



# AGM PRESENTATION

21 November 2017



*accelerating the global development and adoption of Lithium Ion Battery technologies  
for a cleaner energy future*

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# CORPORATE OVERVIEW

## STOCK INFORMATION

ASX Code	NVX
ASX Share Price [17 November 2017]	A\$1.45
52 Week Low - High	A\$0.47 – A\$1.93
Shares on issue	119.63 million
Performance Rights	1.56 million
Market Capitalisation*	A\$175.7 million
Unlisted Options [various strike]	13.98 million

## FINANCIAL INFORMATION @ 31 October 2017

Total Assets	A\$33.26 million
Total Liabilities [31 October 2017]	A\$2.96 million
Cash [incl PUREgraphite JV] [17 November 2017]	A\$6.4 million
Debt	A\$0.0 million

## SHAREHOLDINGS

	(m)	% (fully diluted)
Board and Management – ordinary shares	46.1	34.11%
Board and Management – options/rights	15.54	11.50%
Other shareholders – ordinary shares	73.52	54.39%
	135.17	100%



# Board of Directors

## Chairman

Tony Bellas



## Managing Director

Philip St Baker



## Executive Director

Greg Baynton



## Non-Executive Director

Admiral Robert J. Natter



## Non-Executive Director (Future Appointment)

Andrew N. Liveris AO



## Non-Executive Director

Robert Cooper



# Executive Team

**Managing Director**

Philip St Baker



**Executive Director**

Greg Baynton



**CEO PUREgraphite**

Dr Edward Buiel



**CEO NOVONIX BTS**

Dr Chris Burns



**CTO NOVONIX BTS**

Dr David Stevens



**VP Business Development**

Nick Liveris



**Mt Dromedary GM**

Steve Hadwen



**CFO NOVONIX Group**

Suzanne Yeates



## RECENT DEVELOPMENTS

- downstream integration into high value, high growth battery materials market
- production JV with leading USA-based anode materials development group
- acquisition of leading battery testing equipment and services company
- completion of \$16.3 million capital raising via convertible notes for transactions
- successful implementation of all transactions and conversion of all convertible notes
- mining lease application lodged for Mount Dromedary Graphite Project
- strengthening of the board with announcements on Admiral Robert Natter and Andrew Liveris

# INVESTMENT HIGHLIGHTS

## **Established brand in the rechargeable lithium-ion battery industry**

- NOVONIX is an established brand name known for making the most accurate battery cell test equipment in the world

## **Global footprint of blue-chip customers and sales in 12 countries**

- Our battery cell test equipment now used by leading battery, auto and equipment makers and researchers including PANASONIC, CATL, TESLA, BOSCH, Dyson, 3M, Alcatel-Lucent, DALHOUSIE University, Pacific Northwest National Laboratory, Helmholtz Institute and many others

## **Innovative new products and process being commercialised**

- Developing and commercialising new innovations in battery anode materials, anode manufacturing processes, battery cell test equipment and electrolytes

## **Backed by a world class natural graphite resource in Australia**

- NOVONIX owns a high grade, long-life natural graphite deposit in Queensland, Australia

## **Backed by a board experienced in building and running billion dollar businesses**

- Extensive experience in BD, resources, energy, advanced materials, battery industry, project financing, project delivery, operations and scaling

## **Highly incentivised Board and Management**

- The Board and Management hold ~45% of the equity in the company

## **Great opportunity to position at an early stage in a market with exponential growth**

- Exponential demand for rechargeable lithium-ion batteries being driven by EV and energy storage demand growth

## two operating businesses in North America



Battery Testing Services Inc.

- LEADING BATTERY TESTING EQUIPMENT AND SERVICES COMPANY BASED IN CANADA WITH SALES IN 12 COUNTRIES
- ESTABLISHED IN 2013  
[www.novonix.ca](http://www.novonix.ca)



- USA BASED DEVELOPER OF HIGH PERFORMANCE GRAPHITE ANODE MATERIAL FOR THE LITHIUM ION BATTERY MARKET
- ESTABLISHED IN 2017  
[www.puregraphite.com](http://www.puregraphite.com)



# NOVONIX

Customer locations for our battery testing equipment and services



# NOVONIX

Battery testing equipment and services customers



For confidentiality reasons there are a number of major global automakers, battery makers, medical device and electronics companies that are customers but cannot be represented.

# Rapid growth in production of lithium-ion batteries

6X growth in Lithium-ion megafactories by 2020 – Source: BENCHMARK

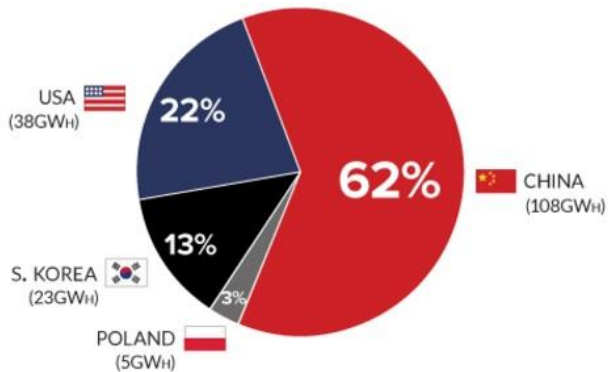
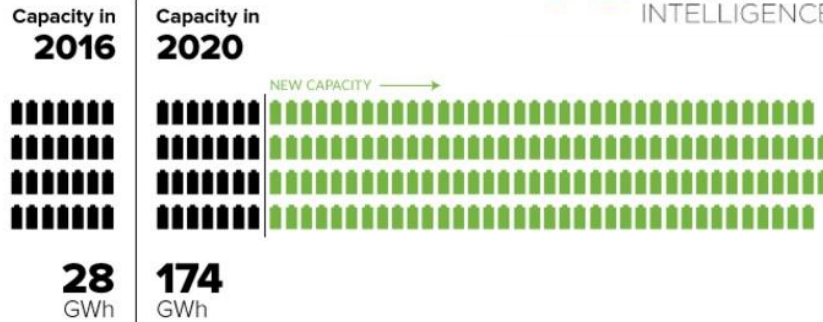
## CHINA IS LEADING THE CHARGE

Lithium-ion megafactories in China to grow capacity 6X by 2020

Data by:  
 **BENCHMARK**  
 MINERAL  
 INTELLIGENCE



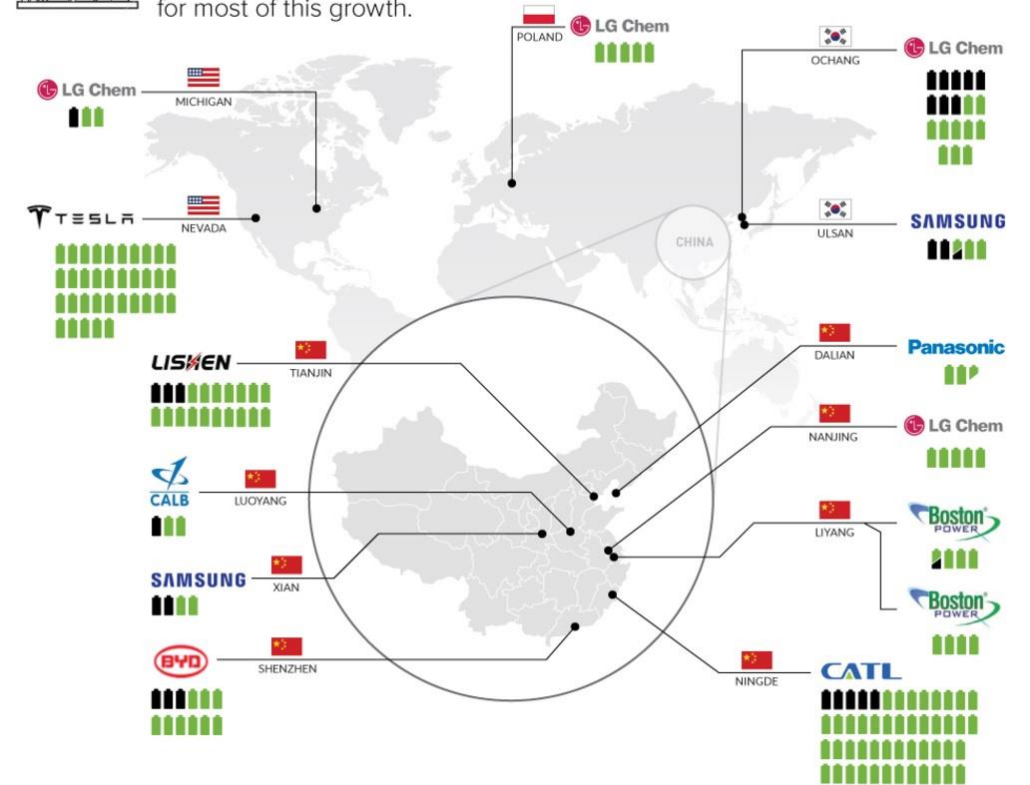
Global lithium-ion battery production capacity will increase by **521%** between 2016 and 2020.



By 2020, mass production of lithium-ion batteries will still be concentrated in just **four** countries.



China's battery sector continues to be a hub for most of this growth.



# ...being driven by ambitious EV targets by governments and auto makers

## Exhibit 89: Governments have announced ambitious EV targets...

Key government targets for EV adoption

Country	Target	Time range
UK	Ban ICE sales	from 2040
	60% of car and van sales	by 2030
	100k EVs in London	by 2020
Germany	1 million by 2020	by 2020
	6 million by 2030	by 2030
France	Ban ICE sales	from 2040
	2mn EVs	by 2020
	400k EVs in Paris	by 2020
	7mn charging points	by 2030
Netherlands	200k EVs	by 2020
	1mn EVs	by 2025
China	8% of sales	by 2018
	5mn NEVs	by 2020
	7mn NEV sales p.a.	by 2025
India	6-7mn NEV sales p.a. (as of 2015)	by 2020
	100% EV sales	by 2030
Quebec (Canada)	15.5% of sales	by 2025
California (US)	15% of sales	by 2025

Source: IEA, Country governments, Goldman Sachs Global Investment Research

## Exhibit 90: ...which automakers are racing to meet

Key automakers' EV/PHEV sales targets government targets for EV adoption

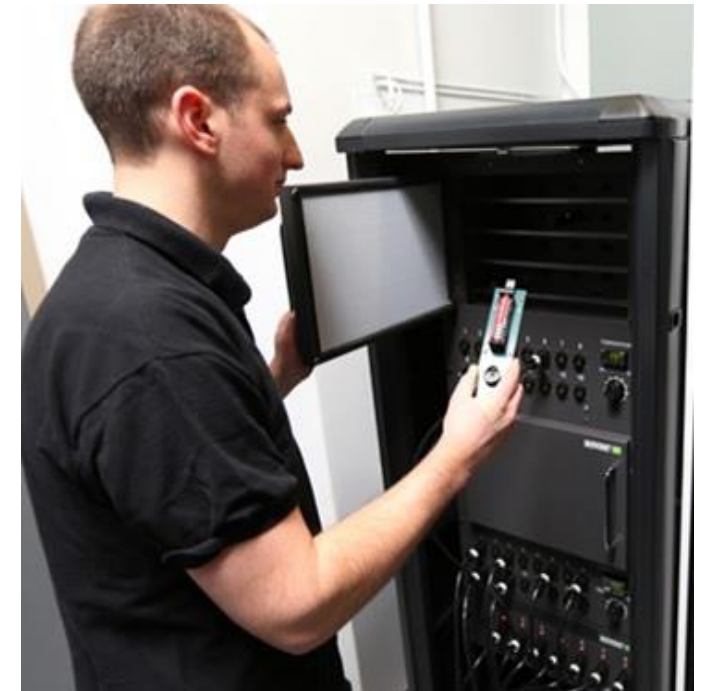
Carmaker	Target	Time range
Tesla	500,000 vehicles sold p.a.	by 2018
	1 mn vehicles sold p.a.	by 2020
Volvo	1mn electrified cars (cumulative)	by 2025
VW	1mn EV sales p.a. (25% of total)	by 2025
	30 EV models	by 2025
BMW		2017
	15-25% of sales	by 2025
Daimler	10 new EV models	by 2022
Ford	40% of nameplates to have an electrified version	by 2020
	70% of sales in China to be electrified	by 2025
GM	2 new EV models	in 2018
	>18 additional EV/FCV models	by 2023
Nissan	20% of sales in Europe	by 2020
Chinese OEMs	4.52mn p.a. (in China)	by 2020

Source: ICCT, Company data, Goldman Sachs Global Investment Research

# NOVONIX

Battery Testing Services Inc.

- NOVONIX Battery Testing Services Inc (BTS) is based in Canada and was spun out of Dr Jeff Dahn's lab at Dalhousie University (DAL) in 2013
- NOVONIX BTS manufactures the most accurate battery cell test equipment in the world used by leading battery makers, manufacturers and researchers with sales in 12 countries
- Our equipment allows researchers to predict battery cell life and performance within weeks of testing rather than years



Dr Chris Burns - CEO

## NOVONIX Battery Testing Technology is supported by:



Government  
of Canada

Gouvernement  
du Canada

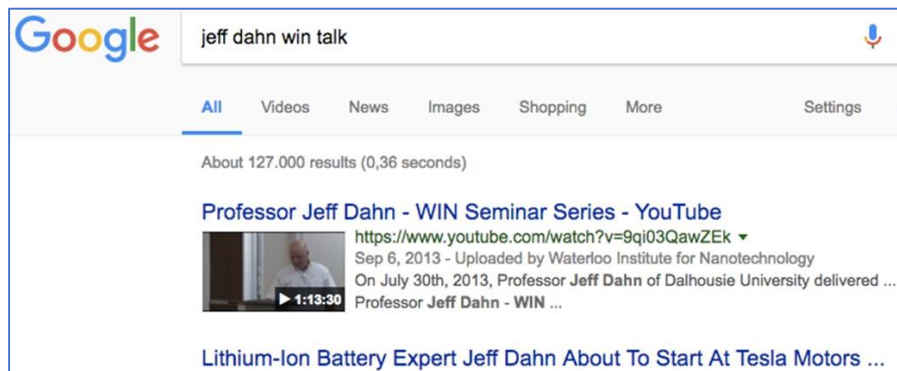


Atlantic Canada  
Opportunities  
Agency

Agence de  
promotion économique  
du Canada atlantique

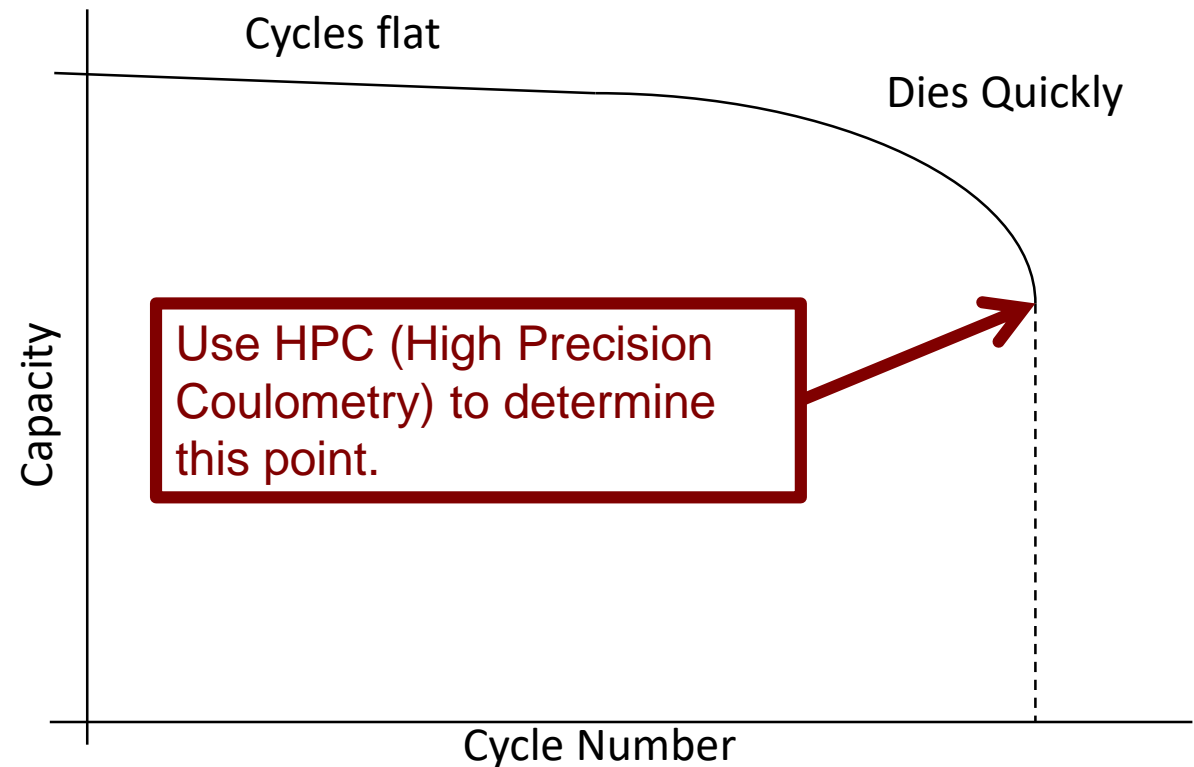
## Cell Cycling

### Why do cells fail this way?



### What can you do?

- High Precision Coulometry
- Measure loss of electrons per cycle due to oxidation/reduction of the electrolyte

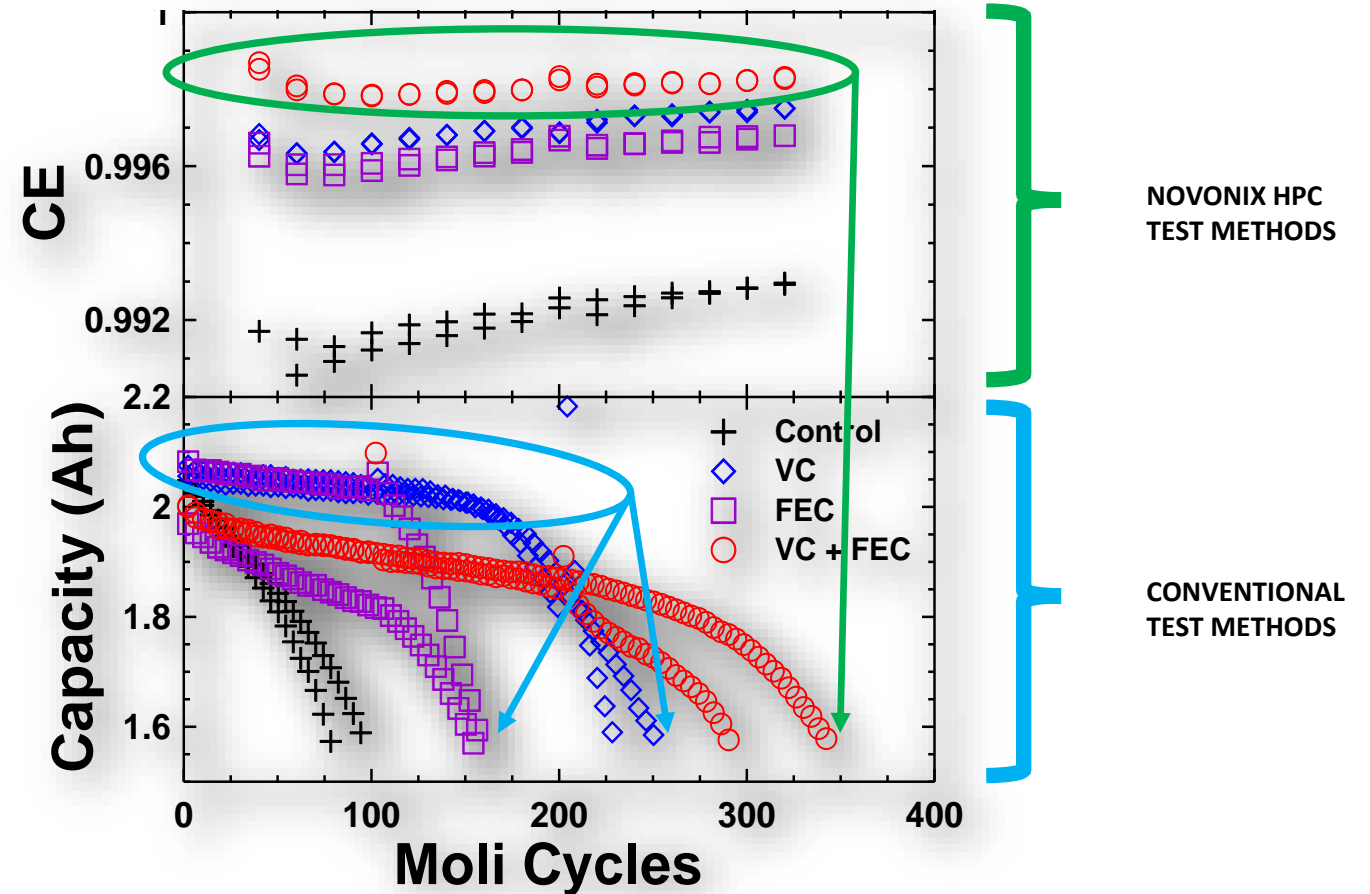


# NOVONIX

Battery Testing Services Inc.

## Coulombic Efficiency & Cell Life: Rapid Capacity Loss

- Highest CE = longest life until rapid capacity loss
- Lowest CE = shorted life until rapid capacity loss





Battery Testing Services Inc.

**Developing breakthrough technology designed to help battery researchers invent safer - longer life - faster recharging battery cells**

**As limits are pushed swelling of battery cells is a major issue**

- NOVONIX is developing non-destructive methods to measure the composition of battery electrolyte throughout cycling allowing correlation between cell health and chemistry changes
- Provisional patents worldwide on this technology have been filed
- NOVONIX is also working on non-destructive systems to measure gas generation through volume change in cells, in-situ while cycling on our high-performance computing systems. This information is critical in understanding cell chemistry and performance; **in addition to how volume changes can impact safety through swelling of cells while in use in an end product**





## Progress and priorities

- Strong sales flow from existing customers now wanting to expand their NOVONIX systems
- Consistent flow of new customers including some very big global brand names
- Expanding manufacturing to meet increasing demand for our HPC testing technology
- Launching and marketing higher power HPC systems for more advanced HPC testing
- Launching and marketing a lower cost range of testing equipment for smaller research organisations
- Prototyping and patenting new breakthrough battery testing technologies
- Expanding the testing services side of the business
- Tooling up to start early stage development work on electrolytes
- Investigating strategic opportunities in the EV fast-charger technology sector



- USA based Joint venture between NOVONIX and Coulometrics est in 2017
- Focused on production of graphite anode materials for lithium-ion batteries promoting:
  - Lower Cost
  - Longer Life
  - Higher Charge Rate
  - Sustainability
  - Security
  - Safety



**Dr Ed Buiel - CEO**



## Intellectual Property

- PUREgraphite is commercialising intellectual property and trade secrets developed by Coulometrics and its founder Dr Edward Buiel over more than two decades and including the development of proprietary particle coating technology and spherical graphite processing

## Coulometrics graphite anode research has been supported by:



National Science Foundation  
WHERE DISCOVERIES BEGIN

National Science Foundation Grant No. 1315040  
(CVD Process for Coating Graphite)



US Department of Energy Grant No. DE-SC0015953 (High yield spheronization)



Coulometrics

# Improvements in lithium-ion battery performance and manufacturing

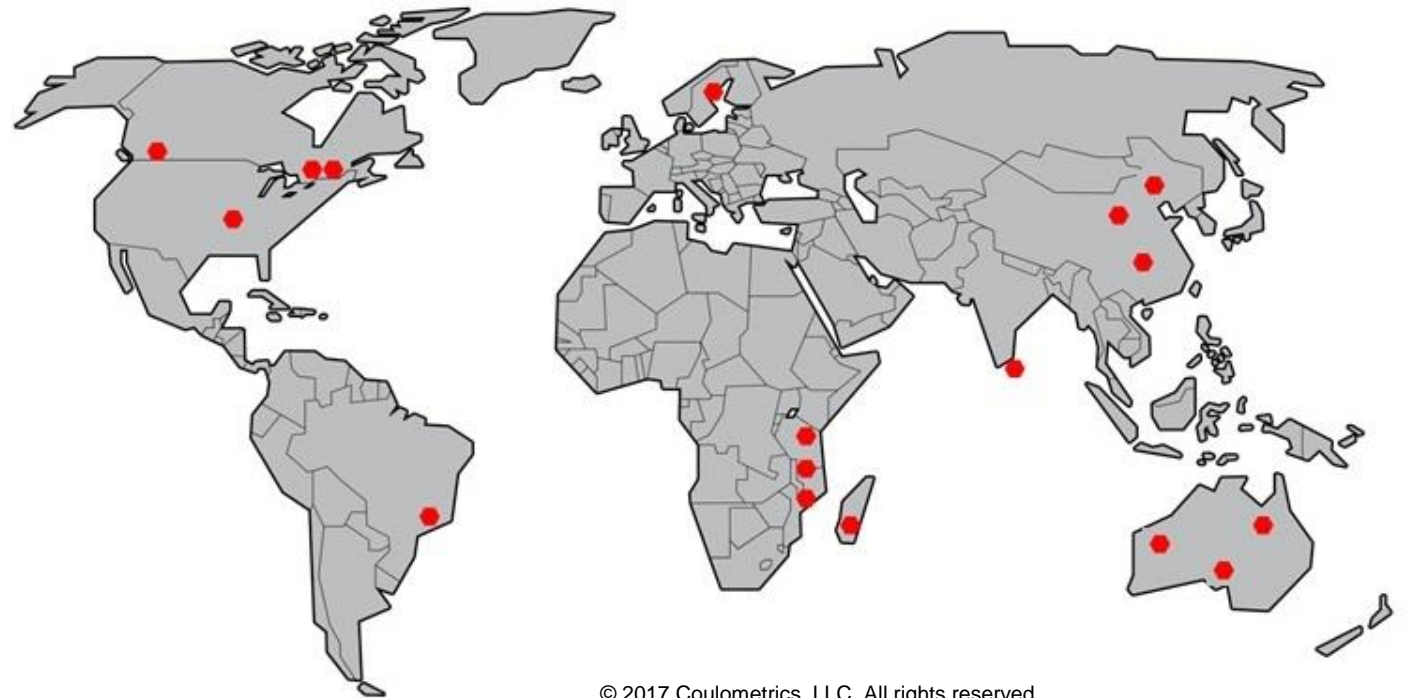
- Most recent improvements in lithium-ion batteries has come from improvements in the cathode, electrolyte, separator and manufacturing
- **The anode has been overlooked and now presents a key area for further improvement**



# We have world wide experience in electrochemical testing of natural and artificial graphite sources for suitability in lithium-ion batteries

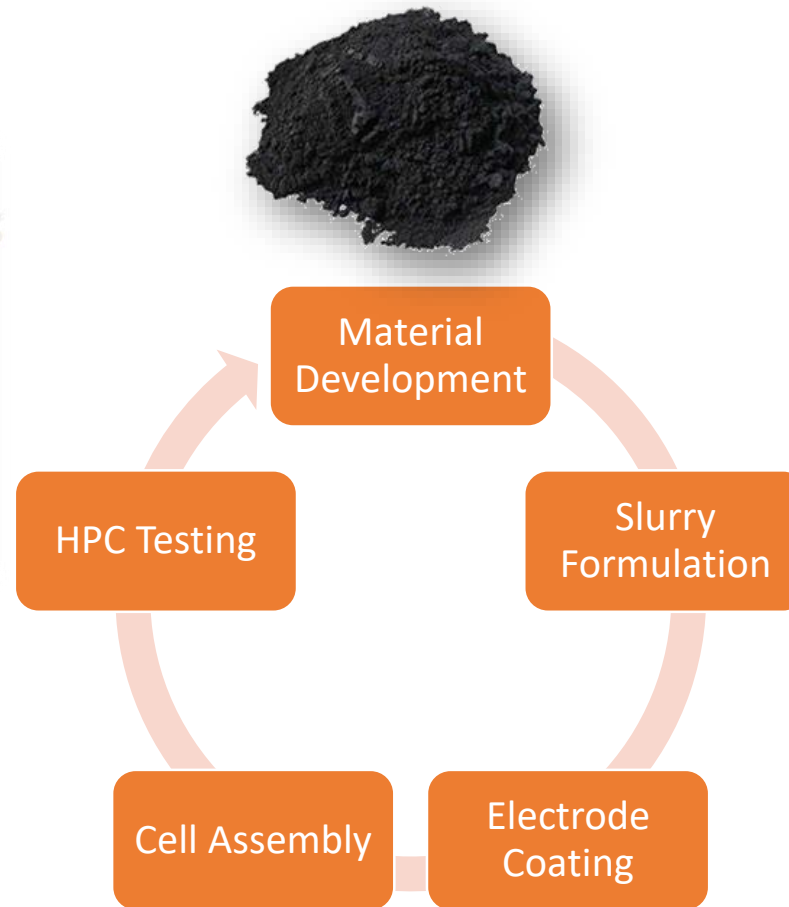
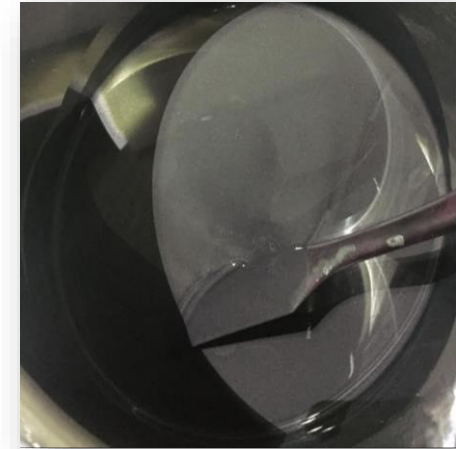
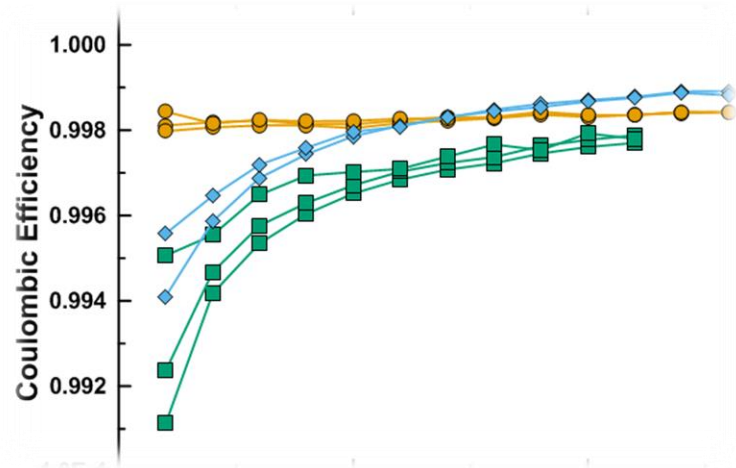
- We are well advanced in selecting our preferred supply for our proprietary product and manufacturing processes
- From a strategic perspective PUREgraphite will continue to develop and test product based on the NOVONIX Mount Dromedary graphite resource in Australia such that this can be leveraged at the right time in the future

In-house Knowledge of Artificial and Natural Graphite Sources



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# We have a rapid battery materials R&D process



# We have commercial grade battery making facilities

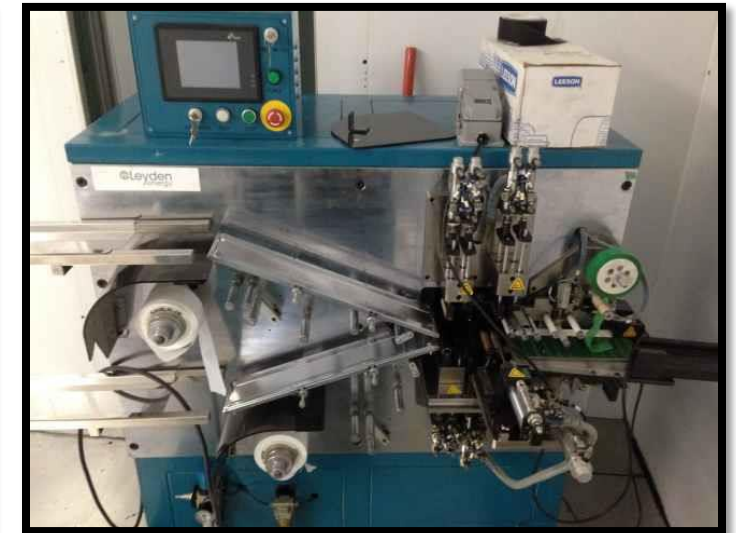
Production Scale Coating



Electrode Roll Pressing



Cell Winding





## Our battery anode materials can deliver superior performance

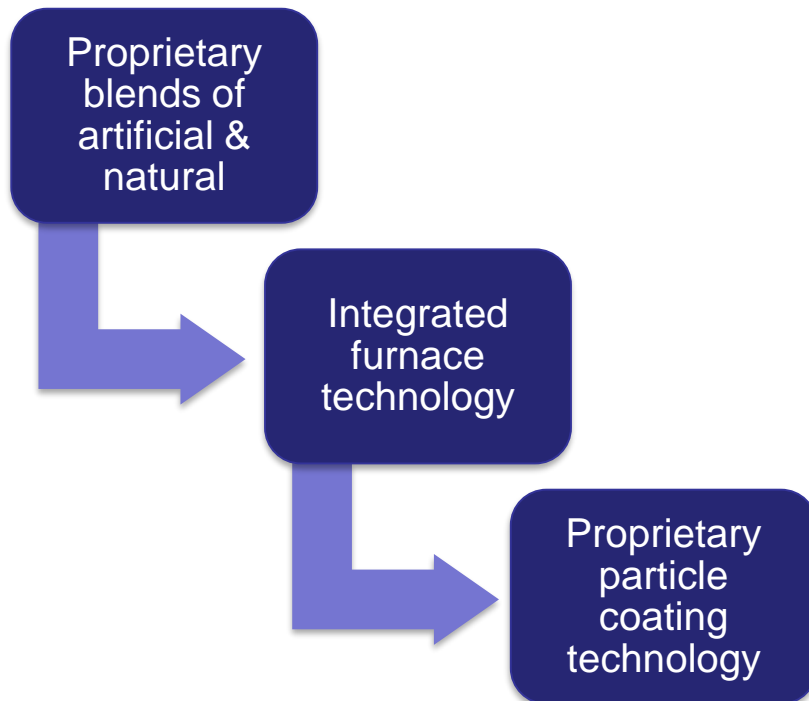
- PUREgraphite can customize anode materials to deliver optimal performance for specific customer applications including Electric Vehicles, Energy Storage, Aerospace, Aviation, Military, Medical and electronics
- We can optimize battery power, energy and life and ensure safety is not compromised
- We can make anode materials and full cell batteries using our anode materials that have coulombic efficiencies better than battery cells used in leading EV's on the road today
- We forecast these better coulombic efficiencies to translate to substantial increases in battery life (30%+) over best in class today, critical for the EV and Energy Storage battery markets





**PURE** graphite

## Our product designs and production methods are expected to deliver lower cost and lower emissions

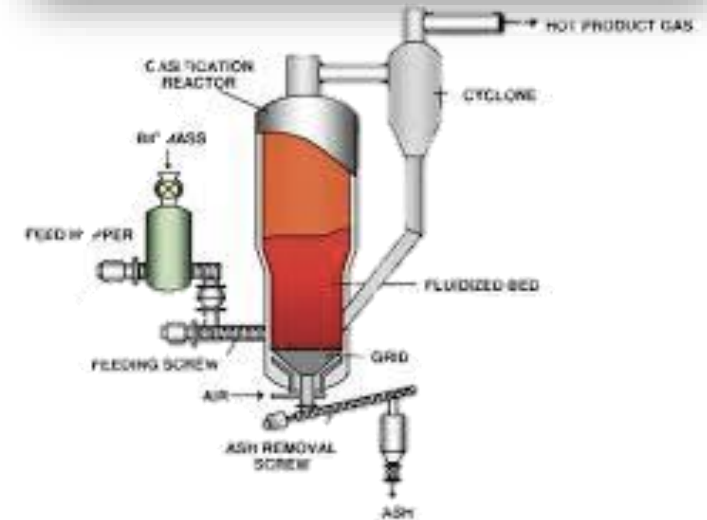


- Proprietary blends of artificial and natural graphite specific to customer applications
- Integrated high efficiency, high throughput and high consistency integrated furnace technology
- Proprietary PUREgraphite particle coating technology
- Low cost and low emission electricity sources
- High purity artificial and natural graphite sources
- No chemical purification using HCL/HF



## Pathway to Production / Progress

- Upgrade to existing facilities to accommodate initial production
- Refinement of production process design and assessment of production plant equipment and process service options
- Selection, construction and installation of production plant and equipment and establishment of service contracts
- Testing, qualification and selection of precursor materials and negotiation of supply agreements
- Ongoing product development, testing and refinement
- Customer engagement, product customisation and qualification
- Product sales and customer support





## Short Term Milestones / Goals

- On track to have a pilot production plant installed, commissioned and producing small quantities before year end including jet mill, shaping mill, furnace and coating equipment
- Good progress toward establishing a 1,000 tpa production capability by 30 June 2018 comprising combination of internal production and some outsourced operations
- Good progress in assessing options, developing plans, assessing sites and service providers to rapidly scale the business up to 100 ktpa

## Customers

- We are actively engaged with many US domestic battery makers focused on speciality applications and a number of major global battery and auto makers looking at long term supply needs for larger EV and ES markets



# INVESTMENT SUMMARY

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# NOVONIX



## **CORPORATE**

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Level 12 – 114 Edward Street, Brisbane, Qld,  
Australia

Telephone: +61 438-173-330



## **BATTERY EQUIPMENT & TECHNOLOGY**

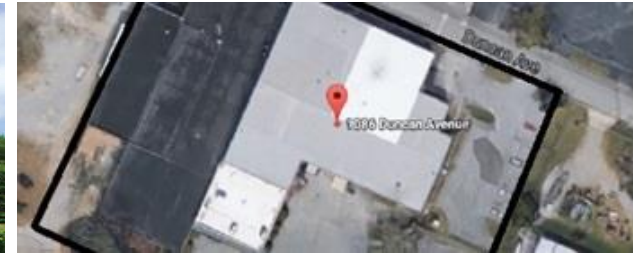
**Dartmouth, Nova Scotia, CANADA**

Contact: Dr Chris Burns

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Telephone: +1 902-449-9121



## **BATTERY MANUFACTURING FACILITY**

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