



The Roaring 20's @LithiumlonBull  
Issue 53 - Part Two

2020 Hindsight meets 2030 Vision: Lithium 3.0

*It may take 60 years to reach the first million tons of demand (~2025), but we expect the next million to take around six years (~2031). New assets will be needed.*

– Rodney Hooper, [December 20, 2019, on LinkedIn](#)

Lithium 2.0



Almost Famous

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Lithium 3.0: Who's Next? Blue Sky in Green Fields

As the Roaring 20's decade dawns, so too the need for 2030 Vision:

- = ~2Mt LCE, 1.7m new tons
- = 6X 2019 production
- = 17 new Wodginas
- = 68 25kta new processing plants!

It takes 4-5 years and USD500M-1B+ to build, or buy & build, 50% of **Mt Holland** or 100% of **Piedmont Lithium** - 20+ year mine life, 20-25kta sustainable, world class qualified integrated project to supply 500,000 EVs from one \$2.3B GM/LG Chem 30 GwH Gigafactory.

With 2030 Vision, **USA can lead North America to 400,000 tons annual production**, or 20% of 2M global LCE market, or 33%+ of the EV OEM-qualified hydroxide, carbonated and metal processing market.

Where from those 400,000 tons? **Vivas Kumar of Benchmark Minerals** eloquently analogized a **Manhattan Project** recently in relation to EV supply chains, and, while **abundant lithium** is not so much **critical** as it is **irreplaceable**, the metaphor is constructive, considering **USA global lithium leadership** through **Albermarle** and **Livent** started in **North Carolina** mining and processing world class spodumene for the hydrogen bomb -> **History repeat**: 'explosive' Carolina TSB lithium production growth.

**"Hard rock to hydroxide is the workhorse for lithium,"** to quote the lithium industry's rising star **Eric Norris**, ALB's lithium head. **100%** of today's global lithium processing from hard rock is in **ChinaAustralia: #NotSustainable**. And, in more instances than not, 3<sup>rd</sup> quartile or higher on the cost curve. In their





## Back to the Future. Sustainability.



**Howard Klein** @LithiumIonBull · Nov 25

BREAKING: 👍 The BOSS @PLLKeith & great @PiedmontLithium team.

Major permit milestone in low cost, low tax, investment-friendly  
#HydroxideHub #NorthCarolina #USA

[d1io3yog0oux5.cloudfront.net/\\_e349aa4b10948...](https://d1io3yog0oux5.cloudfront.net/_e349aa4b10948...)

\$PLL #BackToTheFuture #Lithium

#ProvenPegmatites

#Sustainability

Not Advice. DYOR



**Queen City of the South, Charlotte, North Carolina** – ex-China hydroxide headquarters to the world's largest and most important suppliers of lithium chemicals, **\$ALB \$LTHM** – scores very highly as a great place to live and work for make-a-difference millennials and people of all ages. World class universities, infrastructure. Cosmopolitan downtown culture and restaurants. Fortune 500 Duke Energy, Martin Marietta, Nucor, Bank of America, and of course, Albemarle. CLT is an important airport hub, 90-minutes flight to world's most important financial center.

With 2030 Vision, North Carolina developing into a 100-150kt+ base load USA battery hydroxide supplier seems to me -- like death and taxes -- inevitable. High quality job creation from locally mined ore and also potentially importing clean and green spodumene from Brazil, Europe and/or Quebec.

I still believe Quebec has potential for processing on its own and could in some alternate political universe coordinate strategically to further enhance **Lithium EValley** -- servicing **GM/LG in Lordstown Ohio, SK in Georgia, VW in Chatanooga, Tennessee, Rivian in Normal, Illinois**, and a Tsunami of other **Eastern USA battery and cathode MAGAfactories** with 2030 Vision. But **Carolina has many natural comparative advantages over Quebec** that in my opinion make it higher probability to be producing hydroxide sooner.



Lordstown Have Mercy! - LG Chem/GM – \$2.3B, 30 GWH

Greenfield Battery MAGAFactory, Ohio, USA

 **Howard Klein** @LithiumIonBull · Dec 5  
@GM CEO Mary Barra said 50-50 JV w/ #LGChem aimed at "dramatically enhancing electric vehicle affordability & profitability...\$GM believes science of global warming & believes in an all-electric future"  
  
#Sustainability  
#Lithium #USA  
#HydroxideHub #NorthCarolina  
@PiedmontLithium

 **Mary Barra** @mtbarra · Dec 5  
We look forward to collaborating with LG Chem on future cell technologies that will continue to deliver value for our customers. Combining our #MFG expertise with LG Chem's battery cell technology will help accelerate our pursuit of an all-electric future. [linkedin.com/pulse/how-were...](https://www.linkedin.com/pulse/how-were-...)



 **Howard Klein** @LithiumIonBull · Dec 7  
\*PREDICTION\*  
  
In 2020/21 we will see @mtbarra @GM &/or other auto & battery makers invest billions in tie-ups with upstream #lithium project developers to secure/ensure long-term, sustainable battery qualified supply, esp Hydroxide.  
  
#BlueSkyInGreenfields

[Libull.com](http://Libull.com)

 **Phil LeBeau** @Lebeaucarnews · Dec 7  
Automakers investing billions in tie-ups as industry races toward autonomous and electric vehicles [divr.it/RKrtY5](https://divr.it/RKrtY5)



*"Our joint venture with the **No. 1 American automaker** will further **prepare us for the anticipated growth of the North American EV market**, while giving us insights into the broader EV ecosystem," said **LG Chem Vice Chairman & CEO Hak-Cheol Shin**.*



With a 6-12-month view, I believe Mr. Market will turn its non-Oz hard rock gaze to North Carolina. More investors will connect the dots that BMW and VW's **Irreplaceable lithium words** and **China Girl** Ganfeng **contract deeds**, reinforce the security and sustainability of hard rock. And that these global Auto OEMs will surely seek ways to further optimize sustainable supply chains by shortening travel distances and diversifying away from 100% China supply.

IMO, the under-appreciation of the scarcity value of North Carolina and America's only conventional integrated hard rock play - **ASX/Nasdaq-listed Piedmont Lithium (Rhymes with Kidman)** – is 2020/21's greenfield story to watch. **loneer** too, in Nevada – a credible, well capitalized ASX-listed boron-lithium project, though at USD 225M market value, a lot more is priced into the probability of \$INR success than \$PLL's USD 60M, for similar risk. **#RelativeValue**

**Sidebar:** on balance, ASX-listed lithium names have demonstrated more shareholder value creation – short & medium-term over the past several years (\$ORE, \$KDR, \$MIN, \$NMT) by proving they can get into production or bought out at a premium, compared to the TSX, dominated by Quebec, Argentina and Nevada stories which persistently fail to produce and rarely – LIX – get bought at prices that make shareholders money.

### Muddy Waters Blues to Smooth Jazz?

So, with 2030 Vision, if 100-150kt LCE is North Carolina (and TBD Quebec), **where's the other 250-300kt North American supply to come from?**

#### Tequila!

#### Ganfeng's Big Adventure



[P.S. I Like Soft Rock, Nov 2017](#)

I rate highly the probability of **Ganfengsonora** success in Mexico – the potential to scale the **Sonora Lithium Project** is big. Will the world's best processor of feedstock of all types – Ganfeng – successfully crack the clay code - proving it can hit 17.5kt name plate, with consistent, battery quality production and Q1 quartile costs? If so, they will launch stage two, which, given the company's seeming endless ambition - could be 25-50kt and Stage 3 upwards to 100kt+ with 2030 Vision.

I remain of the view that it is highly unlikely before Sonora is a proven success (2022/23) that a less proven team than Ganfeng will find partners and/or public equity & reasonably costed debt for a second \$500-750M greenfield project. Upon Sonora success, clay projects in Nevada and elsewhere should attract "full funding" investment.





## DLE

I am a believer that **Direct Lithium Extraction** can also succeed and enable sustainable, low impurity, scaled supply virtually impossible with 'conventional' brine flowsheets. 2017/18 witnessed select projects in the USA and Canada attracting some venture risk capital which I expect will accelerate from 2020 to position toward **2025** where **100kt new tons PER YEAR** will be required to support 2030 2MT LCE Vision.

- **Germany's Lanxess** investment with **Standard Lithium**
- USA's Big 4 hydroxide producer **Livent's** \$5.5M deal with **E3 Metals**
- Oil-field services behemoth **Schlumberger** ventures unit essentially taking over **Pure Energy** and market chatter committing \$30M.

Private, venture-capital-backed **Lilac's** results with **Lake Resources** I understand to be promising. I'm paying close attention to this space – as I am the European lithium supply & recycling dynamic – with projects that can make a big, sustainable difference from 2025 on toward 2MT LCE 2030 Vision.

Newly ASX-listed **Vulcan Energy** published a helpful slide I tweeted synthesizing the publicly disclosed DLE stories.



**Howard Klein** @LithiumIonBull · Dec 10

Nice synthesis of the Direct #Lithium extraction universe from @VulcanEnergyRes



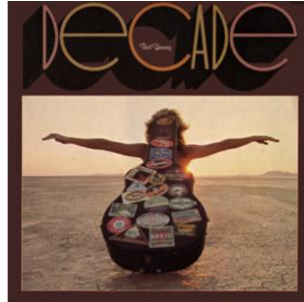
I am rooting for **Standard Lithium's** success, but the TSX-V lithium story that most interests me entering 2020 is "**A Livent in Alberta,**" **Model E3 Metals**. At **USD 7M** market cap, **\$ETMC** offers **#RelativeValue** for those interested in North American DLE speculation, compared to **USD60M \$SLL**



## From Cinnamon Girl to Tim Horton Donut?

### Nemaska's Promise

**Rockin' in the Free World** was not one of the Greatest Hits from Neil Young's 1977 DECADE. Nor, it turns out for lithium, as the 2010s conclude. **Roaring 20's Propulsion Quebec?** Time will tell.



A battery quality hydroxide shortage/price spike is now more likely to happen sooner – and more acutely – as a result of events in Quebec. Meanwhile, **Northvolt**, **LG Chem**, **Johnson Matthey** and other Western Auto OEMs will scramble to source more of their irreplaceable lithium from Chinese assets.

*“What does the market need? The market needs high quality battery grade hydroxide & carbonate. **From rocks. Outside of China.** I've been saying that for years” - [Chris Reed-ing & Recycling Mt. Marion. Neometals, E26 Lithium-ion Rocks.](#)*

- Crocodile Rock converted in China is **high carbon footprint/less Sustainable. Less Secure.**
- Crocodile Rock converted in Australia is **high capex** and **high** 2<sup>nd</sup>/3<sup>rd</sup> quartile **opex** (SQM Mt Holland, \$6,800 opex)

Hydroxide conversion – from rocks – in hydro-powered, sovereign and investor friendly Quebec - for non-China supply - has logic. Proprietary intellectual property – a “greener conversion technology” at lower cost -- has promise.

Lithium project developers reliant on TSX/ASX capitalism's public venture capital markets to finance their plans suffer from the Velocity of boom/bust cyclicity. It is exceptionally hard to raise USD 750M over the 4-5 years necessary to advance, permit, finance, stage/construct an integrated mine and chemical plant when capital markets windows open and shut within 2 years.

It's much easier to weather overruns of similar magnitude – like **Tianqi's Kwinanamaska** – and not need to seek creditor protection when faced with \$2.5B SQM mark to market write-down – when you are an anointed Chinese company with implicit and explicit State support. **#UnlevelPlayingField**



The press and social media purvey an incomplete Nemaska narrative without focusing on a core culprit of its woes - its capital structure. In particular its very high USD 350M secured debt (60% of capital), painful 11.25% interest rate with strict covenants -- in particular, the disputed **“Project Cut Off Completion Cut-Off Event”**.

I wrote hopefully in July about **Pallinghurst’s Promise** (**“[Nemaska Lithium Matters - Jupiter’s Halo](#)”**) but, like them, was surprised that this covenant would turn into a comedy-mystery Pink Panther: Inspector Clouseau vs. Nordic trustees spooked by white shoe New York lawyers advancing the interests of billion-dollar hedge fund vultures in pursuit of ~\$80M “make whole”.



### 2020 Hindsight: Secured Debt Kills Equity

	CAD		CAD
<u>Sources</u>	<u>Amount</u>	<u>Uses</u>	<u>Amount</u>
Equity Bought Deal	\$ 280	Whabouchi Mine - Direct & Indirect Costs	\$ 239
Equity Private Placement - Ressources Quebec	\$ 80	Contingency - Whaboushi Mine	\$ 30
Equity Private Placement - SoftBank	\$ 94	Shawinigan Plant - Direct & Indirect Costs	\$ 432
<b>Secured US\$350M Bond Financing</b>	<b>\$ 455</b>	Contingency - Shawinigan Plant	\$ 70
Stream Financing	\$ 195	Project Capex	\$ 771
		<b>Interest Reserve</b>	<b>\$ 128</b>
		Working Capital	\$ 87
		<b>Cost Overrun Account</b>	<b>\$ 40</b>
		Deal Fees & Transaction Related Costs	\$ 48
<b>Total Sources</b>	<b>\$ 1,104</b>	<b>Total Uses</b>	<b>\$ 1,104</b>







## Summary of US\$350 mm Senior Secured Bond Financing

<b>Guarantors:</b>	<ul style="list-style-type: none"> <li>(i) Nemaska Lithium Whabouchi Mine Inc. and (ii) Nemaska Lithium Shawinigan Transformation Inc.</li> </ul>
<b>Issue Amount:</b>	<ul style="list-style-type: none"> <li>US\$350 mm</li> </ul>
<b>Term</b>	<ul style="list-style-type: none"> <li>5-year</li> </ul>
<b>Settlement Date</b>	<ul style="list-style-type: none"> <li>Expected May 2018</li> </ul>
<b>Interest Payments</b>	<ul style="list-style-type: none"> <li>Quarterly interest payments beginning 3 months after Settlement Date</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>First lien on the project and against the intangible assets of Nemaska</li> </ul>
<b>Amortization</b>	<ul style="list-style-type: none"> <li>Quarterly amortization of 6.25% commencing after 36 months</li> </ul>
<b>Financial Covenants</b>	<ul style="list-style-type: none"> <li>Book Equity / Total Assets &gt; 30%</li> <li>Maintain aggregated minimum Liquidity of USD 30 mm</li> <li>Current Assets / Current Liabilities &gt; 1</li> </ul>
<b>Redemption Right</b>	<ul style="list-style-type: none"> <li>The Issuer may redeem the outstanding Bonds (in whole or in part) at any time from and including: <ul style="list-style-type: none"> <li>(a) the Settlement Date to, but not including, the Interest Payment Date falling 36 months after the Settlement Date (the "First Call Date") at a price equal to the Make Whole Amount (plus accrued interest on the redeemed Bonds);</li> <li>(b) the First Call Date to, but not including, the Interest Payment Date falling 48 months after the Settlement Date at a price equal to [100% plus 40% of the Coupon Rate] of the Nominal Amount (plus accrued interest on the redeemed Bonds);</li> <li>(c) the Interest Payment Date falling 48 months after the Settlement Date to, but not including, the Interest Payment Date falling 54 months after the Settlement Date at a price equal to [100% plus 20% of the Coupon Rate] of the Nominal Amount (plus accrued interest on the redeemed Bonds); and</li> <li>(d) the Interest Payment Date falling 54 months after the Settlement Date to the Maturity Date at a price equal to 100% of Nominal Amount (plus accrued interest on the redeemed Bonds).</li> </ul> </li> </ul>
<b>Permitted Financial Indebtedness</b>	<ul style="list-style-type: none"> <li>A. any Existing Financial Indebtedness;</li> <li>B. any Financial Indebtedness incurred under the Bond Terms, the Security Documents or the Trustee's or the Security Trustee's fee agreements (including, without limitation, the Trustee's Expenses);</li> <li>C. any Financial Indebtedness incurred under any Intercompany Loan;</li> <li>D. any Financial Indebtedness arising under Permitted Financial Leases or Permitted Hedging;</li> <li>E. any Financial Indebtedness incurred under the Permitted Working Capital Facility;</li> <li>F. any Financial Indebtedness incurred under the Permitted Streaming Facility; and</li> <li>G. any other Financial Indebtedness not included under (a) to (f) above the outstanding amount of which does not exceed US\$5 million or its equivalent at any time</li> </ul>
<b>Change of Control</b>	<ul style="list-style-type: none"> <li>101% of nominal value + accrued and unpaid interest</li> </ul>
<b>Project Completion Cut-Off Event</b>	<ul style="list-style-type: none"> <li>If any event happens that pushes completion of project after 30-June-2021, company loses right to draw funds from escrow account and needs to reimburse proceeds in escrow account to bondholders</li> </ul>
<b>Cost Overrun Account</b>	<ul style="list-style-type: none"> <li>Issuer shall set a cost overrun account of C\$40 mm until project completion</li> </ul>

*Stay tuned for 2020 Hindsight, 2030 Vision Part Three: PLUS Mr. Market Scoreboard*



## Disclaimer

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