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## Benchmark World Tour : Presentation

Mr Marc Vogts, the Managing Director of **Magnis Energy Technologies Ltd** [ASX: MNS] is presenting during May 2019, at the North American venues of the Benchmark Minerals Intelligence : World Tour – New Eras. A copy of the presentation has been included for ASX disclosure.

Doug Richardson

**Company Secretary**

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**MAGNIS**  
ENERGY TECHNOLOGIES

ENABLING FUTURE ENERGY



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# LIB Market Forecasting

"Forecasting is the art of saying what will happen, and then explaining why it didn't! "  
--Anonymous [communicated by Balaji Rajagopalan]



Rosy forecasts for LIB production from just over a year ago have not eventuated with impact to lithium and cobalt prices and stocks in Australia.



# Demand Distortion

China EV subsidies are multipronged:

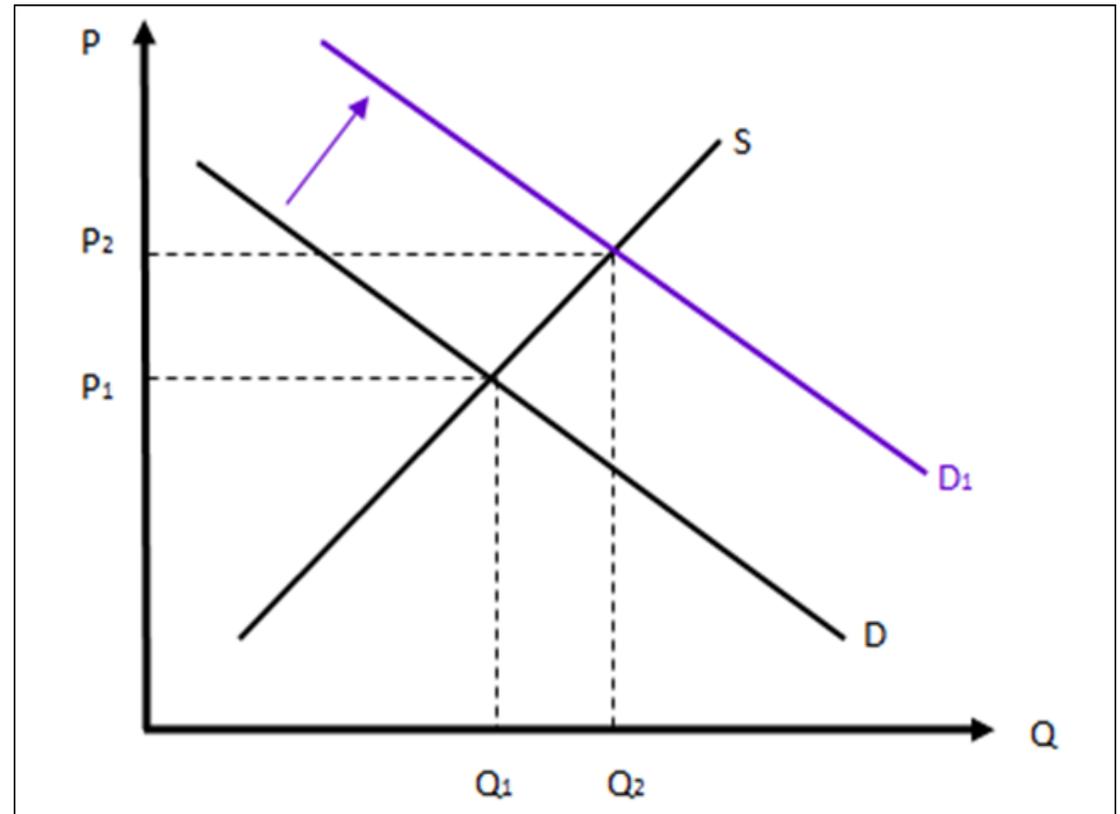
- Creation of strategic industries
- Battery materials technology
- Environmental

US policies are predominantly environmental:

- Federal EV subsidies are abating
- State based policies increasing

Rest of the World:

- EV Policies gaining traction
- ESS benefiting from favourable LCOE of renewables



Subsidies are a temporary tool in transition period until economies of scale and technology gains translate to lower prices

# Supply Distortion

Investment in Market Share:

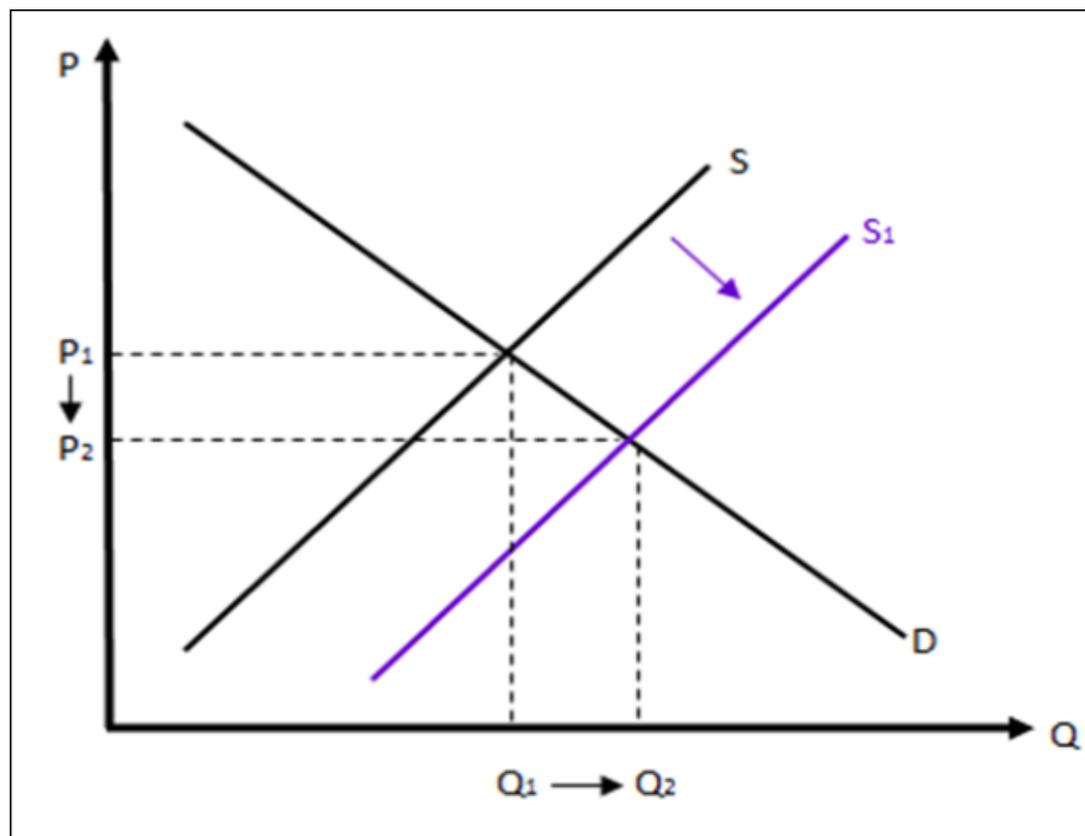
- Cell makers losing money
- Chinese makers shifting focus overseas
- Long term alliances with major autos

Reliance on estimated production costs:

- Large EV contracts pre-empted production expansion locking in prices below cost
- Recent events imply cost increases: Tesla price hike after Panasonic capacity increase and delays in Audi E-tron rollout

Nascent Market:

- Grow from 130 today to >1,000 GWh by 2030
- Losses ~\$10 B/annum not sustainable



Evidence in 2019 of future supply starting to align to actual production costs



# Capacity vs Production

Annual Production does not align with Capacity due to:

- Manufacturing yield
- Production ramp up
- Nominal design capacity often higher than actual

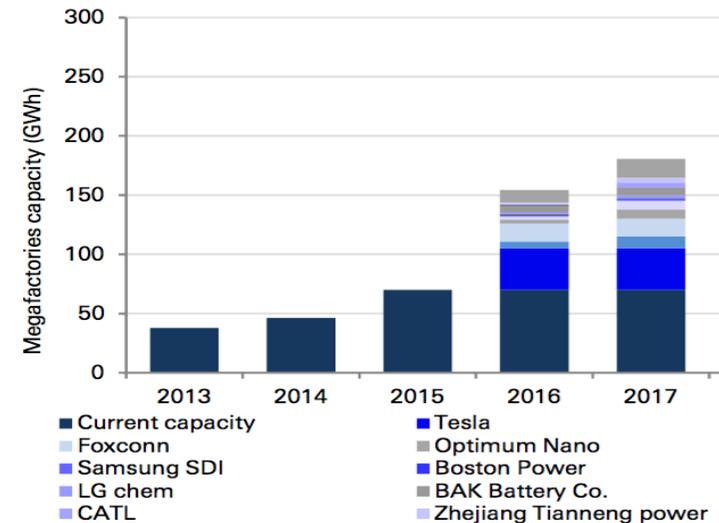
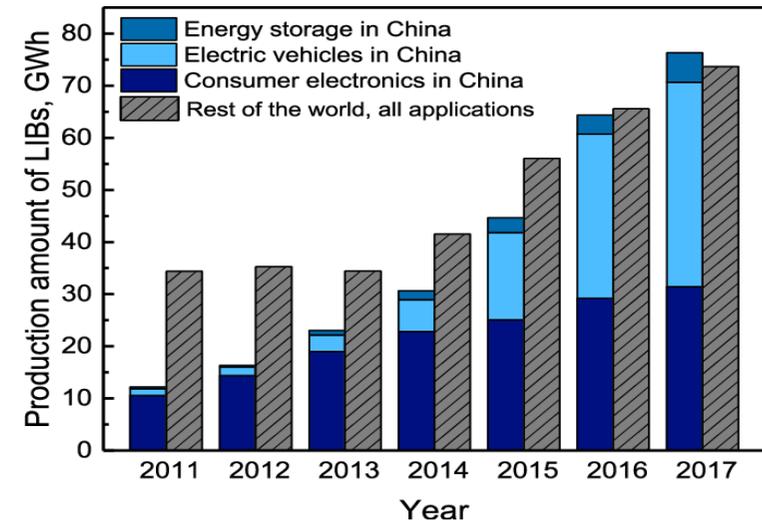
Recent news:

- Elon Musk tweet Gigafactory 23 GWh vs 35 GWh Nominal
- Battery shortages blamed for stalling EV sales and higher prices
- Delays in higher capacity NCM 811 implementation by SK Innovation

Stalled Investment:

- Additional Tesla Gigafactories for cell production announced several years' back yet to be confirmed

Low manufacturing yield and production bottle necks are stalling investment in new capacity until profitable production can be realised



Source: Deutsche Bank, company data

# Implications for Future



Market distortions will abate with rise in demand/capacity as expansion in specific losses from current levels is unsustainable:

-  Improving manufacturing yield has largest potential to decrease cost but demands for higher performance materials is adding complexity. Restrained investment in new capacity until resolved
-  Even if yield losses can be eliminated battery materials and cell components would still account for ~\$90-100/kWh in cost. Long term consolidation around integrated producers. Investment by EV makers in supply chain is increasing
-  Delays in investment and new materials' technologies means window of opportunity still exists for new cell manufacturers but vertical integration, materials IP and industry alliances are vital for success
-  LIB manufacture is fast becoming a strategic industry of the future offering energy independence and opportunities in downstream technology manufacture in sustainable industries. New entrants with right prerequisites offer best returns for strategic investors and governments

# The Magnis Vision



To become a global producer of next-generation lowest cost Li-Ion Battery (LIB) cells for the rapidly growing EV and ESS markets by:

-  Realizing efficiency in the battery material supply chain.
-  Global presence for economies of scale through strategic alliances and JV partners.
-  Maintaining a competitive advantage through unique IP.
-  Establishing collaboration networks with leading institutions and developers

The Company has realised leading battery technology with their high performing, chemically benign anode technology and through the partnership formed with US Based Charge CCCV.



# Board and Management



**Frank  
Poullas**

Non-Executive Chairman

- Over 20 years in investment markets, technology and engineering sectors
- Partner in a successful IT firm
- Involved in successful ventures within the mining industry



**Marc  
Vogts**

Executive Director / MD

- Marc is a project executive with 40+ years experience in major mining projects in South Africa, Madagascar, Australia, Canada, Chile, Indonesia, Papua New Guinea and USA.
- Previous roles include Project Director for the QMM Project in Madagascar for Rio Tinto, Vice President for Project Management for BHP Billiton and Vice President for all Uranium Projects including Olympic Dam for BHP Billiton



**Les  
Hosking**

Non-Executive Director

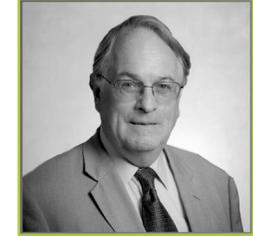
- Over 40 years experience in Australian business with a strong focus in the energy and the global futures industries. Currently Les is serving as an Independent Non-Executive Director of AGL Energy Limited [ASX: AGL] and is an Adjunct Professor of the University of Sydney John Grill Centre for Project Leadership.
- Previously Les was the Chief Executive Officer and Managing Director of the Sydney Futures Exchange, Chairman of Adelaide Brighton Limited [ASX: ABC],



**Dr Frank  
Houllis**

Chief Executive Officer

- 20 years practical experience in development and engineering of metallurgical process.
- Deep process experience across a wide range of commodities; led process development teams at ANSTO [process manager, 2008-2014], BHP Billiton [principal engineer, 2005-2008] and Intec Ltd [1995-2005]



**Prof M. Stanley  
Whittingham**

Non-Executive Director

- Key figure in the invention of the Lithium-ion battery technology and nominated for the Nobel Science Prize.
- Has headed large projects for the US Department of Energy, Exxon and Schlumberger.
- Distinguished Professor of Chemistry at Binghamton University, part of State University of New York



# Board and Management



**Dr Shailesh Upreti**

Lead Battery Consultant

- 16+ years experience in lithium-ion battery technologies. Chairman of Imperium 3 and President of C4V.
- Strong track record in product development and commercialization.
- 5 year PostDoc completed under the supervision of Professor Stan Whittingham, one of the leading pioneers in development of Lithium-ion batteries with over 40 years experience in the field.



**The Hon. Warwick Smith AO**

Non-Executive Director

- Extensive public policy and commercial experience across industries including property, financial services, natural resources, energy, transportation, health, media and technology.
- Currently a Director of Seven Group Holdings, Estia Health, Coates Hire, ANZ Bank China and Chair of ANZ Bank Thailand.
- 15 year Parliamentary career holding various roles as a Federal Minister and Federal Shadow Minister



**Johann Jacobs**

Non-Executive Director

- 30+ years experience in the resources sector
- Managed established companies and acquisitions, including project expansions and start-up mining operations in Australia, South Africa and Indonesia

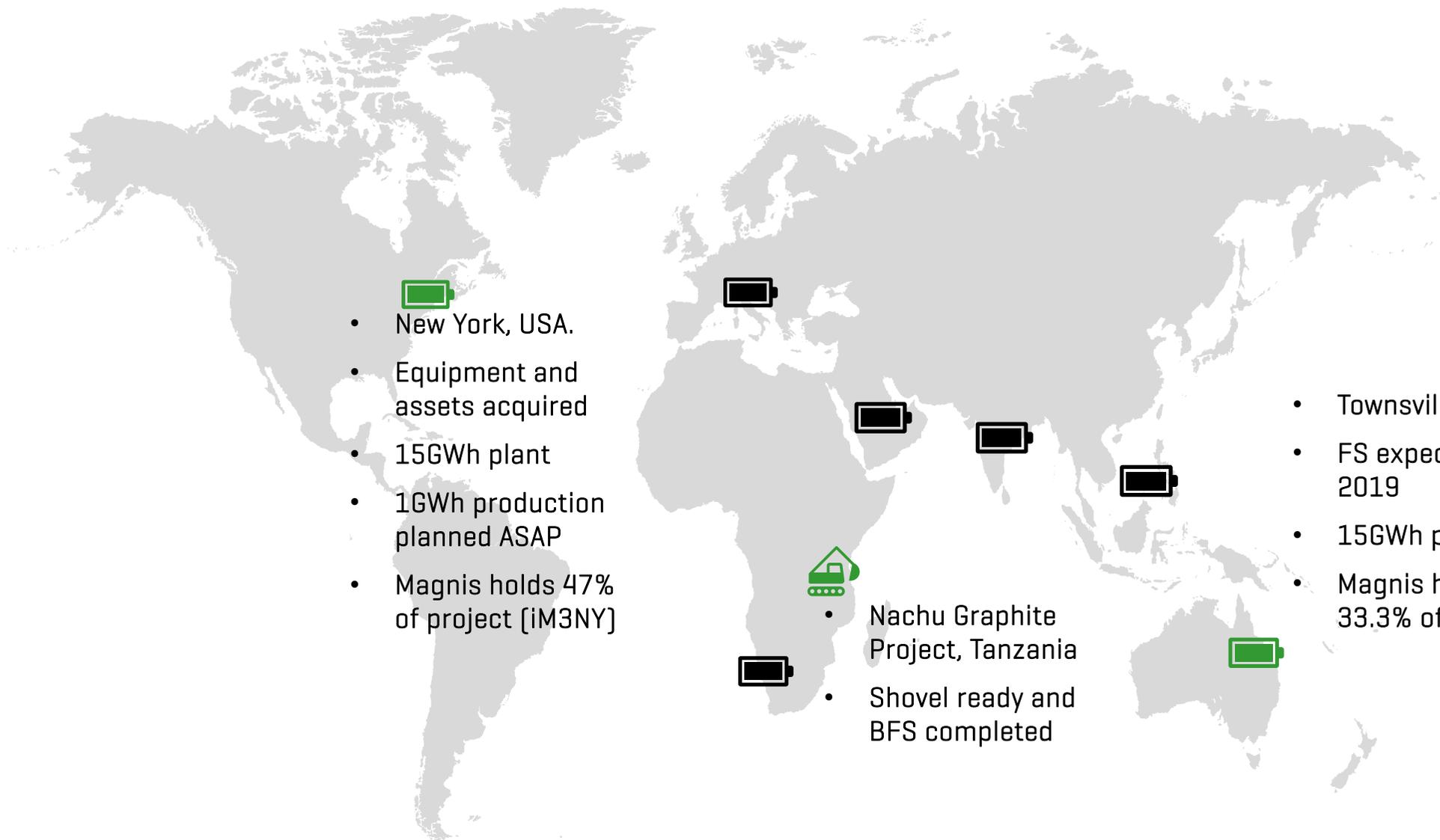


**Peter Tsegas**

Non-Executive Director

- 15+ years experience in Tanzania engaging both private and public sectors on projects; Tanzanian resident
- Previous consulting roles to the Tanzanian government and to a number of mining companies including Rio Tinto

# 11 Global gigafactories and opportunities



- New York, USA.
- Equipment and assets acquired
- 15GWh plant
- 1GWh production planned ASAP
- Magnis holds 47% of project (iM3NY)

- Nachu Graphite Project, Tanzania
- Shovel ready and BFS completed

- Townsville, Aust.
- FS expected Sep 2019
- 15GWh plant
- Magnis holds 33.3% of iM3TSV

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## Business and Technology Criteria

Lower Cost

Higher Safety

Increased Life

High Manufacturing Yield

Better Performance

Scalability

Higher Energy Density



# Primary Technology Partner

## Charge CCCV LLC (C4V)



Primary technology partner. Dr Shailesh Upreti has been awarded numerous patents for composition of matter inventions.



Located within Binghamton University where advisor and inventor of LIBs, Prof Stanley Wittingham, is part of a leading center of excellence for LIB development.



World class \$100m+ development facilities with capabilities for:

- Materials engineering,
- Cell fabrication &
- Cell testing

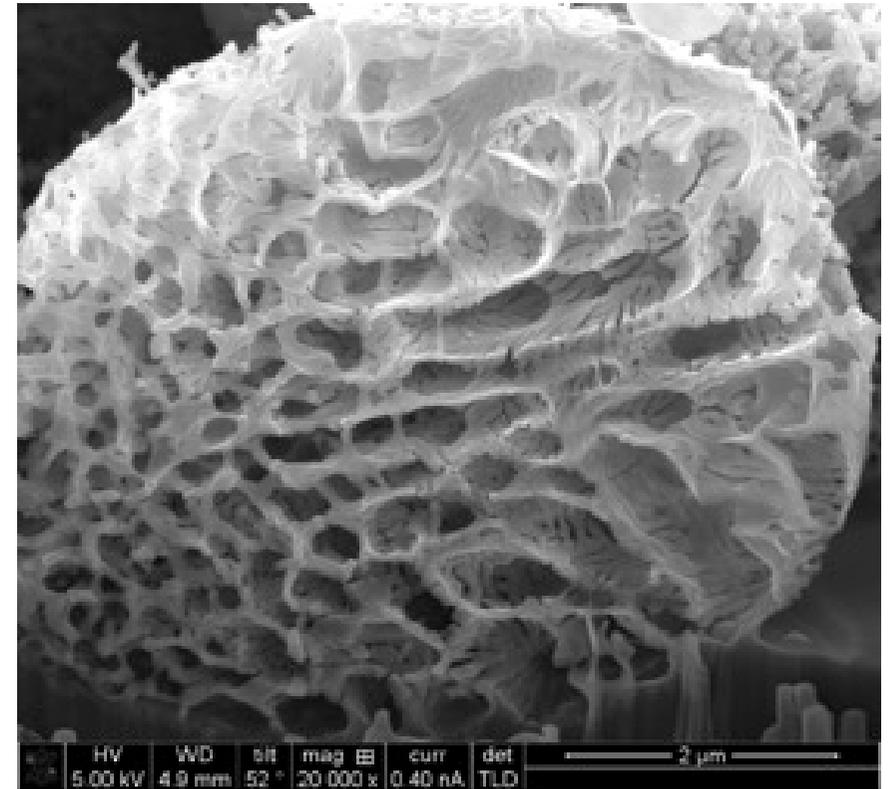




# Game Changing Battery Technologies – Anode

-  Patent protection in over 35 countries.
-  Strong green credentials - no downstream chemical or thermal purification required
-  Lowest cost producer of spherical graphite above 99.95% TGC purity.
-  Graphite and silicon anode blend the next generation of high performance anode material.
-  Potential to deliver significant increase in mileage and power.
-  Test work and commercial validation for 10% silicon additive blended with Nachu coated spherical graphite.

Internal view of silicon composite particle





# Game Changing Battery Technologies – Cathode - BMLMP

 Patent protection for Cathode composition in 35+ countries.

 High performance and long life technology

 Low cost due to no nickel and cobalt

 Raw materials used in plentiful supply

 Wide range of applications

Cathode Material	Voltage (V)	Capacity (Ah/kg)	Cell Energy (Wh/kg)
LFP	3.3	150	130
NMC	3.7	155	215
NCA	3.6	180	238
<b>BMLMP</b>	<b>3.9</b>	<b>155</b>	<b>190</b>



# Global Industry Partners – Key Ingredient to LIB Success

## Siemens

Agreement signed 5th March 2018 covering global LIB plant opportunities.

- World leader in LIB factory digitization, automation and in-line manufacturing technology.



## Celgard

Joint Development Agreement signed 13th Feb 2018.

- Global market leader of separators for Lithium-ion batteries with 40+ years experience.
- Subsidiary of global chemicals manufacturer Asahi Kasei



## Durr MEGTEC

Strategic Partnership Agreement signed 20th Mar 2018.

- Manufacturer of world leading double sided coating equipment driving low footprint, increased efficiency, and significant capital and operating cost advantages.



## Additional Global Industry Partners [Commercial in Confidence] for :

- Electrolyte; Battery electrode materials; Cell forming; Cell assembly



# Optimised Manufacturing Yield

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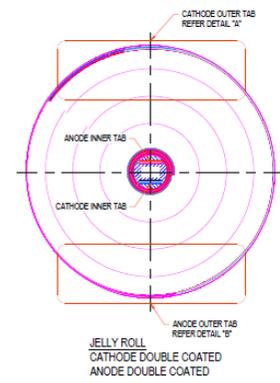
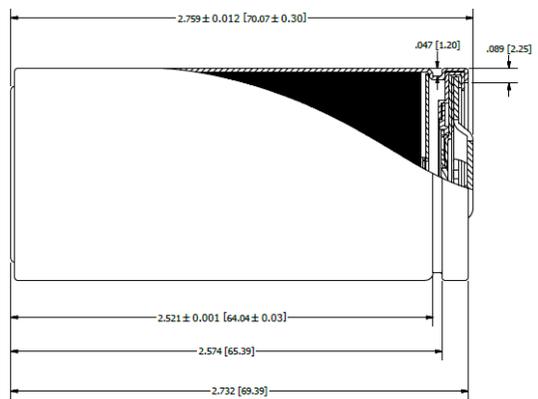
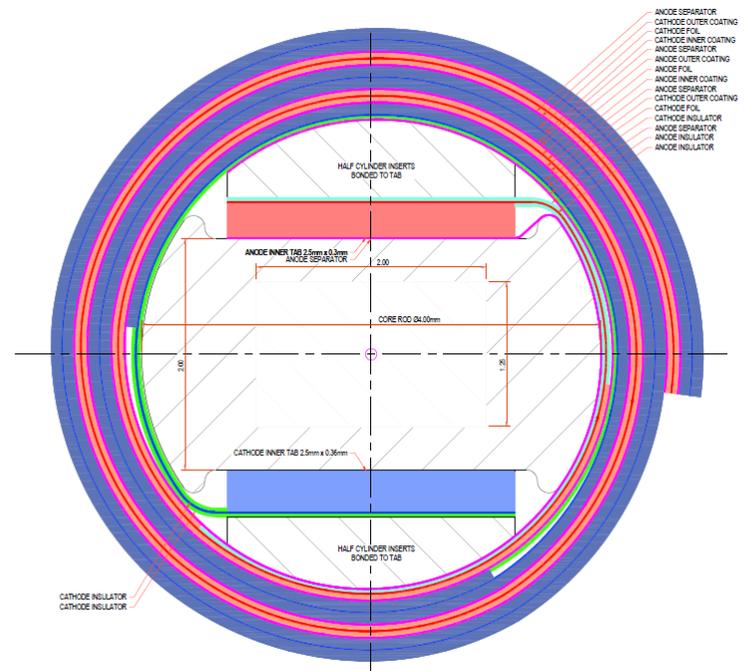
Integrated design reducing process steps. Benefits include preservation of coating integrity and decreased active material exposure to contaminants
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Cylindrical 3270 form factor selected due to suitability to high volume manufacture, reduced failure modes and increased capacity from decreased dead weight
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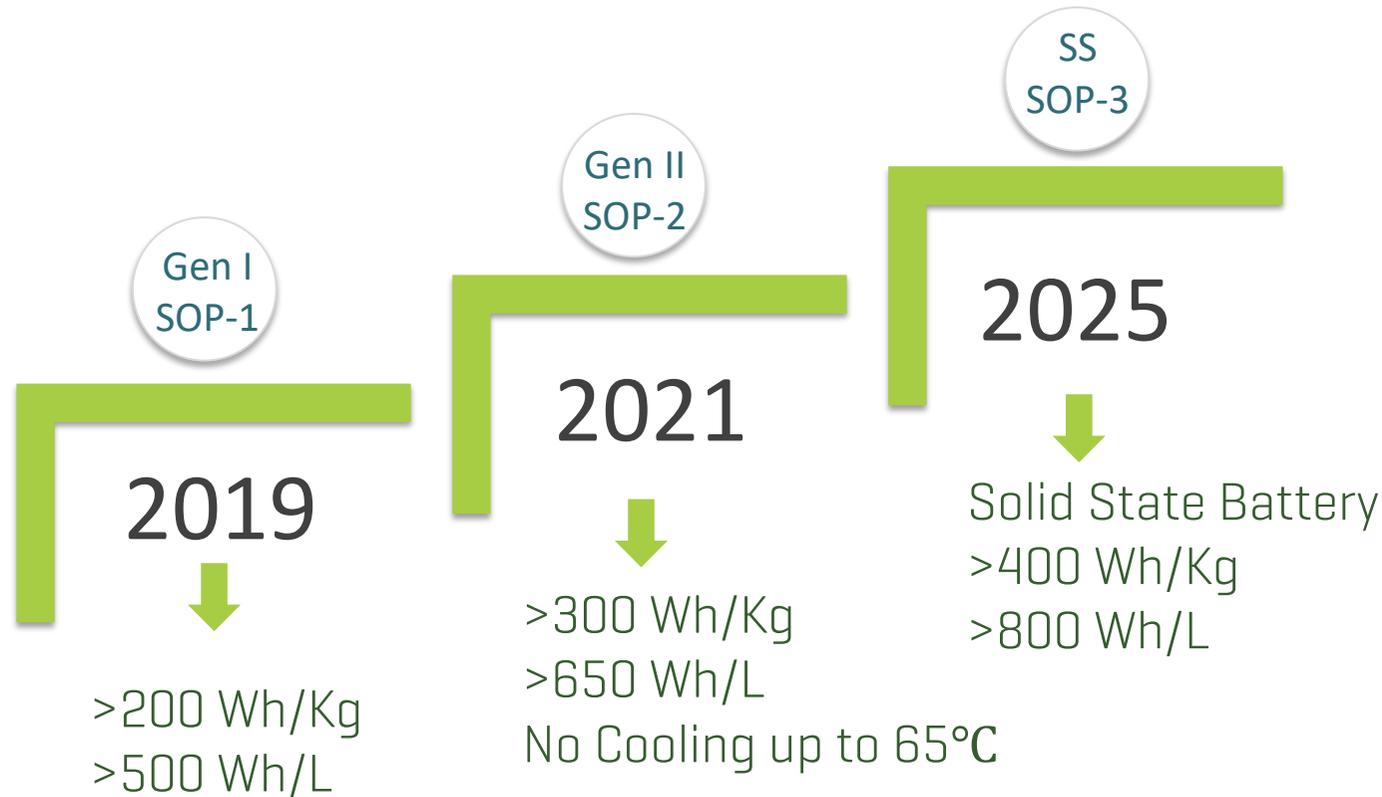
Modular approach to design for maximum flexibility in product offering and ability to adopt new materials technologies for next generation batteries. Ability to ramp production after reliable manufacture is established
- 

In summary, high yield is critical to low production cost

## Internal view of Cell Configuration



# Magnis Battery Technology Roadmap – Generation II & Solid State



NOTE : Our Gen II and Solid State Lithium-ion Battery technology roadmap is being developed within the scope of our existing manufacturing equipment supply chain. Only minor changes to our production environment are required in supporting our Gen II and SS technology roadmap. This will allow Magnis to avoid significant additional capital costs when technology improvements are implemented.



# Battery Technology Advantages Today – Generation 1



## Safety Focus

- Considered Top 2 safest batteries tested by NY State Fire Department & Con Edison. Magnis battery cells tested safer than Tesla-NMC battery storage packs.



## Increased Life

- Extended battery life for a high performance Lithium-ion Battery LIB, going from 4-5 years to 8-10+ years.



## Better Performance

- Batteries sustain 75% of initial capacity after 3,000 cycles @80% DOD, against most competitors with high capacity loss in only a thousand cycles.



## Higher Energy Density

- 15% higher energy capacity compared to market equivalents.



## Scalability

- Easily adaptable technology can be implemented in existing manufacturing plants without incurring additional cost.



## Developing Expertise for Efficient Manufacture

Acquisition and Relocation of New York 1GWh plant fulfils dual roles of development of manufacturing experience and qualification of commercial product:

-  Magnis has **47% ownership** in iM3NY
-  Production expected mid 2020 using **proprietary materials**
-  Plant to be reengineered with **Strategic Partner Vendors** for optimum yield
-  Focus on **proven processes** with flexibility to adapt standard operating platform to latest material innovations.
-  Develop **process flowsheet** and **equipment selection** recipes for efficient manufacture at larger **greenfield projects**
-  Marketing and **qualification** of battery products to major OEM's [Original Equipment Manufactures]
-  Demonstration of **supply chain viability** & validation of high yield battery production



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# New York / USA – IM3 Lithium-ion Battery Plant Update

*Significant Progress being made.....*



Equipment relocated from North Carolina to Endicott New York.



Minor plant redesign has commenced to incorporate Imperium3's leading materials & IP processing technologies in the production of prismatic cells.



Planning underway for additional lines to manufacture cylindrical LIB cells.



Experienced team assembled to install and commission.



Ex Tesla senior Manager Mr. Chaitanya Sharma has joined the Imperium3 Advisory Board.



iM3NY - Debt finance Term Sheet signed recently for US\$52M



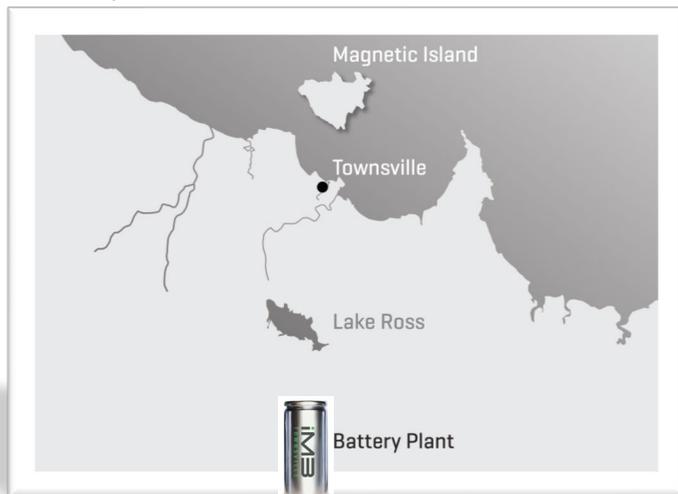
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# Townsville / Australia - IM3 Lithium-ion Battery Plant



-  Magnis has 33.3% ownership in iM3TSV
-  15 GWh Lithium-ion Battery Plant to be located in Townsville, Australia
-  QLD State commits \$3.1m funding package to commence feasibility study.
-  Scoping Study completed.
-  Feasibility Study targeted for completion in Q3 2019.
-  Site contains all major infrastructure including rail, power and close access to Port of Townsville.



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## Fast Track Time To Market



Qualification of equipment vendors and components well advanced



Near term New York 1 GWh production for market development



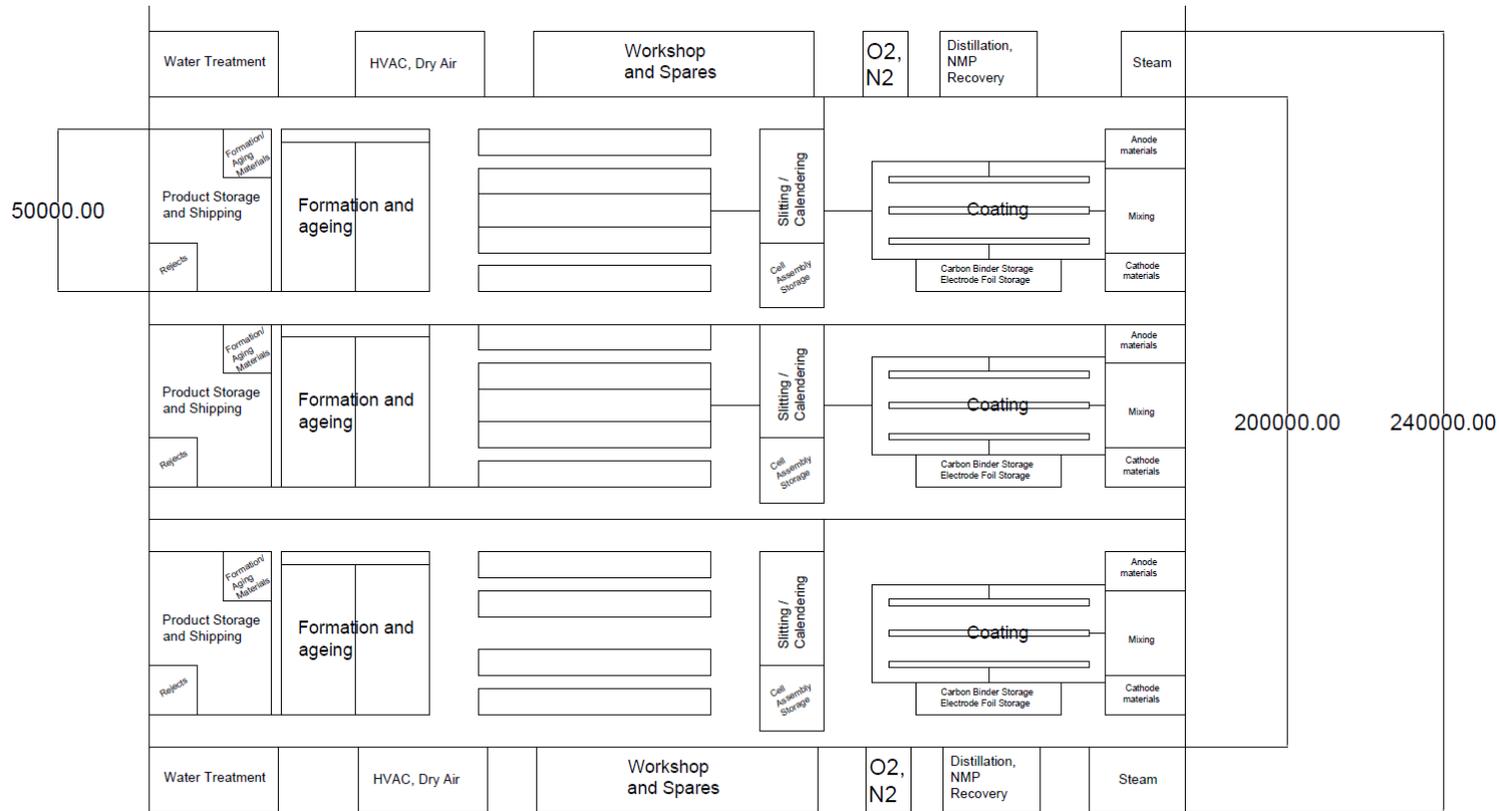
Townsville Project template for 15 GWh manufacturing plant being established





# Modular Layout

- Peak cash requirement is halved with staged expansion through 3 x 5 GWh
- Start with lead acid replacement (ESS) and transition to EV over longer term
- Modular approach benefits utility distribution



## 25 Why Magnis?



**Global Opportunity** to make a direct investment into the rapidly growing Lithium-ion Battery [LIB] sector via Magnis.



**Unique IP** with our next generation anode & cathode battery materials, which have patent protection in over 35 countries. Leading particle engineering **IP** for our raw material processing.



**The People to Execute** with highly experienced & credible Board of Directors. Unrivalled capabilities and expertise in LIB, Automotive Innovation & Mining sectors.



End to end **Supply Chain Management** and control. Global procurement strategy which includes raw material acquisition and processing.





# Corporate Overview

## Capital Structure

ASX code	MNS
ASX share price [30 <sup>th</sup> APRIL 2019]	A\$0.265
52 week Low - High	A\$0.23 - 0.445
Shares on issue	611.1 million
Market Capitalisation	A\$162 million
Unlisted Options [various strike]	16.8 million
Average daily volume [100 days]	350,456
Cash [31 <sup>st</sup> MAR 2019]	A\$3.86M
Debt	A\$0.0M

## Major Shareholders

Shareholder	Shares [M]	Ownership
Mazdel Pty Ltd	51.0	8.4%
Citicorp Nominees Pty Ltd	49.8	8.2%
UBS Nominees Pty Ltd	35.3	5.8%
BNP Paribas Noms	22.4	3.7%

## Board & Senior Management Shareholdings

Shareholder	Shares [M]	Ownership
Board & Senior Management	29.9	4.9%

## MNS Share Price





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ASX: MNS

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