

# **Q2 2022 Quarterly Activities Report**

21 July 2022 Shaun Verner – Managing Director & CEO



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#### **Investor Relations**

Viren Hira

T: +61 3 9670 7264

E: v.hira@syrahresources.com.au

# Media Enquiries NWR Communications

Nathan Ryan

T: 0420 582 887

E: nathan.ryan@nwrcommunications.com.au

#### **Syrah Contact Information**

c/- Vistra Australia (Melbourne) Pty Ltd Level 4, 96-100 Albert Road South Melbourne, VIC 3205

T: +61 3 9670 7264

 $\hbox{\bf E: enquiries@syrahresources.com.au}$ 

W: www.syrahresources.com.au

# Syrah's Value Proposition



#### **Electric Vehicles require graphite**

- Electric Vehicle ("EV") adoption is gaining momentum
- Anodes in lithium-ion batteries used in EVs are made of graphite



## Graphite is a strategic critical mineral

- Global anode supply chain is currently 100% reliant on China
- Graphite is designated as a strategic critical mineral in USA, EU, Japan & Australia



## **Balama Graphite Operation: A Tier 1 asset**

- Long life (>50 years<sup>1</sup>) and high grade (16% TGC<sup>2</sup>)
- Largest integrated natural graphite mine and processing operation globally
- Significant vanadium resource at Balama is a valuable option<sup>3</sup>



## **Vertical Integration in USA**

- Balama vertically integrated with AAM<sup>4</sup> facility at Vidalia, USA
- Large-scale ex-Asia AAM supply option that is ESG verifiable

Syrah's vision is to be the world's leading supplier of superior quality graphite and anode material products, working closely with customers and the supply chain to add value in battery and industrial markets



<sup>1.</sup> Life of mine based on current 107Mt Graphite Ore Reserves being depleted at 2Mt throughput per annum. Refer to 2021 Annual Report released to ASX 24 March 2022 for Reserves as at 31 December 2021. All material assumptions underpinning the Reserves and Resource statement in this presentation continue to apply, other than as updated in subsequent ASX releases.

TGC = Total graphitic carbon.

Scoping study on potential to refine vanadium as per ASX release 30 July 2014.

AAM = Active anode material.

# **Syrah's Positive ESG Profile**

	Leading ESG standards	<ul> <li>✓ ISO:45001 and ISO:14001 certification at Balama</li> <li>✓ ISO:9001 certification at Vidalia</li> <li>✓ Vidalia expansion project being developed in line with best practice health, safety and environmental standards</li> </ul>
	Best practice sustainability frameworks	<ul> <li>✓ Critical Risk Management Framework embedded across the Group</li> <li>✓ Sustainability frameworks guided by:         <ul> <li>Global Reporting Initiative (GRI)</li> <li>United Nations Sustainable Development Goals (SDGs)</li> <li>International Council on Mining and Metals (ICMM)</li> <li>Initiative for Responsible Mining Assurance (IRMA)</li> <li>✓ Robust Community Development and Stakeholder Engagement Strategy</li> </ul> </li> </ul>
	Low carbon footprint	<ul> <li>✓ Lower carbon emissions footprint (life cycle) of natural versus synthetic graphite</li> <li>✓ Independent life cycle assessment (LCA) completed</li> <li>✓ Implementing initiatives to lower carbon footprint further including a hybrid solar and battery system at Balama</li> </ul>
<b>6</b>	Auditable back to source	<ul> <li>✓ Vidalia and Balama products have a single chain of custody back to the source</li> <li>✓ ESG performance verifiable across the full chain</li> </ul>

# **Q2 2022: Highlights**

Health and Safety	Total Recordable Injury Frequency Rate ("TRIFR") of 0.8 for Balama and 17.1 for Vidalia at quarter end
Market	<ul> <li>Strong momentum in EV sales and penetration, a key leading indicator for natural graphite and active anode material ("AAM") demand growth</li> <li>Global EV sales grew 51% in Q2 2022, versus Q2 2021, to ~2.2 million units¹</li> </ul>
	<ul> <li>Significant commitments made to further expanding EV sales and battery manufacturing capacity in the USA</li> </ul>
	<ul> <li>China domestic fines price was stable through Q2 2022 with record Chinese anode production and natural graphite imports</li> </ul>
	Produced 44kt natural graphite at 79% recovery with 44kt sold and shipped
	<ul> <li>Product quality consistent with previous quarter with stable grade and higher recovery</li> </ul>
Dolomo Undoto	<ul> <li>Balama C1 cash costs (FOB Nacala/Pemba) of US\$543/t, impacted by one-off maintenance costs and input price increases</li> </ul>
Balama Update	<ul> <li>Weighted average sales price increased to US\$662/t (CIF) and was stable with increasing Chinese domestic production and strong demand</li> </ul>
	<ul> <li>Two ~10kt spot breakbulk shipments from Pemba port completed in Q2 2022 and further breakbulk shipments planned for Q3 2022</li> </ul>
	<ul> <li>Significant forward sales order book of nearly 90kt natural graphite, demonstrating robust underlying demand conditions</li> </ul>
	<ul> <li>First mover in establishing an independent, vertically integrated ex-Asia supply chain for AAM driving commercial and technical interactions</li> </ul>
	• Detailed engineering for expansion of Vidalia AAM facility to 11.25ktpa AAM production capacity ("Vidalia Initial Expansion") more than 76% complete
Vidalia Update	<ul> <li>Construction of the Vidalia Initial Expansion project advancing within schedule and budget</li> </ul>
	<ul> <li>11.25ktpa AAM Vidalia facility targeted to start production in Q3 2023</li> </ul>
	<ul> <li>DFS for the expansion of Vidalia's production capacity to at least 45ktpa AAM, inclusive of 11.25ktpa AAM, well underway and to be completed in 2022</li> </ul>
	<ul> <li>Memorandum of understanding with Mitsubishi Chemicals Company to develop AAM products and localised production facilities</li> </ul>
	<ul> <li>Commenced process for development of a large-scale AAM facility in the European Union potentially through partnership</li> </ul>
Corporate	<ul> <li>Conditional Commitment<sup>2</sup> offered by the US Department of Energy ("DOE") for an Advanced Technology Vehicles Manufacturing loan to support the financing of the Vidalia Initial Expansion project<sup>3</sup>. Syrah and DOE targeting signing of a binding loan in Q3 2022</li> </ul>
	Quarter end cash balance of US\$168m

<sup>1.</sup> Source: LMC. June 2022 includes Syrah's estimate for EV sales in selected countries (~144k total).

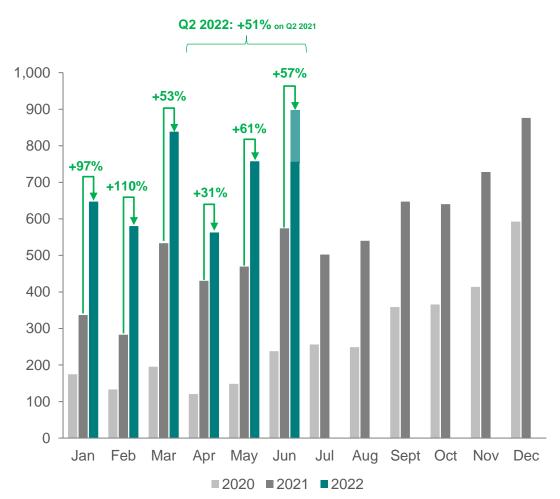


<sup>2.</sup> A Conditional Commitment is offered by DOE prior to issuing a loan and indicates that DOE expects to support the Vidalia Initial Expansion project, subject to the satisfaction of certain conditions including fulfilling remaining legal, contractual, and financial requirements.

<sup>3.</sup> Refer ASX release 19 April 2022.

# EV sales, anode production and Chinese graphite imports strengthen

#### Global EV Sales ('000 Units)

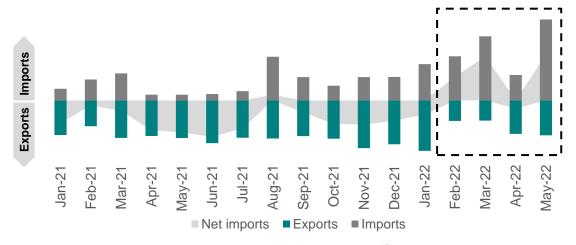


#### Source: LMC. June 2022 includes Syrah's estimate for EV sales in selected countries (~144k total, shown in lighter shade).

#### **Chinese Anode Production (kt)**



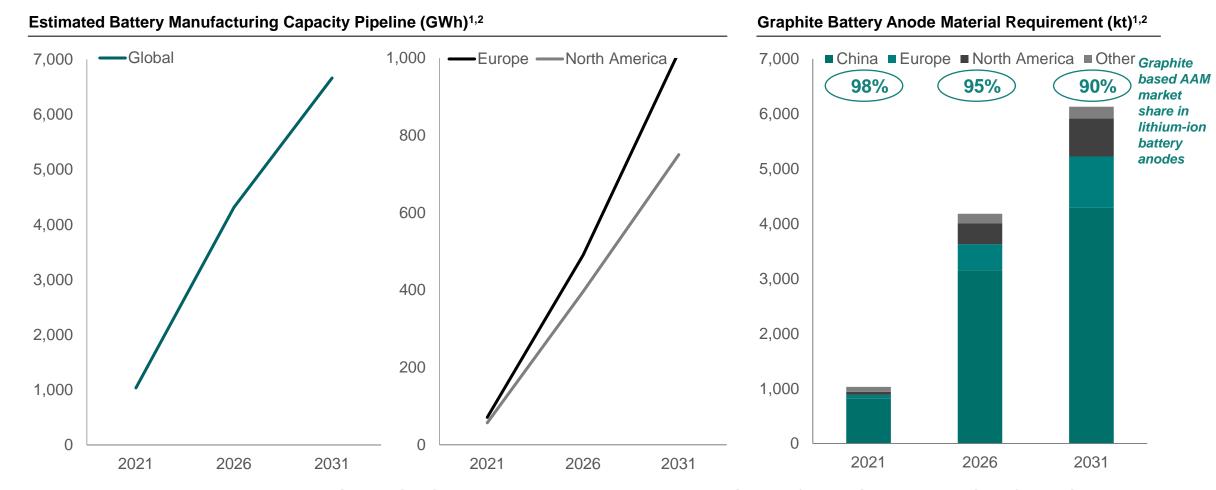
## **Chinese Natural Graphite Imports and Exports**



Source: Asian Metals.



# Battery manufacturing and anode material requirements set to rapidly rise



11.25kt AAM and 45kt AAM capacity at Vidalia equates to 3% and 12%, respectively, of graphite AAM required for estimated USA-based estimated battery manufacturing capacity by 2026<sup>3</sup>

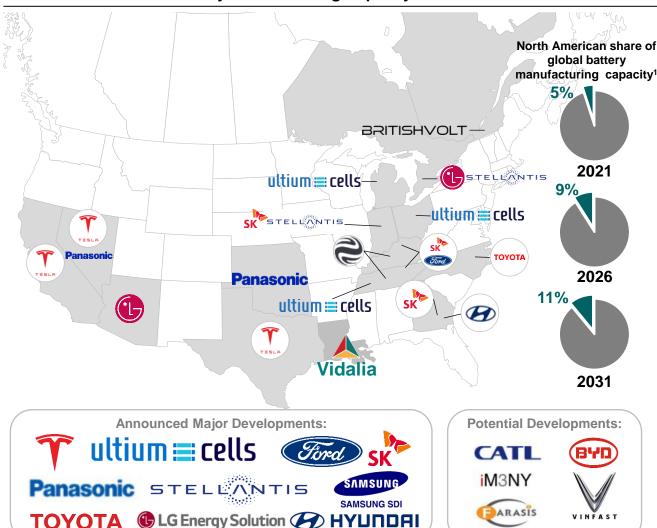
 <sup>2026</sup> forecast North American battery manufacturing capacity of 396GWh, 85% battery manufacturing capacity utilisation, 95% graphite anode market share and 1.2kg/kWh intensity of graphite in anode.
 Source: Benchmark Mineral Intelligence Battery Megafactory Assessment, June 2022 and Flake Graphite Forecast, Q2 2022, excluding capacity utilisation which is a Syrah assumption.

<sup>2.</sup> Intensity by mass of graphite in battery anode.

<sup>2026</sup> forecast North American battery manufacturing capacity of 396GWh, 85% battery manufacturing capacity utilisation, 95% graphite anode market share and 1.2kg/kWh intensity of graphite in anode.

# North American battery market is maturing rapidly to support a large-scale EV manufacturing base in the region

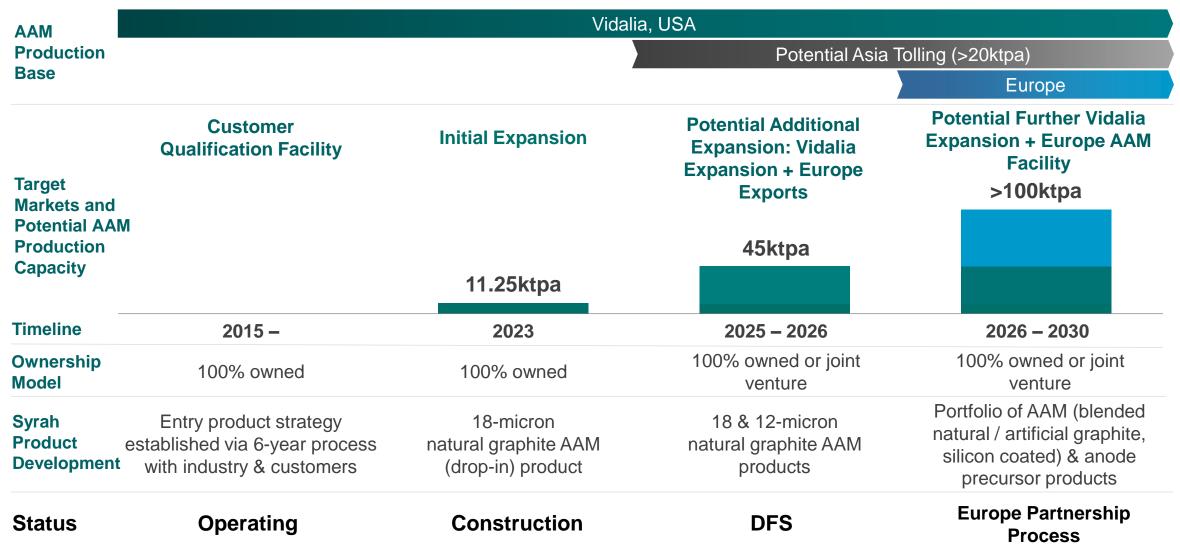
**Location of Planned Battery Manufacturing Capacity in North America** 



#### Planned Battery Manufacturing Capacity in North America

Company	Size (GWh)	Location	Start
Panasonic	100	KS	2024
Stellantis / Samsung SDI	33	IN	2025
Hyundai	300k EVs	GA	2025
Stellantis / LGES	45	Ontario	2024
Envision AESC	40	KY	2025
LG	11	AZ	2024
Toyota	TBC	NC	2025
FREYR / Koch	50	TBC	2030
Ford / SKI (BlueOvalSK 1-2)	129	KY / TN	2025
GM / LGES (Ultium 1-4)	120	OH / TN / MI	2022 – 2024
Stellantis / Samsung SDI	40	TBC	2025
Britishvolt	60	Quebec	TBC
Toyota	TBC	NC	2025
Panasonic (PENA)	49	NV	2022
Tesla	10	CA	Pilot / Operating
LG	5	MI	Operating
Envision AESC	10	TN	2025
iM3NY	5	NY	2025
Farasis	8-16	TBC	2023-4

# Syrah's vision is to become a leading supplier of anode products

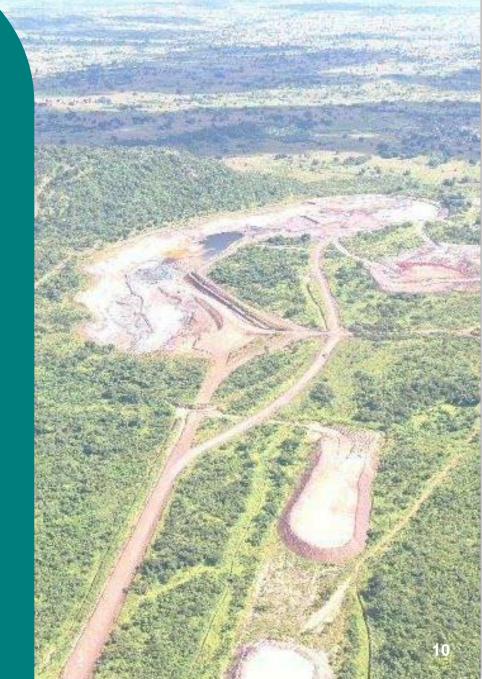


Syrah's downstream expansion strategy is underpinned by Balama's world-class graphite resource



## **Q2 2022: Balama Production and Operations**

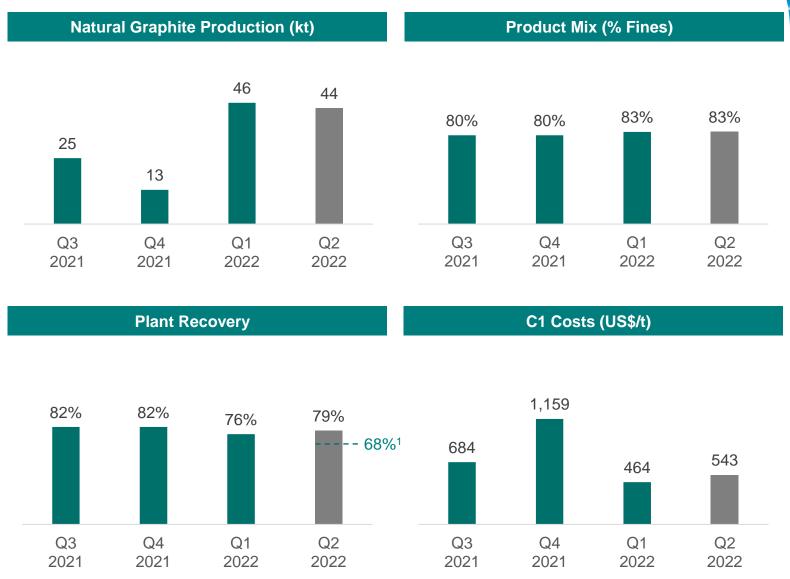
- Maximum inventory positions and ongoing disruption in the global container shipping market continues to constrain Balama production to 15kt per month production rate
- 44kt natural graphite produced at 79% recovery during Q2 2022
- Product quality consistent with previous quarter with stable grade and higher recovery
- Strong operational performance during campaign production runs with average and maximum daily production run-rate of 18kt per month and 27kt per month, respectively
- C1 cash costs (FOB Nacala/Pemba) of US\$543/t at 15kt per month production rate (H1: US\$503/t)
  - Impacted by higher diesel and consumables costs, additional ex-mine gate logistics costs for Pemba breakbulk and one-off maintenance cost timing
  - Reviewing C1 cash cost guidance at 15kt per month production rate
  - C1 cash costs expected to reduce as production rate increases beyond 15kt per month and as improvement initiatives are embedded
- New five-year mining services contract with Tayanna expected to yield improved productivity, performance and costs
- Final investment decision taken on hybrid solar and battery system and construction is progressing on schedule<sup>1</sup>
- Logistics and personnel movements uninterrupted following temporary suspension in June 2022 due to insurgency activity 200km away from Balama<sup>2</sup>



<sup>.</sup> Refer ASX release 6 April 2022.

<sup>2.</sup> Refer ASX releases 9 June 2022 and 17 June 2022

# **Q2 2022: Balama Production and Operations**



<sup>1.</sup> Average recovery in Q1 to Q3 2019 on average natural graphite production of ~46kt per quarter.



# Balama is the largest natural graphite mining/processing operation globally

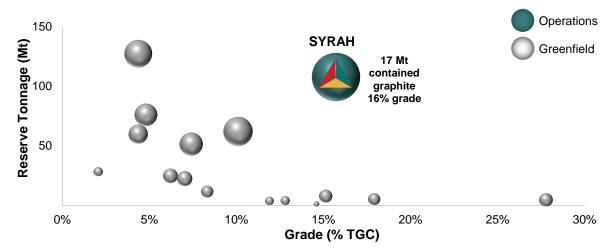
#### **Asset Overview**

Location	Southern Cabo Delgado Province, Mozambique
Reserve & Resource <sup>1</sup>	107Mt (16% TGC) Graphite Ore Reserve 1,421Mt (10% TGC) Graphite Mineral Resource
Life of Mine <sup>2</sup>	~50 years
Mining	Simple open pit mining, low strip ratio
Processing	Conventional – includes crushing, grinding, flotation, filtration, drying, screening and bagging
Plant Capacity	2Mtpa ore throughput yielding ~350ktpa; 342kt produced since 2018
Product	94% to 98% fixed carbon graphite concentrate
C1 Cost <sup>3</sup>	Under review

#### **Key Dates**

Mar 2022	Pemba breakbulk shipments commenced
Mar 2021	Production recommenced at Balama
Mar 2020	Temporary suspension of production at Balama
Sep 2019	In response to drop in flake graphite prices, production moderated
Mar 2019	Graphite Mineral Resources and Ore Reserves updated
Jan 2019	Commercial production declared, with quarterly production of 33kt
Dec 2018	Balama produced >100kt in 2018
Sep 2018	Mining Agreement finalised with Government of Mozambique
Jan 2018	Balama transitions to operations, global sales commenced
Nov 2017	First production of natural graphite
Jul 2016	Balama process plant construction commenced
May 2015	Feasibility Study completed

#### Ex-China Natural Graphite Reserves<sup>4</sup>



#### **Balama Graphite Operation**



- 1. As at 31 December 2020. The Ore Reserve is based on, and fairly represents, Syrah's ASX announcement dated 24 March 2022 (Annual Report 2021), which was prepared by competent persons, Mr Jon Hudson and Mr Christopher Hull. The Mineral Resource is based on, and fairly represents, Syrah's ASX announcement dated 24 March 2022 (Annual Report 2021), which was prepared by competent person. Mr Jonathon Abbot.
- 2. Life of Mine based on Ore Reserves being depleted at 2Mt per annum of mill throughput.
- 3. Syrah is reviewing Balama C1 cash cost guidance at a 15kt per month production rate.
- Source: Company filings; Notes: Selected ASX / TSX-listed graphite projects with declared Reserves only and excludes Chinese producers. Bubble size reflects contained graphite reserves.



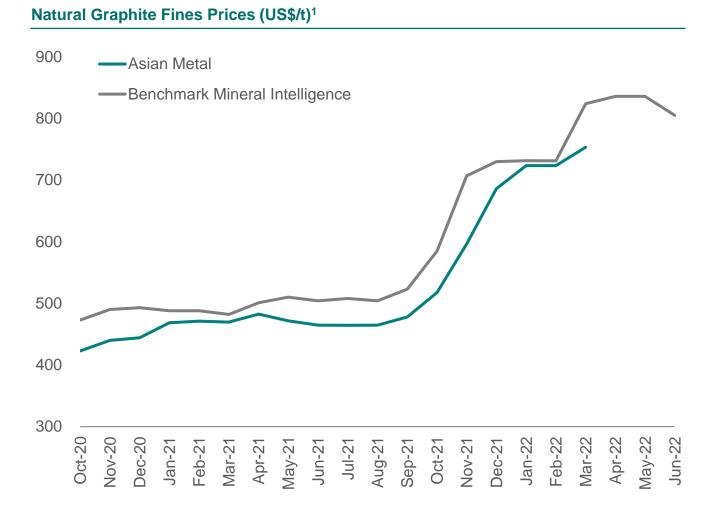
## Q2 2022: Balama Sales and Marketing

- Sold and shipped 44kt natural graphite and all 30kt finished product inventory contracted to customers
- Container shipping market disruption continued to impact access to container capacity and freight cost for Balama products on vessels sailing from Nacala
- Very strong demand and forward contracting with end-user customers nearly 90kt of forward sales orders
- Weighted average sales price increased to US\$662/t (CIF) in Q2 2022
  - Fines prices stable with increasing Chinese domestic production
  - Strong demand evident in fines and coarse markets due to demand growth and Chinese natural graphite production constraints
  - Sea freight rate volatility and surcharges are evident with average shipping costs during quarter at four times long-term average
- Fines sales accounted for approximately 86% of overall product sales during the quarter
- Further breakbulk shipments planned for Q3 2022
- Signs of improvement in global container shipping market. Regional market conditions not expected to improve in Q3 2022
- Integration of breakbulk shipments through Pemba in combination with expected container shipping availability through Nacala will support Balama sales and production of at least 15kt per month



# China graphite fines price stable with constructive market balance

- Strong demand and disrupted domestic supply has supported increased China domestic graphite fines pricing
- Graphite fines demand is strong
  - EV sales increased 51% in Q2 2022
  - Chinese anode production at above 100kt per month in Q2 2022
- Graphite supply (volume and quality) in China
  - Record graphite imports into China to meet anode supply chain demand
  - Chinese natural graphite production constraints are evident due to environmental issues, remedial actions, recertification efforts and COVID-19 related interruptions
  - Disruption in the shipping market constraining Chinese imports to meet growing demand



<sup>1.</sup> Source: Benchmark Mineral Intelligence and Asian Metal (Price Reporting Agencies). China domestic prices for natural graphite fines (94-95% grade; -100mesh) are shown. Syrah's historical weighted average sales prices include sales under a mix of contract types and pricing mechanisms and are not necessarily representative of natural graphite spot prices nor consistent with the natural graphite price assessments of price reporting agencies. Furthermore, prices of China sales, within Syrah's historical weighted average sales prices, are exclusive of China VAT.



## **Q2 2022: Vidalia**

## **Vidalia Initial Expansion**

- Detailed engineering more than 76% completed with Worley Group
- Procurement and contracting accelerated
- Key construction activities were piling, fencing and installation of infrastructure in readiness for contractors' workforce
- Construction progressing within the planned schedule and budget under the management of integrated Syrah and Worley Group team
- Q2 2023 expected construction completion and Q3 2023 target start of production

## **Construction Funding**

- Vidalia Initial Expansion fully funded to start of production
- Conditional Commitment<sup>1</sup> offered by DOE to support the financing of the Vidalia Initial Expansion project<sup>2</sup>. Syrah and DOE targeting signing of a binding loan in Q3 2022, subject to all required approvals and consents

## **Operations and Production**

• Integrated spherical, purification and furnace operation is producing 18-micron and 12-micron AAM, using Balama natural graphite, as required for testing and qualification

2. Refer ASX release 19 April 2022.



<sup>1.</sup> A Conditional Commitment is offered by DOE prior to issuing a loan and indicates that DOE expects to support the Vidalia Initial Expansion project, subject to the satisfaction of certain conditions including fulfilling remaining legal, contractual, and financial requirements.

## **Q2 2022: Vidalia**

## **Customer Engagement and Product Qualification**

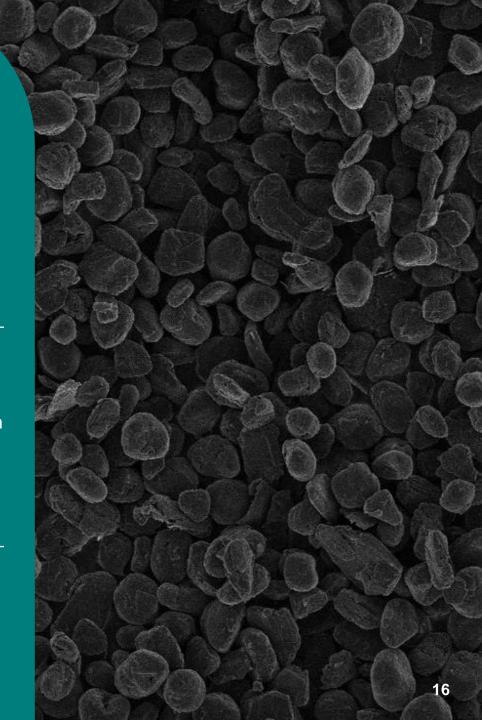
- Offtake agreement executed with Tesla to supply 8ktpa AAM from Vidalia at a fixed price for an initial term of four years<sup>1</sup>
- Market growth and segmentation benefits commercial engagement with other target customers – targeting additional AAM offtake agreements prior to start of production
- Qualification and iterative testing programs with target customers are progressing in parallel with commercial engagement – rapid iteration enabled by operational and laboratory capability

## **Further Expansion**

- Demand for Vidalia AAM expected to significantly exceed 11.25ktpa
- Trade-off studies and design basis finalised for DFS on expansion of Vidalia's production capacity to at least 45ktpa AAM, inclusive of 11.25ktpa AAM
- DFS to be completed in 2022 with detailed engineering, procurement and construction phases to follow sequentially, subject to Syrah Board approval and customer and financing commitments

## **Product Development**

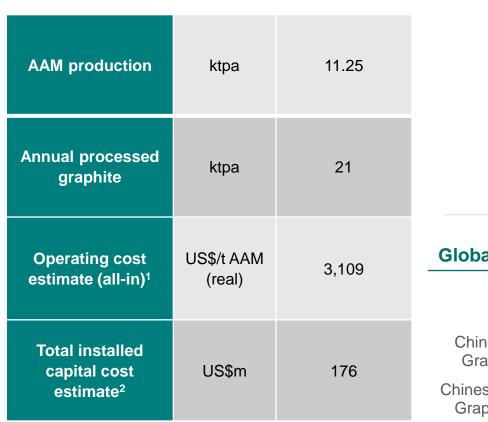
- Base (drop-in) 18-micron AAM and premium 12-micron AAM products
- Partnering with customers, industry, laboratories and universities on product development

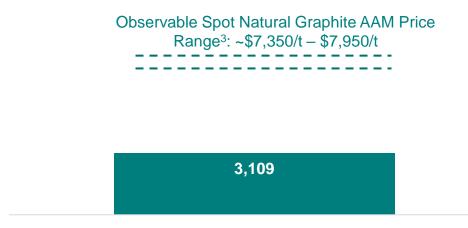


## Vidalia is expected to exhibit robust operating margins and returns

### **Vidalia Initial Expansion Project Parameters**

## Operating Cost Estimate (All-in) (US\$/t AAM Real)<sup>1</sup>





## Global Warming Potential (kg CO2 equivalent/kg AAM)<sup>4</sup>



- Vidalia expected to have a competitive operating cost structure versus existing AAM suppliers in Asia and robust operating margins
- Vidalia's vertical integration with Balama provides Syrah with a significant advantage over non-vertically integrated AAM suppliers in Asia in operating costs, cost protection and environmental impact

<sup>1.</sup> Includes cost of US\$400/t (FOB Nacala) for Balama natural graphite, reflecting an approximate all-in cost of production at Balama at full plant utilisation. Includes costs of transporting Balama natural graphite from Nacala to Vidalia, AAM delivery costs from Vidalia to representative US battery manufacturing facilities and maintenance costs.

<sup>2.</sup> Includes all actual and estimated engineering, equipment, materials, construction, construction-related capitalised costs from 1 December 2020 and an unutilised contingency.

<sup>3.</sup> Price range is the low to high of "domestic/mid-range" natural graphite anode material price as of 15 July 2022, converted at a USD/CNY exchange rate of 6.67. The price shown is the Chinese domestic observable spot price for natural graphite AAM as reported by ICCSino. The price range shown is not necessarily indicative of a landed USA price for AAM nor the price that Vidalia AAM will be sold at.

<sup>4.</sup> Source: Minviro Ltd's lifecycle assessment on Syrah. Note: Global Warming Potential ("GWP") is defined as the cumulative radiative forcing, both direct and indirect effects, over a specified time horizon resulting from the emission of a unit mass of gas related to some reference gas [CO2: (IPCC 1996)]. GWPs shown are a forecast life of operation average for Vidalia based on detailed engineering and include scope 1, scope 2 and scope 3 greenhouse gas emissions. A third-party critical review of Syrah's LCA is being completed in the September 2022 quarter, which will allow Syrah to declare that its lifecycle assessment meets the requirements of ISO14040/14044 standards and allow disclosure of comparative benchmarking of GWP for representative natural graphite, natural graphite AAM and synthetic graphite AAM supply routes in China.

# De-risking Vidalia's initial expansion

Date	Key Milestones		
Jun 2022	✓ Piling, fencing and workforce infrastructure installation underway		
Jun 2022	✓ Committed to a significant proportion of capital costs		
Jun 2022	✓ Detailed engineering >76% completed		
May 2022	✓ MOU executed with Mitsubishi Chemical Company		
Apr 2022	Conditional Commitment from DOE for ATVM loan		
Feb 2022	Vidalia Initial Expansion project fully funded		
Feb 2022	Worley awarded construction management services contract		
Feb 2022	Final investment decision taken on Vidalia Initial Expansion project		
Dec 2021	Tesla offtake agreement executed		
Jun 2021	Transitioned to detailed engineering for Vidalia Initial Expansion project		
Jun 2021	Integrated AAM dispatched to potential customers for qualification		
May 2021	First fully integrated production of AAM from Vidalia		
Mar 2021	Installation and commissioning of furnace		
Dec 2020	BFS confirms robust economics for large scale AAM production		
Nov 2020	Dispatched AAM (toll treated) for product qualification by customers		
Oct 2020	First production of AAM (toll treated) using anode precursor from Vidalia		
Jul 2020	First production of purified spherical graphite to battery specification from Vidalia		
Dec 2018	First production of unpurified spherical graphite at Vidalia		
Sep 2018	Phase 1 study completed for large-scale AAM production at Vidalia		
Aug 2018	Vidalia site purchase completed		
Mar 2018	Benchmarking of AAM produced from Balama graphite completed		
Nov 2016	Syrah announces plans to establish commercial scale facility in Louisiana		
Apr 2016	Pilot test work program initiated in China (milling and purification)		



## Vidalia Initial Expansion construction and production timetable

<2 Years

Target to start of production

#### **Key Steps in Construction**

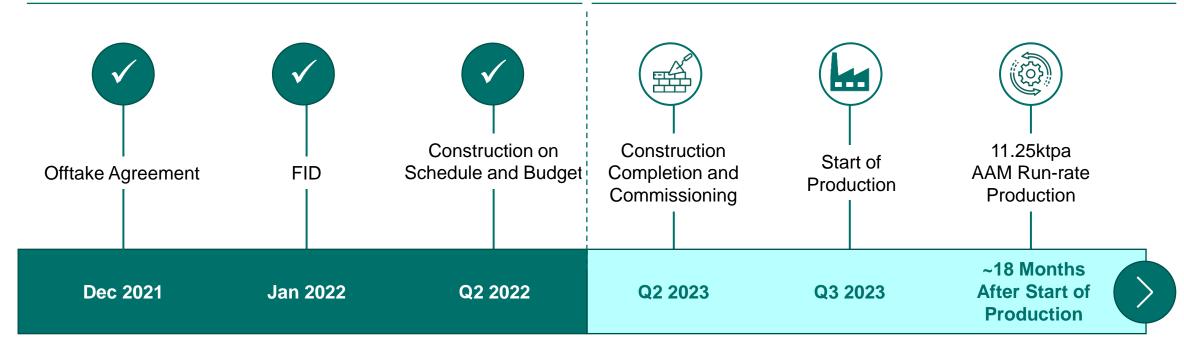
- Order critical long-lead items
- Execute construction contracts sequentially
- Secure additional AAM offtake agreements
- Final construction permitting
- Recruit operating team

#### **Ongoing Activities**

- Product development and testing (small particle sizes)
- Equipment trialing (purification, carbonisation and coating) and R&D for optimisation of larger expansion of Vidalia
- DFS and detailed engineering on 45ktpa AAM facility at Vidalia

#### **Key Project Milestones Achieved**

### Defined Schedule to 11.25ktpa AAM Production at Vidalia



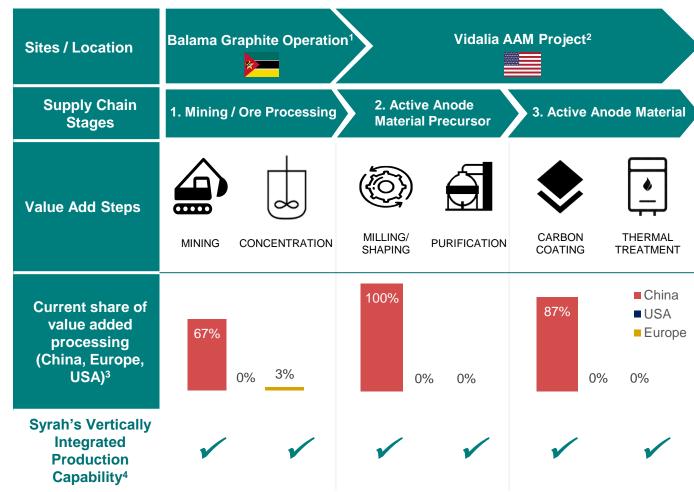
## Vertical integration to AAM supply in USA is a key differentiator for Syrah

## **Benefits of vertical integration to Syrah:**

- Margin capture / cost protection
- Attractive financial returns
- Enhanced channel to market and customer diversity

# Benefits of vertical integration to battery makers / auto OEMs:

- Security of supply
- Optimisation of supply chain management
- Single chain of custody / full ESG auditability



- 1. Balama has capacity to produce 350ktpa natural graphite. Syrah has the option to use 3rd party natural graphite concentrate for toll feed at Vidalia subject to feed being appropriately qualified.
- 2. Vidalia Initial Expansion will increase production capacity to 11.25ktpa AAM, with potential additional expansion to 45ktpa capacity.
- 3. Estimated market share for 2021. Syrah Resources analysis, data from Benchmark Mineral Intelligence.
- 4. Once commercial scale qualification facility is complete.



## Q3 2022 outlook

EV sales growth, constructive demand environment for anode material and ongoing Chinese supply disruption driving strong demand and pricing for Balama products

Increasing Balama production beyond 15kt per month with consideration of market demand, forward customer contracting and shipping availability

Advance construction of the Vidalia Initial Expansion within schedule and budget

Maintain liquidity for Balama operations under various market scenarios and advance debt financing

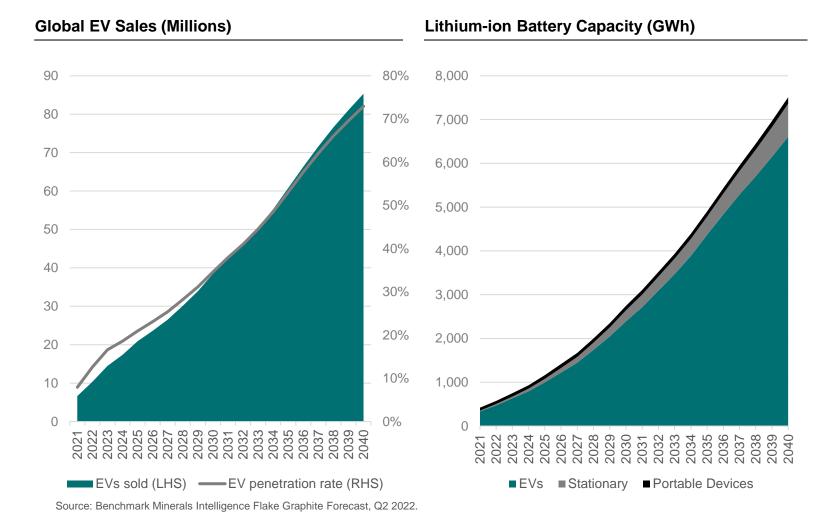




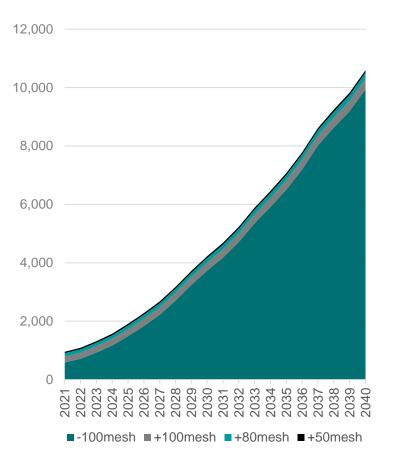
# **Appendix**



# Battery and natural graphite fines (-100mesh) demand in early stages of growth – driven by EV adoption



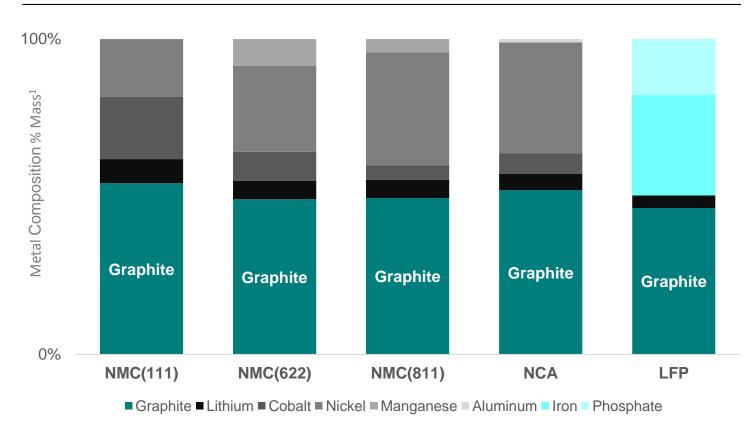
#### **Natural Graphite Demand (kt)**



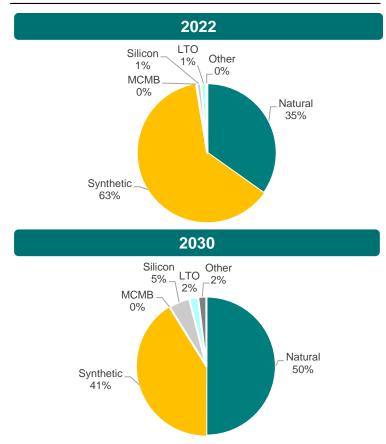


# Graphite is a high intensity material in EV batteries, with costs/emissions expected to drive shift towards natural graphite

#### **Battery Mineral Composition of Batteries**







Source: Syrah Resources analysis, data from Gaines, L., Richa, K., & Spangenberger, J. (2018) Key issues for Li-ion battery recycling (excludes oxygen), Benchmark Mineral Intelligence.

NMC: Lithium nickel manganese cobalt oxide battery.

NCA: Lithium nickel cobalt aluminium oxide battery.

LFP: Lithium iron phosphate battery.

Source: Benchmark Mineral Intelligence Flake Graphite Forecast, Q2 2022.



<sup>1.</sup> Shown as percent of the total sum by elemental mass featured in the analysis for each battery chemistry, excludes oxygen (cathode).

# Syrah's global business to supply growing battery anode demand

