

# Chile's Lithium Quandary

By Ruth Bradley

**W**orld lithium users are getting nervous. Their problem is not a scarcity of reserves - at present level of demand, there are enough to keep the market going for over 500 years - but supply security.

Lithium, a silver-white metal so soft it can be cut with a knife, has long been used to make lubricants and heat-resistant glass as well as by the pharmaceutical industry, first to treat gout and then as a mood-stabilizer. Over the past 20 years, it has, however, also emerged as a key component of the rechargeable batteries used in mobile phones, laptops and digital cameras.

These gadgets now account for over a quarter of international lithium consumption, says Patricio de Solminihac, executive vice-president and COO of Sociedad Química y Minera de Chile (SQM), Chile's largest producer. And that is without counting the development of electric cars which also use lithium in their batteries.

The catch for industries that use

lithium is that there are only a handful of suppliers. Chile, which represents over 40% of the world's current production capacity, has just two producers - SQM and the Sociedad Chilena del Lito (SCL), a subsidiary of New Jersey-based Rockwood Holdings - and there are only another dozen or so, around the world, principally in Australia, China and Argentina.

That explains why, in 2009, as part of a US\$2.4 billion program to promote the development of battery technology for hybrid and electric vehicles, Rockwood received a grant of US\$28.4 million from the U.S. government for the expansion of its existing lithium carbonate facility in Nevada and to build a new lithium hydroxide plant in North Carolina. It also explains why lithium users are interested in moving upstream and investing directly in its production.

Chile is the obvious candidate. As well as a secure and attractive business environment, it has some of the world's lowest lithium production costs, points out Alvaro Merino, head

of research at Chile's Mining Society (SONAMI).

Lithium, which does not exist in nature as a metal but only in different compounds, can be obtained either from brines - or, in other words, salt flats like those found in northern Chile's Atacama Desert - or, more expensively, from certain types of minerals as in Australia. But, even among brine producers, Chile has a competitive edge.

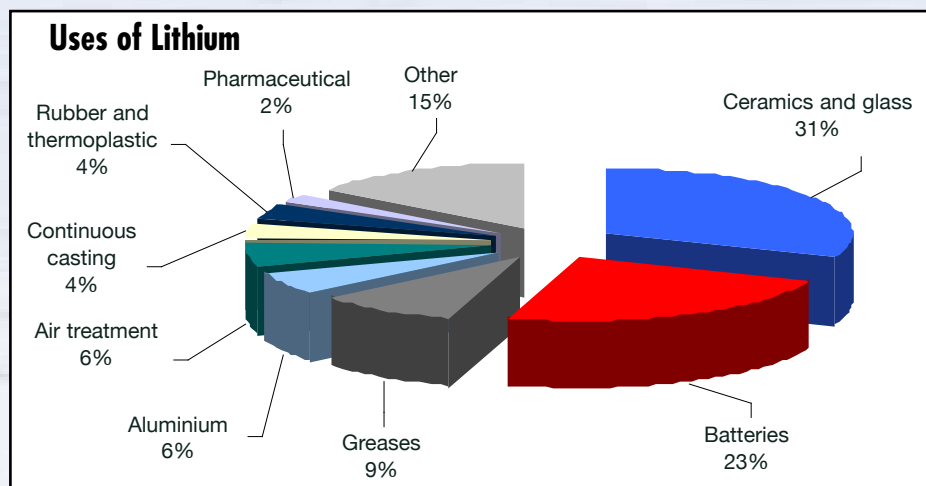
That is because weather conditions in the Atacama Desert - usually windy and sunny - make the evaporation process more efficient, explains Monika Engel-Bader, president of Chemetall, the Munich-based company through which Rockwood owns SCL. "In Nevada, for example, where we also use a pond system, environmental conditions aren't quite as good and production costs are a bit higher," she says.

Lithium users in Asia, Chile's main market, are reported to have scouted investment opportunities in Chile. So far, however, they have gone away empty-handed.

## Reserved for the state

That is because of what now seems an historic anomaly. In the early 1980s, when Chile reformed its mining legislation, opening the way to huge new investments principally in copper, it made a distinction between "concessionable" and "non-concessionable" minerals.

Most, including copper, were placed in the former category, but lithium and hydrocarbons were defined as non-concessionable. In the case of lithium,



Source: Chemetall 2009

# Oddly for a country that has so successfully harnessed market liberalization to its economic development, lithium production in Chile is hamstrung by old legislation that threatens its pole position in a fast-growing international industry.

that was because it was then considered a “strategic” material due to its application in nuclear warheads and potential use in nuclear fusion power plants.

Nuclear fusion has, however, remained a distant prospect and, at the end of the Cold War, the United States sold its strategic lithium stockpiles, but Chile did not change its legislation. “It is the only country in the world that still treats lithium as a strategic material,” notes SQM’s Patricio de Solminihac.

As a result, lithium can only be produced in Chile by the state or state-owned companies (Codelco, the state copper producer, has lithium concessions that it doesn’t exploit).

Moreover, points out Jerónimo Carcelén, a mining lawyer, if a significant amount of lithium is obtained as a by-product of other mining activities, the state must be informed and can claim its right to market it (although this doesn’t, in practice, happen).

The exception to this regime were the lithium concessions that predated the

1980s reform, held by Chile’s Economic Development Agency (CORFO) in the Atacama Salt Flat and by Codelco in the Pedernales Salt Flat, further south in the Atacama Desert. It is CORFO’s concessions that SQM and SCL have been exploiting since then.

SCL, which produced its first lithium in 1984, was born as a joint venture between CORFO and Foote Mineral Company, then the world’s largest lithium producer which was subsequently acquired by Chemetall. CORFO had done the exploration, recalls Engel-Bader, but needed a partner to develop the resources and, after a few years, sold its stake in the venture to Foote.

SQM dates back to the 1920s as a nitrates producer but only entered the lithium market in the early 1990s when it acquired 75% of MINSAL Ltda., a joint venture formed in 1986 by CORFO, the Amax mining company and locally-owned Molymet. In 1995, it too went on to buy out CORFO.

That looks like a comfortable duopoly and there is, indeed, some





## SPECIAL REPORT

Courtesy of SQM



**“Chile is the only country that still treats lithium as a strategic material.”**

Patricio de Solminihac,  
SQM

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criticism of the terms on which SQM and SCL are allowed to use CORFO's concessions. SQM, with lithium sales of US\$150 million in 2010, pays an annual rent of US\$15,000, plus 6.8% of its lithium sales, or a total of around US\$20 million a year.

SCL, on the other hand, pays neither a fixed rent nor a percentage of its lithium sales, but 10% of magnesium sales and 3% of potassium chloride sales which, according to COCHILCO, amounted to US\$1.4 million in 2008. The difference, according to Engel-Bader, is that SCL paid upfront for its use of CORFO's concessions.

At the Chilean government's Copper Commission (COCHILCO), executive vice-president Andrés Mac-Lean denies that the contracts were a mistake. "They were signed on the basis of market conditions at the time," he says, "and it's easy to be wise after the event."

### A legal straitjacket

But the companies aren't too happy with their contracts either. According to COCHILCO, world demand for lithium doubled in the ten years to 2008 while its price approximately trebled and, after a bad year in 2009, strong growth is again expected, with demand possibly doubling again by 2020.

Chile's output of lithium compounds has increased, rising from 36,000 tonnes in 2000 to a peak of 60,000 tonnes in 2007 (but dropping to 57,000 tonnes in 2008 and a low of 31,000 tonnes in 2009). In the medium term, however, both SCL and SQM face caps on their output.

SQM's contract will expire in 2030 and, in any case, only allows it to produce the equivalent of 180,000 tonnes of lithium metal. That means some 960,000 tonnes of lithium carbonate, explains de Solminihac, of which it has



**“Carmakers are asking for long-term lithium supply contracts.”**

Monika Engel-Bader,  
Chemetall

so far produced 350,000 tonnes, and COCHILCO estimates that it will reach its limit by 2023. In 2009, it reportedly requested a 20% increase in the limit, but met with a refusal.

SCL is better off. Its contract sets a limit of 200,000 tonnes of lithium metal but no expiry date and, according to COCHILCO, it should be able to continue to produce through to 2040. But that’s not good enough, says Engel-Bader.

“This is a very important time for the lithium business and users like car manufacturers want to be sure we’ll be

able to continue supplying them in 20, 30 and even 50 years’ time,” she says.

The risk is that, otherwise, they will look elsewhere. And that is the risk for Chile too.

The world lithium market was worth some US\$600 million in 2010, estimates Mac-Lean, and is, in other words, tiny as compared to copper, Chile’s main export. Nor, on present count, is it likely to acquire the importance of that other “white gold” - nitrates - that dominated Chile’s economic and social history in the early twentieth century.

Still, other countries are hungry for a bite of the market. And that includes two of Chile’s immediate neighbors, Argentina and Bolivia.

The Uyuni Salt Flat in Bolivia, just across the border from the Atacama Desert, is, indeed, believed to be the world’s single largest reserve of lithium. The government of President Evo Morales has invested an estimated US\$6 million in a pilot lithium plant there and a number of companies, including Japan’s Mitsubishi and Sumitomo, South Korea’s Samsung and Frances’s Bolloré industrial group, are reported to have made approaches with a view to possible investments.

Along with Chile and Bolivia, northern Argentina also forms part of the area dubbed by Forbes magazine as the “Saudi Arabia of lithium”. Argentina currently accounts for an estimated 11% of world production capacity, with just

World Lithium Resources	
<b>Chile</b>	21%
<b>United States</b>	20%
<b>Bolivia</b>	17%
<b>China</b>	10%
<b>Argentina</b>	10%
<b>Zaire</b>	7%
<b>Australia</b>	5%
<b>Others</b>	10%

Source: SQM and others.

one operation on the Hombre Muerto Salt Flat, owned by U.S.-based FMC Corporation, but a number of junior mining companies, some of them in partnership with subsidiaries of large car manufacturers that had previously had conversations in Chile, are engaged in exploration operations.

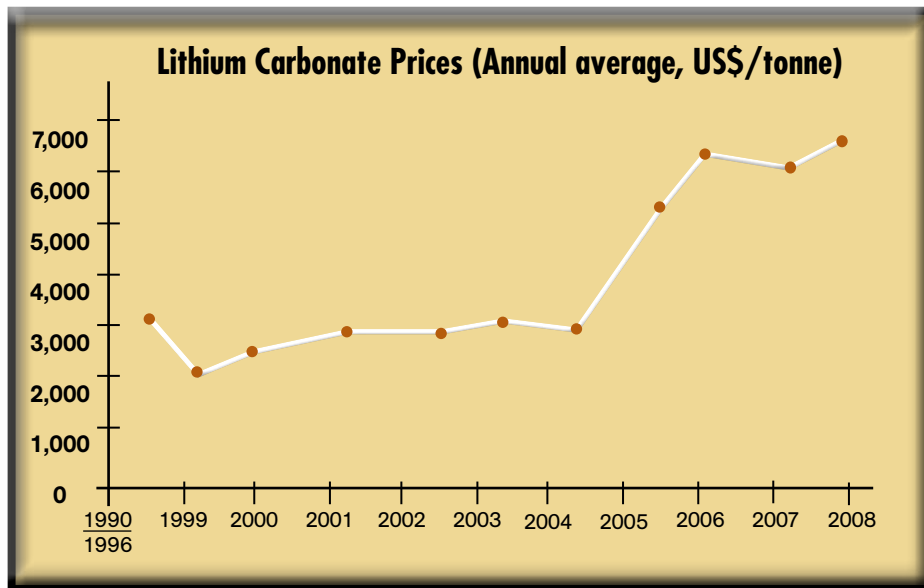
SONAMI’s Alvaro Merino points out there are currently 14 new lithium projects being developed around the world that would more than double world production capacity, but none of them are in Chile. “We’re missing the bus,” he laments. “Despite Chile’s competitive advantages, the new capacity will be in other countries unless there’s a change in law.”

**Fast-track solution**

That view is echoed by Chemetall’s Monika Engel-Bader. “Chile is the best lithium source in the world but... we need to be able to count on a long-term perspective,” she says.

If, by 2020, 10% of new cars are electric, Chemetall would need to have doubled its lithium carbonate output, she says. Given that new projects have a lead time of around three years and production could only be increased gradually, time is at a premium, she insists.

Under the previous Chilean government headed by President Michelle Bachelet, a Lithium Roundtable, bringing together different government agencies, was set up to study the issue but that was as far as it got. However, the government of Sebastián Piñera, who took office as Chile’s president in March 2010, hopes to



Source: COCHILCO

provide an early answer.

The obvious remedy would be to change the law and make lithium concessionable and that is the solution favored by many in the government coalition. However, that would be a major undertaking, calling for a reform of Chile's constitution, an option for which the government would require the support of the opposition and, even in the unlikely event this were forthcoming in sufficient numbers, it could take years, says Jerónimo Carcelén.

According to COCHILCO's Mac-Lean, the government's likely decision will be to tender operating contracts for the development of individual lithium deposits. Similar to the so-called CEOPs offered by the previous government for the development of hydrocarbons reserves in the Magallanes Region of the far south, they have the advantage of not requiring a change in the law, points out Carcelén.

The decision could be announced in late April, suggests Mac-Lean, although issuing tenders for the contracts would take longer. The necessary regulation could be drawn up quite quickly, he says, but each contract would require careful and time-consuming preparation.

One problem is that, although the Atacama Salt Lake has been pretty thoroughly surveyed, there is much less information about reserves in the three salt flats - Pedernales, Punta Negra and

**“The government’s aim is to permit the best use of Chile’s lithium assets.”**

Andrés Mac-Lean,  
COCHILCO



Maricunga - where the so-called Lithium Operating Contracts (CEOLs) would be offered. Most of the studies that exist are quite old, says Mac-Lean.

There is, however, another difficulty,

points out Carcelén. Most of the areas where lithium is believed to exist are already subject to mining concessions for other minerals, either because these minerals are genuinely being exploited or because the concessions were acquired more speculatively in the name of other minerals but with a view to their future lithium potential.

The result is that the government could find itself wanting to offer a CEOL in an area in which there is another company already producing, say, nitrates. That is the drawback of CEOLs, admits Mac-Lean, but is not insurmountable.

The trick will be to find a way to compensate the existing concession holder and there are a number of options. One would be for bidders on the CEOL to offer financial compensation; another would be for the concession holder to become a partner in the contract.

Neither SQM nor SCL have publicly expressed an opinion about CEOLs, but are in talks with the government about their possible introduction. “We are in favor of a broad consensus that permits a change in the regulation... and allows Chile to maintain and strengthen its leadership,” says de Solminihac.

The devil will, of course, be in the details of how the jigsaw of concessions and CEOLs is put together and in ensuring fair compensation arrangements for concession holders. If they can be made to work, CEOLs would, however, be a quick and practical way of loosening lithium's legal straitjacket. **bUSINESS CHILE**

<b>Chile</b>	43%
<b>Australia</b>	20%
<b>China</b>	13%
<b>Argentina</b>	11%
<b>United States</b>	3%
<b>Others</b>	10%

Lithium Carbonate Prices  
(Annual average, US\$/tonne)

**“Making lithium concessionable would be difficult to get through Congress.”**

Jerónimo Carcelén,  
Carcelén &  
Cía. - Abogados

Courtesy Nueva Energía y Minería



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