KEY CONCERNS FOR THE LITHIUM INDUSTRY TO THE END OF THE DECADE

LITHIUM SUPPLY & MARKETS CONFERENCE MONTREAL, CANADA

31 MAY 2017
BATTERY GROWTH IN THE AUTO SEGMENT HAS GENERATED SIGNIFICANT LITHIUM DEMAND

Lithium Consumption by Li-ion Battery End Use (LCE kt)

- With the portable electronics market at saturation, growth is being delivered by automotive, ESS and power devices segments
- The automotive market’s lithium consumption is being enhanced by declining costs (currently ~US$220/Kwh heading toward US$150/Kwh) and a move to bigger batteries
- EV growth rates are currently ~40% and many expect 45-50% may be reached by 2020
- ESS growth rates ~25% and accelerating
- Battery lithium consumption (kg per kWh) steadily declining 1kg > 0.8kg and possibly to 0.6kg

Source: Roskill, Canaccord, Independent research
~230 GWh of capacity additions are expected from 15-20 battery facilities at a cost of ~US$10 billion*

BUT it could be even higher e.g. newcomer Energy Absolute recently proposed building a battery factory that will be scaled up to 50 GWh by 2020 at a total investment of US$2.9 billion dependent on demand.

Sources: Benchmark Minerals, Lux Research, Bloomberg

*Capital spend for some facilities is not available
Capital per GWh capacity calculation using Panasonic Dalian 2017 build example – US$40M for ~5 GWh = US$8M per GWh
GOVERNMENT MANDATES WILL PROVIDE SUPPORT FOR CONTINUED GROWTH IN EV PENETRATION RATES

2020 Government Incentives require 12.7M new EV's and 493kt LCE over four years

Electric Vehicle Stock Targets (Millions)


* This target includes 4.3 million cars and 0.3 million taxis and is part of an overall deployment target of 5 million cars, taxis, buses and special vehicles by 2020 (EVI, 2016b)

** Estimate based on a 10% market share target by 2020

*** Estimate based on the achievement of the 3.3 million EV target announced to 2025 in eight US states which are assumed to account for 25% of the US car market

LCE required: assumes 50kWH per EV unit; 0.8kg per kwh
OVER 120 DIFFERENT EV MODELS ARE EXPECTED BY 2020

Electric-Car Boom
Models by style and range available through 2020

Sources: Bloomberg
VIEWS ON EV PENETRATION RATES PROVIDE UNCERTAINTY IN LCE DEMAND GROWTH

At the current growth rate, EV penetration will reach 3.4% by 2020 and equate to 3.5M EV’s.

An EV penetration of 2.5% in 2020 would represent a deceleration in growth

The difference between a optimistic (4.5%) and pessimistic (2.5%) view is 82kt LCE lithium demand by 2020

Source: Canaccord, Roskill
ANALYSTS FORECAST A RANGE OF OUTCOMES

The average forecast demand growth from 2016 to 2020 is 120kt LCE but forecasts vary by as much as 76kt LCE in 2020.

This figure correlates well, although slightly lower, that 3.5% EV penetration in 2020 allowing for ~20kt LCE in other area.

Analysts revising forecasts upwards?

SOURCE: Broker Reports
*Estimated forecasts from broker reports
Revised demand forecasts may be available after this material is forecast.
WILL WE HAVE SUFFICIENT BATTERY CAPACITY?

Battery Capacity & Potential Demand Scenarios (GWh)

- Incremental Demand: EV Penetration 4.5% by 2020
- Incremental Demand: EV Penetration 3.5% by 2020
- Pessimistic: EV Penetration 2.5% by 2020
- Non-Auto Battery Lithium Demand
- Forecast Battery Capacity

EV growth rates are currently ~40% which would result in a 3.4% EV penetration rate by 2020, however a growing number of industry participants believe penetration rates of at least 4.5% are possible given recent momentum and support e.g. Government subsidies and policies, lowering costs, growing range of EV models available to consumers.

However, any growth above 4.5% EV penetration OR further upside to ESS growth (>30%) would require battery capacity above the current forecasted ~305 GWh figure.

Assumes 0.8kg LCE t per kWh
Non-Auto Battery Lithium Demand Assumptions: ESS 30% YoY growth (2010-2015 ~25% p.a. and growing); Power, Aftermarket and Portable battery market growth at 4% YoY
OVERSTATED CAPACITIES HAVE DISTORTED PERCEPTIONS

Brine operators moderate production to protect operations during GFC

Sources: Company Reports, USGS, Roskill
WHAT IS EXPECTED IS NOT ALWAYS DELIVERED

Planned in 2012

Delivered in 2016

Sources: Company Reports, USGS, Roskill, Industrial Minerals

For personal use only
# PROJECTS DELAYED OR HAVEN’T REACHED CAPACITY

<table>
<thead>
<tr>
<th>Company</th>
<th>Operation</th>
<th>Targeted Capacity</th>
<th>Targeted Completion</th>
<th>Project Status</th>
<th>2016 Estimated Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMC</td>
<td>Hombre Muerto</td>
<td>23000</td>
<td>2013</td>
<td>Added but not fully utilised</td>
<td>18000</td>
</tr>
<tr>
<td>Energi</td>
<td>Salar del Rincón</td>
<td>10000</td>
<td>...</td>
<td>Exploration</td>
<td>-</td>
</tr>
<tr>
<td>Quebec Lithium</td>
<td>Quebec Lithium</td>
<td>21000</td>
<td>2013</td>
<td>Closed</td>
<td>-</td>
</tr>
<tr>
<td>Tibet Lithium</td>
<td>Zabuye</td>
<td>18000</td>
<td>2013</td>
<td>Not complete or being utilised</td>
<td>1500</td>
</tr>
<tr>
<td>CITIC Guoan</td>
<td>West Taijinar</td>
<td>30000</td>
<td>2014</td>
<td>Not complete or being utilised, changed owners</td>
<td>-</td>
</tr>
<tr>
<td>Qinghai Salt Lake</td>
<td>East Taijinaier</td>
<td>17000</td>
<td>2014-2016</td>
<td>Not complete or being utilised</td>
<td>100</td>
</tr>
<tr>
<td>Qinghai Lanke</td>
<td>Chaerhan</td>
<td>17000</td>
<td>2014</td>
<td>Not complete or being utilised</td>
<td>1400</td>
</tr>
<tr>
<td>Galaxy</td>
<td>Mt Cattlin</td>
<td>20600</td>
<td>2016</td>
<td>Shipped 2017</td>
<td>-</td>
</tr>
<tr>
<td>Neometals</td>
<td>Mt Marion</td>
<td>54000</td>
<td>2016</td>
<td>Shipped 2017</td>
<td>-</td>
</tr>
<tr>
<td>Albemarle</td>
<td>Salar de Atacama</td>
<td>45000</td>
<td>2013</td>
<td>Capacity Partly added; Still constructing</td>
<td>24000</td>
</tr>
<tr>
<td>Orocobre</td>
<td>Olaroz</td>
<td>17500</td>
<td>2015</td>
<td>Completed 2015 &amp; Ramping up</td>
<td>10500</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>273,100</strong></td>
<td></td>
<td></td>
<td><strong>55,500</strong></td>
</tr>
</tbody>
</table>

Sources: Company Reports, USGS, Roskill, Industrial Minerals
PRODUCTION RAMP UP PROFILES ARE SLOW

- History shows that all projects take time to ramp up
- Each operation has a unique set of technical, operational, and financial variables impacting ramp up
- Skill set is not widespread

First reported year/part year

<table>
<thead>
<tr>
<th>Project</th>
<th>Average</th>
<th>3%</th>
<th>5%</th>
<th>7%</th>
<th>8%</th>
<th>11%</th>
<th>13%</th>
<th>14%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quebec Lithium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibet Zabuye</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qinghai Salt Lake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orocobre Olaroz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQM Atacama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galaxy Jiangsu Plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMC Hombre Muerto</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albemarle Atacama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second year

<table>
<thead>
<tr>
<th>Project</th>
<th>Average</th>
<th>3%</th>
<th>5%</th>
<th>7%</th>
<th>14%</th>
<th>23%</th>
<th>29%</th>
<th>34%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quebec Lithium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibet Zabuye</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qinghai Salt Lake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMC Hombre Muerto*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galaxy Jiangsu Plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albemarle Atacama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orocobre Olaroz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQM Atacama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Third year

<table>
<thead>
<tr>
<th>Project</th>
<th>Average</th>
<th>3%</th>
<th>5%</th>
<th>13%</th>
<th>14%</th>
<th>29%</th>
<th>34%</th>
<th>39%</th>
<th>51%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quebec Lithium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibet Zabuye</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qinghai Salt Lake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galaxy Jiangsu Plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMC Hombre Muerto</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albemarle Atacama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orocobre Olaroz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQM Atacama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*FMC Hombre Muerto carbonate production line ceased production

**Based on lower range of expected production range in FY17 (12-12.5kt)

Sources: Company Reports, USGS, Roskill
SUPPLY DEMAND BALANCE
NEW SUPPLY WILL BE REQUIRED TO MEET THE CURRENT GROWTH RATES IN EV DEMAND

Orocobre View of Lithium Supply and Demand LCE tpa

- **Ramping Up Chinese Brine**
- **Ramping Up Western Hard Rock + Conversion**
- **Western Brine**
- **Existing Capacity at Utilisation (85% ex-China; 60% China)**
- **Pessimistic**: 2.5% Penetration, ~30% growth in EV's, 30% growth in ESS
- **Current Demand Profile**: 3.5% Penetration, ~40% growth in EV's, 30% growth in ESS
- **Optimistic**: 4.5% Penetration, ~50% growth in EV's, 30% growth in ESS

For personal use only

Sources: company reports, Roskill, Benchmark Intelligence
Battery assumptions: 0.8kg LCE t per kWh
Spodumene assets include mineral losses
CAPITAL INTENSITY – THE HURDLE FOR NEWCOMERS

Sources: Company Reports, Analyst Reports, Independent Research

Spodumene assets include conversion plant capital and conversion to LCE costs

Conversion plant capital utilises Kwinana DFS CAPEX A$398M for 24kt plant

= US$12,438 capital per tonne of conversion capacity required, converted at AUDUSD = 0.75

Brine includes expansion to ponds
FUNDING CAPITAL-HUNGRY LITHIUM PROJECTS IS CHALLENGING

- Lithium is not an LME traded commodity
- Customers require qualified product
- Operations are bespoke
- Technology is held by incumbents
- Greenfield developments are inherently high risk
- Below expectation ramp-up performance experienced in brine operations, hard rock mines and conversion plants increases funding risk for debt and equity
- Technical skills required for integrated concentrate and conversion projects are beyond those normally found in either resource or conversion companies
- Brine does not naturally fit either in chemicals sector or mining experiences

Junior companies need partners or politically supported financing
FUNDING PARTNERSHIP DEALS ARE BEING ESTABLISHED BUT SLOWLY

Well established partnerships:
- Orocobre and TTC
- Neometals with Mineral Resources and Ganfeng
- LAC with SQM

New partnerships developing:
- LAC with Ganfeng and Bangchak
- Pilbara and Ganfeng
- Pilbara and General Lithium

But not all partnerships survive:
- LAC with Mitsubishi and Magma Corp
- Galaxy with KORES

*Partnerships are part of the new norm for non-established producers*
EXPANSION ASPIRATIONS
EXISTING PRODUCERS RESPONDING TO DEMAND

SQM
• Will increase capacity by 15ktpa LCE to 63ktpa
• Expects demand to grow 14% YoY in 2017

FMC
• Will triple lithium hydroxide capacity
• Will add 20ktpa LCE hydroxide capacity each year

Tianqi
• Will increase conversion capacity by ~70% with the construction of the A$398M Kwinana plant

Albermarle
• “lithium demand will rise 35ktpa for the next 5 years”
• “want 50% of new growth”

Ganfeng
• “will build another 20ktpa hydroxide plant by early 2018”
• “just added a further 15ktpa carbonate capacity”

Sources: company reports, Industrial Minerals
INCUMBENTS HAVE SIGNIFICANT ADVANTAGES

- Lower capital intensity
- Existing operations with knowledge of production processes and understanding of technology
- Production scale to protect unit costs
- Existing infrastructure, workforce and supply chains
- A relationship with regulators and familiarity with local laws
- Established markets
- Lower capital intensity
- Shorter time to delivery
- Access to finance
CONCLUSIONS
SUMMARY

• Strong growth in demand but uncertainty on how strong
• New developments are needed to meet >2.5% EV penetration in 2020
• There are projects in the pipeline but supply response will be slower than desired
• Financing projects is challenging and juniors need partners
• Established producers rising to the challenge but response will take time
• Market conditions to stay tight, if not undersupplied, to 2020
KEY CONCERNS FOR THE LITHIUM INDUSTRY TO THE END OF THE DECADE

LITHIUM SUPPLY & MARKETS CONFERENCE MONTREAL, CANADA

31 MAY 2017