Autogol
Por qué la anhelada industrialización está destruyendo valor

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iLi MARKETS

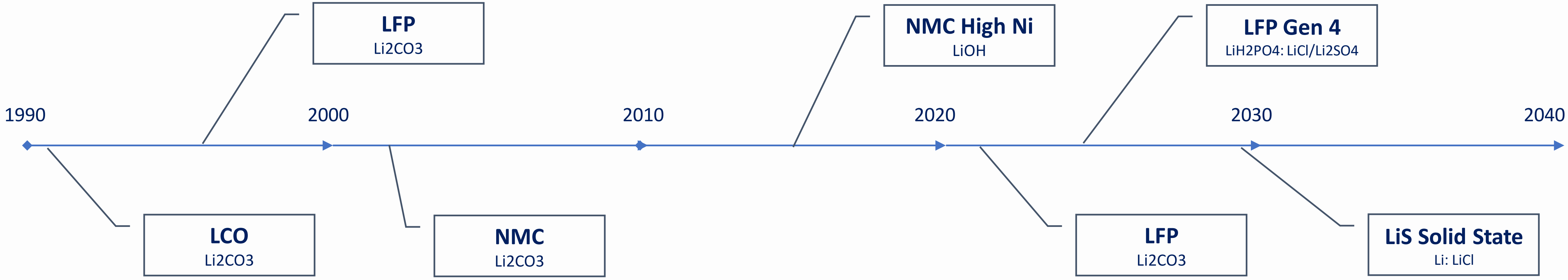
What we do

Market Analysis	We offer our client periodical market updates where we provide our own view of current market conditions and future trends.
Market Studies	We prepare single client specific market studies in the lithium and iodine space.
Business Strategy	We assist companies in developing their business strategies to participate at different stages of the value chain including mining, refining and commercialization.
Procurement strategy and negotiation support	Assisting clients in defining their procurement strategy and supporting them during their contract negotiations.
Offtake Agreements	Lithium and Iodine are niche markets, where commercialization is a key component of a successful business strategy. We put our experience at disposition of our clients to assist them in the structuring and negotiation of their offtake agreements.
Project & Asset Evaluation	Our team has participated in the evaluation and development of many assets in the lithium and iodine industries. We also count with a strong network of technical experts that we bring in to provide a comprehensive approach.
M&A	We assist clients in all the stages of a M&A process, including the formulation of the strategy, project evaluation, due diligence and deal implementation.
Production Process Technology	Together with our network of process experts, we assist clients in the evaluation and design of process technologies for their assets.

Cathode Chemistry Evolution

Historical end expected evolution

- Cathode Chemistry is evolving constantly, and with that evolution so does the Li chemical used as feedstock.
- The industry has gone from demanding Li2CO3 to LiOH, then back to Li2CO3 and future developments point to LiCl/LiH2PO4 and LiCl/Li metal.
- Staying Upstream is very likely a wiser investment decision

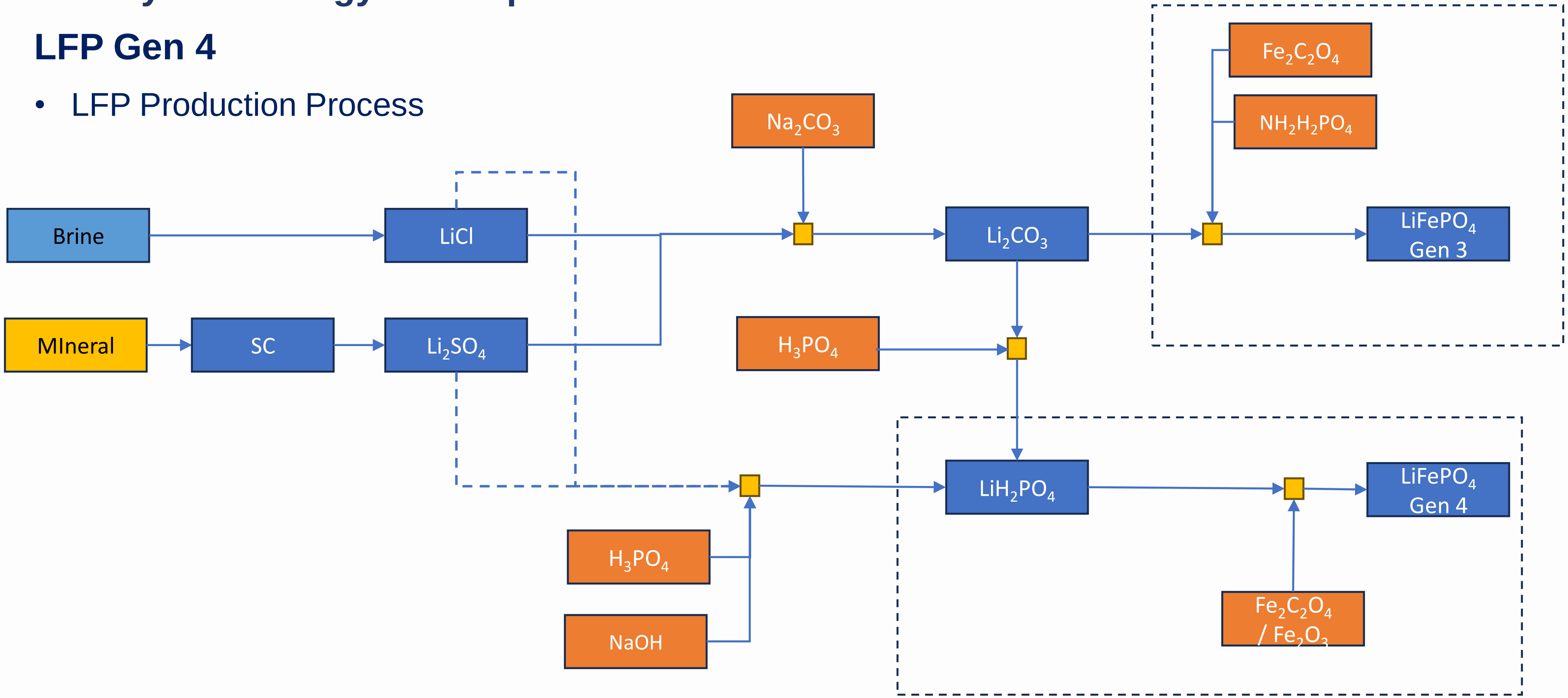


Cathode Chemistry Evolution

Battery Technology Development

LFP Gen 4

- LFP Production Process



Cathode Chemistry Evolution

LiCl potential

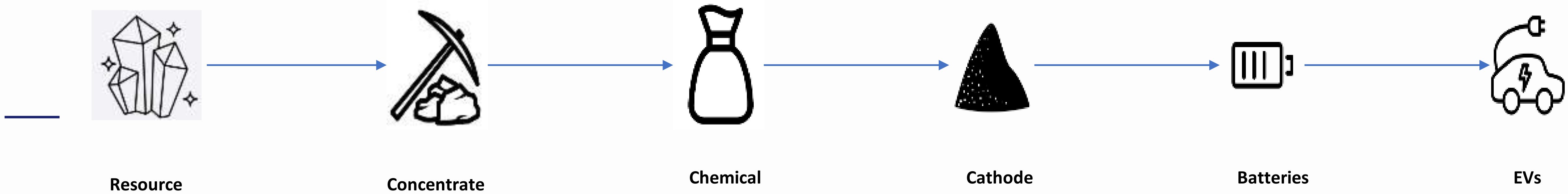
- LiCl is the feedstock to produce Li2CO3
- Li2CO3 consumption for Li Ion Batteries might decrease over time replaced by Li Chemicals produced from the same feedstock: LiCl
- There is a risk in developing a Li2CO3 exclusive industry. LiCl is a diferentiator from Li from minerals

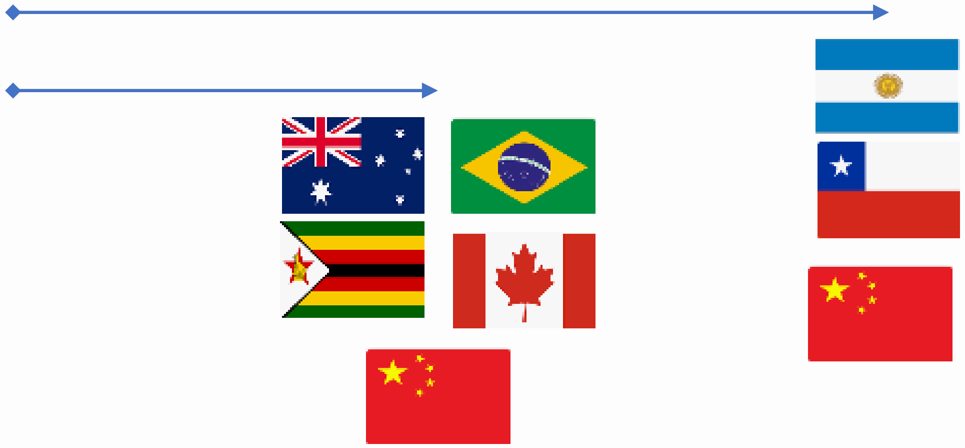
			Market Size (kMT LCE)		
		End Use	2025	2030	2035
LiCl 36%	Li2CO3	Cathode LFP, NMC	750	1500-2000	500-1500
	LiH2PO4	Cathode LFP Gen 4	0 (250)	1000-2000	1500-2000
	Li2S	Solid Electrolite	10	100	200
	Li Metal	LiS Solid Battery	20	200	500-1500

Lithium Supply Chain

Why are brine producers integrated whereas mineral producers tend to be non integrated?

- Answer: History





Supply Growth 2015-2025:

- Minerals: 42 → 851 kMT-LCE : x20
- Brines: 84 → 510 kMT-LCE: x 6

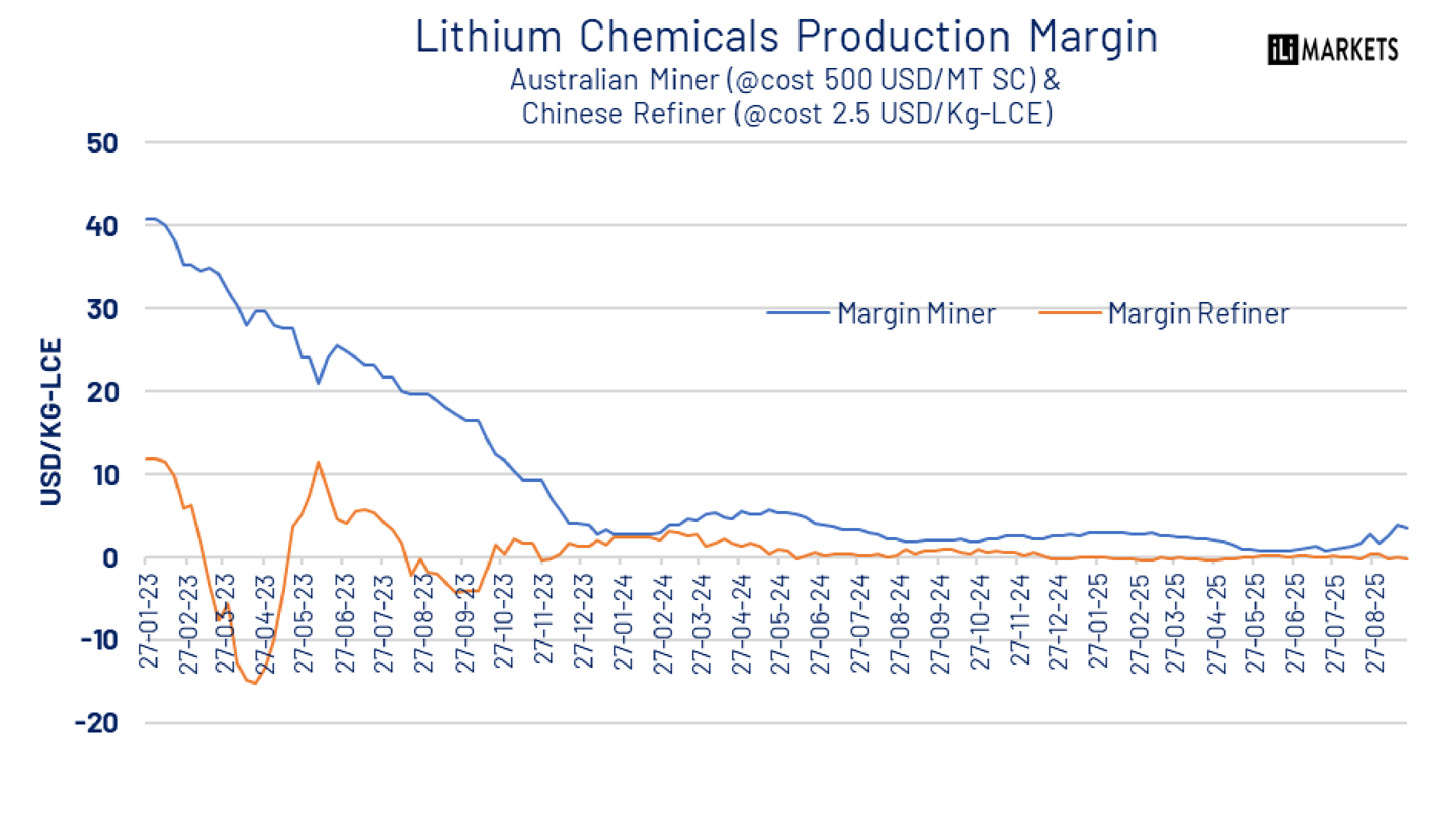
Why have non integrated mineral producers been able to grow faster than integrated brine producers?

- Lower capex
- Lower execution risk
- Lower total cost

Lithium Supply Chain

Margin Stays Upstream

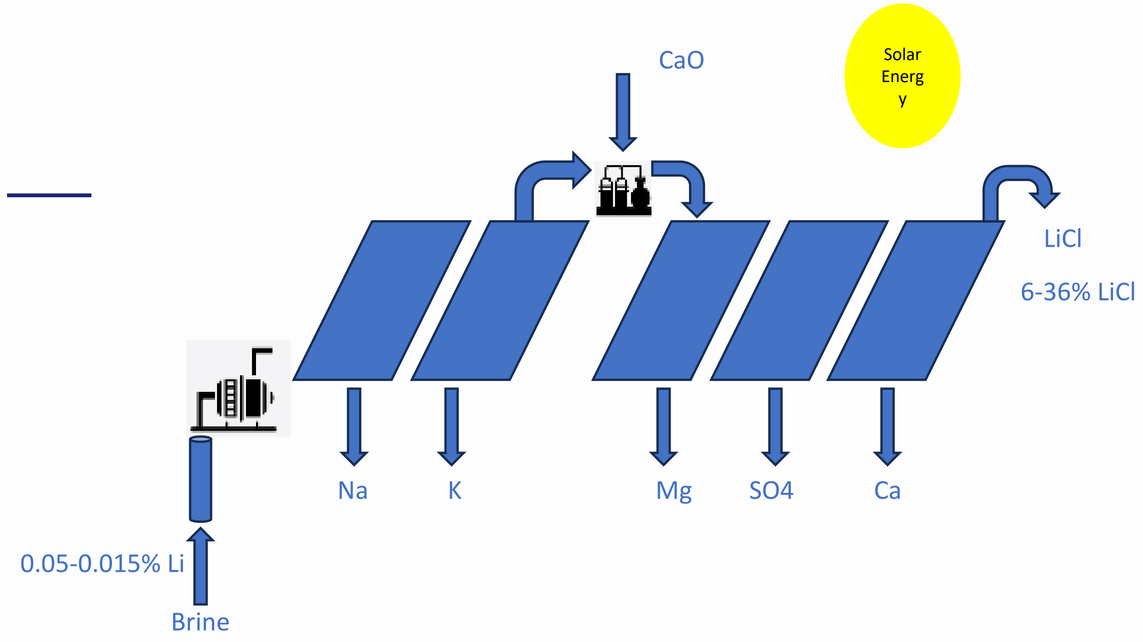
- **Refining/Conversion Margins in China are zero**
  - High conversion capacity
  - Since China´s low cost refiners are making margin zero, it is reasonable to assume that non Chinese that integrated refiners are losing money when refining.



Lithium Production Process from Brines

Two Steps:

LiCl Concentration



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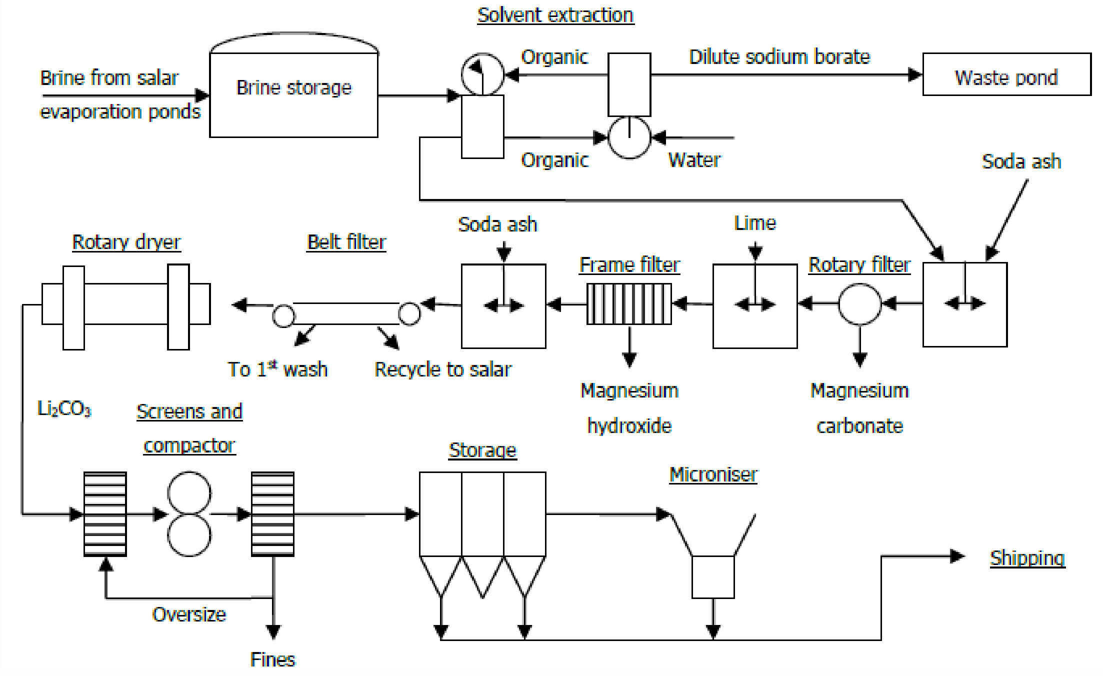
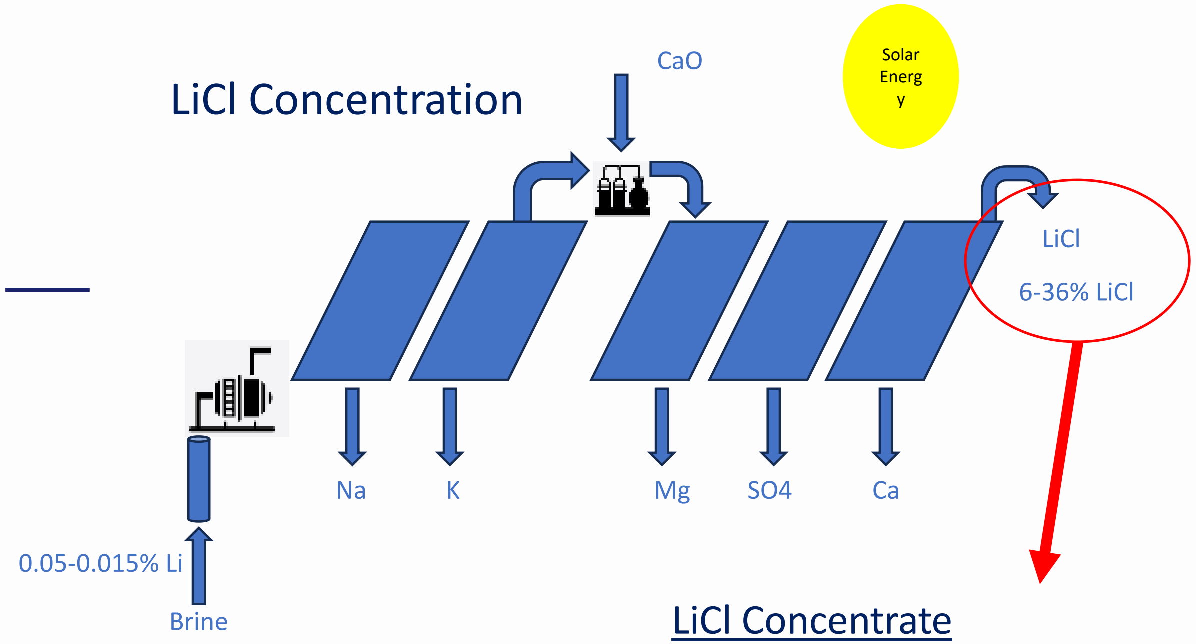
Li2CO3 Conversion/Refining



Lithium Production Process from Brines

What is a LiCl concentrate?



<u>LiCl Concentrate</u>

Aqeuos:	LiCl	36%	Eq. Li 6%
Dry:	LiCl	85%	

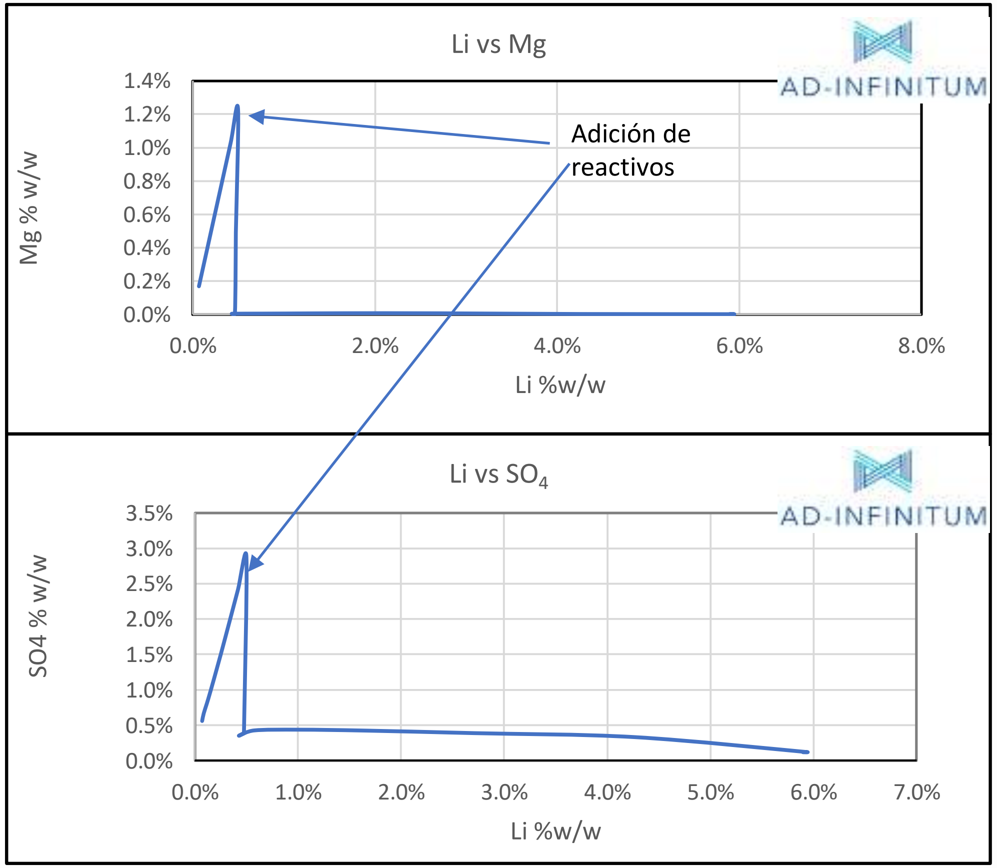
- SQM sold LiCl 36% concentrate to Ganfeng for 10 years
- Economics proved more convenient for both parties
- SQM was forced to stop due to pollical/ideological reasons
- Product was shipped in flexitanks

Lithium Production Process from Brines

How is a 36% LiCl Concentrate produced?

- Achieving higher Li concentrations will depend primarily on the SO4/Mg relation
- Reagents are used to precipitate Mg and SO4 minimizing the precipitation (loss) of Li

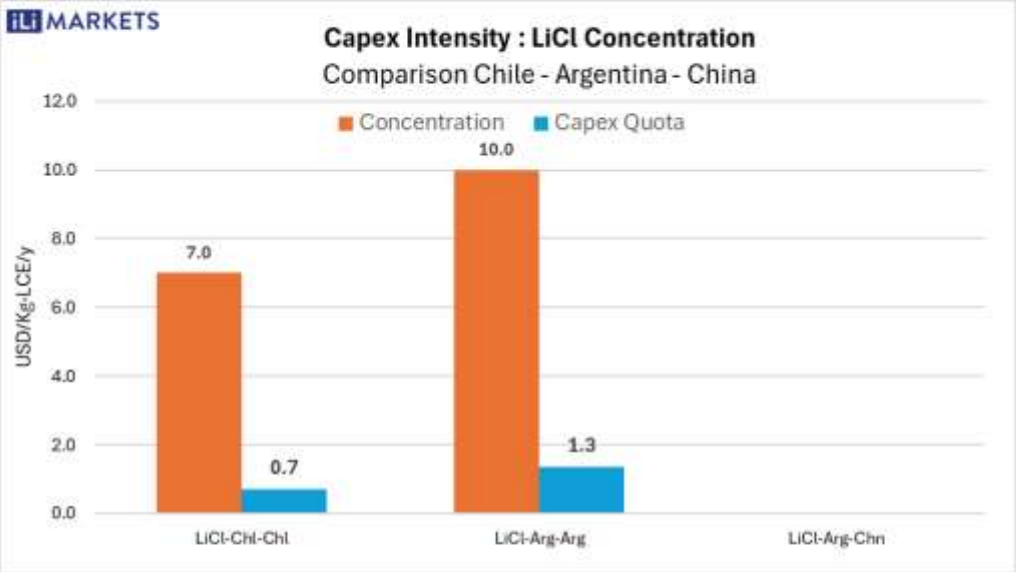
Relation Mg/SO4	Required Reagents	Li Recovery
Any	None	20-30%
SO4/Mg < 4	Cal + NaSO4 or Cal + NaOH	66-70%
SO4/Mg ≈ 4	Solo Cal	66-72%
SO4/Mg > 4	Cal + CaCl2	68-72%

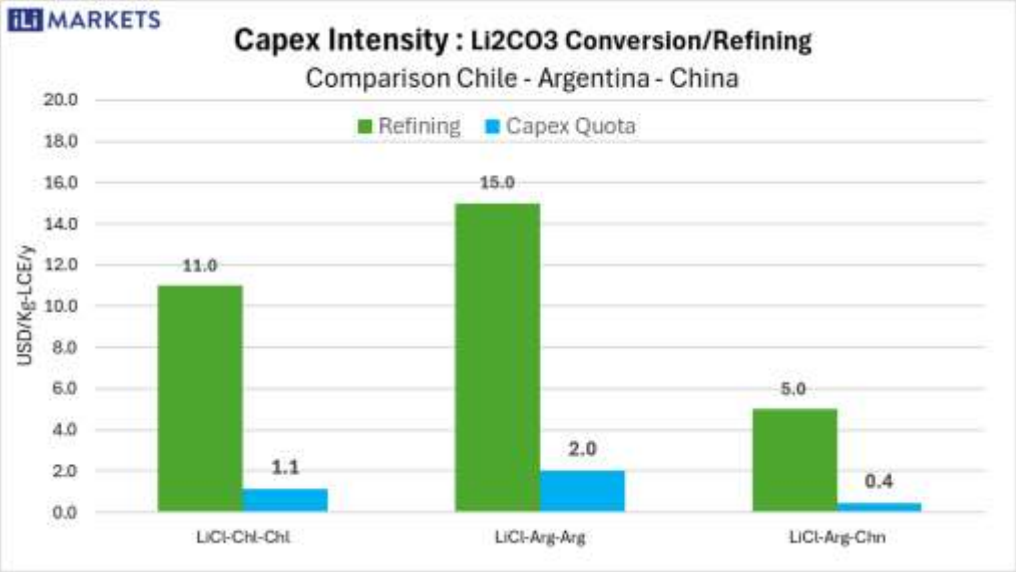


Economics of LiCl Concentate

Capex Intensity in the production of Li2CO3

Argentina is in a disadvantage compared to Atacama and China





Argentina vs Atacama

- Remoteness: 300 km @ 2000 masl vs 800+ km 4000 masl
- Lower Li grades → more evaporation area
- Need of use of reagents and plants

Argentina vs Atacama

- Remoteness: 300 km @ 2000 masl vs 800+ km 4000 m
- Available Infrastructure

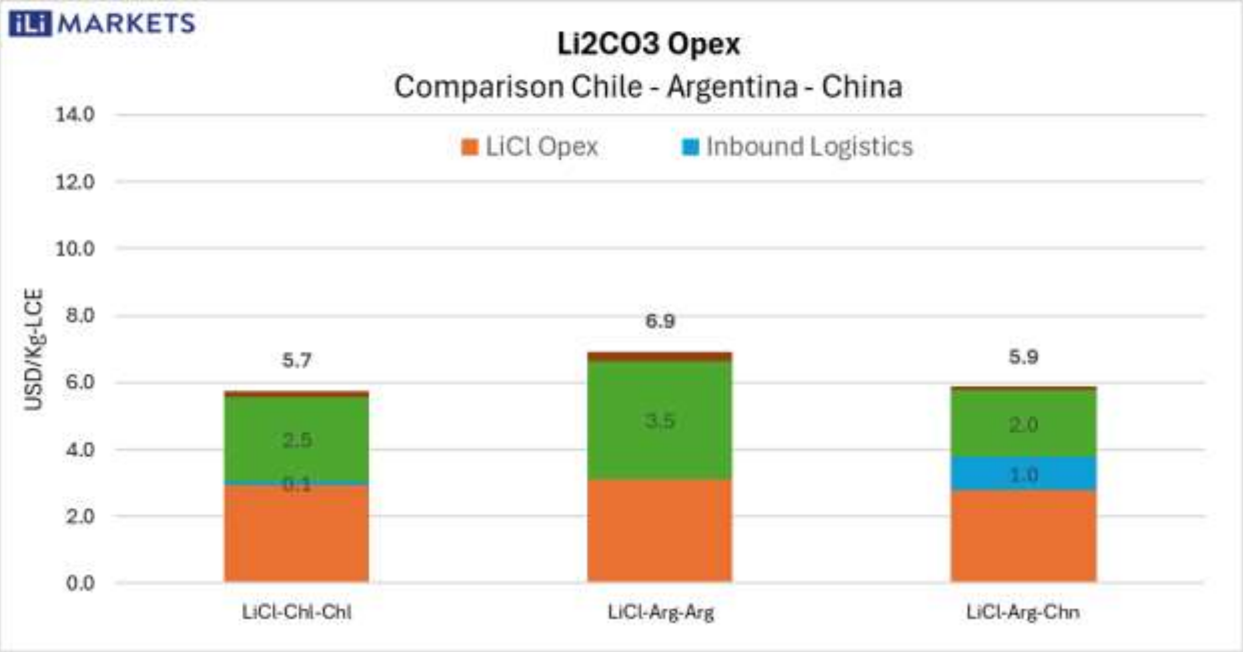
Argentina vs China

- Lower cost plant and equipment
- Available infrastructure
- Technical expertise & know how

Economics of LiCl Concentate

Opex production Li2CO3

Argentina is in a disadvantage compared to Atacama and China refining LiCl Concentrate



Argentina vs Atacama

- Lower Li grades → more evaporation area
- Need of use of reagents → plants
- Remoteness: 300 km @ 2000 masl vs 800+ km 4000 masl

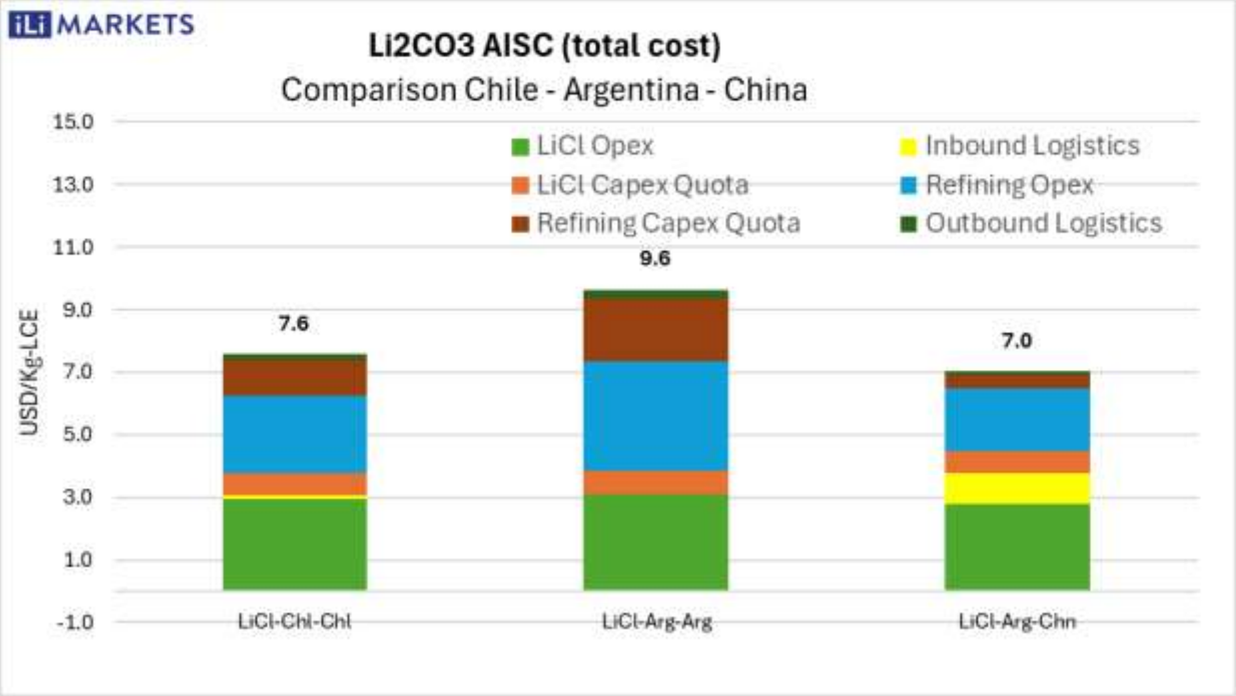
Argentina vs China

- Higher cost of energy and reagents
- Remoteness
- **Lower Li recovery**: technical expertise & know how

Economics of LiCl Concentate

All In Sustained Cost of Production Li_2CO_3

Argentina is in a disadvantage compared to Atacama and China



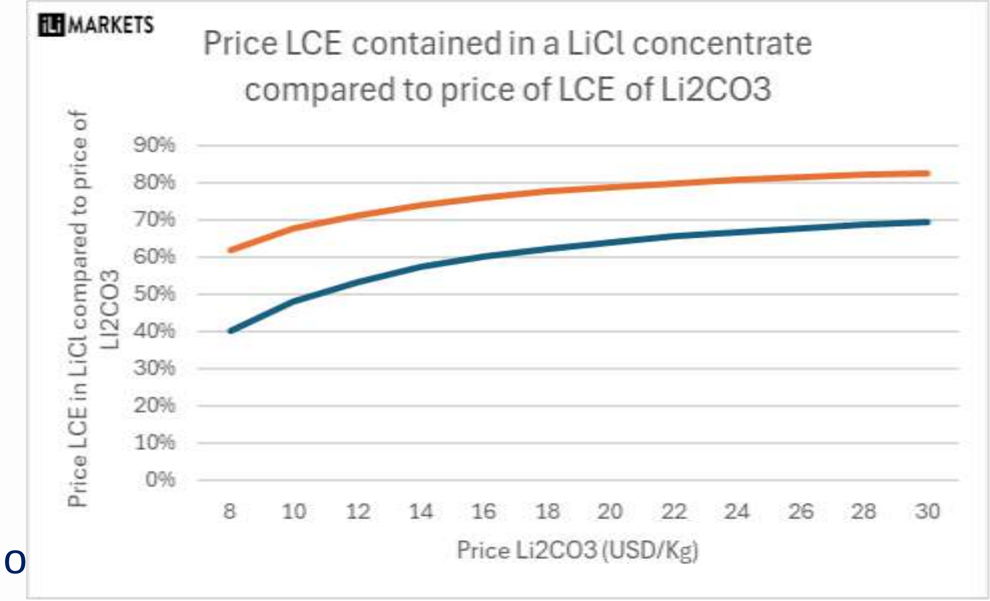
- The cost of producing Li_2CO_3 in Argentina, compared with producing LiCl concentrate in Argentina, shipping it to China to be refined there to Li_2CO_3 is USD/Kg-LCE 2.5-3.0 higher.
- Assuming Argentinian producers capture 50% of these saving, in 2025, Argentinian producers would have made a profit of USD 150 million. By 2030 these number will grow to USD 500 million.

Price of LiCl Concentrate

- The **minimum price** of a LiCl concentrate will be related to Li2CO3 price and conversion cost from LiCl to Li2CO3.
- Conversion costs have 2 components
  - Conversion Cost
  - Yield
- Typical values for these components

	Chinese Non Integ.	Arg Integ.
Conversion Cost	2.5	4.0
Recovery	90%	80%

- At price a Li2CO3 price USD/Kg 15, the LCE contained the LiCl concentrate would be valued between 60% and 75% of the price o Li2CO3.



Royalties

- Australia has developed a royalty scheme that assures equivalent fiscal revenues regardless of the level of forward integration.

		Australia	Argentina	Canada	Chile
Revenue based					
Basis		FOB	FOB		CPT
Royalty	Chemical	3.75%	3.5%		7%-40%
	Concentrate	5.0%			
	Ore	7.5%			

Economic implications of a LiCl production strategy

Argentina

Base Scenario: by 2030 Argentina is expected to be producing close to 300-330 kMT-LI2CO3.

What could a 100% LiCl strategy mean:

		2030	$\sum 27-30$	
1. Increased production (project execution speed)	kMT-LCE		45	180
2. Imported Capex Savings (80%)	MUSD	350	2000	
3. Soda Ash imports saving	MUSD	300	1300	
4. Higher margin (assuming 50-50 split Chn-Arg)	MUSD	500	2100	
5. Incremental Provincial royalties (Using Australias royalty model)	MUSD	70	330	

Summary

- Argentina would benefit from LiCl concentrate strategy rather than being a Li_2CO_3 producer
  - Higher Margin
  - Lower Capex (and imports)
  - Lower Opex (and imports)
  - Lower project execution risk
  - Faster capacity growth

- The process and logistics to produce LiCl concentrate are available

- Fiscal revenues could be unaffected

- Cathode chemistry evolution suggested incremental demand for LiCl