OPPORTUNITIES TO LITHIUM VALUE ADDED INTEGRATION IN CHILE

IN CHILE
On January 26th 2016, President Michelle Bachelet announced a new Policy regarding Lithium and Salt flats.

Move forward an integrated salt flats governance, starting point to sites explorations and resource exploitation. In need of developing technological capabilities to safeguard the salt flats sustainability and move forward to value added products.
According to USGS (2016) worldwide Lithium reserves are 14.3 million tons.

Chile’s Salar de Atacama reserves are about 7.5 million tons (40 millions LCE) making the country the richest in economical proven reserves.
CONTEX styl
LITHIUM MARKET | WOLDWIDE Li SUPPLY

SQM

17%

25%

Albemarle

CHINA

Others, not including Tianqui-Talison

14%

Tianqi 51%

Albermarle 49%

24%

SQM

FMC

9%

Others

11%

LCE: Lithium Carbonate Equivalent
CONTEXT

CHILEAN LITHIUM MARKET (conservative analysis)
CHILEAN LITHIUM EXPORTS

Lithium Carbonate | Lithium Hydroxide | Lithium Chloride | Brine

2015: USD 302 Millions

2016: USD 589 Millions

2016 Chilean exports are about 40% of worldwide Lithium market (Chile: 79,500 tons LCE).
LITHIUM DEMAND 2017 | 2035

2017 Lithium demand is expected to reach 188,000 tons LCE, having Lithium Carbonate as the main product.

2035 conservative scenario: Lithium demand outlook are around 610,000 tons LCE, having about 290,000 tons destined to battery production.

2035 high scenario: Lithium demand outlook of some experts are around 1,200,000 tons LCE of which about 750,000 tons would supply the electro mobility industry. Bloomberg in line with this forecast estimates sales of electric vehicles that would reach 40,000,000 units by 2035-2040.
The rise of mobile phones, laptops and other devices has boosted the lithium demand, and over the past five years the successful introduction of smartphones and tablets continues to drive this trend.

**Electric Vehicles**

Lithium demand traction is expected to change in the short term and will come mostly from its use in electric vehicles and large energy storage systems.

**Almacenamiento Térmico**

There is an incipient interest in developing thermal salts based on LiNO3 (lithium nitrate) thus improving the melting and freezing points of the molten salts currently used in CSP plants.
END-US MARKET
ITS RECENT EVOLUTION AND FUTURE PROSPECTS
# END-US MARKET

**ITS RECENT EVOLUTION AND FUTURE PROSPECTS**

<table>
<thead>
<tr>
<th>Application</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass/Ceramics</td>
<td>• Spodumene&lt;br&gt;• Li$_2$CO$_3$</td>
</tr>
<tr>
<td>Greases / Lubricants</td>
<td>• LiOH</td>
</tr>
<tr>
<td>Chemical Synthesis</td>
<td>• Li Organometallics fed by Li Metal LiCl</td>
</tr>
<tr>
<td>Portable Electronics &amp; Other Handhelds</td>
<td>• BG Li$_2$CO$_3$&lt;br&gt;• BG LiOH&lt;br&gt;• BG Li Metal&lt;br&gt;• BG Electrolyte Salts</td>
</tr>
<tr>
<td>Hybrids</td>
<td>• BG LiCl&lt;br&gt;• BG Alloys&lt;br&gt;• BG Specialty Compounds</td>
</tr>
<tr>
<td>Battery Electric Vehicle (BEV)</td>
<td></td>
</tr>
<tr>
<td>Grid and Other Power Storage Applications</td>
<td></td>
</tr>
</tbody>
</table>

**LITHIUM CONSUMPTION BY APPLICATION 2017 - BASE SCENARIO**

- BATTERIES-PORTABLE DEVICES SECONDARY
- BATTERIES-PORTABLE DEVICES PRIMARY
- BATTERIES HEV/EV
- BATTERIES 2 WEVS
- CERAMICS
- GLASS
- LUBRICATING GREASES
- AIR CONDITIONING
- CONTINUOS CASTING POWDERS
- MEDICAL
- ALUMINUM
- POLYMERS
- OTHERS


*Fuente: Albermarle*
The global market for lithium batteries is expected to continue its accelerated growth to double the current market estimated at about $20-22 billions.

By 2022, the market size of lithium batteries (*)

US$ 40 ~ 46 billions

GLOBAL PRODUCTION CENTER
HEAVILY CONCENTRATED MANUFACTURING
Li-Ion Batteries

<table>
<thead>
<tr>
<th>Region</th>
<th>Fully Commissioned (MWh)</th>
<th>Partially Commissioned (MWh)</th>
<th>Under Construction (MWh)</th>
<th>Announced (MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>16,704</td>
<td>3,576</td>
<td>18,730</td>
<td>12,847</td>
</tr>
<tr>
<td>Japan</td>
<td>10,778</td>
<td>0</td>
<td>1,200</td>
<td>0</td>
</tr>
<tr>
<td>Korea</td>
<td>16,059</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>U.S.</td>
<td>3,770</td>
<td>0</td>
<td>1,200</td>
<td>35,000</td>
</tr>
<tr>
<td>EU</td>
<td>1,798</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rest of World</td>
<td>2,440</td>
<td>0</td>
<td>0</td>
<td>564</td>
</tr>
<tr>
<td>TOTAL</td>
<td>51,549</td>
<td>3,576</td>
<td>21,130</td>
<td>48,412</td>
</tr>
</tbody>
</table>

Note: This map includes factories that are fully and partially commissioned, under construction, and announced. Capacity is not disclosed for all factories. Source: Corporate reporting. Bloomberg New Energy Finance BNEF (2013).
LITHIUM VALUE CHAIN FOR EV

- **Raw material processing**
- **Components Manufacturing**
- **Cells Production**
- **Assembly with thermal control and electric charge**
- **Vehicle integration**

- **Components:**
  - **Motor.**
  - **Electrical.**
  - **Positioning systems.**

- **Individual elements:**
  - **Motor.**
  - **Tires.**
  - **Positioning systems.**

- **Lithium chloride.**
- **Lithium carbonate.**
- **Lithium hydroxide.**
- **Lithium nitrate.**

- **Cathodes:** Li, Mn, Ni, Co, Fe, P, Al.
- **Precursors material.**
- **Anodes:** Purified graphite.
- **Electrolitos:** LiPF6, LiClO4.
- **Binders** (functional compounds).

- **Packing:** Metal laminate (steel, aluminum).
- **Lead.**
- **Insulation.**
- **Ventilation.**
LITHIUM VALUE CHAIN FOR EV

Raw material processing
Components Manufacturing
Cells Production
Assembly with thermal control and electric charge
Vehicle integration

Relative market value

x 1
US$ 1b (*)
Albemarle
Samsung-Umicore-BASF
L&F-Clariant-Easpring
Nichia-Mitsubishi Chemicals
Ube Industries-3M

x 4
US$ 3,50b (**)
A123 -Toyota Motor
Panasonic-Sanyo-LG Chemicals

x 14
US$ 13,6b (**)
Tesla-Panasonic-LG
GM-Yuasa-Hitachi
Lishen-Tesla

x 20
US$ 19,6b (**)
BYD-LG Chem-GM
BYD-Samsung SDI

x 100
US$ 100b (***)
forecast 2020
GM-BMW-Hyundai-Nissan
Ford-Magna-Eaton-BAE
BYD Auto-Luxgen motors
Chery Automobile

Main players

CHILEAN LITHIUM CALL
CORFO & INVESTCHILE PROGRAMS

IFI, Integrated Development Initiatives -
PRAP, Pre-Investment Support Program -
Guarantee -
R & D Tax Incentive -
Subsidies for Innovation -
Competitiveness Training Program -

- Promotion
- Investor Assistance
- Aftercare

CORFO | Albemarle Contract
Preferred lithium prices
Supply assurance
ESPECIALIZED PRODUCERS CALL

INVITATION
CONTEXT

CORFO AND ROCKWOOD CONTRACT

Fourth Clause, number 8 of CORFO and Rockwood contract:

Preferable lithium prices. RLL is obliged for as long as the “Convenio Básico” operates and prior to CORFO’s approval, to sell its lithium production at the lowest exportation market price (FOB Chile) of the last six months (“Obligación de Precio más Favorable”, “most favorable price obligation”) to value added lithium producers (public or private corporations) which among others, elaborate products as lithium cathodes, ion-lithium battery components or lithium salts in Chile (“Productores Especializados Establecidos en Chile”, “Local Specialized Producers”, “LSP”).

By Local Specialized Producers (LSP) it will be considered companies established in Chile which have developed or acquired technologies to produce lithium value added products such as the ones already listed or others. Therefore, no LSP will be allowed to produce from RLL lithium supply products such as lithium carbonate, hydroxide and or chlorine in any of its grades.

Therefore, no LSP will be allow to comercialized Lithium carbonate, hydroxide or chloride from the Lithium supply obtained by this contract.
The obligation acquired by RLL will not exceed, at the moment of signed its contract with the LSP’s, the 15% of RLL’s local annual theoretical production stated in annex VII of “Anexo Convenio Básico”.

Once the 15% recently mentioned is fully allocated to LSP’s, then that percentage of the local annual theoretical production will be increased in 2.5% year on year until reaching the 25%.

To make this obligation functional, CORFO shall designate either one or more LSP with one year in advanced to the beginning of supply by RLL.

- Supply stability throughout 27 years (until 2044).
- Guaranteed lowest price for long term contracts.
- Inicial volume: 6,700 tons Li2CO3, ramping up to 16,000 tons in 2023 and until 2044.
- Including LiOH and LiCl the final available volume is up to 20,000 tons LCE.
FAVORABLE ENVIRONMENT TOWARDS INVESTORS

OPPORTUNITY HIGHLIGHTS

• Chile as a leader of Lithium producer gives confidence in supplying stability.
• Chile guarantees long term Lithium sources, forecasting to be expanded by Codelco (Maricunga).
• Chile is an emergent economy, the best evaluated to do business within Latam, as well as renowned worldwide.
• The State of Chile is looking to bring foreign investment to the country.
• Align with the Official National policy regarding Lithium and Salt flats, document by the President (2016).
• Synergy with Solar Technological District in Atacama Region.
CALL
COMPANY’S SELECTION PROCEDURE

A
Applying
Letter of Interest
Time limit: June 30th, 2017
Road Show, Frankfurt
Germany
May 18th, 2017

B
Prequalification
Selection of companies
Eligibility criteria:
- Production experience
- Technological capabilities
- Market experience
- Environmental trackrecord
- Financial solvency
Prequalified companies notification

C
Projects enhancement
Q&A process with prequalified companies only
90 days to project presentation
Criteria:
- Value added per lithium unit
- Technological sophistication
- Local human resources
CALL
LETTER OF INTEREST

Contents

**Participants**

- Candidate: single company, compsortium, joint venture or other.
- Company’s general information concerning itself and it’s holding related companies.
- Financial reports proving capacity to make the necessary investments.
- List of legal procedures (sworn statement).
- Confidentiality agreement.

**Area to develop**

- Name areas interested in developing in Chile.
- Name product(s) looking to produce in Chile and provide market information.
- Describe the company’s technological capabilities that will allow to fulfill the project regarding value added products.
- Market experience.
- Describe current operation sites.
- Provide a trackrecord regarding relationship with communities in operation sites, security, health and environment.
- Provide a gross estimation of local capital expenditure to develop your Project.
LOCATIONS & REAL ESTATE ALTERNATIVES IN NORTHERN CHILE
LOCATIONS

1. **TARAPACA REGION**
   - **ALTO HOSPICIO – IQUIQUE**
     - ZOFRI Alto Hospicio Industrial Park – PEZAH
     - Lots starting from 1,500 m² (developed)
     - Iquique Maritime Terminal – 17 Km
     - Free Duty Zone
     - Owner: Zona Franca de Iquique S.A. - ZOFRI

2. **ANTOFAGASTA REGION**
   - **LA NEGRA SUR AREA**
     - Location is on the southern entry to Antofagasta
     - 3 plots making 20.3 Hectares
     - Antofagasta Maritime Terminal – 18 Km
     - Owner: Ministry of National Assets

3. **ANTOFAGASTA REGION**
   - **LA NEGRA NORTE AREA**
     - Location is on the southern entry to Antofagasta
     - 2.53 Hectares plot available
     - Antofagasta Maritime Terminal – 19 Km
     - Owner: Ministry of National Assets

4. **ANTOFAGASTA REGION**
   - **MEJILLONES – SOUTHERN ACCESS**
     - Antofagasta Region, Mejillones Southern Access
     - 20.12 hectares
     - Mejillones Maritime Terminal – 12 Km
     - Owner: Ministry of National Assets

5. **ANTOFAGASTA REGION**
   - **SALAR DEL CARMEN AREA**
     - Northern access from Antofagasta to Pan-American Highway
     - 2.53 Hectares plot
     - Antofagasta Maritime Terminal – 16 Km
     - Owner: Ministry of National Assets

6. **ATACAMA REGION**
   - **DIEGO DE ALMAGRO**
     - 18 km north of Diego de Almagro town
     - 26.477 Hectares (5.262 Feasibility Studies)
     - Barquito Port (CODELCO) 89 km
     - Concesion Managment Solar Energy Development Committee
ALTO HOSPICIO - IQUIQUE
TARAPACA REGION

FEATURES
The estates belong to “ZOFRI Alto Hospicio Industrial Park – PEZAH”. Location: 17 km East of Iquique, ZOFRI (the Iquique Duty Free Zone) and Iquique Maritime Terminal. It is strategically placed, close to Maritime Terminal, good road connectivity and attractive operation conditions. All business based in the Industrial Park enjoy Free Duty Zone advantages which include:

- Merchandise inside Free Duty Zone are considered as out of territory. They are not subject to taxes, import duties nor any other custom related duties.
- Domestic sales inside Duty Free Zone and sales out of the country not submitted to Chilean taxes nor custom duties.
- Domestic sales inside Duty Free Zone TVA exempt.
- Corporate income tax exempt.
- Any corporate income tax paid, gives 50% credit on personal income tax.

Surface available
Lots starting from 1,500 m² (developed)

Price
Rent: USD 1.35/m² month (until 03/2019)
Sales: USD 229/m²

Offer
Long term lease & Sale

Application
Open

Term
To be defined by project

Energy
Connected to public grid

Water
Connection to public network

Distance to maritime terminal
Iquique Maritime Terminal – 17 Km
DIEGO DE ALMAGRO
ATACAMA REGION

FEATURES

Land in the Solar District Project zoning, 18 km north of Diego de Almagro town and 1.5 km North of future substation Cumbres through route C-13.

The project area have been allocated 26,477 Hectares. Is reserved for solar power projects and industrial park.

The Industrial Park will be allocated land with fully developed plots. To be supplied power by the Solar District.

Solar Power will be made available 24/7 at US$ 50 per around MW/h and going down.

Surface
Zoning plan in development. Once development done detailed conditions will be made public. Please inform yourself if your business is akin to Alternative Energy projects. We thank your expression of interest.

Energy
Connection available starting 2018

Distance to maritime terminal
Barquito Port (CODELCO) 89 km

Water
Can be bought to CODELCO
Its desalinization plant has available capacity by batches of 100 l/s
CHILEAN POTENTIAL MINERAL DEVELOPMENT

Co-Ni-Mn
Chilean Potential Mineral Development

COBALT Co | NICKEL Ni | MANGANESE Mn

A. Deposits

Studies and prospection of potential development regions

Antofagasta | Atacama | Coquimbo

B. Tailings

R&D to recover high value elements from tailings

Around 700 tailings, 400,000 tons/y produced by Copper Mining

Transforming Liabilities into Assets

High Potential

CORFO Matching Grants for “Strategic Technological Projects” Valuable Elements Recovery

USD 3,9 MM
LABOUR MARKET

IN NORTHERN CHILE
## LABOUR MARKET AND SALARIES
### NORTHERN CHILEAN REGIONS

#### Monthly Labor Costs - Professionals - (US$ dollars after tax)

<table>
<thead>
<tr>
<th>US$/pm</th>
<th>Years of Experience</th>
<th>Professions</th>
<th>1</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering</td>
<td>1,737</td>
<td>2,892</td>
<td>4,336</td>
<td>5,201</td>
<td>5,959</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrical Engineering</td>
<td>1,921</td>
<td>3,079</td>
<td>4,525</td>
<td>4,858</td>
<td>5,400</td>
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<td>Computer Science Engineering</td>
<td>1,635</td>
<td>2,508</td>
<td>3,599</td>
<td>4,182</td>
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<td>Industrial Engineering</td>
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<td>4,373</td>
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<td>2,805</td>
<td>4,495</td>
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<tr>
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<td></td>
<td>Business Administration</td>
<td>1,544</td>
<td>2,541</td>
<td>3,786</td>
<td>4,549</td>
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<td>Electrical Technic</td>
<td>1,293</td>
<td>2,120</td>
<td>2,803</td>
<td>3,132</td>
<td>3,401</td>
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<td></td>
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<td>Business Technic</td>
<td>1,232</td>
<td>1,571</td>
<td>2,106</td>
<td>2,785</td>
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<td>Industrial Technic</td>
<td>1,463</td>
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<td>Computer Technic</td>
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<td>1,942</td>
<td>2,605</td>
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<td>3,364</td>
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<td>Mechanical Technic</td>
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<td>1,933</td>
<td>2,511</td>
<td>2,991</td>
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<td>Management Control and Inf. Systems Engineering</td>
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<td>2,624</td>
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<td>3,847</td>
<td>4,185</td>
</tr>
</tbody>
</table>

#### Workforce

<table>
<thead>
<tr>
<th>Region</th>
<th>TOTAL</th>
<th>Employment Rate</th>
<th>Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarapaca Region</td>
<td>185,480</td>
<td>91.3%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Antofagasta Region</td>
<td>291,250</td>
<td>92.2%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Atacama Region</td>
<td>138,740</td>
<td>92.1%</td>
<td>7.9%</td>
</tr>
</tbody>
</table>

Source: Conexión Consultants
SOLAR

ENERGY PROGRAM
CONTEXT
NORTHERN CHILE | OUR ADVANTAGE ➔ “A SINGULARITY”

Global Horizontal Irradiation

Atacama Desert
>2,500 kWh/m² year (GHI)
>4,000 solar hours/year
SOLAR DISTRICT PROJECT

OBJECTIVES

- More than 750 MWe of solar power, avoiding more than 1,000,000 Ton de CO₂ eq. per year
- Several solar generation technologies, energy storage and solar fuels
- Human Capital
- Local value capture and job creation
- R&D
- Promotion of local industry
- Chilean technological development adapted to the conditions of the Atacama Desert
SOLAR DISTRICT PROJECT
SYMBIOTIC PARK

POTENTIAL INDUSTRIAL DEVELOPMENT

- Industrial gas
- Solar fuels
- Storage
- Solar metallurgy
- Water treatment
- PV module assembly
- Metalmechanical industries