 2.

Lithium chloride and carbonate is extracted from brines by solar evaporation, in so-called evaporation-ponds. The second source of extraction is from hard rock, pegmatite minerals, such as spodumene.²¹

These minerals can be converted to lithium carbonate and hydroxide (COCHILCO, 2013). In Latin America, thus Chile, Argentina, and Bolivia, lithium is extracted from brines; in Australia, lithium is extracted from mineral pegmatite namely spodumene; in China lithium is extracted from both salt deposit brines and pegmatite minerals. In 2012, 50,4 percent of the total world production came from salt deposits, and 49,6 percent from pegmatite minerals (COCHILCO, 2013). Extracting lithium from pegmatite minerals is a more expensive process than extracting lithium from brines (Gruber et al., 2011), which gives Latin American lithium producers a significant advantage over other—lithium-pegmatite—producers.

D. Global lithium production

The production of lithium compounds has increased significantly in the past years, from 97 kMT LCE in 2005, to 178,4 kMT LCE in 2012 (COCHILCO, 2014:15). This is an increase of more than 83%. Table 2 shows the top lithium producing countries between 2005 and 2013. Table 2 also shows the total resource availability in the respective states.

Table 2
Estimates of world lithium production per country in kMT LCE,
and the total Resource Availability (RA)

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total RA (kMt LCE)	RA (% of total)
Argentina	14.8	15.8	13.4	19.2	13.9	16.7	14.0	17.6	-	37 740	19.3
Australia	20.1	29.3	36.8	33.4	30.0	45.4	62.6	67.5	-	8 091	4.1
Bolivia	-	-	-	-	-	-	-	-	1.0	47 374	24.2
Chile	43.7	47.3	54.9	52.3	27.3	47.3	63.3	65.6	55.9	42 797	21.9
China	4.8	4.9	5.2	7.5	14.7	15.5	12.9	16.0	-	27 413	14.0
USA	3.4	3.8	3.5	3.6	-	-	1.0	2.5	-	8 889	4.5
Other	10.6	11.1	11.8	12.2	10.4	9.1	8.7	9.2	-	23 155	11.8
Total	97.2	112.2	125.6	128.2	96.2	134.0	162.4	178.4	-	195 460	100

Source: Constructed by the authors from: COCHILCO, 2013; SERNAGEOMIN, 2014b.

Table 3 shows the world biggest lithium producers, where they produce, where they are headquartered, their latest available production volume, and their total production capacity. Note that because these figures are based on the latest available production figures, they do not represent the production volume of one specific year, but rather a representation of publicly available figures between 2008 and 2014.

It is worth noting that many of these mining companies have transboundary strategic partnerships with other mining companies, chemical companies, and corporate groups that process or develop lithium compounds. Australian and Canadian miners often have such partnerships with Asian enterprises, particularly with Japanese, Korean, and Chinese enterprises. The lithium market in these Asian countries is attractive, because of the processing plants located in Asia and the growing Asian markets. Some of these strategic partnerships are discussed in the country profiles.

²¹ Formula: $\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_4$. Spodumene varies in its Lithium contents, but approximately holds 8% theoretical Li_2O content (Talison, 2009).

Table 3
Top lithium producers worldwide

Company	Location	Headquarter	Production (in kMTpa LCE)	Production Capacity (in kMTpa LCE)
Talison Lithium	Australia (Greenbushes)	Australia	53.0 c	74.0 c
SQM	Chile (Atacama)	Chile	36.1 d	48.0 e
Rockwood Holdings (SCL)	Chile (Atacama / La Negra)	USA	23.8 d	28.0 e
FMC	Argentina (Hombre Muerto)	USA	16.6 d	23.0 d
Citic; QLL; Tibet; ABA; Jianxi; Minfeng; Ni&Co; XLP; Panasia; Tianqi	China (various)	China	9.9 a	40.0 b
Various	Brazil, Zimbabwe, Portugal, Spain, Canada	Various	5.1 a	15.5 b
Rockwood Holdings	USA (Silverpeak)	USA	4.6 d	6.0 d
Total			149.1	185.0

Source: Constructed by the authors from: Western Lithium, 2010; SQM, 2011; Ministerio Minería, 2010; COCHILCO, 2014; SQM, 2013b.; Talison Lithium, 2012b; Rockwood, 2013; USGS, 2013).

Table 4 presents the lithium-projects that are in the developmental stage, and their respective production capacity.

Table 4
Lithium-projects in developmental stage, with respective production capacity

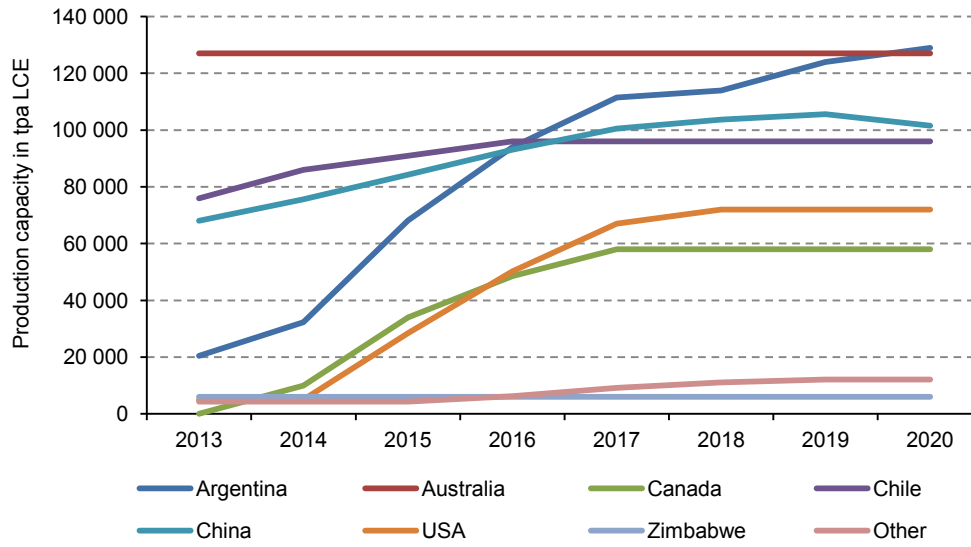
Company	Location	Headquarter	Production Capacity (in kMTpa LCE)
Lithium Americas	Argentina (Caucharí)	Canada	15
Orocobre Ltd	Argentina (Olaroz)	Australia	15
Sentient Group	Argentina (Rinón)	Australia	15
Galaxy Resources	Australia (Mt. Cattlin)	Australia	17
Reed Resources	Australia (Mt. Marion)	Australia	25
COMIBOL	Bolivia (Uyuni)	Bolivia	20
Western Lithium	Canada (Mc Dermitt)	Canada	27
Canada Lithium	Canada (Quebec)	Canada	19
Li3 Energy	Chile (Maricunga)	USA	15
Rio Tinto	Serbia (Jadar)	United Kingdom	27
Simbol Mining	USA (Salton Sea)	USA	16
Total			213

Source: Constructed by the authors from: (Ministerio Minería, 2010; COCHILCO, 2013).

As shown in Table 4, many of the developing lithium-projects are located in Argentina. *Ceteris paribus*, Argentina is expected to have the highest LCE production capacity by 2020. The only project in Chile that is sure of execution is the expansion of Rockwood Holdings with a plant in the Salar La Negra, which will add a production capacity of ~20 kMT LCE per year (El Mercurio, Economía y Negocios, November 2014).

Figure 5 shows the predicted growth in LCE production capacity of the biggest lithium producing states based on an international market analysis by COCHILCO (2013). These projections show that Chile will stray further away from its position as leading lithium producer, which partially explains the current political ambition by the Chilean government to address the Chilean lithium market, through the NLC.

Figure 5
Total LCE production capacity in ton per annum
of main lithium producing countries



Source: Constructed by the authors from: COCHILCO, 2014.

IV. Profiles of lithium producing countries

A. International benchmark country profile: Australia

As indicated earlier, Australia is currently the biggest lithium producer in the world. Besides lithium, Australia is one of the world's leading producers of minerals, producing 19 different minerals in significant amounts, from more than 400 different mines.

Table 5
Lithium characteristics Australia

Mine	Enterprises	Average lithium concentration (in % Li)	Li reserves (in kMT)
Mt. Cattlin	Galaxy Resources	0.50	70
Greenbushes	Talison Lithium	1.60	560
Mt. Marion		0.65	20

Source: Constructed by the authors from: COCHILCO, 2013; Gruber et al., 2011; Vikström et al. 2013).

The industry's export —excluding oil and gas— were worth AUS\$107 billion²² between 2012 and 2013 (Geoscience Australia), Lithium is mined from salt lakes and from pegmatite, respectively in the form of brines and in the form of spodumene, for example.

The lithium industry in Australia is based on the mining of a high quality spodumene, which can be processed into battery grade lithium carbonate. The Australian government only publishes statistics on spodumene production however these figures are not easy to come by because Western Australia aggregates data on lithium, with tin and tantalum for publicly released figures.²³ Table 6 shows the spodumene production of 2001 to 2012, based on sources of the USGS and the federal Australian Bureau of Statistics.

²² ~91,47 billion US\$.

²³ The analysis of spodumene is not so simple, as production is often quoted as spodumene concentrates which are not 100% spodumene. Spodumene is ~8% LiO₂, which equals ~3.72% Li. Theoretically, ~26.5 tonnes of spodumene is required for one tonne of lithium. However the amount of concentrates required will depend on the purity of the concentrate.

Table 6
Spodumene and Lithium (tonnes) production in Australia

Year	Produced Spodumene (in t)	Produced Li (in ~t)	Produced LCE (in ~t)
2001	90 400 a	3 363	17 901
2002	102 573 a	3 816	20 313
2003	114 568 a	4 262	22 687
2004	108 804 a	4 048	21 548
2005	193 229 a	7 188	38 262
2006	290 432 a	10 804	57 510
2007	246 015 a	9 152	48 716
2008	239 528 b	8 910	47 428
2009	197 482 b	7 346	39 103
2010	295 000 b	10 974	58 415
2011	421 396 b	15 676	83 443
2012	456 921 b	16 997	90 475

Source: Constructed by the authors from: Australian Bureau of Statistics, 2013; USGS, 2013b.

1. Private companies exploiting lithium in Australia

In Australia the two main lithium-producing companies are Talison Lithium and Galaxy Resources. Talison Lithium produces its lithium from Greenbushes mine, and Galaxy Resources produces its lithium mainly from Mount Cattlin. Both companies mine their lithium in the State of Western Australia, meaning that they're both subject to the fiscal regime of the Western Australian State Government (Talison Lithium; Galaxy Resources). The Chinese chemical company Tianqi and Rockwood Lithium from the USA have recently bought Talison Lithium, which is further discussed. The Australian mineral resource classification scheme of JORC identified 854 kMT Li as accessible for mining in Australia, as of the 31st of December 2013 (Geoscience Australia, 2013).

2. Fiscal regimes in lithium mining in Australia

In Australia government responsibilities are shared between the Australian federal Government and State and Territory Government taxes. In Australia sub-national governments are empowered to raise mining taxes, as part of the federalist political-administrative setup. The federal government possesses overall power to tax income and consumption. The Australian States and Territories —not the federal government— own the rights to minerals. As a consequence each State and Territory has its own mining acts and regulations to control the exploration for, and the extraction of minerals on public and private lands. The Australian State and Territory Governments levy various mining-taxes an overview is presented in Table 7.

Table 7
Taxation of Lithium in Western-Australia

Lithium Royalty	5% - Any royalty paid at the state level is deducted as an expense from income at the federal level.
Top rate of Corpora Income Tax (CIT)	30% - Flat rate
Level at which CIT is applied	Federal
Ownership of lithium	The states Western Australia in the lithium sources used for this document. Lithium is treated as any other mineral product.
Land taxes	All States/Territories impose land taxes as an annual tax on the unimproved value of land held in the State/Territory. The rates vary from State/Territory, but are in all cases progressive. The government of Western Australia has a list of all land tax rates (website Department of Finance).

Source: Constructed by the authors from: Department of Mines and Petroleum; PwC, 2012; ICMM, 2009.

In Australia lithium is treated as any other onshore mineral. This means that the royalties on lithium extraction are collected at the level of the States and Territories. In Australia there is no common royalty regime at the federal level (Department of Industry). At the federal level, the only revenues collected from the mining industry are through income taxation. As noted earlier, lithium production is only significant in the province of Western-Australia. The Mining Act of 1978 dictates all mining regulations with regard to governmental activity, such as royalties;²⁴ “When a mineral is obtained from a mining tenement, or from land the subject of an application for a mining tenement, royalties shall be paid by the holder of, or applicant for, the mining tenement” (Mining Act 1978).

In Australia, all states and territories have the power to levy royalties, as a purchase price for minerals extracted by mining companies. The corporate income tax, in Australia called the Federal Company Income Tax, is levied on the taxable income of a lithium-producing company. The two principal Commonwealth Acts that deal with income tax are the Income Tax Assessment Act 1936 and the Income Tax Assessment Act 1997. The Commissioner of Taxation, a statutory official appointed under provisions of the Taxation Administration Act 1953, heads the Australian Taxation Office. The Commissioner has general administration of his Act. The Taxation Administration Act 1953 also contains provisions relating to tax collection, administration, and recovery of tax payments.

The Australian government deems it important that its communities receive benefits from the state’s mineral resource wealth, through imposed charges. Under the Australian Constitution, State Governments—and not the National Government—own minerals on behalf of the people. The Australian Constitution was designed prior to Australia becoming a nation in 1901. By giving the State Governments ownership of the minerals the State’s maintained the revenue and control of these minerals.

3. Redistribution of collected REI revenue in Australia

The public finance system of Australia does not have a regulated way of returning minerals revenues to the mining communities. Mining companies generally do not pay rates to local government bodies. However, there are special government programs and initiatives, such as the indigenous communities/mining industry regional partnership program: Working in Partnership (WIP). These partnerships aim to support and encourage cultural change taking place in relations between indigenous communities and the mining industry. Their aim is also to promote long-term effective partnerships that benefit all stakeholders.

B. International benchmark country profile: China

As indicated earlier in this report, much of the information on fiscal regimes, production-figures, and revenue-data with regard to lithium, are difficult to obtain. This information with regard to the Chinese lithium industry is especially difficult to come by (COCHILCO, 2013: 34).

Lithium brine sources that have higher concentrations of magnesium than that found in Chile and Argentina, such as those in China, have difficulty—or even find it impossible—to produce high purity battery grade lithium carbonate.

China’s domestic’s spodumene is also of low quality and cannot be used to produce battery grade carbonate. This is why the Chinese chemical company Sichuan Tianqi Lithium Industry has bought 51% of Australia’s Talison Lithium in 2013, as Talison Lithium has very high quality spodumene that can be processed into battery grade lithium carbonate. Tianqi has created a joint venture with Rockwood Holdings,²⁵ which, as indicated earlier, has recently bought 49% of Talison Lithium (website Business Wire, May 2014).

²⁴ For the full list of royalties levied on all non-renewable natural resources in Western Australia see; website Australasian Legal Information Institute.

²⁵ Rockwood Holdings is now for 70% owned by Albemarle, as indicated.

Table 8
Lithium characteristics of Salares and Pegmatite mines in China

Salar	Enterprises	Li ore grade (in mg/l)	Li reserves (in kMT)	Surface (in km ²)
Mt. Zhabuye	Tibet Lithium New Technology Dev.	680	1 530	243
Diangxiongcuo	Tibet Sunrise Mining Dev.	400	-	56
Xitai	Qinghai CITIC	310	-	-
Dontai	-	300	-	-
Qaidam	-	300	2 020	
Pegmatite Mine	Enterprises	Average lithium concentration (in % Li)	Li reserves (in kMT)	
Jiajika	GanZi Rongda Lithium	0.59	204	
Yichun	-	-	325	
Maerking	-	-	225	
Gajika	-	-	591	
Daoxian	-	-	182	

Source: Constructed by the authors from: COCHILCO, 2013; Gruber et al., 2011.

Tianqi is focused on the development, production, and sales of chemical lithium products, and it operates factories that convert lithium and other chemicals in China. By acquiring Talison, Tianqi is assured of its lithium supply. Through the joint venture, Rockwood Holdings now has access to the Chinese market; one of the biggest, and fastest growing markets for lithium-consumption.²⁶ The Australian Galaxy Resources employs another strategy for entering the Chinese market; it has built its conversion plants directly in China.

Table 9
Mining taxation in China

Top rate of corporate income tax	25%
Corporate income tax levied at	Federal level

Source: Constructed by the authors from: (PwC, 2012; KPMG).

C. Regional analysis country profile: Argentina

Lithium production is expected to grow significantly in the coming decade. COCHILCO even forecasts Argentina to be the biggest lithium producer in the world, by 2020. The Argentinean government is looking into the development of its lithium industry. Argentina is currently exporting the brine and extracted salts of its salt lakes without treatment, while special products, such as lithium batteries, are imported.

To reverse this situation the Argentinean government started a project called “From the Salar to the Battery”, through the National Bureau of Lithium, composed of the ministries of Science and Technology, Industry, and Economics. The goal of this project is to develop local lithium-battery production; several Argentinean universities are participating in this project (Website Universidad Nacional de San Martín; COCHILCO, 2013).

²⁶ As shown lithium carbonate import has grown with 7 percentage points in China between 2010 and 2012.

In Argentina lithium is found in the provinces of Jujuy, Salta, and the north of Catamarca.

Table 10
Lithium characteristics of Salares in Argentina

Salar	Enterprises	Li ore grade (in mg/l)	Surface (in km ²)	Li reserves (in kMT)
Hombre Muerto	FMC Lithium Corp (Proyecto Fénix) – Galaxy Resources (Proyecto Sal de Vida)	690	565	795
Salinas Grandes		795	212	-
Olaroz	Orocobre	690	118	156
Diablillos	RodiniaLithium	556	40	-
Cauchari	Lithium Americas	380	350	1 118
Rincón	ADY Resources	330	250	1 118

Source: Constructed by the authors from COCHILCO, 2013; CODELCO, 2014; Gruber et al., 2011: 7; Gruber & Medina, 2010).

The legal framework encompassing the exploitation of lithium in those provinces is particular. The Argentinean Mining Code, and the overall regulations regarding mining, dates back to 1884. The federal state preserves the jurisdiction on the application of the laws. However, the process of implementation is entrusted to the Argentinean provinces. Mining regulations therefore differ among the provinces. In Argentina, lithium is concessible.

However, in some of the provinces, lithium is considered to be a strategic mineral. In those cases extraction has to be approved by a committee of experts (COCHILCO, 2013; Saravia-Frias, 2007; UN DESA, 2010). The relevant fiscal regulations on lithium in Argentina are summarized in Table 11.

Table 11
Overview of Argentina's fiscal regime on mining

Lithium Royalty	3% - Provincial Mining Royalty (deductible in CIT calculation)
Top rate of Corporate Income Tax (CIT)	35% - Any royalty paid at the province level is deducted as an expense from income at the federal level.
Level at which CIT is applied	Federal
Tax on exports:	Ore extracted: 5% Processed ore: 5% Refined metal: 5% - 10%
CIT deductions allowed for	Depreciation of ores, buildings, and machinery; applicable to tax paid for first five years. Import taxes.
National concession status	Lithium is concessible, however, Lithium is considered to be a strategic resource in several provinces, in those cases the projects have to be approved by experts.
Ownership of lithium	Nation / Provinces

Source: Constructed by the authors from: ECLAC, 2014; PwC, 2012; KPMG; NSI, 2013; COCHILCO, 2013).

D. Regional analysis country profile: Plurinational State of Bolivia

As indicated earlier, Bolivia has currently the largest reserves of lithium in the world. However, Bolivia is not yet producing lithium in a significant manner. The following paragraphs provide an overview of the history of the relevant legislation, and a brief introduction to the plans of Bolivia develop a national lithium industry.

Bolivia's latest Mining Code dates from 1992. In this Code, it declared all mineral deposits of Bolivia to be property of the state. Parties are able to obtain mining concessions, given out by the state subject to particular payments. These concessions granted the holder the exclusive right to explore, exploit and refine the mineral substance located within the concession. Bolivian law treated local and foreign companies equally with regard to the acquired concessions. In 2006, however, a Bolivian court declared this Mining Code to be unconstitutional.

Bolivian President Morales signed a decree in 2007 that assures all the existing mining concessions would be respected. However, all new concession-requests would have to form a joint venture with the Bolivian Mining Corporation (COMIBOL) both parties holding 50%. Requests for private concessions would no longer be honored. The new Bolivian Constitution of 2009 declared that the Bolivian state was in control of all the natural resources in Bolivia. Under this framework, the Bolivian state began a public project to industrialize its lithium resources. The National Management Committee for Evaporitic Resources (GNRE) headed the project, as a specialized operational branch of COMIBOL. Morales gave COMIBOL the objective to protect the natural resources on Bolivian territory from foreign resource extracting companies (COCHILCO, 2013).

The extraction of lithium in Bolivia by foreign companies has historically been controversial. The FMC —formerly the Lithium Corporation— had a deal with the Bolivian government to exploit lithium in the Salar de Uyuni.

Table 12
Lithium resources in Bolivia

Salar	Enterprises	Li ore grade (in mg/l)	Surface (in km ²)	Li reserves (in kMT)	LCE Reserves (in kMT)
Salar de Uyuni	Comibol / GNRE	350	12 000	10 200	54 294
Pastos Grandes		1 033	100		
Coiposa		319	2 218		

Source: Constructed by the authors from: COCHILCO, 2013; Gruber et al., 2014; Gruber & Medina, 2010).

In 1992, however, several Bolivian organizations protested their presence, which led to the foreign company being driven out of the country (Radhuber & Vega, 2013). The Bolivian government now wants to keep production and export under state-control, but needs technical assistance.

To this regard, last year a political agreement for cooperation between the Netherlands and Bolivia was signed, in order to develop the Bolivian lithium industry. Negotiations regarding the specific business-deals are still ongoing.

Table 13
Overview of Bolivia's fiscal regime on lithium

Lithium Royalty	12.5%
Corporate Income Tax	25%
National concession status	Lithium is not concessible. All mining concessions have become transitory, since 6-12-2010, by presidential Decree. All lithium belongs to the state, which also manages it.
Ownership of lithium	The Plurinational State of Bolivia
Distribution to producing regions	Yes
Mechanism to compensate non-producing regions	No

Source: COMIBOL, 2014.

V. Lithium governance in Chile

A. Introduction

Chile has abundant natural resources, especially minerals. Chile has very large reserves of lithium and copper. Through the exploitation of these reserves, Chile is among the world's biggest producers of both lithium and copper. Chile, however, is a developing state. Although Chile is a member of the OECD, it is among the lowest ranking members with regard to GDP and GDP per capita. In 2013, the GDP per capita in Chile was US\$ 21,990, while the OECD average was US\$ 36,427 in 2012 (Website OECD Statistics). Chile and many other Latin American states are trying to foster their natural resources for sustainable development.

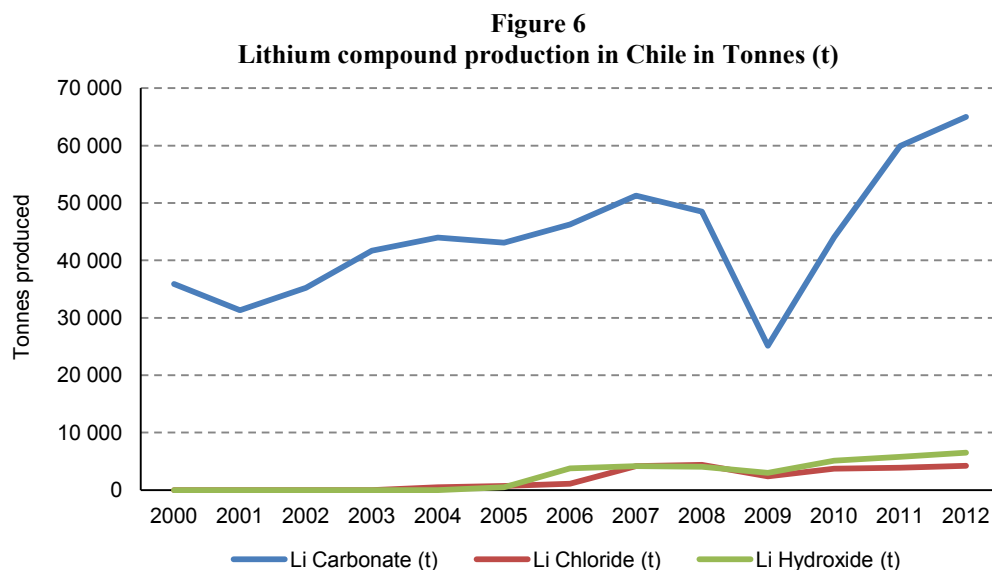
As indicated earlier (Table 2) Chile is one of the most important actors in the lithium industry because of its annual mine production and its lithium reserves. In Chile, lithium is currently of little importance within commercial mining exports—as shown in Table 14. The exported lithium carbonate in US\$ has grown with almost 250% from 2003 to 2013— but in comparison the lithium export was only 0.56% of the total copper exports in US\$. Copper, simultaneously, grew by more than 400% from 2003 to 2013. The Chilean government and the broader Chilean community, however, have a close interest in the development and rents of the lithium industry— because of its growth potential (Ebensberger et al. 2005). Chile employs remarkable legal regulations for lithium, which are explored in the following paragraphs.

Table 14
Mining exports in Chile in millions of US\$

	Copper	Iron	Silver	Gold	Lithium carbonate
2003	7 995	137	126	302	65
2004	15 397	161	156	318	75
2005	19 923	308	172	351	94
2006	34 069	328	326	530	123
2007	39 204	402	536	577	189
2008	31 755	593	380	763	219
2009	29 695	534	314	910	113
2010	41 361	1 183	382	1 041	174
2011	44 670	1 610	689	1 456	204
2012	41 987	1 338	611	1 644	247
2013	40 158	1 379	379	1 384	226

Source: Constructed by the authors from: Banco Central de Chile, 2014.

Chile is responsible for approximately 40% of the production of lithium compounds in the world (SERNAGEOMIN, 2014). The total lithium compound production in Chile, in the forms of Lithium Carbonate (Li₂CO₃), Lithium Hydroxide (LiOH), and Lithium Chloride (LiCl), are presented in Figure 6.



Source: Constructed by the authors from: SERNAGEOMIN, 2011; USGS, 2013.

B. Lithium sources in Chile

Table 15 contains information on the most important salares in Chile. The table shows the most important lithium-characteristics, and which enterprises have claims in the salares.

Table 15
Lithium characteristics of Salares in Chile

Salar	Enterprises	Li ore grade (in mg/l) ¹	Surface (in km ²)	Li reserves (in kMT)
Salar de Atacama	SQM & Rockwood Lithium (through CORFO)	1 500	3 000	6 500
Salar de la Isla	Talison Lithium	860	152	948
Punta Negra		350	250	735
Salar de Maricunga	Li3 Lithium & CODELCO Salvador (18%) & Simbalik	800	145	280
Salar de Pedernales	CODELCO Salvador	400	335	240
Aguilar	ENAMI	71	n.a.	n.a.

Source: Constructed by the authors from: COCHILCO, 2013; CODELCO, 2014; Gruber et al., 2011; SERNAGEOMIN, 2014; Gruber & Medina, 2010).

¹ This measurement is used for evaluating the quality of a salar as a source of lithium; the concentration of lithium in the brine measured in milligrams per liter (mg/l).

Other salares in Chile with lithium potential include: Aguas Calientes 2, Pajonales, Quisquiro, Aguilar, Tara, Las Parinas, Pujsa, Aguas Calientes 1, Capur, and Aguas Calientes 4.²⁷ However, according to SERNAGEOMIN (2013), there are only six salares with a medium to high lithium potential: Atacama, Aguas Calientes Centro, Pajonales, La Isla, Pedernales, and Maricunga.

²⁷ For information on the lithium characteristics of these salares, see: SERNAGEOMIN, 2014

C. Chilean legislation on mining and lithium

1. Lithium concessions and concession-law

The legal aspects of the mining-industry in Chile, especially with regard to lithium, are complex but contextually important. The following paragraphs provide an overview of the history of mining legislation relevant to the lithium industry.

In 1932, the Chilean government created its first Mining Code. This Code stated, in Article 3, that lithium was concessible. However, the Chilean laws on mining have changed and evolved. There are currently three relevant laws on lithium mining:

- The Chilean government created a new Mining Code in 1983, Law 18.248. This Law stated, in article 7, that lithium was not concessible,²⁸ adding, in article 9, that concessions can be given to deposits containing concessible substances, and has to notify the state if it encounters non-concessible substances in its deposit. This means that a company has to notify the state if it finds lithium.
- Another relevant Law is the Organic Constitutional Law On Mining Concessions, in 1982 Law 18.097. This Law granted investors the permission to explore for minerals within the limits of an exploration concession,²⁹ which can be secured with the payment of a nominal fee, and for a 4 years period. Exploitation concessions are secured through the payment of yearly fees. There are no limits to their duration, and ownership can be transferred transmitted, the same as with real estate (UN DESA, 2010: 13).
- Decree Law 2.886 of 1979, declared lithium a state reserved mineral in order to use it for nuclear fusion at a later stage. This Decree Law was maintained in Law 18.097 and Law 18.248. Respecting the right on ownership, the declaration of lithium as non-concessible does not influence the mining concessions constituted before the corresponding statements on non-concessible minerals made by the Laws 18.097, 18.248 and Decree Law 2.886.

Since the new Mining Code is in force, the exploitation and commercialization of lithium has been carefully regulated, and reserved by the state. As indicated, lithium was considered to be a strategic resource by the military government. The mineral was linked to national security due to the possible applications lithium might have for the manufacturing of nuclear weapons and atomic energy through nuclear fusion (Organic Constitutional Law on Mining Concessions 1982: Article 3).

The new Organic Constitutional Law stated that the reserve of lithium belonged to Chile, and expressly provided that the exploration or exploitation of non-concessible substances, such as lithium, can be performed only directly by the State of Chile, or its companies or institutions, or by means of administrative concessions or special operation contracts, fulfilling the requirements and conditions set forth by the President of Chile for each case. This law additionally stated that the Chilean Nuclear Energy Commission would regulate the mineral. This created a significant barrier to the entrance of new capital in the lithium industry. In resume then, the forms in which lithium can be exploited in the current legal framework of Chile are:

- Directly through the state.
- Through the state's enterprises.
- By means of administrative concessions.
- By means of special operating contracts.

The only companies that are currently exploiting lithium in Chile are SQM and Rockwood Holdings (SCL); they had operating contracts with the state owned institution CORFO before

²⁸ Meaning that it subject to a mining concession

²⁹ One exploration concession is the size of 10 km².

Law 18.097 passed. CORFO is a Chilean state institution for development, on account of its purpose, it was granted several lithium concessions by the Chilean state. CORFO gave concessions to SQM and SCL, which allow these companies to exploit and extract lithium in Chile.

CODELCO, however, also owns salt-lakes that contain lithium. Considering that CODELCO is also a state-owned company, the copper giant is legally allowed to exploit and explore lithium. However, CODELCO has decided so far not to endeavour in the extraction and exploitation of lithium. CODELCO decided in August 2013 that it would shelve its plan to bring in international partners to develop its lithium reserve because it wanted to focus on other projects (Mining Lithium, August 2013). The Chilean government created the Mining Code in 1971 and then modified this in 1983. The new 1983 Mining Code created new legislation wherein property rights were constitutionally defended and secured for foreign investors.

The Chilean laws as they are now, are not unambiguously clear on the subject of lithium-privatization. Rather, there is an obvious contradiction between constitutional and statutory provisions on the subject of lithium. First, the Constitution establishes that the state owns subsurface resources as a public good, while the Mining Code provides that mining concessions, once granted, are open-ended; “Compensation in the event of revocation includes all potential future flows from exploitation of current reserves, which amounts to ownership” (ECLAC, 2014). This is, for example, why Rockwood Lithium has no end date to its concession (CORFO, 2014).

As indicated earlier, lithium is considered a strategic resource in Chile, and thereby property of the state. However, that Chilean Constitution does not explicitly forbid the private activity on lithium this could be done, although always through a concession. This concession is a type of in rem right, meaning, among other things, that the private party having the concession has a right onto the concession, which is equal to the constitutional right to own private property, with all the legal, constitutional and international protection this involves.

The concession, in this case, refers to who can explore and exploit the lithium, and therefore have a right to recompense for this activity. With a concession to private parties, these recompenses will go to private enterprises. The state will be forcing the company to pay a tax, fee, or royalty for the concession, or a part of the earnings this activity brings to the private party. When the state explores or exploits lithium, all earnings go to the public treasury.

Thus although the Constitution does not forbid private activity on lithium, there are legislative and statutory provisions that do so. In Chile, as well as in many of the rest of Continental Legal Systems, these provisions are legally inferior to the Constitution, but more applicable and indeed they are the very first provisions to be applied in legal cases, or concessions in this case. That is the factual analysis, but that is not how it works in common practice, for constitutional provisions are too general and judges tend to avoid them as they reflect more philosophical and political principles rather than concrete legal rules to be applied in particular cases (Instituto Igualdad, 2012)

Another law that is relevant to the analysis of the current Chilean mining industry came from an initiative of the military government, with the introduction of Decree Law 600 (DL 600); the ‘Foreign Investment Statute’. This decree is a mechanism for the entry of capital into Chile (Foreign Investment Statute 1974) based on three principles (Mayorga & Mont, 1993):

- Non-discriminatory treatment to foreign investors compared to national investors except in obtaining credits from national entities;
- Free access to all sectors of the economy;
- Minimum intervention by the authority on the investment activities.

The DL 600 also created the Comité de Inversiones Extranjeras (Foreign Investment Committee) (CIE); this was to be the only agency responsible for the authorization and acceptance of the inflow of foreign capital. Once a contract is signed between an investor and the CIE has the same legal quality as contract law, meaning that it can only be changed by mutual agreement of the contracting parties (Foreign

Investment Statute 1974). There have been several adjustments to DL 600 over the years: by Law 19,207 in 1993; by Law 20,026 in 2005; by Law 20,097 in 2006, and; by Law 20,469 in 2010 (Foreign Investment Statute 1974). These changes were mostly to improve efficiency towards foreign investors. The DL 600 gives foreign investors legal security over their investments made in Chile.

The military regime wanted to attract foreign investment in mining, not only by DL 600 and the constitutional protection to the right of private ownership of mines. There was also a fiscal regime for mining which included; (i) no royalty payments; (ii) low tax rates on profits; (iii) and, the possibility of reducing the tax burden even more through accelerated depreciation. FDI's in the mining sector increased tremendously. From 1974 until 1989 there was a yearly average of US\$ 90 million FDI's. In 1990, this grew to US\$ 803 million. From 1989 to 1995, the mining sector made up more than half of the FDI to Chile (Spilimbergo, 1999). This helps explain why Rockwood Lithium (SCL) does not have to pay royalties.

2. Attempted lithium concession tender in 2012

Chilean mining experts were afraid that the Chilean lithium industry would be underdeveloped compared to other lithium producing nations, because there were not enough incentives for mining companies to develop exploration because of the legal limitations (Santiago Times, 2011). A study by the Chilean Ministry of Mining estimated that there are more than 52 salt lakes with potential for lithium exploitation see Appendix 3.

Former Chilean President Piñera announced in June 2012 that he had decided to privatize the Chilean lithium. The idea was that any company could be granted rights to exploit lithium in Chile. The highest bidders would have to sign a Contrato Especial de Operación de Litio (CEOL) (Special Lithium Operating Contract). These CEOL's would cover exploration and production of lithium, mostly in the country's Atacama Desert with a permit to exploit up to 100 kMT Li during a period of 20 years (website Chile Chamber).

There was a lot of opposition towards the privatization of the mineral. Senator Isabel Allende, who was the president of the Senate's Mining and Energy Committee in 2012, stated that most of the members in that Committee were of the opinion that lithium is a resource that should be dealt with by the state. Also the Federation of Unions and Professional Supervisors of CODELCO (FESUC) maintained that the state-owned copper company should lead the exploitation of lithium, so the resource stays under Chilean state control and not under control of private companies (Santiago Times, 2012).

Despite the opposition, the concession was still tendered; in September 2012 SQM won the tender to develop a lithium concession in Chile. SQM reportedly presented a US\$ 40,8 million offer for the 20 year concession. This was much higher than the bids from other important contenders. SQM was granted the right to mine up to 100 kMT of lithium over a period of 20 years. SQM would have to pay royalties to the Chilean government, which amounted to 7 per cent of the total output.

After this tender, the Chilean public expressed its doubt about the fairness and transparency of the lithium concession tender. Julio Ponce presided the privatization-process. He was appointed to the board of SQM before it was privatized —by the military regime— and was also appointed president of the agency that supervised the privatization of many state-owned companies (Forbes, 2013).

In 1987, Ponce became the president of the SQM. Ponce owned nearly 32 per cent of all the shares in SQM by 2013. The Chilean governmental regulatory institution for market price values (Superintendencia de Valores y Seguros (SVS) accused Ponce of insider trading. Ponce —and three other SQM executives— allegedly carried out trades between subsidiary companies to the detriment of minority shareholders.

The tender, won by SQM, was eventually nullified by the Comité Especial de Licitación (CEL) one week after the tender (Infolatam, 2012).

D. Concessions and fiscal regulation the Chilean lithium industry

Although lithium is considered a strategic mineral in Chile —and therefore only exploitable by the state— lithium is not completely nationalized. Lithium in Chile is exploited and explored by private firms who were granted their concessions before lithium was declared a strategic mineral, or through a state institution;

“Chemetall (Rockwood Holdings) and SQM have operated in what appears to be a favourable income tax environment but with rather different royalty frameworks. These have arisen in association with the particular circumstances surrounding the development of each project’ (Ebensberger et al., 2005).”

1. Private firm: SCL & Rockwood holdings

In 1969 the Chilean Institute for Geological Research³⁰ studied the Salar de Atacama and indicated that it contained brines with interesting levels of lithium and other minerals. From 1974 until 1975, CORFO came to an agreement with Foote Minerals, from the USA. The two parties agreed to study the process and feasibility of lithium exploitation in Salar de Atacama. By 1980, CORFO and Foote Minerals signed a basic agreement for the development of the lithium project. The Sociedad Chilena del Litio (SCL)³¹ was created, owned for 55% by Foote Minerals and for 45 % by CORFO (CORFO, n.d.). In 1984, SCL started its operations in the Salar de Atacama, with a concession of approximately 167 km² (Rockwood Lithium, 2014).

Between 1988 and 1989, CORFO sold its interests to Foote Minerals for US\$ 15,2 million. SCL was later acquired by Cyprus Minerals, then by Chemetall, and finally by Rockwood Lithium. Since CORFO sold its shares in SCL between 1988 and 1989, the exploration and exploitation of lithium in Salar de Atacama has been a fully private endeavour (Evans, 2008). Rockwood Lithium has recently acquired a 49% share³² in the Talison Lithium Pty Ltd. the worlds leading spodumene producer, with mines in, among other countries, Australia (website Rockwood Lithium).

Albemarle, a chemical company from the USA, has recently bought Rockwood Lithium. Albemarle will own 70% of the combined concern, and Rockwood Lithium will own the remaining 30% (Rockwood Specialties, 2014).

2. Private firm: SQM

In 1983, CORFO issued another tender, inviting bids for the exploration and exploitation of lithium in a territory of 819,2 km², also in the Salar de Atacama. The concession went to the Ministerio de Salud (Ministry of Health, Chile / MINESAL), which contracted two private companies to exploit and explore lithium: AMAX with 25% and Molymet with 75%.

SQM joined the endeavour to explore and exploitation spearheaded by the MINESAL in 1993. In 1995, the involved parties changed the contract of the concession; CORFO withdrew and SQM acquired all of its shares. The renewed contract reaffirmed that nobody, not the CORFO nor any other party, can exploit resources in the rest of the Salar de Atacama not given in concession to either Rockwood Lithium or SQM a territory of approximately 1.470 km².

These rules apply until the end of the contract, which could last until the end of 2030 depending on how much lithium SQM produces. The production limit for SQM is set at 180,1 kMT LCE; the contract expires if SQM produces this amount of lithium before 2030. Rockwood Lithium has a production limit of 200 kMT LCE, which officially ends at 2014 —but since Rockwood Lithium

³⁰ Instituto de Investigaciones Geológicas (IIG).

³¹ The enterprise is currently a wholly owned subsidiary of the US-based Rockwood Lithium Inc. For a clear overview, the enterprise will be referred to simply as Rockwood Lithium in this document.

³² The other 51% was bought the Chinese chemical company Tianqi which is further discussed in paragraph.

is the owner of the deposit, it can continue exploiting until all its minerals are exhausted (SERNAGEOMIN, 2014). SQM has approximately produced 82 kMT LCE of its 180,1 kMT LCE limit—and Rockwood Holdings has produced 74 kMT LCE of its 200 kMT LCE limit.

In the case of SQM, the rights of the lithium mineral are still owned by CORFO, but leased to the mining company. In the case of Rockwood Holdings, CORFO sold all its rights including the rights to mine 200 kMT LCE free of royalty payments. Rockwood Lithium is the sole owner of its lithium-deposits. The two lithium-producing companies now lease and own a total surface of 986,2 km² where they can exploit lithium, plus a buffer zone between the tenders of SQM and Rockwood Lithium of 100 km² which separates the two (SQM, 2013a; Le Monde Diplomatique; Gruber & Medina, 2010). Appendix 2 shows the Salar de Atacama, and the concessions of SQM and Rockwood Holding.

3. Fiscal regulation

Table 16 shows the fiscal regulation for the two lithium-producing companies in Chile.

Table 16
Fiscal regulations on Lithium in Chile

Company	SQM	Rockwood Lithium (SCL)
Lithium Royalty ¹	6.8%	Royalty free
Quarterly fixed rental obligations (in US\$)	3.750 (15.000 per year)	Free of payment
Expiration of exploitation contracts or agreements	Until SQM has exploited ~960 kMT LCE. Or, until 2030.	Until Rockwood Lithium has exploited ~1.065 kMT LCE. Initial term was for 30 years, but the term has been renewable for 5 successive years until it has fulfilled its exploitation goals.
Top rate of Corporate Income Tax (CIT)	20%	
Level at which CIT is applied	Federal	
CIT deductions allowed for	Depreciation of ores, buildings, and machinery allowed over the lifetime of the mine, with no limit of tax %. Import taxes.	
Concession granted by	CORFO	
National concession status	Lithium has been non-concessible after Mining Code of 1983: Law 18.097. Lithium in Chile is a strategic mineral of national interest.	
Ownership of lithium	Chilean state (regulated by Nuclear Energy Commission).	
Mining Taxes not applicable to lithium concessions—of SQM and Rockwood Lithium (SCL)—		
Specific Mining Tax (royalty)	Introduced in 2006, paid by mining companies depending on their production and based on operating margins, which are sales minus direct costs and expenses.	
Mining Patent (protection regime)	Mining firms are obligated to pay an annual mining patent, in order to keep the mining concession. Patent rates vary, but for an exploration concession it is generally ~US\$160 per km ² , and ~US\$800 per km ² for exploitation concessions.	

Source: Constructed by the authors from: CORFO, 2014; KPMG; NSI, 2013; Organic Constitutional Law on Mining Concessions 1982.

¹ Royalties on Lithium Carbonate Li₂CO₃; Lithium Hydroxyde LiOH, and Lithium Brines.

The royalty payments to be made to CORFO by SQM in Chile are based on its quarterly corporate sales. However, since lithium is non-concessible, the production of lithium is not affected by specific mining taxes, such as the annual fee for the Mining Patent that Chile employs for other minerals (COCHILCO, 2013: 42). Nevertheless, since lithium is a non-concessible strategic mineral, SQM and Rockwood Holdings are not obligated to pay this mining patent.

Would lithium, however, become a concessible mineral, then lithium producers would also have to pay this mining patent. This tax is levied, progressively, on operational income obtained by the mineral exploiter from mining activities (KPMG, 2014).

4. Redistribution of collected REI revenue in Chile

In Chile almost all taxes are paid to the central government, and none of these revenues are set aside for redistribution back to the regions containing the mines and its communities. The exception is the Mining Patent; this fee is paid to the region containing the mine, in order to protect the mining title. The spending of collected revenue from REI's, however, is subject to the government's general resource allocation strategies and public financial management principles. This means that mineral revenues reach mining regions and mining communities only via general expenditure allocations approved in the annual budget process.

A case study on the sustainable development through the Chilean REI, done by the ICMM (2007), concluded that for a mining region to benefit from mining, they do not necessarily require revenue distribution. The main mining region in Chile is the Second region of Antofagasta. This region has experienced faster economic growth and poverty reduction than the rest of Chile, because of the rapid mining expansion in the region.

The Chilean case study showed that there were —unusually— strong linkages between the mining sector and other economic sectors of the local economy. The local economic growth, on account of the mineral-industry, is also partly explained by the relatively effective management of public finances. Chile's relatively strong institutions have been effectively used tax revenues in order to further social development. (ICMM, 2007; ICMM, 2009).

5. State agencies in the Chilean lithium industry

The Chilean state has claims of territory in Pedernales, Aguilar and Maricunga, through CODELCO, CORFO, and ENAMI. The state has only 0.8% of the total mining exploration concessions of the lithium containing salares, because it only has exploration concessions in Pedernales. The total granted exploitation concessions³³ amount to 34.4% of the lithium containing salares, which means that 65.5% is theoretically still concessible. However, as salares are often home to more natural resources, territories containing lithium have in some cases already been given in concession to companies mining for other natural resources.

- CORFO controls 36.3% of the mining property and covers 54.6% of the surface of the Salar de Atacama;
- ENAMI holds 3% of the concessions in the Salar de Aguilar, and;
- CODELCO has 100% and 18% of the concessions in the salt mines of Pedernales and Maricunga, respectively.

CODELCO has, according to its own calculations, of 56 kMT of lithium resources in Maricunga, and 21 kMT of lithium resources in Pedernales. The Chilean state, all in all, owns 51.8% of the surface of the given concessions of lithium exploitation (SERNAGEOMIN, 2014). The Chilean state has, therefore, a considerable amount of claims to lithium concessions, which means that the state has a potential for significant lithium production would it chose to do so.

E. Added value in the lithium industry

Chile has thus far not exported lithium batteries, or added significant value in the lithium industry. Rockwood Lithium is producing batteries in the USA and Germany, but has not done so in Chile (COCHILCO, 2013). Rockwood Lithium is however, planning to create a facility in Chile in which lithium can be processed to basic inputs for electronic vehicles (El Mercurio, 2014). COCHILCO (2013) has estimated that the Chilean lithium industry has contributed US\$ 3,6 billion to the domestic economy through the total lithium production since 1984 until 2012.

³³ Under the Mining Code of 1932.

VI. The national lithium commission

A. The policy proposal

The Chilean National Lithium Commission (NLC) stated in its final Policy Proposal (Ministerio de Minería, 2014) that lithium in Chile should remain a strategic mineral because of the potential of lithium in electric appliances. The NLC, therefore, recommends keeping lithium non-concessible. The NLC also finds that the state should maintain exclusive ownership of these resources, while defining the terms and rules of its exploitation.

The NLC recommends the state to focus on the long-term development, in order to fully capture the economic resource rents. Long-term benefits in the case of lithium should come through the development of science, and the integration of the production-chain; as to add value in the production-chain by processing and manufacturing lithium-related products. The NLC therefore recommends encouraging public-private partnerships (PPP).

The NLC found that the Chilean state has been lacking in its regulation and control with regard to natural resources such as lithium, which has made it difficult for the state to develop economically through the sustainable exploitation of these resources. The NLC proposes to treat the lithium industry as part of an integrated system of salar-management, meaning that the exploitation of lithium should not be governed independent of its environment —the salares—. This involves assessments of negative environmental externalities, but also dealing with the local inhabitants.

The NLC proposes to this end the incorporation of the concept ‘shared value’. To achieve this, the NLC proposes a public institution, which would act as a counterpart to the enterprises that are exploiting minerals in the salares. This institution would then define an integrated methodological framework that will ensure the Chilean state of the best form of exploitation and management of its salares. This methodological framework would equip the Chilean state with sound regulatory and fiscal capacity. The benefits hereof would be in its long-term goals; from the exploration of the salares, to the exportation of raw materials or further processed products aimed at promoting knowledge creation and new uses for lithium.

The NLC has analyzed various administrative forms this public institution could take; from the reforming of existing public institutions, to the creation of a new institution. The NLC also proposes the creation of an Enterprise, controlled by the state, dedicated to the exploitation of valuable minerals of the salares —especially lithium—. The NLC proposes to use a PPP business-model, incorporating the shared-value principle. This public-private structure could be achieved through the

creation of a new public enterprise or a state corporation, or as a subsidiary or affiliate of existing state-owned mining companies. The NLC believes that the state participates in the exploitation of lithium through this new enterprise, as a supervisor of all the projects

Because of the complexity and diversity of the possible current and future applications of lithium, the NLC implores the Chilean government to incentivize research and development for technologies regarding lithium extraction and its various uses. The NLC stresses the development of production-processes for lithium carbonate, such as the production of batteries and other energy accumulating salts. Research and development, for the NLC, would be aided by creating and strengthening a sectorial cluster linked to lithium, which will strengthen the research and innovation centers associated with universities and the industry, as well as PPP for the exploitation of lithium. The NLC finds a concrete example of the need for linking research with industry is the huge potential for Chile in generating solar energy.

The NLC recommends CORFO to look over, and perhaps revise, its existing contracts in Salar de Atacama —with SQM and Rockwood— giving the state a more active role. The NLC also recommends CORFO not to renew or extend the exploitation permits at the same low terms.

B. Concluding remarks

This report has shown that a mineral-rich state faces various challenges in choosing an exploitation-policy and a developmental strategy. Especially when it comes to sharing the resource rent, the level and manner of state-involvement directly influences economic growth and development. In the case of Chile and lithium, it has yet to be decided what kind of fiscal regime the Chilean government will implement; although it is clear that the state wants to be directly involved in the exploitation process albeit as a supervisor. When a state creates PPP's it can choose to levy taxes based on production or value as described earlier a state can also create special operating contracts.

It is clear that the NLC recommends the state to create an institution that governs the regulation and fiscal policy of the Chilean salares. It is, however, yet to be seen precisely which approach the Chilean state will take towards its fiscal policy and to what extent the current Government will fully adopt the NLC's recommendations. In its endeavor to find a suitable approach, it is wise to remember the scale of the lithium industry. As indicated in this report, the export of raw lithium is relatively small especially when compared to a huge Chilean industry as that of copper.

The lithium-industry is valuable for its technological applications such as in energy storage. The NLC therefore aptly recommends the promotion of research and development and cooperation with the private sector, in order to develop an industry that goes beyond the simple exportation of raw lithium.

Bibliography

- Australasian Legal Information Institute. Rates of Royalty. Last visited on November 23rd, 2014: http://www.austlii.edu.au/au/legis/wa/consol_reg/mr1981190/s86.html.
- Australian Bureau of Statistics (2013). Mining Operations. Last visited on October 1st, 2014, from Australian Government: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8415.02011-12?OpenDocument>.
- Auty, R.M. (1993). *Sustaining Development in Mineral Economies: The Resource Curse Thesis*. London: Routledge.
- Banco Central de Chile (2014). Exportaciones Mineras. Retrieved April 20th, 2014: http://srvwebspp1/estadisticas-economicas/series-indicadores/xls/balanza_comercial_export_min.xls.
- Barendse, J.P. (October 2nd, 2014). Directorate General for International Cooperation. Ministry of Foreign Affairs of the Netherlands (Netherlands).
- Bascuñán Montaner, F. (June 18th, 2014). Partner at Allende Bascuñán & Cia., Ltda. (Law firm). Natural Resources Law (Chilean Law Firm).
- Boon, R. (October 29th, 2014). Former COMIBOL Employee; Initiator of Cooperation-project between Netherlands and Bolivia (Netherlands, Bolivia).
- Burns, L. & Mullins, P. (2014). Tax Administration and Other Fiscal Issues. Fiscal Affairs Department: International Monetary Fund. Retrieved on October 27th, 2014: http://www.sopac.org/dsm/public/files/meetings/rartonga.may.2014/01_LeeBurns_PeterMullins_Tax_Administration.pdf.
- Burns, L. (2012). *Income Tax Issues for Extractive Industries*. Graduate School of Government, University of Sydney. Retrieved October 27th, 2014: <http://www.iticnet.org/file/document/watch/3965>.
- Business Wire (May 2014) Rockwood Completes the Acquisition of 49% Interest in Talison Lithium. Last visited on November 23rd, 2014: <http://www.businesswire.com/news/home/20140528005569/en/Rockwood-Completes-Acquisition-49-Interest-Talison-Lithium#.VHN2YFXF8Yc>.
- Castro Fones, F. (June 4th, 2014). Strategic Business Manager at CODELCO (Chile).
- Champion, D. (October 1st, 2014). Commodity Specialist, Regional Geologist of Mineral Systems at Geoscience Australia (Australia).
- Chile Chamber. Lithium Brochure. Invest Chile. Last visited on November 12th 2014: <http://www.chilechamber.com/assets/Uploads/News%20and%20Events/InvestChile-CORFO/lithium%20brochure.pdf>.
- CNN Chile (June 2012) La Polémica del Mercado del Litio en Chile. Last visited on May 21st, 2014: <http://www.cnnchile.com/noticia/2012/06/13/la-polemica-del-mercado-del-litio-en-chile>.
- COCHILCO (2013). Mercado Internacional del Litio. Comisión Chilena del Cobre Dirección de Estudios.
- COCHILCO (n.d.) Desarrollo del Litio en Chile. Retrieved on October 9th, 2014: http://www.centroenergia.cl/cil/nivell/mac-lean-cochilco_desarrollo_del_litio_en_chile.pptx.
- CODELCO (2014). Reconocimiento en Salares de Propiedad Minera de CODELCO. Presentación a Mesa Recursos y Salares: Santiago, September 3rd.
- Collier, P., & Hoeffler, A. (2009). Testing the Neocon Agenda: Democracy in Resource-Rich Societies. *European Economic Review*, (53): 293-308.
- Comisión Nacional del Litio. Presentación. Last visited on November 14th, 2014: <http://comision.minmineria.cl/presentacion/>.

- CORFO (2014). Cuadro Comparativo SQM y Rockwood Litio LTDA. (SCL) Porcentajes Royalty Sobre Productos en Pagos Trimestrales, Renta de Arrendamiento Fija y Plazos Para la Explotación. Document obtained through personal communication with CORFO (Valenzuela Valencia).
- CORFO (n.d.). Origen de los Contratos/SCL (Rockwood L.). Document obtained through personal communication with CORFO (Valenzuela Valencia).
- Cussen Mackenna, P. (June 24th, 2014). M.Sc. in Economics. President of the Board at CESCO. Chairman of the Board at Li3 Energy (Chile, International).
- Department of Finance. Land Tax Rates. Last visited on November 10th, 2014, from Australian Government: <http://www.finance.wa.gov.au/cms/content.aspx?id=239>.
- Department of Industry. Resource Taxation. Last visited on September 30th, 2014, from Australian Government: <http://www.industry.gov.au/resource/Enhancing/ResourcesTaxation/Pages/default.aspx>.
- Department of Mines and Petroleum. Mineral Regimes. Last visited on September 24th, 2014, from Government of Western Australia: <http://www.dmp.wa.gov.au/4407.aspx>.
- Desormeaux, D. (July 17th, 2014). M.Sc. in Economics. Director at SignumBOX: Market Intelligence in Industries Related with Natural Resources. Member of National Lithium Commission of Chile (Chile).
- Ebensperger, A. Maxwell, P. & Moscoso, C. (2005) The Lithium Industry: Its Recent Evolution and Future Prospects. *Resources Policy*, 30 (3): 218-231.
- ECLAC (2013). Natural Resources Within the Union of South American Nations: Status and Trends for a Regional Development Agenda. Santiago: United Nations Publications.
- ECLAC (2014). Economic Survey of Latin America and the Caribbean 2014: Challenges to Sustainable Growth in a New External Context. Santiago: United Nations Publications.
- ECLAC (2015). Economic Survey of Latin America and the Caribbean 2014: Challenges in boosting the investment cycle to reinvigorate growth. Santiago: United Nations Publications.
- Eifert, B. Gelb, A. & Tallroth, N.B. (2003). Managing Oil Wealth: The Political Economy of Oil-Exporting Countries: Why Some of Them Have Done So Poorly. *Finance & Development*.40 (1). Retrieved May 5th, 2014: <http://www.imf.org/external/pubs/ft/fandd/2003/03/eife.htm>.
- El Mercurio, Economía (June 2012). Parlamentarios Presentan Reforma Constitucional que Establece Control Estatal sobre el Litio. Last visited on March 19th, 2014: <http://www.emol.com/noticias/economia/2012/06/20/546669/parlamentarios-presentan-reforma-constitucional-que-establece-control-estatal-sobre-el-litio.html>.
- El Mercurio, Economía (September 2012). SQM Ganó Licitación para Explotar Litio con Oferta de \$19 Mil Millones. Last visited on March 15th, 2014: <http://www.emol.com/noticias/economia/2012/09/24/561555-del-litio.html>
- El Mercurio, Economía y Negocios (November, 2014). Rockwood Incrementará un 74% Su Producción de Litio con Ampliación de Planta la Negra. Last visited on November 24th, 2014: <http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2014-11-10&NewsID=271460&dtB=24-11-2014%2000:00:00&BodyID=2&PaginaId=6>
- Evans, R.K. (2008). Abundance of Lithium. Retrieved at July 7th, 2014: http://www.che.ncsu.edu/ILEET/phevs/lithium-availability/an_abundance_of_lithium.pdf.
- FMC (2014). Aligning for Success. Annual Report 2013. Retrieved November 11th, 2014: <http://www.fmclithium.com/Portals/FMCLithiumFineChemicals/Content/Docs/2013%20Annual%20report.PDF>.
- Forbes (June 2013). Meet Chemicals Billionaire Julio Ponce Lerou, Former Son-In-Law Of Chilean Dictator Augusto Pinochet. Last visited on May 1st, 2014: <http://www.forbes.com/sites/erincarlyle/2013/06/19/meet-chemicals-billionaire-julio-ponce-lerou-former-son-in-law-of-chilean-dictator-augusto-pinochet/>.
- Foreign Investment Statute 1974. Chile, Decree Law 600. Retrieved on July 20th, 2014: http://www.ciechile.gob.cl/wp-content/uploads/2010/10/DL600_English.pdf.
- Fox-Davies Resources Specialist (2013). The Lithium Market. Retrieved May 8th, 2014: http://www.globalstrategicmetalsnl.com/_content/documents/405.pdf.
- Fraser & Kingwell (1997) Can Expected Tax Revenue be Increased by an Investment-Preserving Switch From Ad Valorem Royalties to a Resource Rent Tax? *Resources Policy*, 23 (3): 103-108.
- Galaxy Resources. Projects Western Australia. Last visited on October 1st, 2014, from Galaxy Resources: http://www.galaxyresources.com.au/projects_western_australia.shtml.
- Galaxy Resources. Sal de Vida – Argentina. Last visited on November 11th, 2014: http://www.galaxyresources.com.au/projects_sal_de_vida.html.
- Garnaut, R. & Clunies Ross, A. (1975). Uncertainty, Risk Aversion and the Taxing of Natural Resource Projects. *The Economic Journal*, 85 (338): 272-287.
- Garnaut, R. & Clunies Ross, A. (1983). *Taxation of Mineral Rents*. Clarendon Press, Oxford.
- Geoscience Australia (2013). Australia's Identified Mineral Resources. Last visited on October 1st, 2014, from Australian Government: <http://www.ga.gov.au/scientific-topics/minerals/mineral-resources/aimr/table1>.
- Geoscience Australia. Minerals Basics. Last visited on September 29th, 2014, from Australian Government: <http://www.ga.gov.au/scientific-topics/minerals/basics>.
- Gereffi, G. (1996). The Elusive Last Lap in the Quest for Developed-Country Status. In: Mittelman, J.H. *Globalization: Critical Reflections*. Boulder, Colo.: Lynne Rienner Publishers, pp. 53-81.

- Government of the Netherlands (2013). The Netherlands Helps Bolivia Make Most of its Lithium Reserves. Last visited on November 12th, 2014: <http://www.government.nl/news/2013/08/26/the-netherlands-helps-bolivia-make-most-of-its-lithium-reserves.html>.
- Government of Western Australia (2014). Western Australian Spodumene Sales. Department of Mines and Petroleum. Document obtained through personal communication with the Government of Western Australia.
- Gregory, J. (November 19th, 2014). Research and Statistical Analyst at the Department of Mines and Petroleum of the Government of Western Australia.
- Gruber, P. & Medina, P. (2010). Global Lithium Availability: A Constraint for Electric Vehicles? University of Michigan. Retrieved October 13th, 2014: <http://www.erb.umich.edu/Research/InstituteReports/09-10/GlobalLithiumAvailability-PaulGruberPabloMedina.pdf>.
- Gruber, P., Medina, P., Keoleian, G., Kesler, S., Everson, M. & Wallington, T. (2011). Global Lithium Availability. *Journal of Industrial Ecology*, 15 (5): 760-775.
- Heinrich, A. (2011). Challenges of a Resource Boom: Review of the Literature [Electronic Version]. *Forschungsstelle Osteuropa an der Universität Bremen*, 114. Retrieved June 11th, 2014: <http://www.forschungsstelle.uni-bremen.de/UserFiles/file/06-Publikationen/Arbeitspapiere/fsoap114.pdf>.
- Hoeksma, P. (September 23rd, 2014). Senior Policy Officer at Ministry of Foreign Affairs of the Netherlands. Department of Latin America and the Caribbean (Netherlands).
- ICMM (2007). Chile: Country Case Study: The Challenge of Mineral Wealth, Using Resource Endowments to Foster Sustainable Development. International Council on Mining and Metals (ICMM) Publishing. London: ICMM. Retrieved on March 12th, 2014: <http://www.icmm.com/document/278>.
- ICMM (2009). Minerals Taxation Regimes: A Review of Issues and Challenges in Their Design and Application. Retrieved on September 14th, 2014: <http://www.icmm.com/document/520>.
- ICTD (2014). The ICTD Government Revenue Dataset. Retrieved September 14th, 2014: <http://www.ictd.ac/sites/default/files/ICTD%20WP19.pdf>.
- IMDC (2012). Mineral Royalties and Other Mining-Specific Taxes. Mining for Development: Guide to Australian Practice. Retrieved on September 7th, 2014: http://im4dc.org/wp-content/uploads/2012/01/uwa_1698_paper-01_mineral-royalties-other-mining-specific-taxes1.pdf.
- IMF (2012a). Fiscal Regimes for Extractive Industries: Design and Implementation. Retrieved on September 8th, 2014: <http://www.imf.org/external/np/pp/eng/2012/081512.pdf>.
- IMF (2012b). Issues in Extractive Resource Taxation: A Review of Research Methods and Models. Retrieved on September 10th, 2014: <https://www.imf.org/external/pubs/cat/longres.aspx?sk=40150.0>.
- IMF (2014). Template to Collect Data on Government Revenues from Natural Resources. Retrieved on September 14th, 2014: <http://www.imf.org/external/pubs/ft/gfs/manual/pdf/templatedata.pdf>.
- Infolatam (October 2012). Chile: Subsecretario Renuncia tras Anularse Polémica Licitación del Litio. Last visited on May 8th, 2014: <http://www.infolatam.com/2012/10/02/chile-subsecretario-renuncia-tras-anularse-polemica-licitacion-del-litio/>.
- Instituto Iguualdad (2012). La Minería del Litio: Visión Jurídica y Estratégica. Retrieved on March 11th, 2014: <http://www.igualdad.cl/wp-content/uploads/2012/04/miner%3%8da-del-litio-visi%3%93n-jdca-y-estrat%3%89gica.pdf>.
- Jaskula, B. (September 19th, 2014). Lithium Commodity Specialist at the National Minerals Information Center of the U.S. Geological Survey (USA, International).
- Johnston, David (2007). How to Evaluate the Fiscal Terms of Oil Contracts. In: Humphreys, Macartan, Sachs and Stiglitz: *Escaping the Resource Curse*. Columbia University Press, New York.
- Karl, T. L. (1997). *The Paradox of Plenty: Oil Booms in Petro-States*. Berkeley: University of California Press.
- Koch, D.J., Dr. (October 30th, 2014). Special Envoy Natural Resources, Ministry of Foreign Affairs of the Netherlands (Netherlands, International).
- Kohl, B., & Farthing, L. (2012). Material Constraints to Popular Imaginaries: the Extractive Economy and Resource Nationalism in Bolivia. *Political Geography*, 31 (4), 225-235.
- KPMG (2014). Chile: Country Mining Guide. Strategy Series. Retrieved on November 23rd, 2014: <http://www.kpmg.com/global/en/issuesandinsights/articlespublications/pages/chile-mining-guide.aspx>.
- KPMG. Corporate Tax Rates Table. Last visited on November 14th, 2014: <http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>.
- La Segunda (July 2012). ¿Cuáles Son los 15 Salares Más Atractivos Para Explotar el Litio en Chile? Last visited on October 9th, 2014: <http://www.lasegunda.com/Noticias/Economia/2012/07/766080/cuales-son-los-15-salares-mas-atractivos-para-explotar-el-litio-en-chile>.
- Land, B. (2007) Capturing a Fair Share of Fiscal Benefits in the Extractive Industry. Background paper prepared for UNCTAD, London: Commonwealth Secretariat, Mimeo.
- Le Monde Diplomatique. Las Inconsecuencias del Litio en Chile. Last visited on September 10th, 2014: <http://www.lemondediplomatique.cl/Las-inconsecuencias-del-Litio-en.html>.
- Manuel, M. (July 9th, 2014). Project Management Office at the Centro de Innovación del Litio (Lithium Innovation Centre of Chile).
- Mayorga, R. & Montt, L. (1993). *Inversion Extranjera en Chile*, Editorial Juridica, Santiago, Chile.

- McPhail, K. (2009). The Challenge of Mineral Wealth: Using Resource Endowments to Foster Sustainable Development. In: J. Richards (eds) *Mining, Society, and a Sustainable World*. New York: Springer, pp. 61-74.
- Minerals Education Coalition. Lithium. Last visited on May 12th, 2014: <http://www.mineralseducationcoalition.org/minerals/lithium>.
- Mining Act 1978. Western-Australia. Retrieved on November 18th, 2014: https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_604_homepage.html.
- Mining Lithium (October 2012). Chile's Deputy Mining Minister 'Quits' After Lithium Fiasco. Last visited on May 15th, 2014: <http://www.mining.com/chiles-deputy-mining-minister-quits-after-lithium-fiasco-18678/>.
- Mining Lithium (September 2012). Divisive Contract to Exploit Lithium in Chile Granted to Local SQM. Last visited on July 13th, 2014: <http://www.mining.com/divisive-contract-to-exploit-lithium-in-chile-granted-to-local-sqm-80677/>.
- Ministerio Minería (Chilean Government) (2010). *Litio ¿Salto al Futuro?*. Presentation at UN-ECLAC, November 10th, 2010.
- New York Times (December 2004). The Pinochet Money Trail. Last visited on May 14th, 2014: http://www.nytimes.com/2004/12/12/business/yourmoney/12riggs.html?pagewanted=print&position=&_r=0.
- North South Institute (2013). Tax Regimes on Mining in Latin America. Policy Brief. Retrieved on October 24th, 2014: <http://www10.iadb.org/intal/intalcdi/PE/2013/12958.pdf>.
- OECD Better Life Index. Chile. Last visited on July 10th, 2014: <http://www.oecdbetterlifeindex.org/countries/chile/>.
- OECD Statistics. Gross Domestic Product (GDP): GDP Per Head, US \$, Current Prices, Current PPP's. Last visited on September 4th, 2014: <http://stats.oecd.org/index.aspx?queryid=558#>.
- Organic Constitutional Law on Mining Concessions 1982. Chile, Law 18.097. Retrieved on May 21st, 2014: http://www.cochilco.cl/descargas/english/legislation/organic_constitutional_lawon_mining.pdf?idNorma=1004876&buscar=Ley+20.363.
- Organic Constitutional Law on Mining Concessions 1982. Chile, Law 18.097. Retrieved on May 21st, 2014: http://www.cochilco.cl/descargas/english/legislation/organic_constitutional_lawon_mining.pdf?idNorma=1004876&buscar=Ley+20.363.
- Otto, J., Andrews, C., Cawood, F., Doggett, M., Guj, P., Stermole, F., Stermole, J. & Tilton, J. (2006). *Mining Royalties*. Washington: World Bank.
- Palley, I. (2003). Lifting the Natural Resource Curse. *Foreign Service Journal*, 80 (1): 54-61.
- Political Constitution of The Republic of Chile 1980. Chapter III, Article 19. Retrieved on July 13th, 2014: http://www.cochilco.cl/descargas/english/legislation/political_constitution_of_the_republic_ofchile.pdf?idNorma=1004876&buscar=Ley+20.363.
- Political Constitution of The Republic of Chile 1980. Chapter III, Article 19. Retrieved on July 13th, 2014: http://www.cochilco.cl/descargas/english/legislation/political_constitution_of_the_republic_ofchile.pdf?idNorma=1004876&buscar=Ley+20.363.
- Prince Bourbon-Parma, J. (October 21st, 2014). Former Special Envoy Natural Resources. Ministry of Foreign Affairs of the Netherlands (Netherlands).
- PwC (2012). *Corporate Income Taxes, Mining Royalties and Other Mining Taxes: A Summary of Rates and Rules in Selected Countries*. Retrieved on September 15th, 2014: http://www.pwc.com/en_GX/gx/energy-utilities-mining/publications/pdf/pwc-gx-mining-taxes-and-royalties.pdf.
- Radhuber, I. & Vega, O. (2013). *Lithium in Bolivia: Preliminary Reflections on The Current Disputes*. Retrieved November 23rd, 2014: http://proyecto-nebe.org/upload/books/37/Lithium_in_Bolivia_preliminary_reflections_Isabella_Radhuber_Oscar_Vega_original.pdf.
- Rockwood Lithium (2014). Presentation for the Chilean Lithium Commission. July 9th, 2014.
- Rockwood Lithium. History. Last visited on November 3rd, 2014: <http://www.rockwoodlithium.com/about-us/history/>.
- Rockwood Specialties (2014). Albemarle and Rockwood Announce Merger to Create a Premier Specialty Chemicals Company. Retrieved on November 13th, 2014: [http://www.rockwoodspecialties.com/rock_english/media/pdf_files/ALB-ROCMergerAnnouncement_140715.pdf#search="albemarle"](http://www.rockwoodspecialties.com/rock_english/media/pdf_files/ALB-ROCMergerAnnouncement_140715.pdf#search=).
- Sachs, J. & Warner, A. (1999). The Big Push, Natural Resource Booms and Growth. *Journal of Development Economics*, 59 (1): 43-76.
- Sáinz, P. (June 6th, 2014). Former Director of the Division of Statistics and Economic Projections at ECLAC (Chile, International).
- Sáinz, P. (2007). *The Chilean Experience with Mining Foreign Direct Investment 1985-2005*. Working Paper Prepared for UNCTAD. Document obtained through personal communication with Sáinz.
- Santiago Times (June 2012). Chile's Opposition to Contest Lithium Privatization. Last visited on May 20th, 2014: <http://santiagotimes.cl/chiles-opposition-to-contest-lithium-privatization/>.
- Santiago Times (November 2011). Experts Call for Reforms to Chile's Lithium Extraction Laws. Last visited on May 20th, 2014: <http://santiagotimes.cl/experts-call-for-reforms-to-chiles-lithium-extraction-laws/>.
- Santiago Times (September 2012). Pressure Mounts Against Chile's Lithium Privatization. Last visited on May 20th, 2014: <http://santiagotimes.cl/pressure-mounts-against-chiles-lithium-privatization/>.
- Saravia-Frias, A. (2007) *Is the Argentine Legal Mining Framework Capable Enough to Attract Foreign Investment? Is There a Need to Amend the Current Mining Legislation?* Retrieved November 17th, 2014: <http://www.dundee.ac.uk/cepmlp/gateway/?news=29299>.

- Satchwell, I. (September 16th, 2014). Director of the International Mining for Development Centre (Australia, International).
- Schwarz, S., Dr. (June 19th, 2014). Mining Analyst at COCHILCO (Chile).
- SEMinería (Argentinean Government)(2014). El Litio en la Provincia de Catamarca, Argentina. Panel Minería del Litio en el NOA Argentino. Document obtained through personal communication with COCHILCO.
- SERNAGEOMIN (2014a). Potencial de Litio en Salares del Norte de Chile. Retrieved on October 8th, 2014: [http://www.sernageomin.gov.cl/pdf/presentaciones-geo/Potencial-de-Litio-en-Salares-de-Chile\(AnibalGajardo\).pdf](http://www.sernageomin.gov.cl/pdf/presentaciones-geo/Potencial-de-Litio-en-Salares-de-Chile(AnibalGajardo).pdf).
- SERNAGEOMIN (2014b). Compuestos de Litio. Retrieved on October 14th, 2014: http://www.sernageomin.cl/pdf/mineria/estadisticas/estadistica_de_produccion_minera/13_produccion_minera_compuestos_de_litio_2013.pdf
- Singh, J. T. (2013). Towards Post-neoliberal Resource Politics? The International Political Economy (IPE) of Oil and Copper in Brazil and Chile. *New Political Economy*, 19 (3): 1-30.
- SQM (2011). Oportunidades para Centro Innovación del Litio. Retrieved on October 9th, 2014: http://www.centroenergia.cl/cil/nivel1/Pablo_Altimira-SQM.pptx.
- SQM (2013a). FORM 20-F/A. United States Securities and Exchange Commission. Retrieved May 20th, 2014, on SQM: http://ir.sqm.com/files/doc_downloads/20-f/20f_2013_amendment.pdf.
- SQM (2013b). Annual Report, 2013. Retrieved September 13th, 2014: http://ir.sqm.com/files/doc_financials/annual_report/memoria%20SQM%20INGLES%202013_Total.pdf.
- Talison Lithium (2009). Talison and the Role of Minerals in the Lithium Industry. Lithium Supply & Markets 2009. Document obtained through personal communication with Government of Western Australia.
- Talison Lithium (2012a). Investor Relations. Retrieved on November 25th, 2014: <http://www.talisonlithium.com/docs/pdf-presentations/talison-lithium-investor-presentation-june-2012.pdf>.
- Talison Lithium (2012b). Greenbushes Lithium Operations. NI 43-101 Technical Report. Retrieved on November 20th, 2014: <http://www.sedar.com>.
- Talison Lithium. Projects. Last visited on October 1st, 2014, from Talison Lithium: <http://www.talisonlithium.com/projects>.
- Umina, M. (September 22nd, 2014). Assistant Commissioner. Energy & Resources Industry Leader at Australian Taxation Office (Australia).
- UN DESA (2010). Assessment of Lithium Resources in Latin America: Opportunities and Issues for Sustainable Development. Working Paper from the United Nations Department of Economic and Social Affairs (DESA). Retrieved on May 9th, 2014: http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/EGM_latinamerica/Presentations-and-Speeches/Session-1/3_HENRI_MAIRES/MAIRE.pdf.
- Universidad Nacional de San Martín. Del Litio a la Batería Propia. Last visited on November 20th, 2014: <http://www.unsam.edu.ar/tss/del-litio-a-la-bateria-propia/>.
- USGS (2013a). Mineral Commodity Summaries. Retrieved March 19, 2014, from the U.S. Geological Survey: <http://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2013-lithi.pdf>.
- USGS (2013b). Lithium. 2012 Minerals Yearbook. Retrieved on October 14th, 2014: <http://minerals.usgs.gov/minerals/pubs/commodity/lithium/myb1-2012-lithi.pdf>.
- USGS (2014). Lithium-For Harnessing Renewable Energy. USGS Mineral Resources Program. Retrieved on October 10th, 2014: <http://pubs.usgs.gov/fs/2014/3035/pdf/fs2014-3035.pdf>.
- Valenzuela Valencia, L. (November 3rd, 2014). Asset Executive at CORFO (Chile).
- Vikström, H., Davidsson, S., & Höök, M. (2013). Lithium Availability and Future Production Outlooks. *Applied Energy*, 110: 252-266.
- Viñuela Hojas, M., Dr. Prof. (June 20th, 2014). Ph.D. in Law, Professor Administrative Law, Los Andes University. Partner at Allende Bascuñán & Cia., Ltda. (Chilean Law firm).
- Von Haldenwang, C. (2011). Taxation of Non-Renewable Natural Resources—What are the Key Issues? Briefing Paper of the Deutsches Institut für Entwicklungspolitik. Retrieved on September 4th, 2014: <http://www.die-gdi.de/en/briefing-paper/article/taxation-of-non-renewable-natural-resources-what-are-the-key-issues/>.
- Ward, H. (2009). Resource Nationalism and Sustainable Development: A Primer and Key Issues. Working Paper of the International Institute for Environment and Development (IIED). Retrieved March 4, 2014, from IIED: <http://pubs.iied.org/G02507.html>.
- Western Lithium (2010). The Role of Lithium. MMSA Symposium. Retrieved on October 9th, 2014: <http://www.mmsa.net/greensocsymp/06bryanmmsatalk-2-4-10.pdf>.
- Western Lithium. Conversion Factors for Lithium Compounds. Last visited on October 14th, 2014: <http://www.westernlithium.com/project/conversion-table>.

Annexes

Annex 1

The Latin American lithium triangle (Talison Lithium, 2012a: 15)



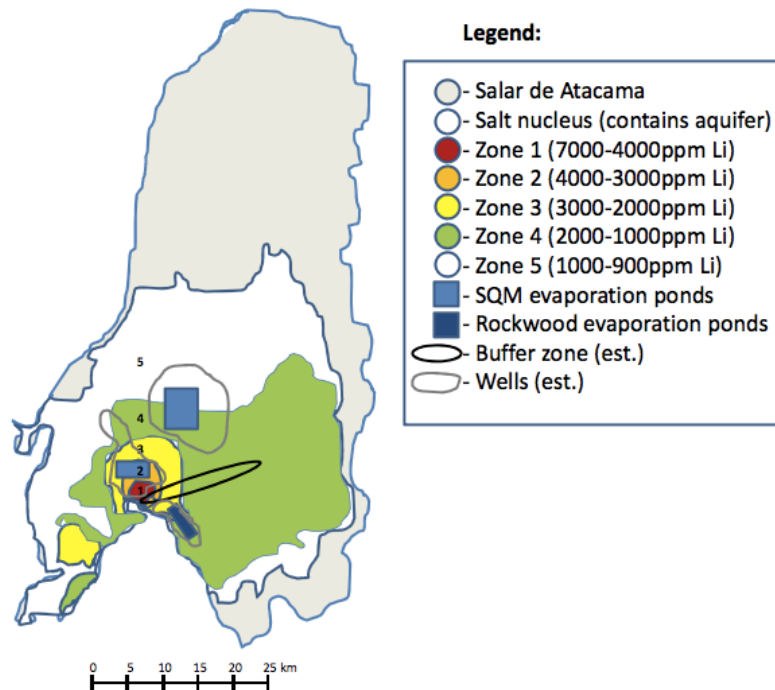
Annex 2

Lithium battery grade and price (Fox-Davies Resources Specialist, 2013: 10)



Annex 3

Map of Atacama showing location variations in concentration of lithium in the brine and the ponds and wells of SQM and Rockwood Holdings (Gruber & Medina, 2010: 33)



List of acronyms and abbreviations

CEOL	<i>Contratos Especiales de Operación de Litio</i> (Special Lithium Operating Contract)
CEOP	<i>Contratos Especiales de Operaciones de Petróleo</i> (Special Petroleum Operations Contracts)
CEPAL	<i>Comisión Económica para América Latina y el Caribe</i> (Spanish acronym for: ECLAC)
CIT	Corporate Income Tax
COCHILCO	<i>Comisión Chilena del Cobre</i> (Chilean Copper Commission)
CODELCO	<i>Corporación Nacional del Cobre de Chile</i> (National Copper Corporation of Chile)
COMIBOL	<i>Corporación Minera de Bolivia</i> (Bolivian Mining Corporation)
CORFO	<i>Corporación de Fomento de la Producción</i> (Production Development Corporation)
ECLAC	<i>Economic Commission for Latin America & the Caribbean</i> (English acronym for: CEPAL)
EITI	<i>The Extractive Industry Transparency Initiative</i>
ENAMI	<i>Empresa Nacional de Minería</i> (National Mining Company)
FMC	Food Machinery Corporation
GDP	Gross Domestic Product
GNRE	<i>Gerencia Nacional de Recursos Evaporíticos</i> (National Management Committee for Evaporitic Resources)
ICMM	International Council on Mining & Metals
ICTD	International Centre for Tax and Development
IMF	International Monetary Fund

JORC	Joint Ore Reserves Committee
Km ²	Square kilometer
kMT	Kilo metric ton
kMTpa	Kilo metric tones per annum
LCE	Lithium Carbonate Equivalent
Li	Lithium
Mg/l	Milligrams per liter
N.D.	Not dated
NLC	National Lithium Commission
OECD	Organization for Economic Co-operation and Development
PPS	Public-private partnerships
PSA	Production Sharing Agreement
PwC	PricewaterhouseCoopers
RA	Resource Availability
RE	Resource Extraction
REI	Resource Extractive Industry
SA	Service Agreement
SCL	<i>Sociedad Chileno del Litio</i> (Chilean Lithium Society)
SEMinería	Secretaría de Estado de Minería (Argentina) (Ministry of Mining)
SERNAGEOMIN	<i>Servicio Nacional de Geología y Minería</i> (National Geology and Mining Service)
SQM	<i>Sociedad Química y Minera</i> (Chemical and Mining Society)
T	Ton
Tpa	Tons per annum
US\$	Currency in United States of America (Dollar)
USGS	United States Geological Survey

