# CRITICAL MATERIALS FOR THE NEW MILLENNIUM



AMG Advanced Metallurgical Group N.V. Berenberg Pan-European Discovery Conference June 2017

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# AMG Overview



AMG Advanced Metallurgical Group N.V.

#### **Global Trends**

- Need to contain CO<sub>2</sub> emissions
- Operation growth and increasing affluence need a technology counterbalance

#### Demand

 Material science-based solutions for energy efficiency (lighter, stronger, temperature resistant)

 AMG sources, processes, and supplies the materials which are critical because of market demands

# AMG is a critical materials company



LEADER IN ADVANCED TECHNOLOGIES TO ADDRESS CO<sub>2</sub> REDUCTION

# CO<sub>2</sub> REDUCTION

A GLOBAL IMPERATIVE FOR THE 21ST CENTURY

# AMG has developed into a leader in enabling technologies

#### AMG: MITIGATING TECHNOLOGIES

Products and processes saving raw materials, energy and CO<sub>2</sub> emissions during manufacturing (i.e., recycling of Ferrovanadium)

#### AMG: ENABLING TECHNOLOGIES

Products and processes saving CO<sub>2</sub> emissions during use (i.e., light-weighting and fuel efficiency in the aerospace and automotive industries)

#### EXCELLENT PLATFORM FOR ORGANIC AND ACQUISITION LED GROWTH

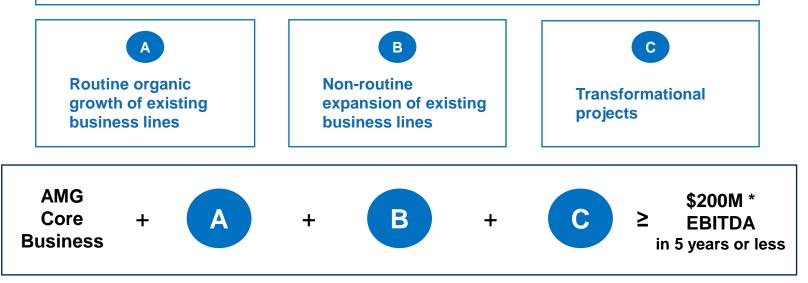
#### **MISSION STATEMENT**

To increase long-term value through industry leadership, operational expertise and efficient deployment of capital

#### STRATEGIC OBJECTIVE

Identifying long-term trends and leveraging those trends through technological excellence and innovations in the indispensable areas of critical materials and vacuum technologies

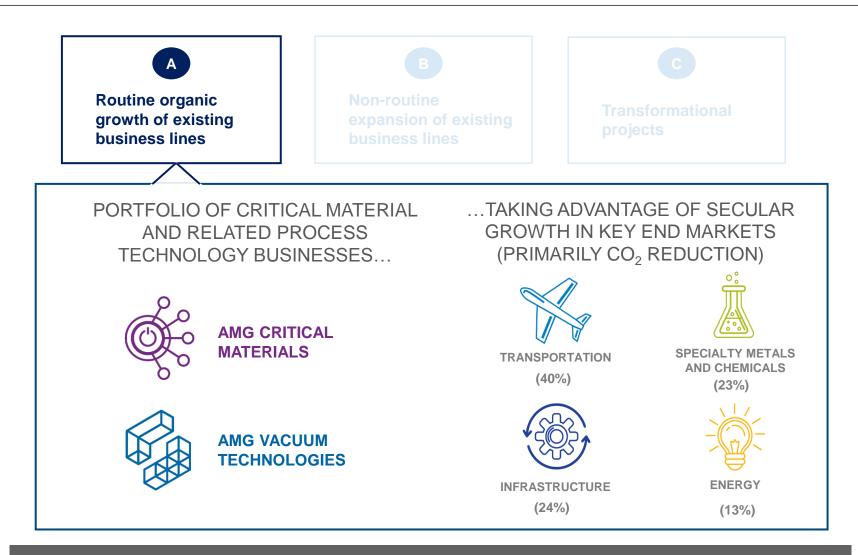
#### **GROWTH OBJECTIVES**





\* EBITDA target assumes current metal prices and no major acquisitions

#### LEVERAGING A STABLE PORTFOLIO OF INDUSTRY-LEADING BUSINESSES



Example: AMG Graphite, ongoing expansion of heat insulation materials business



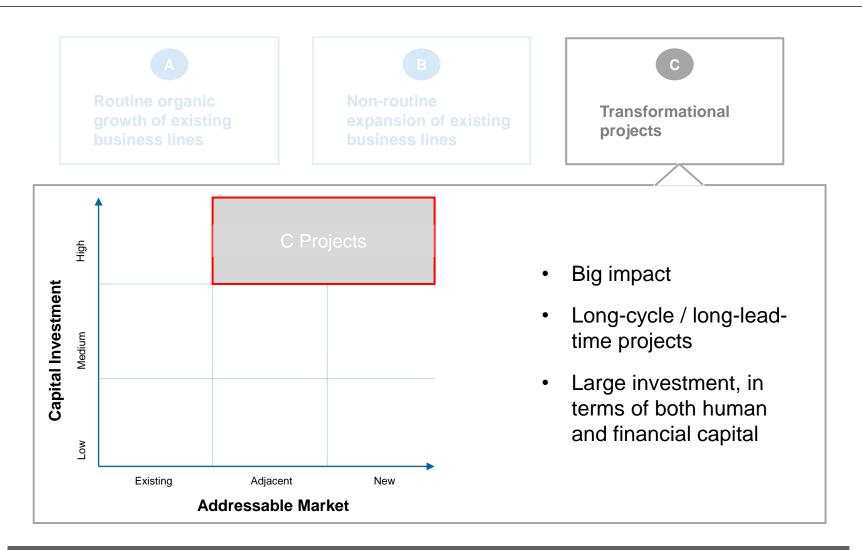
#### **OPPORTUNISTIC INVESTMENTS IN "NON-ROUTINE" EXPANSION PROJECTS**



Example: AMG Titanium Alloys & Coatings, ongoing expansion of industry leading Titanium Aluminides business



#### IDENTIFYING AND EXECUTING ON TRANSFORMATIONAL PROJECTS



Example: Execution of AMG's transformational lithium project



## AMG'S CORE KNOW-HOW

#### PROCUREMENT

Sourcing material from remote origins

#### **OPERATIONS**

World leader in advanced metallurgical & mineral processing

#### MARKETS

Operating in volatile oligopolistic niche markets

#### CUSTOMERS

Intense interaction with global industrial leaders

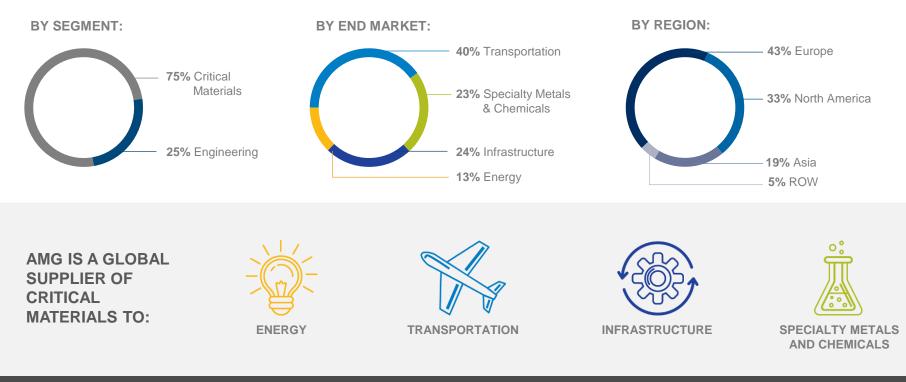
# Financial Highlights



AMG Advanced Metallurgical Group N.V.

### AMG AT A GLANCE – Q1 2017

Q1 2017 REVENUE



Market leading producer of highly engineered specialty metals and vacuum furnace systems

 ~3,000
 ~\$1 billion
 At the forefront of

 Employees
 Annual Revenues
 CO2 Reduction

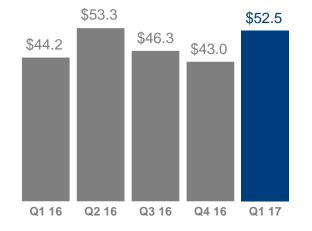


### Q1 2017 FINANCIAL HIGHLIGHTS



#### **REVENUE** (IN MILLIONS OF US DOLLARS)



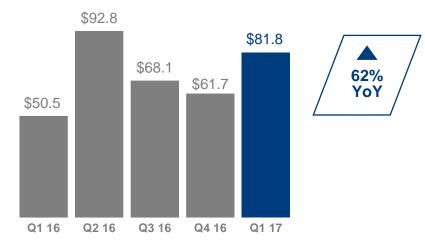


19% YoY

**EBITDA** (IN MILLIONS OF US DOLLARS)



ORDER INTAKE (IN MILLIONS OF US DOLLARS)



\* Gross Profit has been restated to include restructuring expenses and asset impairment expenses, in order to take into consideration ESMA's latest recommendations.



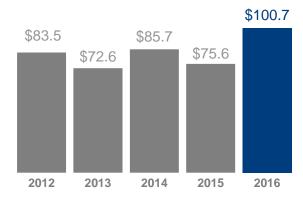
#### AMG GROUP FINANCIAL PERFORMANCE – 2016 v 2015 ANNUAL

	2016	2015	% CHANGE
Gross Profit (\$M)	\$186.8	\$160.0	17%
EBITDA (\$M)	\$100.7	\$75.6	33%
Operating Cash Flow (\$M)	\$79.2	\$76.3	<b>1</b> 4%
ROCE	18.8%	12.0%	57%
Earnings per Share	\$1.32	\$0.40	230%
Dividend per Share	€0.27	€0.21	29%



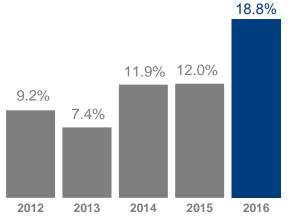
### 5 YEAR TREND – EBITDA & ROCE

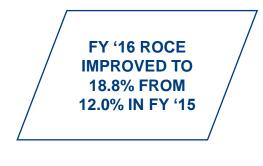
#### **EBITDA** (IN MILLIONS OF US DOLLARS)





Annualized ROCE



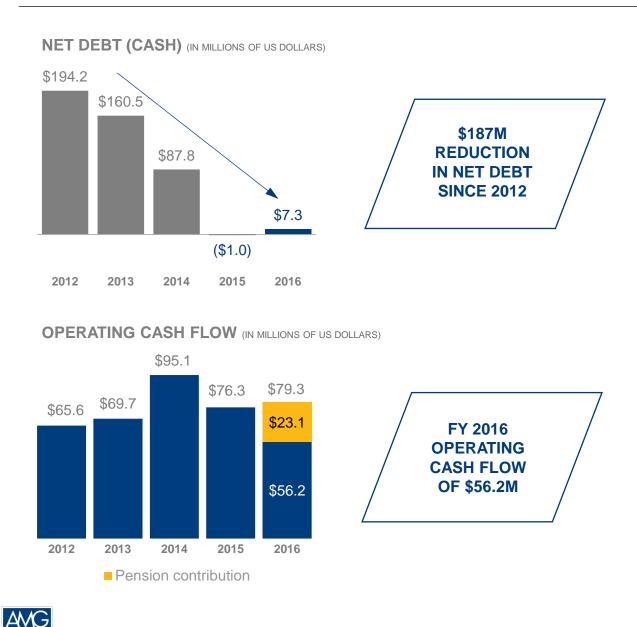


 2016 EBITDA is up 33% due to product mix and operational improvements in Critical Materials as well as a very strong performance by Engineering due to an increase in demand for furnaces from the aerospace industry

- FY 2016 annualized ROCE improved to 18.8% from 12.0% in FY 2015
- ROCE improvements are the result of efficient use of capital and improved profitability



### 5 YEAR TREND – NET DEBT & OPERATING CASH FLOW



- Net debt: \$7.3 million
  - \$186.9 million reduction of net debt since December 31, 2012
  - Net Debt to LTM EBITDA: 0.07x
- AMG's primary debt facility is a \$400 million multicurrency term loan and revolving credit facility
  - 5 year term (until 2021) with an accordion feature that allows the Company, subject to certain conditions, to increase the commitment amount by up to \$100 million
  - In compliance with all debt covenants
- FY '16 net cash from operating activities of \$56.2 million, which included voluntary cash contributions to the Company's pension plans of \$23.1 million made during the year

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# AMG Lithium

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#### AMG'S INTEGRATED LITHIUM STRATEGY

Lithium I	Lithium II	Lithium III
Upstream (Spodumene)		Downstream (Lithium Chemicals)
<b>Spodumene Plant 1</b> 90k MT per annum of spodumene	<b>Spodumene Plant 2</b> Increase spodumene production to 180k MT	Lithium Chemical Plant Participation in lithium value chain downstream
production	per annum	Potential Joint Venture

Status: Under construction

*Status:* Engineering & due diligence

**Status:** Feasibility study & due diligence

structure with existing

consumer of lithium

producer and/or

chemicals



# AMG LITHIUM – PROJECT STRENGTHS

- 1) Existing management and mining infrastructure not a new mine project
- 2) Strong understanding of the mine geology
- 3) Mining infrastructure already in place and operational
- Ore extraction and crushing costs absorbed by profitable tantalum operation
- 5) Spodumene plant will be fed via lithium deposits in existing tailings, as well as incremental lithium-bearing tailings generated via tantalum production
  - 2.8 million metric tons of spodumene plant feed stock already extracted in the form of on-site tailings
- 6) AMG has operated a spodumene pilot plant since 2010
- 7) Strategic flexibility to further develop operational scope

AMG has operated the Mibra mine for 38 years



## AMG LITHIUM – SPODUMENE PROJECT OVERVIEW

#### Lithium Concentrate (Spodumene) Project

#### OBJECTIVE

Monetization of substantial lithium mineral deposits currently residing in AMG Mineração's tailings ponds and tailing stockpiles

Production facility to be co-located with AMG Mineração's tantalum mine and upgrading plant in Brazil

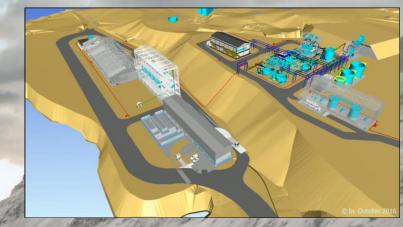
TARGETED PRODUCTION

180,000 MT per year of lithium concentrate

#### STATUS

**Plant 1** (90,000 MT per annum) capital investment of approximately \$50m was approved by the AMG Supervisory Board on July 19<sup>th</sup>, 2016. Production to commence mid-2018

**Plant 2** (expansion to 180,000 MT per year) final investment decision expected Q4 2017





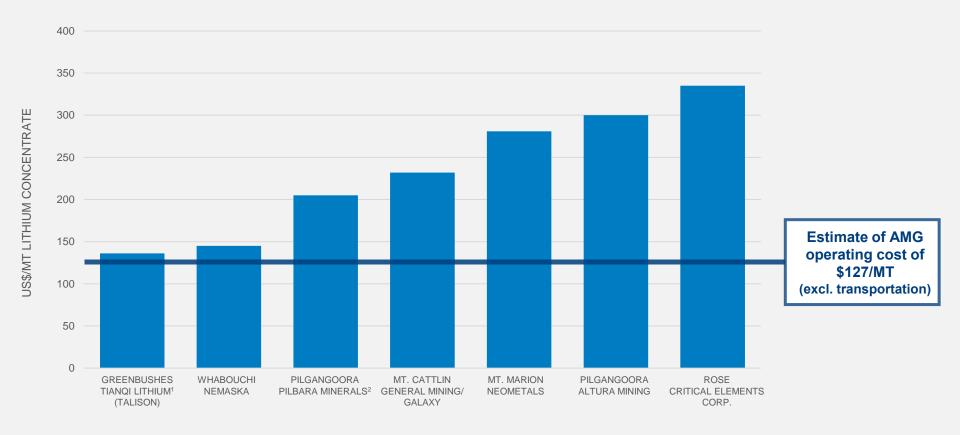
AMG's objective is to be the low-cost producer of spodumene globally

### SPODUMENE PROJECT STATUS

		Status
Construction Approval	AMG approved construction of lithium concentrate plant at the AMG Mibra mine, with annual production of 90,000 tons	Complete
EPC Contract Awarded	AMG awarded EPC contract to Outotec (Finland) for turnkey delivery of lithium concentrate plant	Complete
Offtake Agreement Established	AMG announced a multi-year contract to supply 90,000 tons per year of lithium concentrate; deliveries commencing mid-2018.	
Resource Expansion	Updated resource statement published 3 April 2017 – estimated life of the mineral resource is approximately 20 years, based upon targeted production level of 180k MT of lithium concentrate starting 2020	Complete
Increased Production	Targeted increase in annual lithium concentrate production, to a capacity of 180,000 tons, by end of 2019	Engineering work in progress



#### AMG COST POSITION – LITHIUM CONCENTRATE (SPODUMENE)



Source: Roskill 2016, Ehren Gonzalez Ltda, Hatch; Note – Operating costs only, not including transportation

<sup>1</sup> Greenbushes cost includes G&A but excludes selling expenses

<sup>2</sup> Pilbara Minerals figure includes credits from tantalite production; includes transport and loading costs of \$37/t concentrate

Note: AMG cost estimates per Outotec of \$127/MT; includes production costs and SG&A costs; does not include cost of transportation to port

AMG

### LITHIUM: CAPTURING THE VALUE DOWNSTREAM

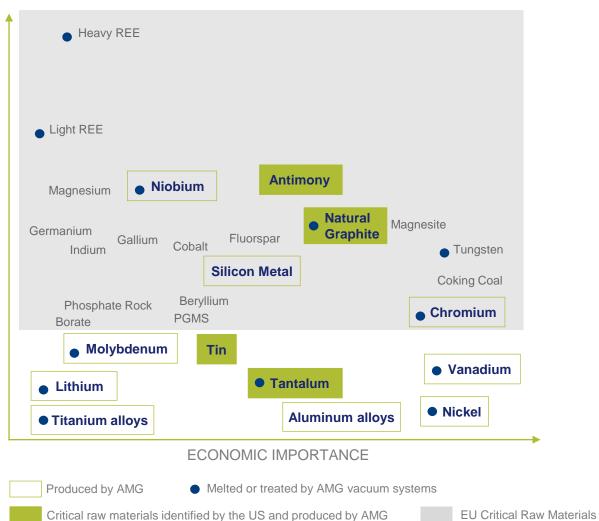


## LITHIUM RESOURCE MAP





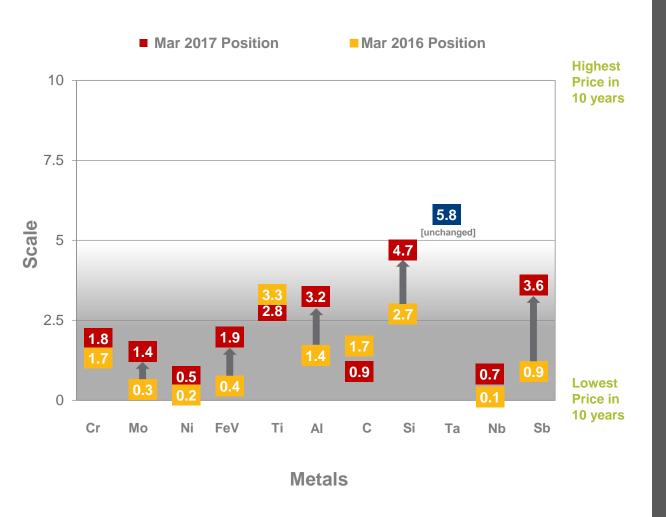
### CRITICAL RAW MATERIALS



- The EU identified 20 critical raw materials\* to the European economy in 2014, focusing on two determinants: economic importance and supply risk
- The US identified 30 critical materials\* which are vital to national defense, primarily through assessing supply risk
- AMG has a unique critical materials portfolio comprising:
  - $_{\circ}$  5 EU critical raw materials
  - 4 US critical raw materials
  - Highly engineered Titanium
     Alloys for the aerospace industry
  - High value added Aluminum Master Alloys
  - Vanadium, Nickel and Molybdenum from recycled secondary raw materials

\*Report on Critical Raw Materials for the EU, May 2014; Strategic and Critical Materials 2015 Report on Stockpile Requirements by Department of Defense in January 2015.

#### CRITICAL MATERIALS PRICES: 10 YEAR PERSPECTIVE



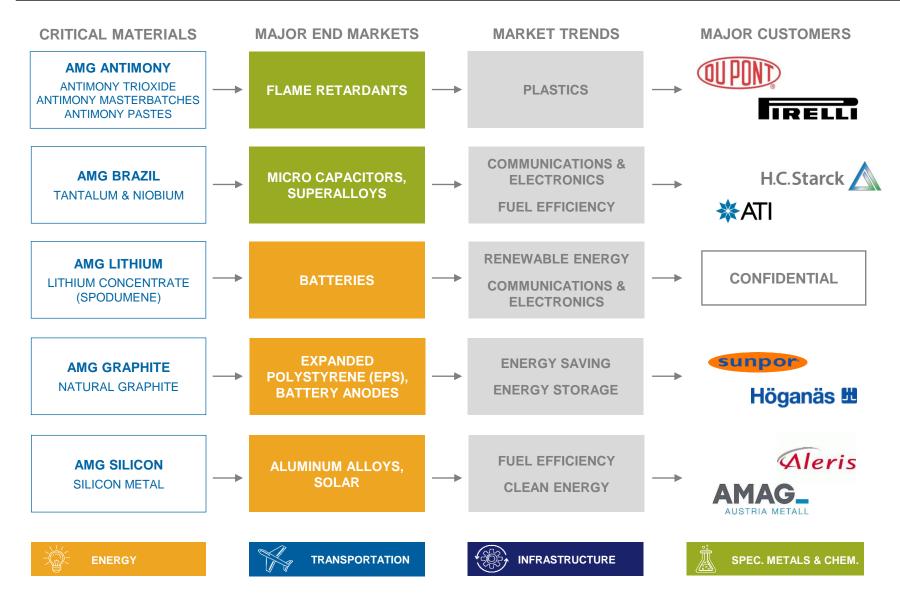
 Metal prices are measured on a scale of 0 to 10, with 0 and 10 representing the minimum and maximum average quarterly prices occurring during the past 10 years

 The positions demonstrate the current price level of each metal with respect to their various historical price points over the past 10 years

AMG has significant potential upside within certain critical materials based on historical price ranges

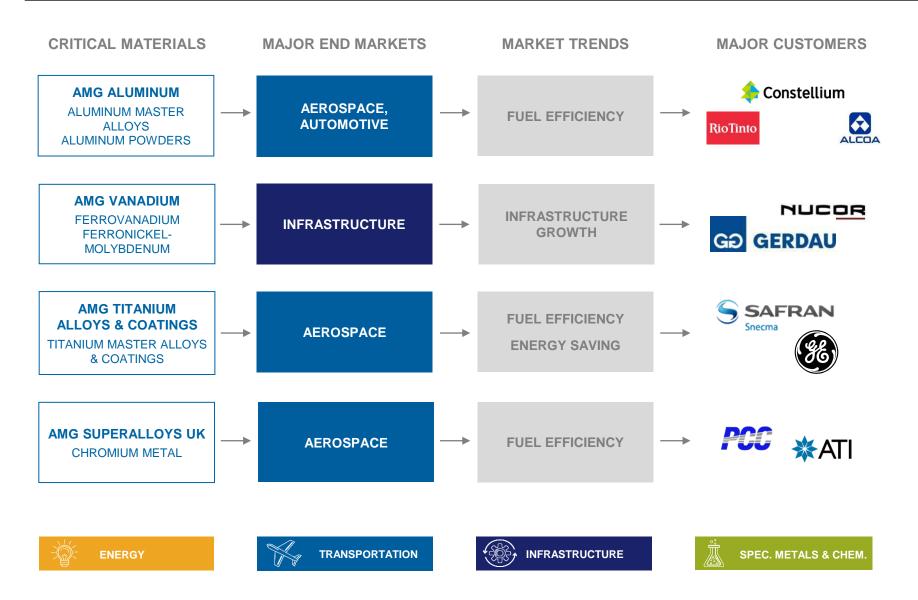
Note: Metal Positions are measured on a scale of 0 to 10, with 0 being the minimum price and 10 being the maximum price. They are calculated using the formula [(Mar '07 month avg – min. monthly avg) / (max. monthly avg – min. monthly avg) \*10] where maximum and minimum monthly averages are measured over the period 1 Mar '07 through 31 Mar '17.

### CRITICAL MATERIALS – MARKET TRENDS



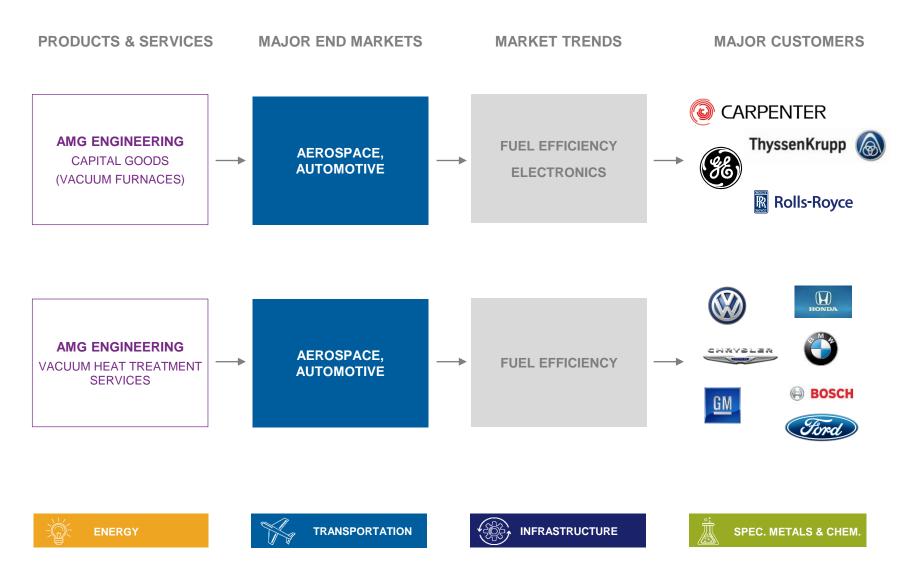


### CRITICAL MATERIALS – MARKET TRENDS



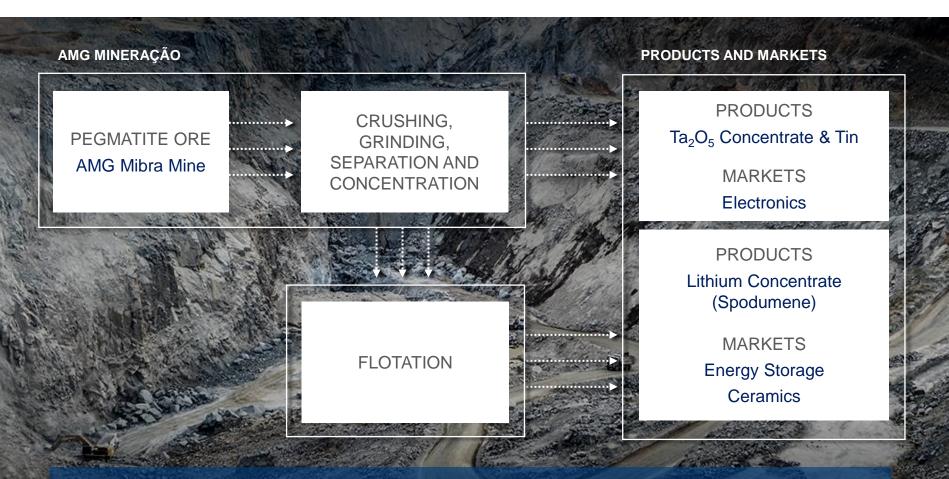


### ENGINEERING – MARKET TRENDS





### SPODUMENE PRODUCTION PROCESS OVERVIEW



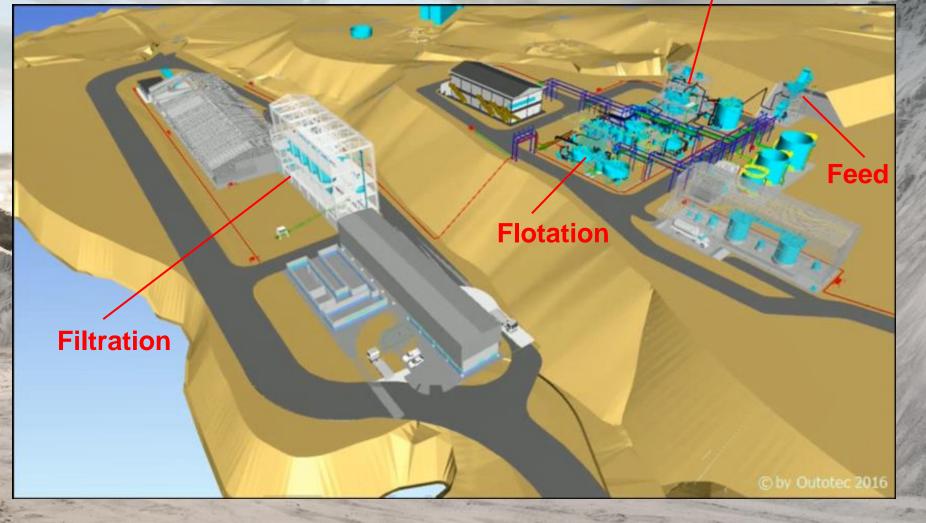
MIBRA MINE IS A PROVEN RESOURCE PROVIDING MULTIPLE PRODUCT STREAMS



### FIRST SPODUMENE PLANT – LAYOUT

AMG

### **Grinding / Mag Separation**



### HEALTH AND SAFETY FOCUS

#### LEADING SAFETY INDICATORS

- The number of safety improvement items reported in Q1 2017 was 35% lower compared to the Q1 2016. These are essential in order to avoid potential injuries.
- Safety training hours increased 18% in Q1 2017.
- At the end of Q1 2017, lost time incident rate was 20% lower and total incident rate and incident severity rate were down 39% and 15%, respectively, from Q1 2016.

YEAR	LOST TIME INCIDENT RATE	INCIDENT SEVERITY RATE
2013	1.76 🔶	0.21
2014	1.20 🖊	0.19 🖊
2015	1.03 🔶	0.17 🖊
2016	1.04 🔶	0.11 🖊
2017*	0.83 🖊	0.11 🔶



Rigorous commitment to safety reflected in continually improving safety records

