

# Syrah Resources and Graphite Market

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# Corporate Background

# Syrah Resources: Only major new supplier of natural graphite

## First mover advantage – operations commenced

- First production November 2017
- Customer shipments commenced January 2018
- First revenue received February 2018

## Global supplier of flake graphite

- Sales agreements with global customer base
- Exposure to high growth markets – graphite is key component in Li-Ion battery anodes
- Diversified end markets including battery & industrial
- First significant graphite exporter to China

## Largest natural graphite producer

- Balama Tier 1 asset: 17% grade, LoM > 50 years, 350ktpa capacity
- Targeting first quartile cash costs
- Market share ~40% by 2020

## Value accretive strategy

- Aim to be the first integrated battery anode material producer outside China with value added processing of Balama graphite
- Optionality to expand Balama production



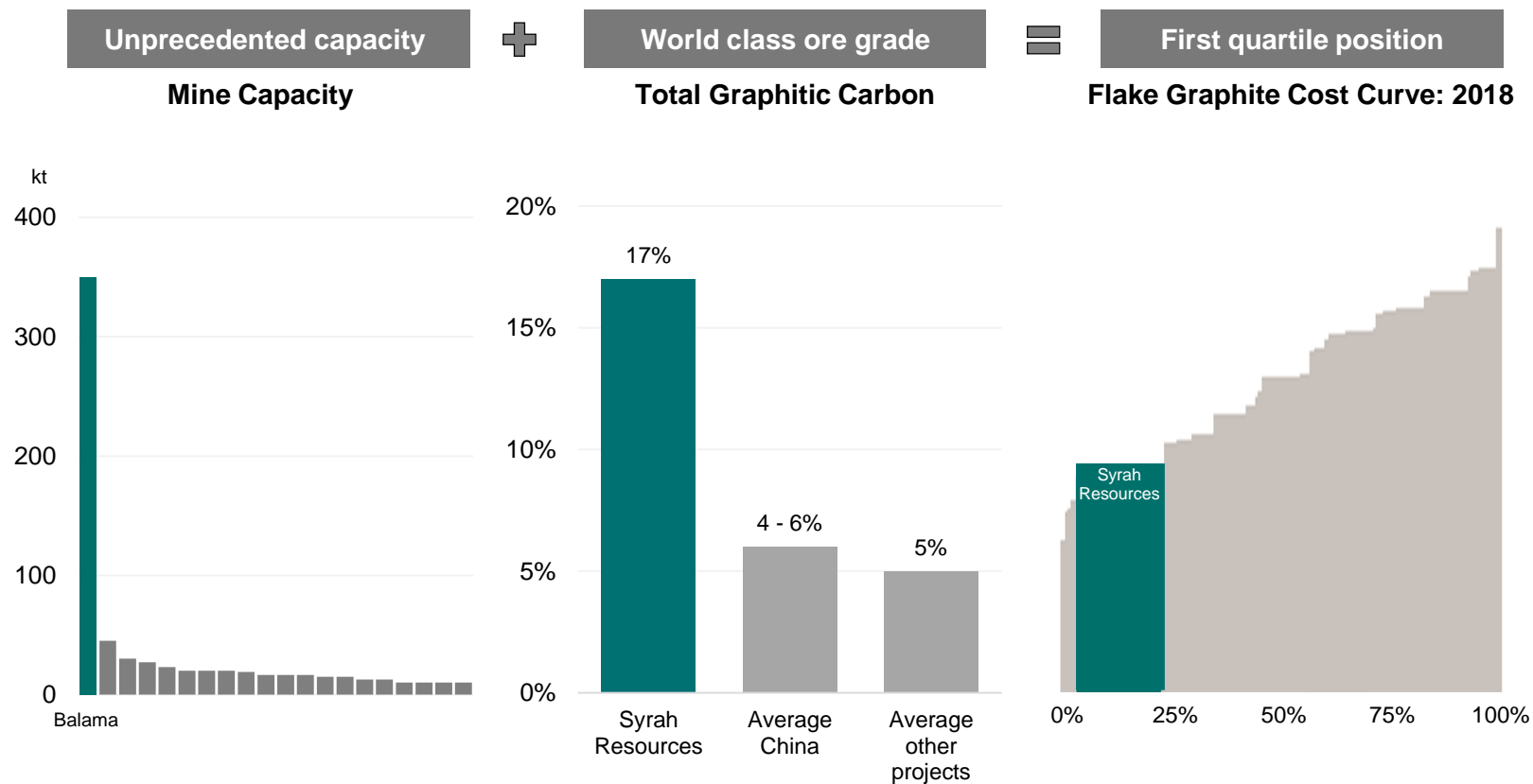
**SYRAH RESOURCES**

# Syrah's strategy is focussed on value; enabled by a world class deposit and fast growing market

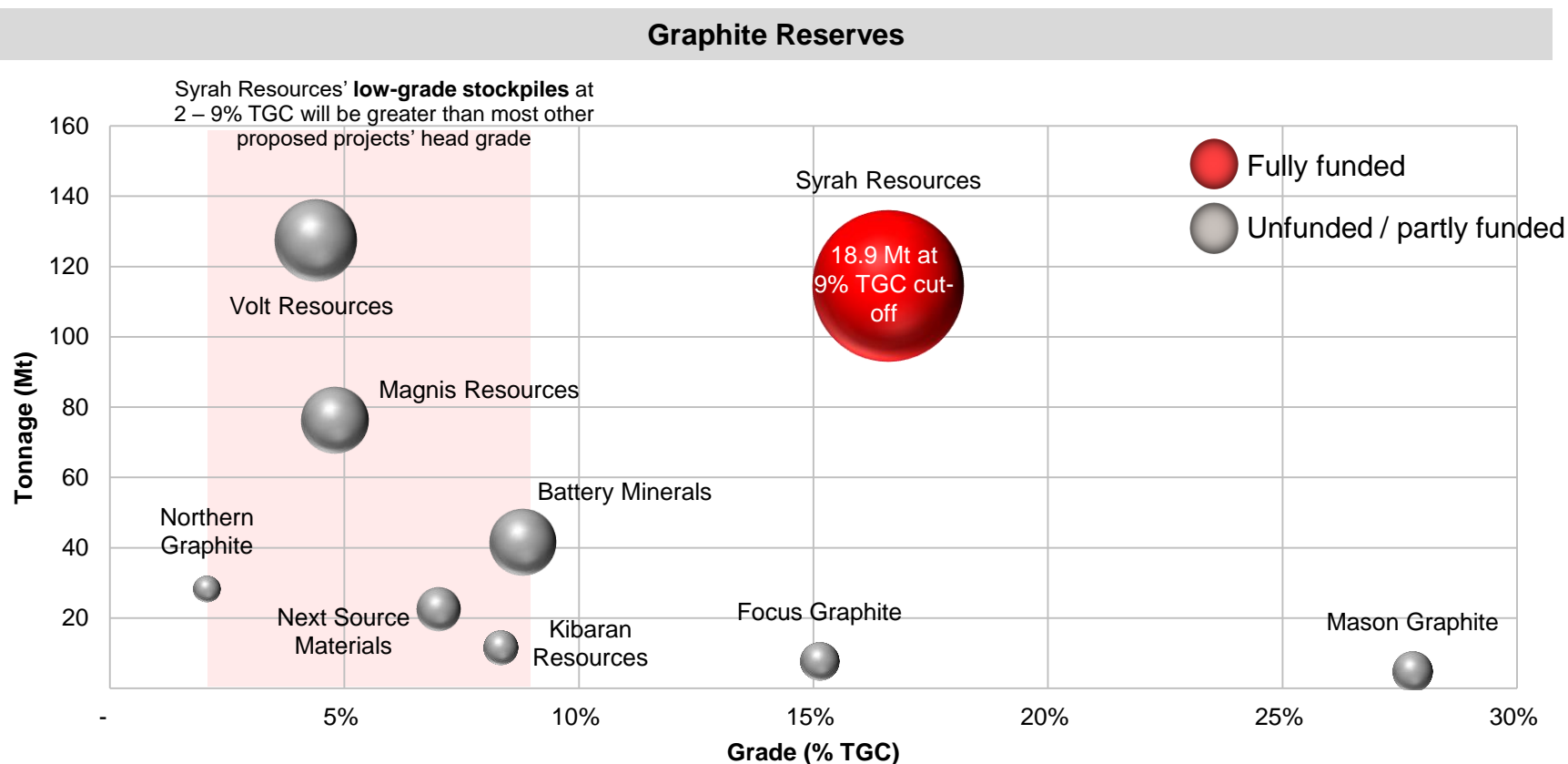
Goals	Logic	Enablers	Timing
<b>Be the pre-eminent supplier of flake graphite</b>	<ul style="list-style-type: none"> <li>Industrial for baseload demand</li> <li>Lithium-ion battery market growth</li> </ul>	<ul style="list-style-type: none"> <li>Low cost &lt;US\$400/t, toward US\$300/t</li> <li>High quality 95%-98% Fixed Carbon</li> <li>Large volume 350ktpa</li> </ul>	<ul style="list-style-type: none"> <li>Transitioned to operations 1 January 2018</li> </ul>
<b>Be the first integrated Battery Anode Material producer outside China</b>	<ul style="list-style-type: none"> <li>High value-add product</li> <li>First mover advantage</li> <li>Diversification in the global supply chain</li> </ul>	<ul style="list-style-type: none"> <li>Electric vehicle market growth</li> <li>Energy storage</li> <li>Consumer goods</li> </ul>	<ul style="list-style-type: none"> <li>2018</li> </ul>
<b>Maximise value of other options</b>	<ul style="list-style-type: none"> <li>Large scale deposit</li> <li>Lithium-ion battery market growth</li> <li>Vanadium</li> </ul>	<ul style="list-style-type: none"> <li>Expansion of Balama mine</li> <li>Battery anode material expansion</li> <li>Processing Vanadium</li> </ul>	<ul style="list-style-type: none"> <li>Options under development</li> </ul>
<b>Our Values and People underpin how we execute our strategy</b>			
<b>Deliver value for stakeholders and shareholders</b>			



# Largest capacity, high consistent quality, and a long life asset enables Syrah Resources to be the global graphite leader



# Syrah's high grade Balama deposit has the largest defined graphite reserve globally; only major project in operations



Source: Company filings as at September 2017

Notes: Selected ASX and TSX listed graphite projects only and excludes Chinese producers. TGC = Total graphitic carbon

Bubble size is representative of latest reported contained graphite reserves

Cut-off grade for Northern Graphite (Ontario, Canada) is 0.96% TGC

Cut-off grade for Volt Resources (Tanzania) is 1.29% to 1.76% TGC

Cut-off grade for Magnis Resources (Tanzania) that aims for a 98% Cg

concentrate grade at a production level of 240ktpa from a 5Mtpa concentrator

Cut-off grade for NextSource Materials (Madagascar) is 4.5% TGC

Cut-off grade for Battery Minerals (Mozambique) is 4% TGC

Cut-off grade for Kibaran Resources (Tanzania) is 5% TGC

Cut-off grade for Focus Graphite (Quebec, Canada) is 3.1% TGC

Cut-off grade for Mason Graphite (Quebec, Canada) is 6% TGC



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# Balama is a tier 1 asset

## Commodity

Flake Graphite



Copper



Iron Ore



Zinc



## Largest mine

**Balama**  
Mozambique



**Escondida**  
Chile



**S11D (Carajas)**  
Brazil



**Rampura Agucha**  
India



## Market share

15 – 20% in 2018  
35 – 40% at full capacity

~5% in 2017

~5% at full capacity

~5% in 2017





# Q1 2018 Highlights

<b>Health, Safety and Community</b>	<ul style="list-style-type: none"> <li>- Strong safety record continues with Total Recordable Injury Frequency Rate (TRIFR) of 0.8</li> <li>- President of Mozambique, His Excellency Mr Filipe Nyusi, officially opening the Balama Graphite Operation at an onsite inauguration in April</li> </ul>
<b>Balama Graphite Operation</b>	<ul style="list-style-type: none"> <li>- Fines dryer repaired and operational post quarter end, ahead of schedule</li> <li>- Q1 production of 11.2kt. Production below plan, current production rates improving with increased recoveries, plant throughput and stability to deliver significant uplift in daily production</li> <li>- Plant consistently producing carbon grade &gt;95% and particle size distribution within specification</li> <li>- Targeting lower end of 2018 production guidance of 160,000 to 180,000 tonnes<sup>1</sup></li> <li>- Cost base well positioned for C1 production costs &lt;US\$400/t by end of 2018</li> </ul>
<b>Sales and Marketing</b>	<ul style="list-style-type: none"> <li>- Sales and qualification shipments commenced in January to all major customer markets</li> <li>- Positive qualification feedback from &gt; 20 customers across industrial and battery markets</li> <li>- Additional spot and term sales contracts settled in Q1, further contract negotiations well advanced</li> <li>- Basket price impacted by qualification shipments, higher fines production and China pricing</li> <li>- Higher basket price expected in H2 2018 given full sales and production profile, product consistency and grade premium</li> </ul>
<b>Battery Anode Material (BAM) Project</b>	<ul style="list-style-type: none"> <li>- BAM site Letter of Intent to purchase an industrial site in Vidalia, Louisiana with strong local community support</li> <li>- Positive results from testing reconfirm Syrah's BAM products have essential core properties required by global battery industry</li> <li>- Targeting production of first purified spherical graphite by end 2018</li> <li>- Feasibility study to determine size and economics of potential larger commercial facility to be completed by end Q3 2018</li> </ul>
<b>Finance</b>	<ul style="list-style-type: none"> <li>- Cash on hand US\$80.5m as at 31 March 2018</li> <li>- Forecast cash balance end Q2 2018 ~US\$55m</li> <li>- Timing of BAM major capital expenditure post site selection will be made in conjunction with Balama cash flow profile</li> </ul>

(1) Refer to ASX announcements titled "Syrah finalises Balama Graphite study and declares maiden ore reserve" released on 29 May 2015, "Syrah increases Balama Reserves and awards Laboratory Contract" released on 15 November 2016. All material assumptions underpinning the production target in these announcements continue to apply and have not materially changed.



# Balama Graphite Operation: Production rates improving

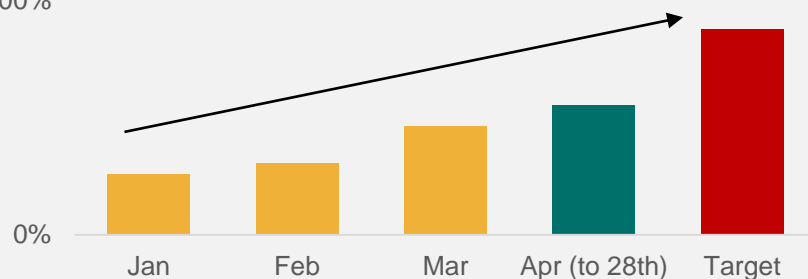
## 2018 Production 160kt – 180kt

- Targeting lower end of guidance 160kt to 180kt<sup>1</sup>
- Planned production ramp up 25% H1, 75% H2 – Q2 and H2 profiles broadly similar to original plan
- Operating costs in line with expectations, well positioned to achieve C1 <US\$400/t<sup>2</sup> by end 2018
- Strong plant throughput performance post dryer repair, combined with continued improvement in graphite recoveries and improved plant stability positions the operation well for continued progressive production ramp up, with maximum daily production achieved in April of 470 tonnes

## Flotation optimisation improving recoveries<sup>3</sup>

Recoveries

100%



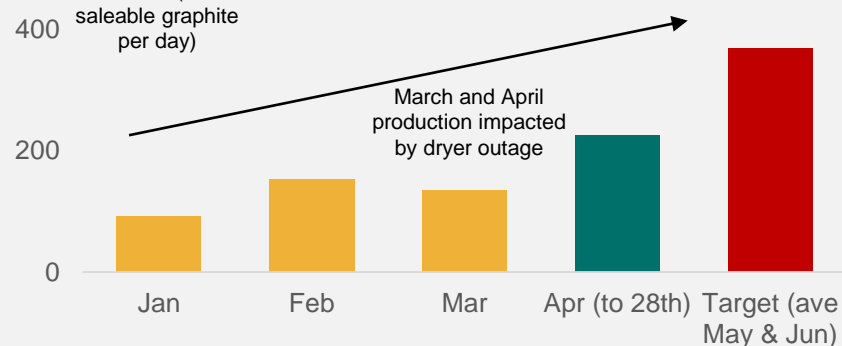
## Daily production increasing

Production (tonnes saleable graphite per day)

400

200

0



(1) Refer to ASX announcements titled "Syrah finalises Balama Graphite study and declares maiden ore reserve" released on 29 May 2015, "Syrah increases Balama Reserves and awards Laboratory Contract" released on 15 November 2016. All material assumptions underpinning the production target in these announcements continue to apply and have not materially changed.

(2) C1 cash operating costs (FOB Port of Nacala, excluding government royalties and taxes)

(3) Total plant recovery for January, February and March and flotation recovery April month to date.



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# Balama Inauguration April 2018

President of Mozambique, His Excellency Mr Filipe Nyusi, officially opening Balama



Greeting Syrah MD & CEO, Shaun Verner



Traditional tree planting



Local community



Bagging of graphite concentrate



Unveiling of commemorative Balama plaque



Balama inauguration plaque

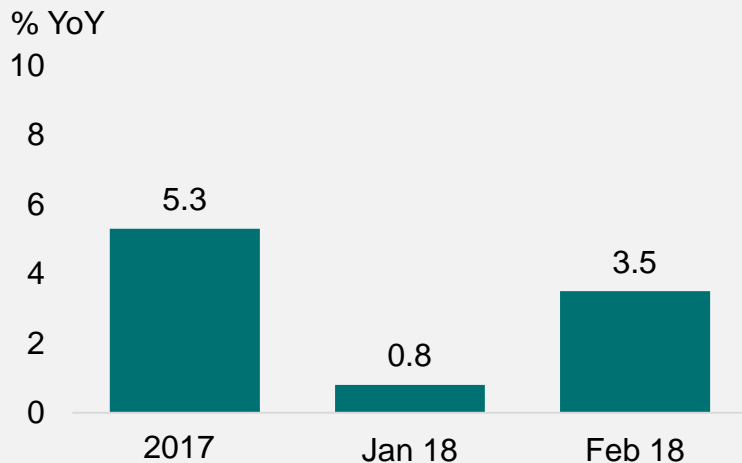
# Graphite Market



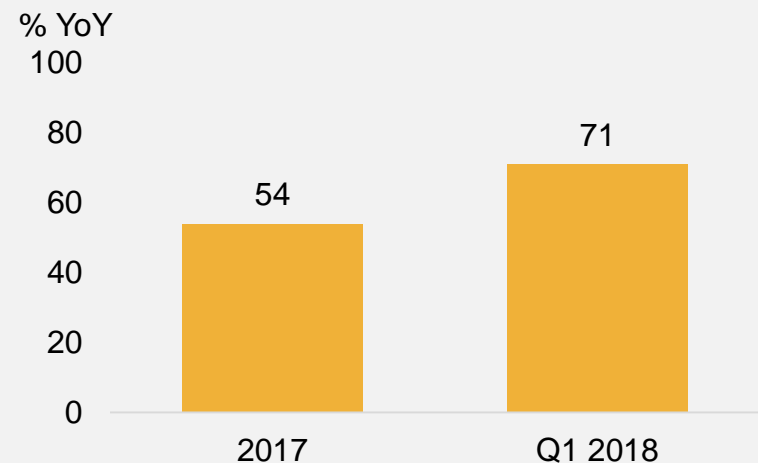
# Industrial and battery market demand was strong in 2017; has continued Q1 2018

- World Steel Association expects global steel production growth of +1.8% in 2018. Down from +5.3% in 2017 as demand from China eases
- In 2017, ~120,000 tonnes of flake graphite was used to produce lithium ion battery anode material for all electrical applications
- Syrah expects electric passenger vehicle market to grow by +40% to +50% in 2018
- In 2018, Syrah expects an incremental +80,000 tonnes of demand from the battery sector and flat demand from the steel sector

## Global Steel Market Growth



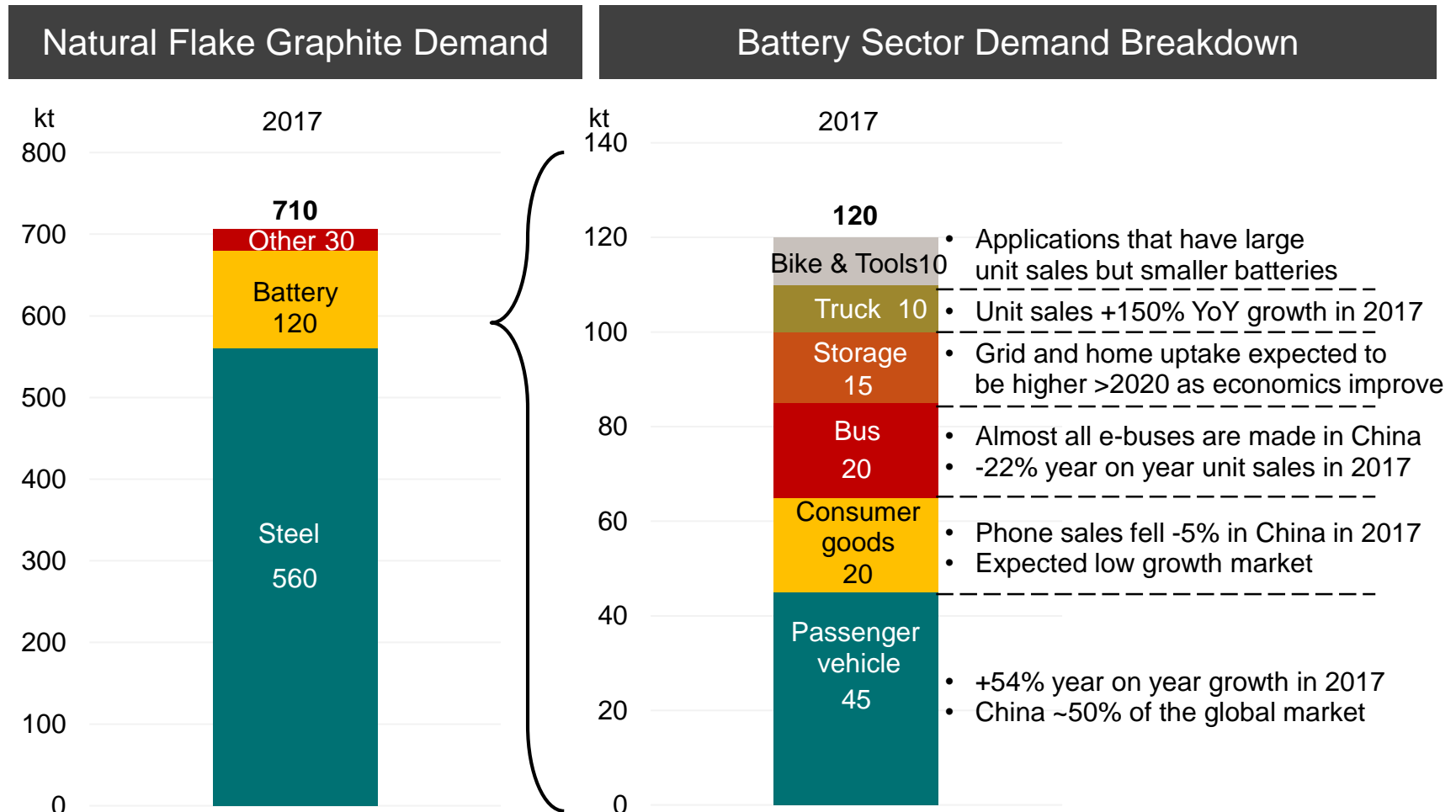
## Passenger Electric Vehicle<sup>1</sup> Market Growth



Source: Syrah Resources, CEIC, World Steel Association

(1) Does not include electric bus, trucks and bikes

# Battery sector demand growth for flake graphite driven by passenger vehicles and trucks in 2017

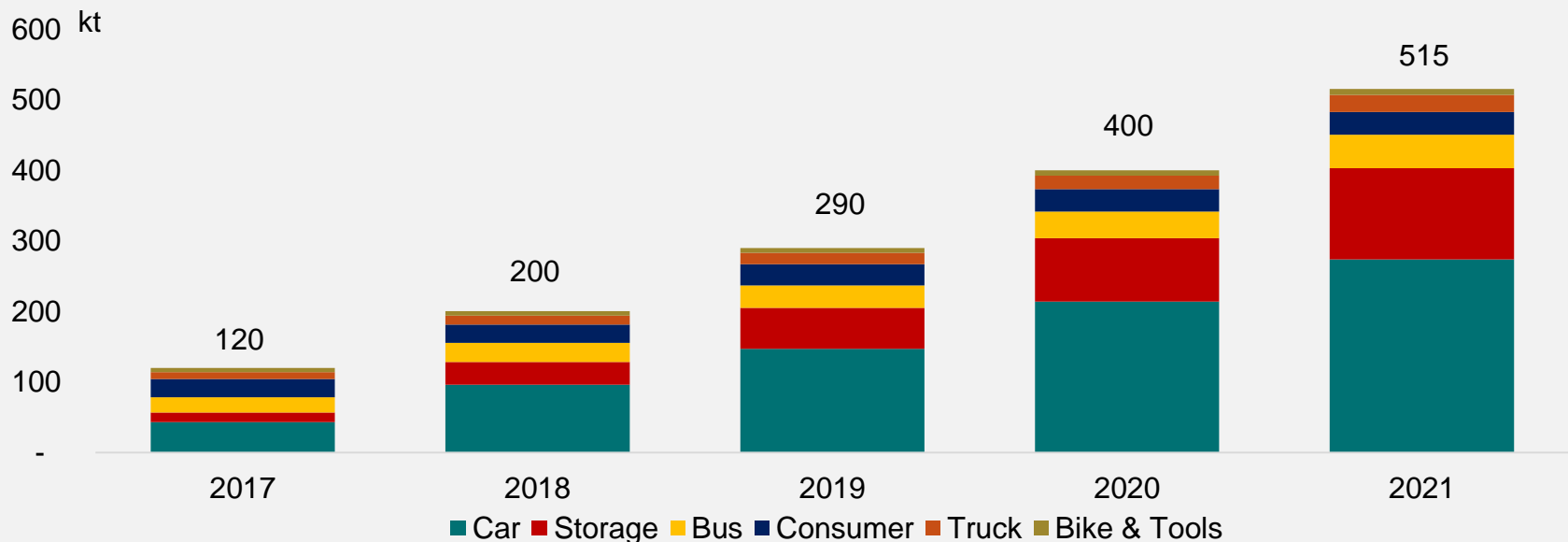


# Natural flake graphite market outlook: Battery sector

## Rapid growth of lithium ion battery market expected

- Syrah estimates an increase in demand of nearly 400kt from the battery sector between 2017 and 2021, to ~500kt
- Assume an electric vehicle penetration rate of 5.5% (global) and 9% (China) to reach 2021 demand forecast
- Expect energy storage to be a major market >2021 due to renewable energy integration in homes and grids

## Lithium ion battery demand by end use application








Source: Syrah Resources internal demand and supply model



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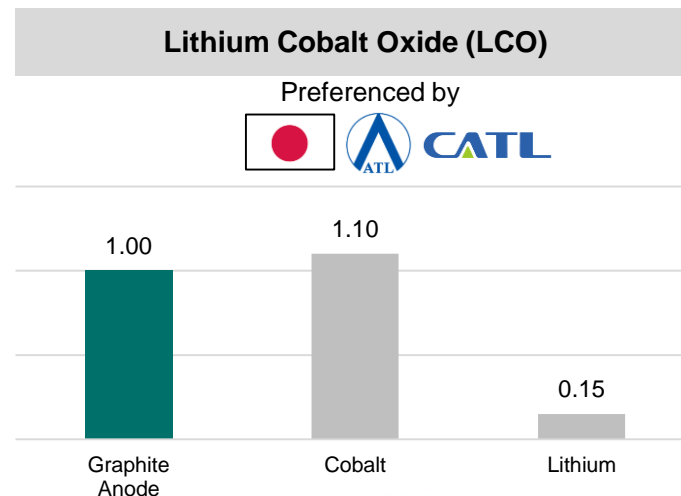
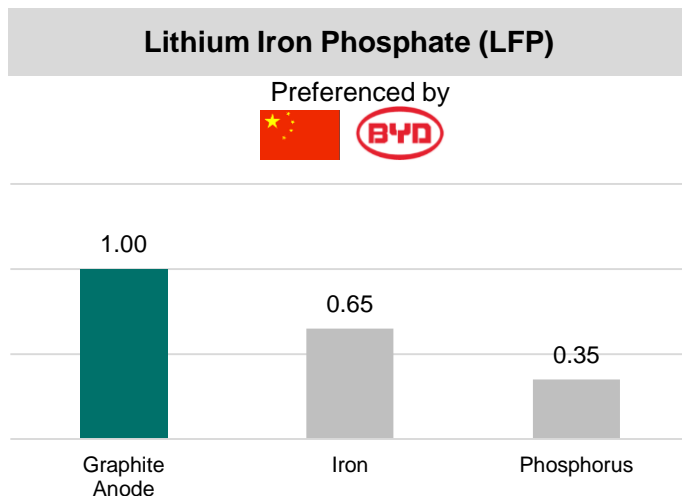
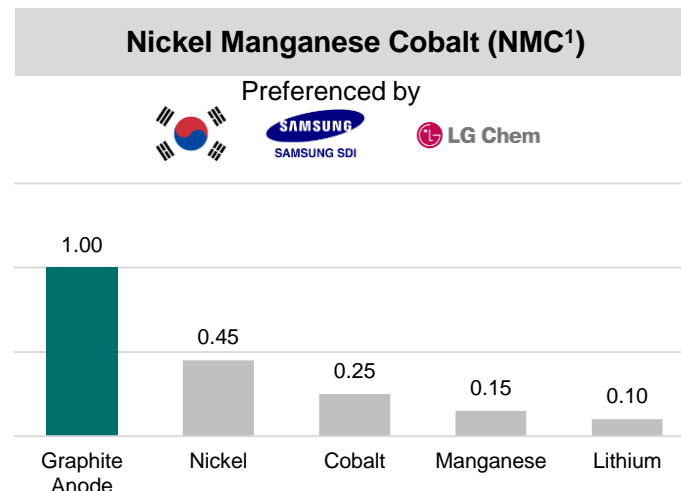
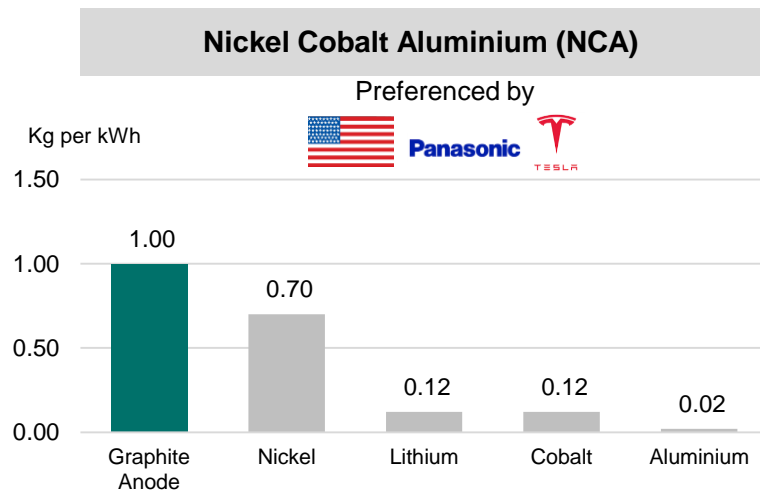


# How much natural graphite is in an electric vehicle? It depends on battery size and natural graphite content in the anode material

	2017 unit sales (global, thousands)	Lithium ion battery size	Anode Material per unit (natural & synthetic combined)	Natural Flake Graphite per unit (40 - 50% yield per kg of anode material)
<b>Plug in Electric Vehicle</b> 	~400	5 - 20kWh	5 - 20kg Balanced proportion of natural and synthetic graphite	10 - 30kg
<b>Full Electric Vehicle</b> 	~400	30 - 45kWh	30 - 45kg Balanced proportion of natural and synthetic graphite	35 - 50kg
<b>Electric Commercial Truck</b> 	~120	40 - 70kWh	40 - 70kg Balanced proportion of natural and synthetic graphite	40 - 80kg
<b>Premium Electric Vehicle</b> 	~150	75 - 100kWh	75 - 100kg Higher proportion of synthetic graphite	40 - 50kg
<b>Electric Bus</b> 	~105	150 - 350kWh	150 - 350kg Balanced proportion of natural and synthetic graphite	150 - 380kg



Source: Syrah Resources

# Graphite anode mass in Li-ion battery per kWh is consistent and agnostic of cathode chemistry



Source: Syrah Resources

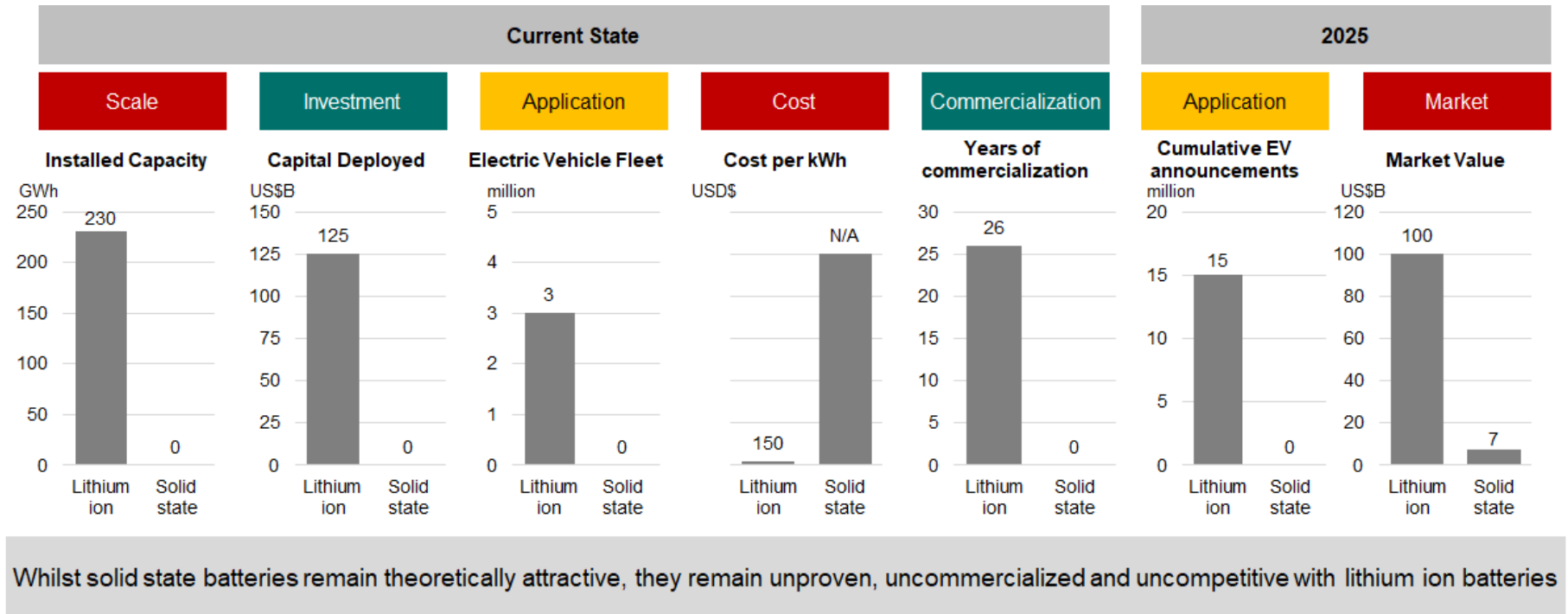
Each kg of natural graphite anode material requires >2kg of natural flake graphite  
 (1) NMC 523 Chemistry

 Anode  
 Cathode Materials

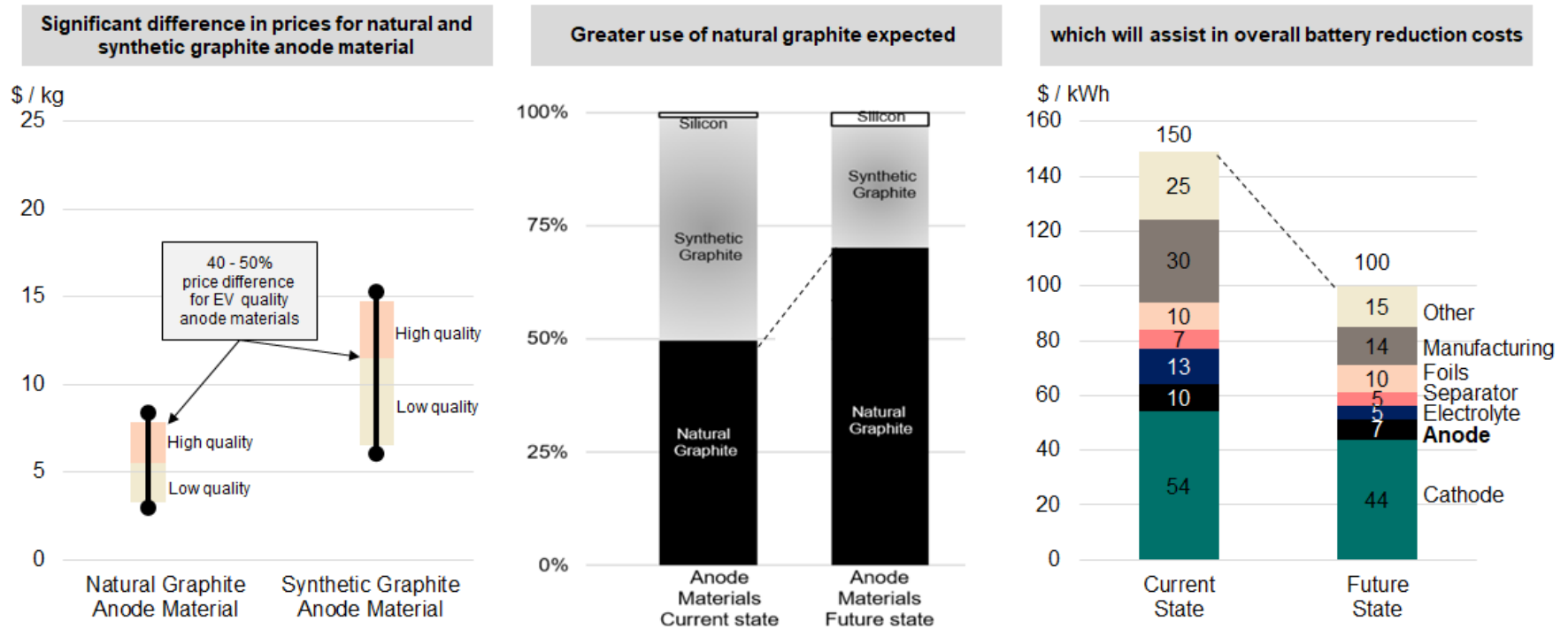


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# Scale and economics means lithium ion battery technology likely to remain the base load of energy delivered to meet future demand from electric vehicles



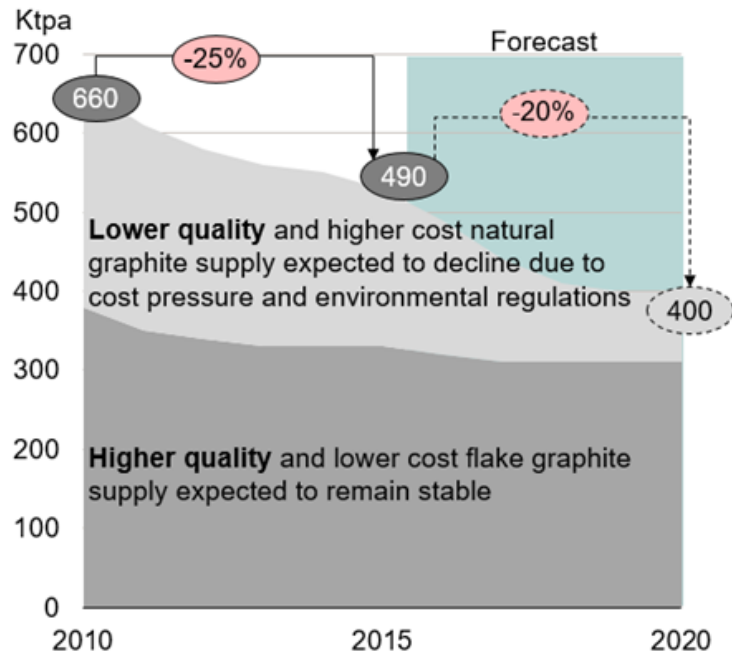
# Increased penetration of natural graphite in anode material supports future demand and prices for natural graphite; facilitates reduction in battery costs



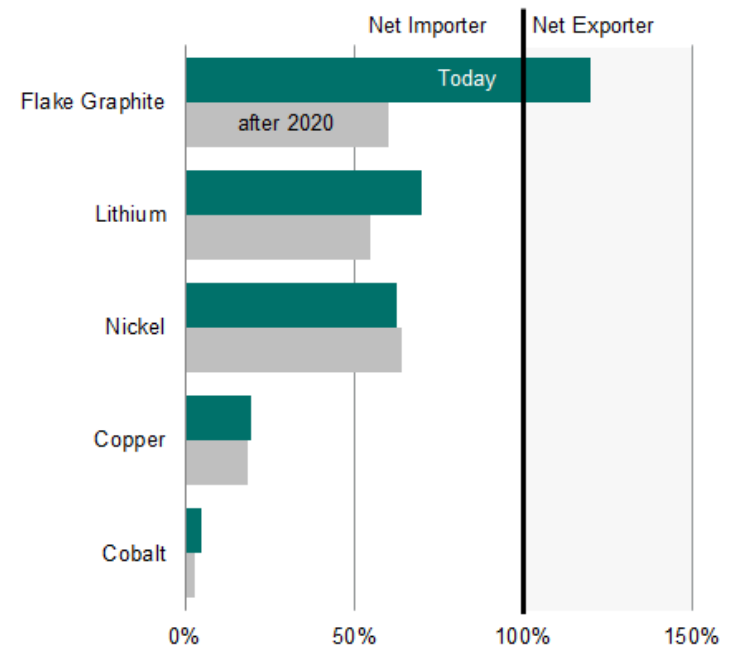
Source: Syrah Resources, Bernstein

# China's demand profile and declining domestic graphite resources means a structural change to a net importer of natural graphite will occur

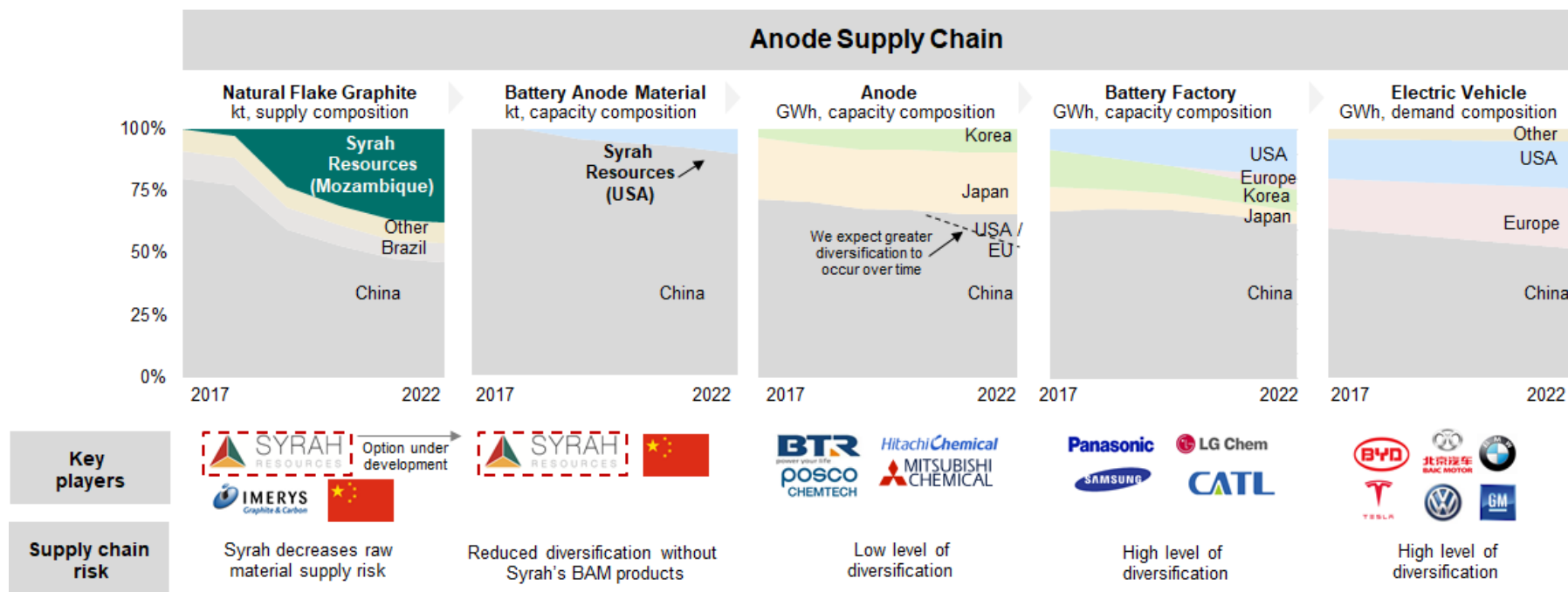
China's domestic supply of natural flake graphite has been declining due to resource depletion and environment improvement



China's switch from an exporter to importer of natural will permanently and structurally change the market dynamics



# Anode supply chain margins driven by the development of intellectual property by anode material and anode producers



Source: Syrah Resources

# BAM strategy leverages product quality, location and timing to establish position and maximise value

Electric Vehicle driven battery growth of 23% CAGR (in GWh) to 2025

## Market and Strategy

BAM market opportunity and margins are driven by:

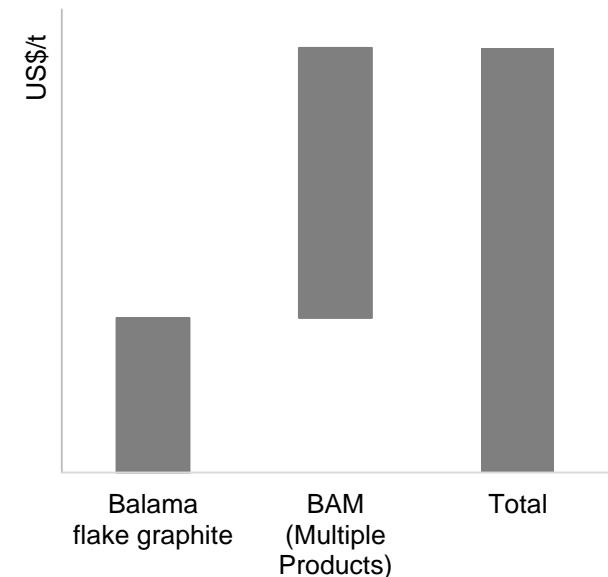
- Anode **quality and performance** in the battery
- **Cost** of alternative materials
- **Security** of supply and sourcing **diversification**
- **Intellectual property** and **technology expertise**

Syrah's BAM strategy is to:

- Highlight quality through **testing and benchmarking**
- **Capture value in use** upstream
- Commence **low risk BAM production in Louisiana**
- Provide baseload **supply security and diversification**
- **Leverage relationships to move down the value chain** for market entry and value

## Value

### Potential EBITDA contribution



**SYRAH** RESOURCES



# Summary

Syrah establishing solid foundation as only major new supplier of graphite to battery market

## Syrah Resources

- Largest and one of the lowest cost and highest quality producers of natural flake graphite
- Strong demand profile outlook for natural graphite from lithium ion batteries for electric vehicles and power storage
- Sales agreements with traditional and battery market customers
- Will establish a position in the battery supply chain through value added processing of graphite for anode materials
- Syrah remains the only major new supplier of flake graphite to world's battery market

