

## **Investor Update**

Exceptionally high purity natural flake graphite

**July 2016** 

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### Magnis and the Nachu Project



- A significant industry leading asset poised for development
- Superior flake size and purity of Nachu graphite deposit drives our competitive advantage
  - Thickness and ordered crystal structure of Nachu natural graphite flake supports production of spherical graphite through sustainable processing and flexibility to meet customer specifications
- Clean, sustainable and simple flowsheet
  - Low carbon and chemical footprint
- A shovel ready project
  - BFS completed in March 2016 confirmed the high returning potential of the Nachu project
  - Clear strategy and process route to produce a high quality spherical graphite product
  - All requisite regulatory and environmental permits finalised
- Project timeline for first production in 2018 coincides with the beginning of battery "mega-factory" ramp ups
- Board and management team with a proven track record and range of skill sets to realise value in a dynamic and rapidly evolving industry

## **Corporate Overview**



Capital structure	
ASX ticker	MNS
ASX share price (15 July 2016)	A\$0.97
12 month share price range	A\$0.22 – 1.12
Pro forma shares on issue	430.5 million
Pro forma market capitalisation	A\$418M
Options (\$0.095ps strike)	116 million
Options (various strike)	16.6 million
Average daily volume (3 months)	2.49 million
Cash	A\$7.0M
Debt	A\$0.0M

Major Shareholders		
Shareholder	Shares (M)	Ownership
Mazzdel Pty Ltd	48.5	11.3%
Pershing Aust. Noms	21.2	4.9%
Citicorp Noms	21.1	4.9%

#### **Analyst Coverage**









### **Board and Management**



Frank Poullas Non-Executive Chairman MAICD	<ul> <li>15 years in investment markets and engineering sectors</li> <li>Partner in a successful IT firm</li> </ul>
<b>Cobb Johnstone</b> Non-Executive Director <i>B.Eng</i>	<ul> <li>Mining engineer with +30 years experience. Previous roles include Chief Operating Officer positions of Equinox Minerals and Sino Gold, served as General Manager of Kalgoorlie Super Pit, Olympic Dam and Northparkes</li> <li>Lead Non-Executive Director of Evolution Mining</li> </ul>
Len Eldridge Executive Director B.Econ	<ul> <li>14 year background in mining finance and commercial roles including senior positions with Equinox Minerals, JCP Investment Partners and Macquarie Group</li> <li>Founding principal of Fivemark Partners, a specialist mining advisory group</li> </ul>
Johann Jacobs Non-Executive Director B.Acc, MBL, FCA, FAICD	<ul> <li>30+ years experience in the resources sector</li> <li>Managed established companies and acquisitions, including project expansions and start-up mining operations in Australia, South Africa and Indonesia</li> </ul>
Peter Tsegas Non-Executive Director	<ul> <li>15+ years experience in Tanzania engaging both private and public sectors on projects; Tanzanian resident</li> <li>Previous consulting roles to the Tanzanian government and to a number of mining companies including Rio Tinto</li> </ul>
Dr Frank Houllis Chief Executive Officer B.Sc (USyd BEng) (Chem 1 <sup>st</sup> Class, USyd), PhD (USyd)	<ul> <li>20 years practical experience in development and engineering of metallurgical process</li> <li>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)</li> </ul>
Rod Chittenden Head of Operations	<ul> <li>30 years experience, metallurgist with a strong track record in project development; has worked in Australia, Europe, Africa</li> <li>Detailed involvement in metallurgical testing, feasibility studies, process design and commissioning for projects with Newcrest Mining, Barrick Gold, Paladin Energy and Mantra Resources</li> </ul>
Shailesh Upreti Lead battery consultant PhD (IIT Delhi) Post Doc (Prof Stan Whittingham, SUNY New York)	<ul> <li>16+ years experience in lithium-ion battery technologies</li> <li>Strong track record in product development and commercialisation</li> <li>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</li> </ul>
Brent Laws Exploration Manager B.Sc Geology (Honours)	<ul> <li>Geologist with a broad and diverse 12+ years of experience including exploration, resource development and mining management roles in emerging markets projects. Previous roles at Newmont and Oz Minerals</li> <li>7+ years of African based project development experience</li> </ul>

### A differentiated strategy



- Not all graphite is created equal and the market for graphite is not homogenous
- Concentrate purity and a "sustainable" flowsheet to produce coated spherical graphite are key value drivers in the growing lithium-ion battery market
- Capitalise on the significant divergence in graphite end markets by focusing solely on growing and high value product markets
  - Avoid exposure to traditional graphite markets with clear future oversupply risk in fine grain, lower purity products
  - Produce a high quality spherical graphite product for use in lithium-ion battery anodes
- BFS work driven by a team with significant process engineering experience and a focus on product development
- Progress discussions with potential off-takers in a manner that will allow full value capture for the high purity Nachu ore body

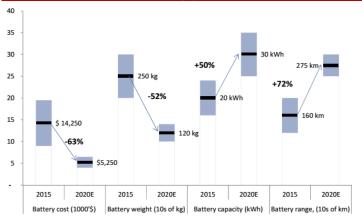


### Nachu quality and our markets



- Nachu graphite will not be competing with new production currently under construction in traditional graphite markets
  - Capture market share in the growing lithium-ion battery market
  - Provide a cost effective, sustainable and higher performance alternative to synthetic graphite
- Higher proportion of very coarse flake and purity of Nachu graphite provides a higher level of product flexibility
  - Starting with higher flake size and simple flotation flowsheet Magnis can adjust production to meet the market
  - Can move down the size spectrum; others can not start with smaller flake and move up the size spectrum
- Nachu flake size and thickness drives spherical graphite yield of 75%
  - Use of +150 micron feedstock drivers higher spherical yields
  - Commentary suggesting <150micron material "required" for spherical production is incorrect and is based on current Chinese supply chain which yields 30-40% spherical graphite from natural flake

#### High performance materials will play an important role in efficiencies and battery performance evolution



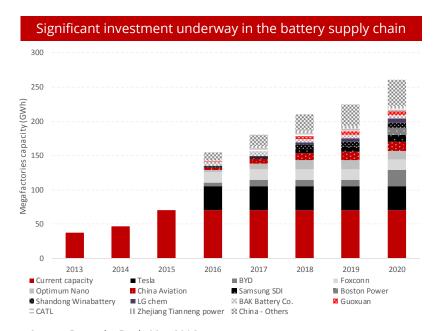
Source: Goldman Sachs, November 2015

# Rapid evolution of a global industry



#### **Magnis Resources**

- A global movement towards the adoption of clean energy technology
  - Transportation
  - Energy storage
- Strong Western world and Chinese investment in battery mega-factories will increase competition for raw materials
- Mega-factories capacity forecasts are largely representative of current EV visibility; this is just the beginning
- Value of sustainable footprint across the supply chain is becoming a focus



Source: Deutsche Bank, May 2016

# "Megatrends" and "hyper-adoption"

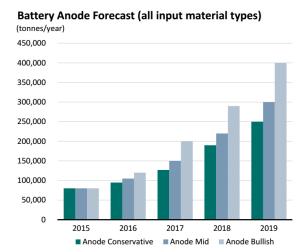


#### **Magnis Resources**

- Volkswagen strategy highlights the structural shift towards electric vehicles
- Target of 20-25% of group sales in 2025, implies annual sales of 2-3m "e-cars" v 2015 Volkswagen global total sales of 9.93m
  - Compares to broker/industry forecasts of EV sales representing ~2.5% of new cars sales by 2020
- To support strategy Volkswagen anticipates fleet requirement of ~150Gwh by 2025
  - Equates to ~165ktpa anode material or ~165ktpa spherical graphite
  - At current Chinese flake yields into spherical graphite estimated at 30-40%, equates to ~470ktpa of natural graphite
  - Nachu graphite test work has indicated spherical graphite yields of ~75%
- EV are no longer the domain of Silicon Valley companies
  - EVs represent "product innovation" of a staple of civilisation not revolution which drive the potential for "hyper adoption" scenarios that significantly exceed market forecasts



Source: Volkswagen, June 2016



Source: Benchmark Mineral Intelligence as at April 2016.

Note: 1 tonne of battery anode produced from natural graphite requires approximately 1 tonne of

Source: Syrah Resources, June 2016

# Shovel ready project of significance



#### **Magnis Resources**

- Located west of the coastal city of Lindi and ~200km by road from port city of Mtwara in south east Tanzania
- One of the most advanced graphite projects of scale globally
- BFS completed
- ESIA completed in accordance with Equator Principles guidelines
- Power solution
- Port access
- All requisite environmental and mining permits secured
  - Special Mining Licence (SML) granted to Nachu by the Ministry of Energy and Minerals of Tanzania
- Mineral Development Agreement (MDA) finalised for Nachu
  - 30% corporate tax rate
  - 3% production royalty
  - 5% free carried interest in project for Tanzanian Government
  - Environmental conditions, dispute resolution mechanisms



### **Compelling BFS Results**



- BFS confirms Nachu as a robust, high returning graphite project with premium product quality
- Average 220ktpa graphite concentrate produced over an initial reserve-backed 15 year mine life
  - 240ktpa over first 12 years
- Strong further high grade resource conversion potential
- Post-tax NPV<sub>10%</sub> of US\$1.69b and project IRR of 98%
- 12.5x mine life to payback ratio
- Outstanding forecast operating margin of US\$1,791/t
- Projected basket price of US\$2,350/t reflects high value products – exceptional purity and flake size
- Increased pre-production capex relative to PFS driven by larger plant capacity (3.6mtpa PFS)

Key project parameters	BFS (March 2016) <sup>1</sup>
Resources	174mt at 5.4% TGC
Reserves	76mt at 4.8% TGC
Initial life of mine (years)	15.2
Total mined ore (mt)	76.3
Strip ratio (LOM avg)	1.5
Plant throughput (mtpa)	5.0
Feed grade (% TGC, LOM avg)	4.8%
Recovery (LOM avg)	92%
Graphite concentrate production (ktpa, LOM avg)	220
Average concentrate purity (% TGC)	98%
Cash cost (US\$/t conc FOB Mtwara, LOM avg)*	559
Pre-production capital (US\$m)	269
Sustaining capital (US\$m)	71
Weighted average basket price (US\$/t conc FOB)	2,350
Free cash flow (US\$m pa, LOM avg)	255
NPV <sub>10%</sub> (US\$m, post-tax)	1,686
Project IRR (post-tax)	98%
Payback period (years)	1.2

<sup>\*</sup> Excludes production royalty (3%)

#### **Product Streams and Pricing**



#### 240ktpa Flake Graphite Concentrate (average 98.3% TGC)\*

#### 22ktpa Super Jumbo Flake

Size: +500 microns, +35 mesh

**Purity:** 97.5% TGC

**Key markets:** Aerospace, composites

and niche markets

**Current pricing:** US\$4,000-6,000/t CFR\*\*

#### 77ktpa Jumbo Flake

**Size:** 300-500 microns, +50/-35 mesh

**Purity: 97.0% TGC** 

Key markets: Expandable graphite,

composites and electronics

**Current pricing:** US\$2,500-3,000/t CFR\*\*

#### 141ktpa Battery Feedstock

Size: Sub 300 microns, -50 mesh

**Purity:** 99.1% TGC

**Key markets:** Spherical graphite for use

in Li-ion battery anodes

Value-in-use pricing: +US\$2,100/t FOB\*\*

- Premium pricing due to purity, absence of halides and terminal product performance
  - Spherical graphite produced from Nachu Battery Feedstock delivers superior performance to leading synthetic graphite
- Downstream margin capture
  - Toll processing (spheronising and coating) to produce spherical graphite
- Strong market outlook for all Nachu product streams
  - In contrast, clear future oversupply risk in fine grain, lower purity products
  - Large flake sizes provide significant marketing flexibility

<sup>\*</sup> Concentrate production rate over first 12 years of initial mine plan

<sup>\*\*</sup> Current pricing based on industry sources and end user discussions

#### **Capital and Operating Costs**



- Pre-production capital estimate of US\$269m (includes 11% or US\$28m contingency provision)
  - Increase from PFS estimate predominantly driven by bigger plant size (5mtpa)

269

- Sustaining capital of approximately US\$4.7m pa
- Cash operating cost LOM estimate of US\$559/t concentrate FOB Mtwara
  - US\$502/t average across the first five years (240ktpa production rate)
  - Contract mining and product transport
- BFS cost estimates to an accuracy of -10%/+10%

Capital activity	Capex (US\$m)
Process plant	117
Infrastructure	60
Pre-mining and site preparation	25
Owner's costs	20
EPCM	20
Contingency and escalation	28

Total pre-production capital cost

Nachu pre-production capital cost estimate

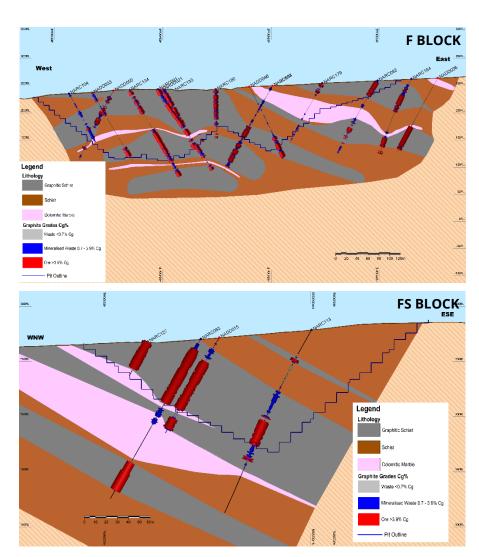
Nachu cash operating cost LOM estimate						
Production activity	Opex (US\$/t conc FOB)					
Mining	217					
Processing	51					
Power	66					
Diesel	48					
Product logistics	81					
Maintenance, G&A and other	96					
Total cash operating cost (FOB Mtwara)*	559					

<sup>\*</sup> Excludes production royalty (3%)

### **Simple Geology**

Magnis Resources

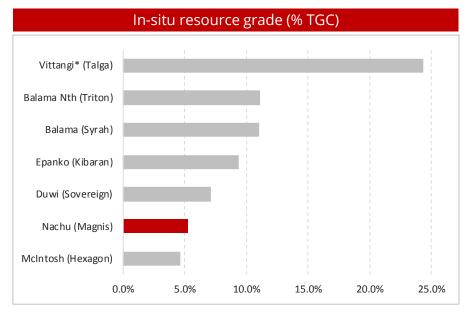
- Graphitic schist with later stage dolomite intrusives resulting in high purity and ordered crystal structure
- Impurities on the surface not within the crystalline structure
- Outcropping and near surface
- Open folded anticlines with an average dip of less than 20 degrees
- Excellent continuity
- Major deposit is F Block
  - Strike length over 1.4km
  - Defined width over 900m
  - Major horizons are 30-70m thick
  - Open in all directions

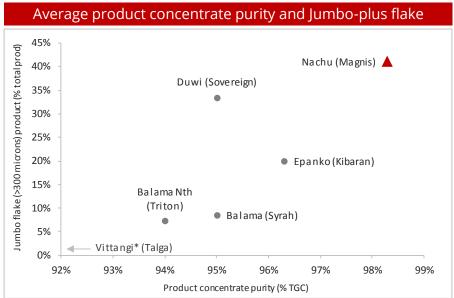


## High Quality, High Value Deposit



- In-situ grade is just one of the relevant factors in graphite project analysis
- Graphite project economics predominantly driven by realised basket price
  - Final concentrate purity and flake size distribution are therefore critical and need close evaluation
- Huge price differentials (and forecast to grow) between high and low value product concentrates
  - 98-99% purity / +150 micron product versus 94-97% purity / sub-150 micron concentrate





Source: Various company ASX releases on Resource estimates and Scoping Study/PFS/DFS outcomes

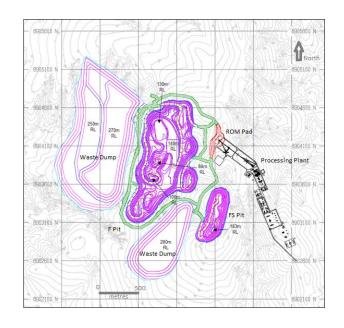
<sup>\*</sup> Vittangi development case involves new direct processing technology and includes an assumed ~1kt super high-value graphene production

#### **Conventional Mining**



- Nachu reserve = 76mt at 4.8% TGC for 3.7mt contained graphite
  - Two open pits F and FS
- Broader resource = 174mt at 5.4% TGC for 9.3mt contained graphite
  - Represents only 2% of project licence area
- Conventional drill and blast, truck and shovel open pit mining techniques
- A number of independent mining cost estimates received and reviewed from contractors as part of BFS
  - Assumed \$3.95/t material moved in BFS
- 90t excavators (Cat 390) and 40t articulated trucks (Cat 475)
  - Ramp design allows up to 90t Cat 777 trucks
- Average strip ratio of 1.5:1 LOM
  - 1.4:1 over the first 5 years
- Lower grade ore (3.5% TGC) stockpiled for treatment in latter years of initial mine life

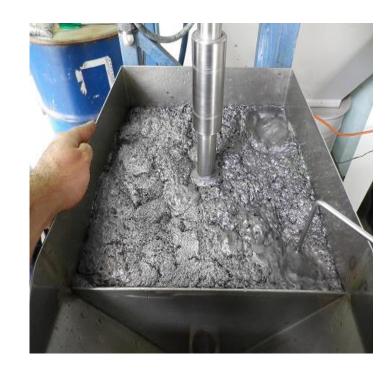
Nachu ore reserve estimate <sup>1</sup>								
Classification Tonnes Grade Graphite (mt) (% TGC) (mt)								
Proved	50.5	4.6	2.3					
Probable	25.7	5.1	1.3					
Total ore reserves	76.3	4.8	3.7					



# **Process and Metallurgical Rigour**



- Simple and proven process flowsheet crushing and screening, grinding, flotation, filtration, drying
- Key processing parameters
  - Front end throughput of 5mtpa ore
  - Feed grade: avg 5.2% TGC first 12 years and avg 3.9% TGC next 3 years (LG stockpiles)
  - Processing recovery of 92%
  - Final average concentrate purity of 98.3%
- High volume and broad nature of Nachu testwork delivers robust process and product parameters
  - > 99% TGC and up to 99.6% TGC from basic flotation for sub-300 microns concentrate
  - Results repeated throughout Blocks F and FS
  - Core sample tests from every diamond hole

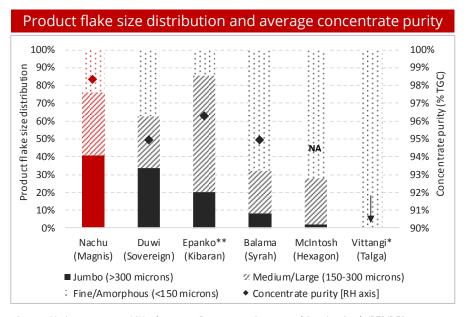


## **Exceptional Purity and Flake Size**



- Exceptional final concentrate grade of +99% TGC for sub-300 micron product from <u>solely</u> flotation = very rare at 92% process recovery
  - Driven by Nachu being coarse flake with impurities on the surface not within the crystalline structure
  - High value, high appeal as removes/minimises need for expensive downstream chemical purification (HF/HCl treatment) for use in Li-ion battery anodes and expanded graphite material
- Over 40% of Nachu product in high value Super Jumbo (+500 microns) and Jumbo (+300 microns) flake sizes

Graphite flake size and concentrate grades									
Classification	Concentrate grade (% TGC)	Sieve size (microns)	Sieve size (mesh)	Weight distribution					
Super Jumbo	97.5%	> 500	+35	9%					
Jumbo	97.0%	300 - 500	+50/-35	32%					
Large	99.2%	180 - 300	+80/-50	25%					
Medium	99.1%	150 - 180	+100/-80	10%					
Fine	99.0%	75 - 150	+200/-100	18%					
Amorphous	98.9%	< 75	-200	6%					
Battery Feedstock									



Source: Various company ASX releases on Resource estimates and Scoping Study/PFS/DFS outcomes

 $<sup>\</sup>hbox{$^*$ Vittangi development case involves new direct processing technology and includes $\sim 1$ kt graphene}$ 

<sup>\*\*</sup> Medium/Large size fraction for Epanko is 106-300 microns (ie includes significant Fine product)

### **Infrastructure and Logistics**



- In-country transport
  - Bagged concentrate loaded in containers and trucked to port
  - 200km by road; 140km sealed and 60km hard dirt to site
- Port access
  - Mtwara facility has 400ktpa capacity; 130-140ktpa current utilisation; required Nachu usage approximately 240ktpa
  - Efficient consumables supply chain and product export route
- Water availability
  - Borehole field on-site; water recovery and re-use
- Power
  - Grid power agreement signed with Symbion Power
  - Symbion to construct a dedicated 30MW power station, associated substations and 132KV transmission line to Nachu
  - Grid power pricing of US\$0.08-0.10/kWh represents significant cost saving over diesel or HFO





## **Basket Price and Sensitivity**



BFS basket price construction										
Classification	Concentrate grade (% TGC)	Sieve size (microns)	Sieve size (mesh)	Price (US\$/t FOB)	Weight distribution					
Super Jumbo	97.5%	> 500	+35	4,000	9%					
Jumbo	97.0%	300 - 500	+50/-35	2,500	32%					
Battery Feedstock	99.1%	< 300	-50	2,125	59%					
Gross basket price				2,413	100%					
Discounted net basket prid	ce			2,350						

Sensitivity of BFS outcomes to basket price assumption								
Price scenario	Low (-35%)	BFS base	High (+35%)					
Weighted average basket price (US\$/t conc FOB)	1,528	2,350	3,173					
Free cash flow (US\$m pa, LOM avg)	125	255	383					
NPV <sub>10%</sub> (US\$m, post-tax)	779	1,686	2,592					
Project IRR (post-tax)	54%	98%	139%					
Payback period (years)	2.0	1.2	0.6					

### **Supply Chain Strategy & IP**



- Magnis Resources' supply chain has significant flexibility to meet customers indicated specifications
  - This starts and finishes with the quality of the in-situ graphite at Nachu
- Co-location potential of downstream facilities for efficiency, reduced cost and rapid scale up potential to meet end user demand
  - Establishment of a higher quality and consistent non Chinese supply source
- Magnis may supply both coated and uncoated spherical graphite subject to customer requirements
  - Coated Spherical Graphite @ >99.95% C
  - Uncoated Spherical Graphite @ 99.90% C
- Industry leading infrastructure and IP
  - Team with cumulative 50+ years of Li-ion industry experience
  - Access to IP to continue product evolution

Magnis Flakes From Mine
~ 180 Micron (d50)
(Purity 99.2%)



Spheroidisation ~75 % Yield (Purity 99.9%)



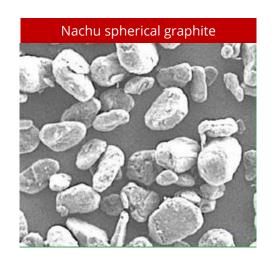
Coating/ Ultra Specification (Purity 99.95+%)

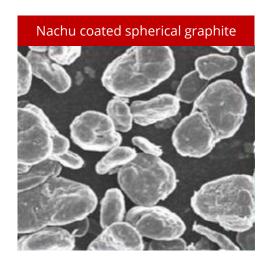
# Outstanding battery anode results



#### **Magnis Resources**

- >99.95% purity coated spherical graphite produced from Nahcu graphite
  - Utilising existing commercial scale technology and facilities in North America
  - Approximate 75% yield from spheronising versus typical 30-40% for current Chinese product
  - No chemical purification treatment applied in the process
  - Competitive advantage over incumbent Chinese fines product and prospective new entrants
- Nahcu graphite battery anode performance tests delivered the following outstanding results
  - Tap Density: 1.21 g/cc
  - BET: 1.908m2/g
  - First cycle efficiency: 95%
  - First charge capacity: 354mAh/g
- Clear potential to displace existing sources in high growth battery markets providing a greener, more cost effective supply chain for sustainable industry end users





# Graphite/Silicon blend results highlight our R&D commitment



- Graphite and silicon anode blend is an area receiving significant attention from battery makers and car manufacturers for the next generation of high performance anode material
  - Experience of the Magnis team allows for parallel development of the silicon blend with delivery of coated spherical graphite material from the Nachu project
- Testwork conducted for a 10% silicon additive blended with Nachu coated spherical graphite
- Initial results from coin cell testing include
  - First charge capacity capacity of 587+ mAh/g, a 65% improvement over the energy density of ~355mAh/g for current industry standard graphite anode
  - First cycle efficiency >86%
  - More than 98% capacity retention after 38 cycles
- Potential to deliver significant increase in mileage and power
  - The 65% increase in anode capacity translates to 20-30% increase in mileage for current battery pack sizes

# **Target Development Timeline**



	20	14		20	15			20	16			20	17		20	18
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Drilling and resource modelling	V	<b>V</b>														
Metallurgical testwork	<b>V</b>	<b>V</b>	V	V	V	V										
Pre-feasibility study	V	<b>√</b>														
Cornerstone offtake agreements			<b>✓</b>													
Environmental impact study	V	$\overline{\checkmark}$	V	V												
Mining approval and MDA					$\overline{V}$	$\overline{\checkmark}$										
Detailed design			V	V	V	V	V									
Bankable Feasibility Study						V	<b>V</b>									
Detailed engineering							V	$\overline{V}$								
Offtake agreements																
Project financing																
Construction																
Commissioning and production																

#### Summary



- Nachu is a high quality, long life graphite resource
- Located in Tanzania, a well established mining jurisdiction
- Development ready all environmental and mining permits secured, fiscal stability with signed MDA
- Nachu BFS delivers outstanding forecast returns 98% post-tax IRR, US\$1.69b post-tax NPV<sub>10%</sub>
- Key advantages relative to graphite development peers
  - High appeal, high value product given exceptional concentrate purity and coarse flake size
  - High volume and broad nature of met testing delivers robust processing and product parameters
  - Outstanding realised price and operating margin position expected given premium product composition
  - No downstream chemical purification requirement for Nachu concentrate = strong 'green credentials'
- Project financing progressing in parallel with advanced North American, European and Asian buyer offtake discussions

# Appendix A: Tanzanian Operating Environment

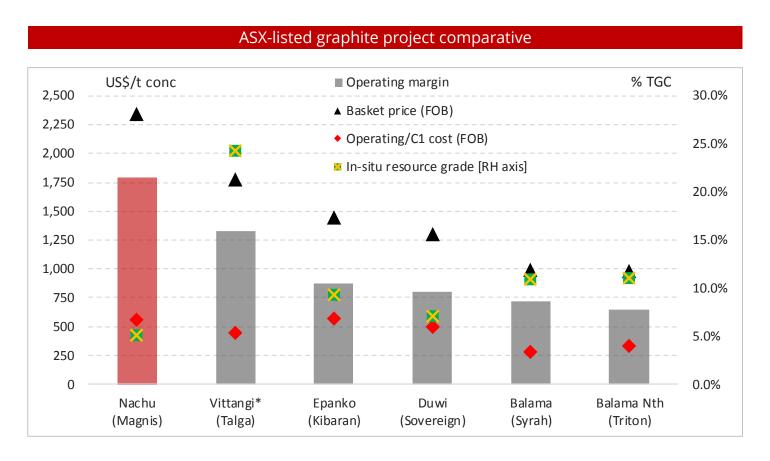


- Tanzania overview
  - Broad stability following independence in 1961
  - Presidential constitutional republic with democratic multi-party elections since 1995; most recent
     October 2015
  - Reform of mining policy in 1998 has attracted significant capital investment
  - 4<sup>th</sup> largest gold producing country in Africa
- All requisite environmental and mining permits secured
  - Special Mining Licence (SML) granted to Nachu by the Ministry of Energy and Minerals of Tanzania
- Mineral Development Agreement (MDA) executed for Nachu
  - 30% corporate tax rate
  - 3% production royalty
  - 5% free carried interest in project for Tanzanian Government
  - Environmental conditions, dispute resolution mechanisms

# Appendix B: Outstanding Margin Dynamics



Nachu concentrate product purity and coarse flake distribution drive outstanding projected margins



Source: Various company ASX releases on Scoping Study, PFS and DFS outcomes

<sup>\*</sup> Vittangi development case involves new direct processing technology and its basket price includes an assumed ~1kt super high-value graphene production

### **Appendix C: Graphite Markets**



- Global graphite market = 2.2mtpa
  - Natural (1.1mtpa); flake and amorphous sources; key producers China, India, Brazil
  - Synthetic (1.1mtpa); high purity but energy intensive and expensive
  - Natural-for-synthetic displacement potential
- China currently ~70% of total natural supply
  - Consistency and quality issues
  - Ore value declining and labour costs rising
  - Increased focus on environmental impacts
  - 20% export duty and 17% VAT levied on exports
  - Downstream spherical plants at ~50% capacity
  - End users seeking greater diversity of supply

#### **Key graphite end uses**

- Battery anodes (high growth)
- Expandable graphite (high growth)
- Composites
- Refractory and foundry
- Gaskets, seals, brake linings, lubricants



# Appendix D: Graphite in Li-ion Batteries



#### Natural flake graphite concentrate

- Typical pricing: U\$\$750-1,000/t (94-95%, small to medium flake).
- Significant issues with quality and consistency of predominant Chinese supply.
- Pricing increases with purity and flake size (Nachu Battery Feedstock is +99% and large to medium flake).

#### **GLOBAL NATURAL FLAKE SUPPLY**

Synthetic graphite feed

sources



67%



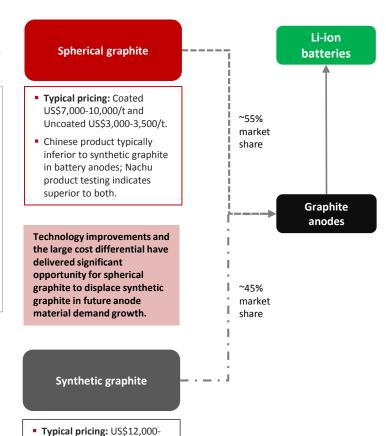
15%

#### SPHERONISATION AND PURIFICATION

- Natural flake placed in a circulating terminal that spins the graphite, forcing the flakes to collide and bend. As the flakes bend, they form small spheres with a sub 20 micron diameter (uncoated spherical graphite).
- Typical yield from this spheronising process is 30-50% (ie 50-70% loss from concentrate); Nachu yield is ~75%.
- Uncoated spherical graphite is then purified to 99.95% via acid baths (HCI/HF), cleansed and coated with a single layer of carbon (coated spherical graphite).
- Purification cost ranges widely driven by the extent of chemical (and thermal) treatment processes required; Nachu Battery Feed is already +99% vs typical 94-95%.
- Close to 100% of current uncoated spherical graphite production occurs in China. The coating process occurs mainly in China, Japan, Korea and Taiwan.

#### HIGH TEMPERATURE TREATMENT

 Carbon material such as petroleum coke, coal tar pitch, etc.  Aggressive heat treatment (2,300-3,000°C) to recreate the pressure-temperature environment required to form natural graphite. Highly energy intensive.



20,000/t

 Historically high performance anode material but expensive.

#### Source: Deutsche Bank, Syrah Resources, Industry sources, March 2016

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