Presentation Overview

1. Environmental & Social License
3. Lithium in South America: Triangle is Brine
4. Brines are not created equal
5. Technology Innovations
6. Lithium: Opportunity or Hype?
7. Market Growth and Context
8. Value Added & Common Sense
9. Danger of Stranded Resources
10. Questions
Social License
Communities must be treated as stakeholders from day one

- Local Employment
  Employment of local community members from Isivilla, Tantamaco, Chacoconiza, Quelcaya, Chimboya, Pacaje and Corani
  Skill building roles include:
  - Drill road and platform preparation/construction
  - Camp personnel
  - Environmental monitoring
  - Prospecting, etc.

- Equipment Loans
  Loaning company owned road building equipment for local community use to improve community infrastructure

- Medical Campaign
  Twice yearly campaign targeting the communities we are engaged with

- Water Treatment Plant
  Assisted establishing water treatment plant

- Festival Sponsorship
  Sponsorship of local and regional festivals and events celebrating the culture and communities in the Macusani plateau

- All-weather soccer field

- Milk Program
  Monthly school milk program sponsorship

- Schools Sponsorship
  Sponsorship of educational programs in local schools

Source: Plateau Energy Metals
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth
Environmental Considerations
Extractive Industries Leave Permanent Mark On Earth

Do you own a Laptop?
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth

Do you own a Laptop?

What about a Cell phone?
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth

Do you own a Laptop?  Do you use electricity?

What about a Cell phone?
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth

Do you own a Laptop?

Do you use electricity?

What about a Cell phone?

Have you recently traveled in a vehicle?
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth

Do you own a Laptop?

Do you use electricity?

What about a Cell phone?

Have you recently traveled in a vehicle?

Do you heat or cool your home?
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth

Do you own a Laptop?

Do you use electricity?

What about a Cell phone?

Have you recently traveled in a vehicle?

Do you heat or cool your home?

Modern life has an environmental impact. Acknowledge it.
Environmental Considerations

Extractive Industries Leave Permanent Mark On Earth

Extracting lithium from brine necessitates

- Pumping water from underground reservoirs to the surface and evaporating large volumes
- Use of chemical reagents
- Construction of infrastructure to access
- Use of additional fresh water
- Energy needs

Responsible extraction means taking these realities into account and mitigating as much as possible
Environmental Considerations
All stakeholders have a role

**Governments:**
- Set clear rules and transparent policies
- Attract responsible companies with sufficient capital to follow these rules
- Remain up to date with international industry best practices
- Monitor companies activity transparently and penalize offenders

**Companies:**
- Assess baseline conditions before project, monitor & report changes
- Follow international best practices and highest environmental regulations
- Invest sufficient capital in mine closure and ongoing monitoring

**Communities:**
- Maintain constant dialogue with companies and governments

**Shareholders:**
- Demand that companies follow international standards
- Penalize leadership for non-compliance

**Consumers**
- Demand responsibly-sourced products, *even if it means paying a premium*
What is Lithium?
The third element on the periodic table

- Lithium is the lightest – or least dense – metal that exists on earth
- Allows for high performance batteries that are smaller and last longer
- Lithium never occurs freely in nature, only in compounds
Lithium is not a commodity
Lithium chemicals are important, differentiated value-added products

*Demand for lithium in chemical form – does not include mineral use

Source: Global Lithium LLC

2018 Market Demand*

- Lithium Ion Battery: 59%
- Glass/Frit/Glaze: 17%
- Grease: 4%
- Air treatment: 3%
- Polymer: 7%
- Pharma: 2%
- Metal: 4%
- Other: 3%

*Demand for lithium in chemical form – does not include mineral use
Lithium is not a commodity
Lithium chemicals are differentiated value-added products

- Consumers demand batteries that are safe, stable, and long lasting
- Battery makers demand lithium products that allow them to guarantee their devices won’t catch fire on an airplane 🔥🔥🔥
Where do you find lithium?

Everywhere – lithium is abundant

- Deposits on every continent
- New discoveries are made constantly
- Seawater contains 0.17 mg/l – not economic but there
How does a lithium deposit look?

Easy to find, difficult and expensive to commercially extract

- Conventional Brine
- Volcanic Tuff
- Lepidolite
- Hard Rock (Spodumene)
- Clay
- Oilfield Brine
How does a lithium deposit look?
Easy to find, difficult and expensive to commercially extract

There is a critical difference between:

- **Deposit:** I know it’s there
- **Resource:** I know how much there is
- **Reserve:** I know how to extract & commercialize
How does a lithium deposit look?
Easy to find, difficult and expensive to commercially extract

There is a **critical difference** between:

- **Deposit:** I know it’s there
- **Resource:** I know how much there is
- **Reserve:** I know how to extract & commercialize

**Conventional Brine**

**Hard Rock (Spodumene)**

**Clay**

**Oilfield Brine**
How does a lithium deposit look?
Easy to find, difficult and expensive to commercially extract

There is a critical difference between:

- **Deposit:** I know it’s there
- **Resource:** I know how much there is
- **Reserve:** I know how to extract & commercialize

Mineral exploration is **inherently risky and expensive**. The risk of not finding what you hope, or that the market shifts in the time it takes to bring a discovery through feasibility, is unavoidable.

In South America and other developing countries, mineral exploration is undertaken by foreign companies.
In addition to producing brine projects, South America is also home to promising hard rock (spodumene) resources and lithium-bearing volcanic tuff deposits being actively explored and developed.
Discoveries on Every Continent
Few translate into new projects

Chile: Commercial production
- High quality brine
- Concentrated assets

Argentina: Commercial production
- Diverse brines
- Too many players

Peru: Early exploration
- Volcanic Tuff
- Few players

Brazil: Advanced exploration
- Spodumene
- Few Players

Bolivia: Exploration
- Low quality brine
- High government control
The “Lithium Triangle” is Brine
Only Argentina and Chile are in Commercial Production

Chile: Commercial production
• High quality brine
• Concentrated assets

Argentina: Commercial production
• Diverse brines
• Too many players

Peru: Early exploration
• Volcanic Tuff
• Few players

Brazil: Advanced exploration
• Spodumene
• Few Players

Bolivia: Exploration
• Low quality brine
• High government control
The “Lithium Triangle” is Brine
Only Argentina and Chile are in Commercial Production

Over 50% of known lithium resources are located beneath the salt flats in the “lithium triangle”

Without adequate exploration, scientific research and development, and investment, the lithium will remain observed and under the ground.
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium

Global Brine Resource Comparison (Note Log Scale)

Bubble Size ~ Resource Size

Source: Combination of internal and third-party data
Proprietary Information of Albemarle Corporation
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium

A brine resource is DYNAMIC – it will change in composition as pumping and extraction occurs
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium

Brine chemistry is complex: impurities such as magnesium and sulfate affect recovery rates and product quality.
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium

The host material matters: permeability is essential for the liquid brine resource to flow to the surface over the life of the project.
All Brines Are Not Created Equal

Differentiating is more complicated than % lithium

Hydrometeorological Parameters (aka weather ☀️) including evaporation rates, precipitation rates, temperature, and wind impact project viability, and differ even across the same resource
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium
All Brines Are Not Created Equal
Differentiating is more complicated than % lithium

Referring to the “Lithium Triangle” as a homogenous lithium deposit creates false understanding of reality – and a hype.
Technology Is Not Magic
Innovations to evaporation ponds must answer two key questions

- **Energy**: Cost and availability
- **Reagents**: Cost and availability
Why is lithium so important?

Electric vehicles mean batteries. Batteries mean lithium

In the Fast Lane
China is set to lead in the global electric-vehicle revolution

Europe    U.S.    China    Japan    Korea    Rest of World

70M light-duty EV sales per year

Source: Bloomberg New Energy Finance
Lithium Opportunity or Hype?
There is a bubble in lithium junior mining companies

- Countless companies, few viable projects
- Market lacks ability to discriminate bad assets from good, exacerbates financial squeeze on all
- There is limited experience and technical talent – operational experience and capability is real problem

Invest the Time to Learn to Weed Out Hype

Sources: Exane BNP Paribas; UBS

The Economist
Exponential Market Growth
The Lithium Market Tripled from 2015 to 2017

- The lithium market reached US $1 billion for the first time in 2015.
- Total market was worth US $3 billion in 2017, close to US $5 billion in 2019.
Exponential Market Growth

But given context.

Relative Market Size in USD, Lithium vs. Gold

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2017</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exponential Market Growth
It’s still quite small

Relative Market Size in USD, Lithium vs. Gold and Oil

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil</th>
<th>Gold</th>
<th>Lithium</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Oil
Gold
Lithium
Misconception of “Value Added”
Lithium Supply Chain ≠ Higher “Value”

Presentation from Ing. Carlos Galli, Salta Argentina, LSC Lithium
Use Common Sense
You can’t build a battery supply chain without **roads** and **energy**
Use Common Sense
You can’t build a battery supply chain without **roads** and **energy**

In Argentina, mining authorities and companies cite lack of infrastructure as number one barrier to investment in the lithium industry.
Use Common Sense
You can’t build a battery supply chain without **roads** and **energy**

No Infrastructure = Drastically Higher Costs

Source: Benchmark Mineral Intelligence, Lithium ion Battery Megafactory Assessment, September 2018
The Laptop Supply Chain
South America Exports Raw Materials
Battery supply chains are global and interconnected. Take the laptop supply chain. At first glance it appears that South America is on the losing end of this equation...
The Laptop Supply Chain
South America Exports Raw Materials

...but this overlooks the tremendous capital investments required to bring assets into production. These countries lack the ability to self-finance mineral extraction.
Not to mention the technology that is transferred in order to extract and produce high-quality lithium chemicals fit to enter the lithium ion battery supply chain...
Lithium is exported as a chemical compound. Producing these compounds is an advanced chemical process that requires additional imported inputs.
Modern mining and chemical production requires advanced machinery and equipment to comply with international standards.
Resource Nationalism
South America is Leading the Charge
Chile has deemed lithium “strategic”.
Resource Nationalism
South America is Leading the Charge

**Chile** has deemed lithium “strategic”.

**Argentina** wants a battery factory in Jujuy
Resource Nationalism
South America is Leading the Charge

Bolivia claims it will produce electric vehicles in country.

Chile has deemed lithium “strategic”.

Argentina wants a battery factory in Jujuy.
Resource Nationalism
South America is Leading the Charge

Bolivia claims it will produce electric vehicles in the country.

Argentina wants a battery factory in Jujuy.

Brazil has deemed lithium “strategic”.

Chile has deemed lithium “strategic”.
Resource Nationalism
South America is Leading the Charge

**Bolivia** claims it will produce electric vehicles in the country.

**Argentina** wants a battery factory in Jujuy.

**Brazil** has deemed lithium “strategic”.

**Chile** has deemed lithium “strategic”.

**Peru** is weighing a special classification for lithium.
Resource Nationalism
Not just a South American phenomenon

**Peru** is weighing a special classification for lithium. **Australia** is building a “Lithium Valley”. **Brazil** has deemed lithium “ strategic”. **Bolivia** claims it will produce electric vehicles in country. **Chile** has deemed lithium “strategic”. **Argentina** wants a battery factory in Jujuy
Resource Nationalism
Not just a South American phenomenon

The USA has deemed lithium “strategic”.

Peru is weighing a special classification for lithium
Brazil has deemed lithium “strategic”.

Bolivia claims it will produce electric vehicles in country.

Australia is building a “Lithium Valley”

Chile has deemed lithium “strategic”.

Argentina wants a battery factory in Jujuy
Resource Nationalism
Not just a South American phenomenon

The USA has deemed lithium “strategic”.

Peru is weighing a special classification for lithium.

Brazil has deemed lithium “strategic”.

Bolivia claims it will produce electric vehicles in country.

The European Union has launched a Battery Alliance.

Australia is building a “Lithium Valley”.

Chile has deemed lithium “strategic”.

Argentina wants a battery factory in Jujuy.
The show will go on. South America must participate and compete in order to be a player in the battery supply chain.
Realizing the Lithium Opportunity

Good policies require understanding of the market
Realizing the Lithium Opportunity

Good policies require understanding of the market

✓ Lithium requires both science and pragmatism
Realizing the Lithium Opportunity
Good policies require understanding of the market

✓ Lithium requires both science and pragmatism

✓ The “Lithium Triangle” is home to some of the best quality, lowest cost deposits in the world – but they are not the only deposits
Realizing the Lithium Opportunity
Good policies require understanding of the market

- Lithium requires both **science** and **pragmatism**

- The “Lithium Triangle” is home to some of the best quality, lowest cost deposits in the world – but they are not the only deposits

- Without investment-friendly policies that support long term investment, the lithium opportunity will pass South America by
Realizing the Lithium Opportunity
Good policies require understanding of the market

- Lithium requires both science and pragmatism
- The “Lithium Triangle” is home to some of the best quality, lowest cost deposits in the world – but they are not the only deposits
- Without investment-friendly policies that support long term investment, the lithium opportunity will pass South America by
- Without infrastructure, fewer projects will be economic and competitive
Realizing the Lithium Opportunity
Good policies require understanding of the market

- Lithium requires both **science** and **pragmatism**

- The “Lithium Triangle” is home to some of the best quality, lowest cost deposits in the world – but they are not the only deposits

- Without investment-friendly policies that support long term investment, the lithium opportunity will pass South America by

- Without infrastructure, fewer projects will be economic and competitive

- Countries must develop comprehensive strategies based on the realities of the lithium market
Realizing the Lithium Opportunity
Good policies require understanding of the market

- Lithium requires both **science** and **pragmatism**

- The “Lithium Triangle” is home to some of the best quality, lowest cost deposits in the world – but they are not the only deposits

- Without investment-friendly policies that support long term investment, the lithium opportunity will pass South America by

- Without infrastructure, fewer projects will be economic and competitive

- Countries must develop comprehensive strategies based on the realities of the lithium market

- Science will not bend to wishful thinking
Realizing the Lithium Opportunity
Good policies require understanding of the market

- Lithium requires both **science** and **pragmatism**

- The “Lithium Triangle” is home to some of the best quality, lowest cost deposits in the world – but they are not the only deposits

- Without investment-friendly policies that support long term investment, the lithium opportunity will not be fully realized South America

- Without infrastructure, fewer projects will be economic and competitive

- Countries must develop comprehensive strategies based on the realities of the lithium market

- Science will not bend to wishful thinking

- The Lithium Triangle has a competitive advantage in lithium battery chemicals. Do that first and open the door to future potential.
Questions or Comments?
Thank you for your time