

FROM THE CEO

# LETTER TO SHAREHOLDERS



On behalf of the Management Board, I hereby present AMG's 2018 Annual Report. As a summary, we are pleased to declare 2018 the most successful year in AMG's history, measured in a variety of ways.

In 2018, our EBITDA increased from \$125 million to \$217 million (plus 73%), a record in AMG's history. We also ended the year in a net cash position despite large investments. Surprisingly, the stock price declined in 2018 from €42 per share in the beginning to €28 per share at year-end. Compare that to 2017. In that year, the EBITDA went from \$101 million to \$125 million (an increase of 24%) and the share price increased from €15 per share to €42 per share. We received the Euronext Award for the all-around best performer. Given our much better earnings performance in 2018, we naively hoped to have the chance to receive that award again. Instead, we are disappointed to report that our excellent results did not translate to a similar degree into our share price.

## PROFITABILITY

The 73% EBITDA increase was assisted by certain metal prices, with ferrovanadium in the first place. I want to remind you that in my Letter to Shareholders last year, I went into great detail to explain that vanadium would benefit from several trends. That turned out to be correct. The 2018 EBITDA to sales margin was 17% compared to 12% in 2017. The 5-year EBITDA growth rate was 26%. However, the margin expansion we experienced in 2018 due to the rapid increase in vanadium prices will correct when prices level off.

AMG's 2018 return on capital employed (ROCE) is in record territory above 30%. A ROCE like this is rare in natural resources and difficult to achieve in any industry.

Operating cash flow was \$97 million despite working capital investments of \$73 million during the year, and this cash flow yielded free cash flow of \$26 million after capital expenditures of \$73 million. It is interesting to note that the ROCE CAGR rose faster than the EBITDA CAGR. That is difficult to achieve.

Net debt made it to negative territory. We made it to a net cash position despite our high capital expenditures.

Net income increased in 2018 by 66% to \$95 million. We determined and announced that our dividend policy should be guided by a corridor of 20-40% of net income. As a result, we raised the dividend to €0.50 per share for 2018.

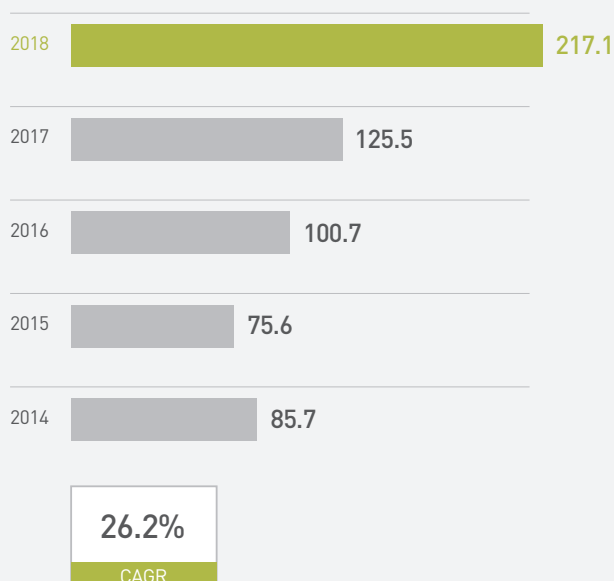
## LONG-TERM VALUE CREATION

In my 2018 Letter to Shareholders I elaborated on AMG's strategic framework, its overriding objective to create long-term value and AMG's approach towards its stakeholders. The basic analysis set forth therein is still valid. AMG's Mission Statement and Strategic Objectives are unchanged, and I will explain further in this 2019 Letter how AMG's implementation is progressing, taking into account the current economic environment and AMG's priorities.

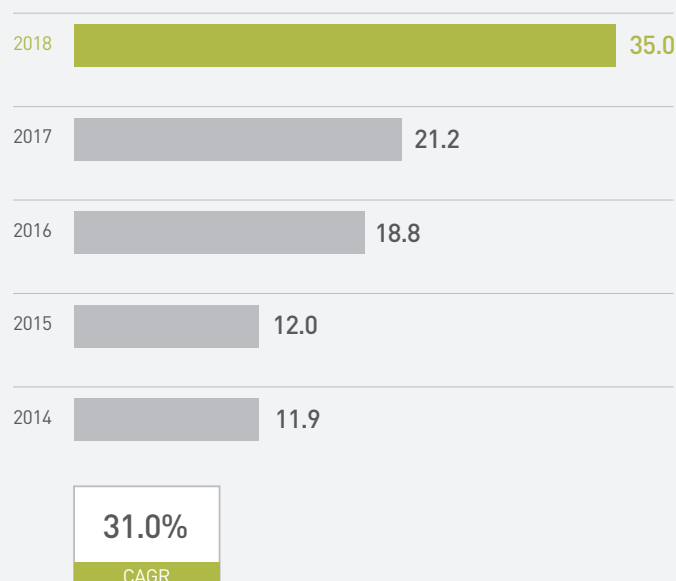
## SAFETY

Safety is our main battleground. We operate a lot of furnaces that are at the heart of upgrading metals and minerals. Of course, each year we aim to achieve a "zero"-incident status, but this is a very challenging objective. However, we have achieved remarkable results and have reduced lost time incidents consistently year-over-year.

### ANNUAL EBITDA PROGRESSION (USD millions)



### ANNUAL ROCE PROGRESSION (%)



We assess our safety performance against our peers using the most reliable data available. Namely, we rely on industry injury and illness data published by the United States Department of Labor Bureau of Labor Statistics. According to most current survey data for our industry code (2017-NAICS 331: Primary Metal Manufacturing), our peer performance for total recordable incident rate is 4.4 and lost time rate is 1.1. We are proud to announce that our 2018 performance is 72% better than the published total incident rate of our peers and 47% better than the published lost time rate of our peers.

The better your safety profile gets, the more difficult it is to continue the improvement process with similar reduction rates. Our 9 business units have 29 operating entities, each with an officer dedicated to managing safety. These officers report to AMG's head of safety, who reports to me. 20 of the 29 operating entities achieved zero lost time incident performance in 2018. "Zero" is possible.

#### CO<sub>2</sub>

We feel that our main stakeholder responsibility, after safety for our employees, is to the global community, and that the best way to measure this is in terms of our contribution to global CO<sub>2</sub> reduction. We know our CO<sub>2</sub> emissions in 2018 were about 412 thousand metric tons. In 2014, we introduced a methodology to measure how certain AMG product offerings enable CO<sub>2</sub> reduction when used by our customers. For example, the enabling of higher operating temperatures in jet engines through titanium aluminides and through ceramic coatings of turbine blades for jet engines increases fuel efficiency and therefore reduces CO<sub>2</sub> emissions versus the next best solution. Or, as another example, the doping of

insulation materials with natural graphite enables energy saving in buildings, leading to the reduction of CO<sub>2</sub>. These and other AMG solutions are embedded in materials science in the search for new materials which are lighter, stronger, more heat resistant, etc. Using this methodology, our total CO<sub>2</sub> reduction impact enabled our customers to save 41 million cumulative metric tons of CO<sub>2</sub> in 2018, as shown in the chart on the next page, offsetting a material impact to the global annual increase of atmospheric CO<sub>2</sub>. We have commissioned ERM, a leading sustainability consultant, to sharpen our in-house methodology for the measurement of "enabling" CO<sub>2</sub> savings using our energy-saving materials and technologies. We look forward to the results which will be published in due course.

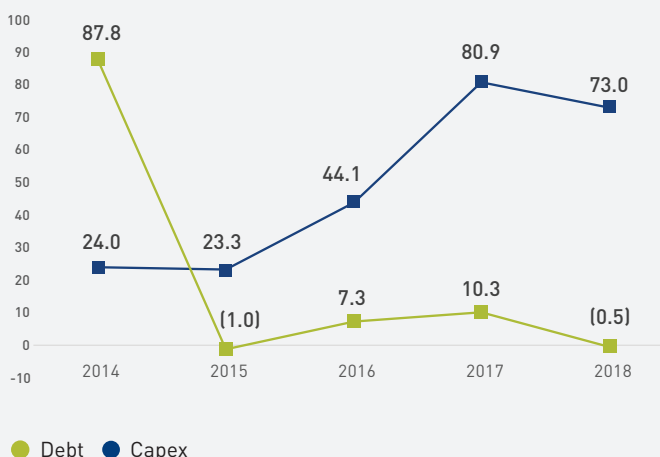
Please allow me to mention that AMG has CO<sub>2</sub> reduction written in its formation documents as critical materials are critical or have become critical primarily as a result of the search for material-science-based solutions to reduce CO<sub>2</sub>. We are fortunate because we do not have to dream up a green theory. We were an early mover in our focus on CO<sub>2</sub> reduction.

#### AMG VANADIUM

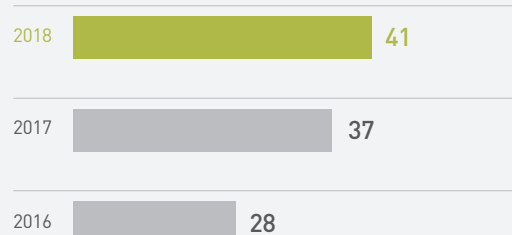
First, we must congratulate our team in Ohio on excellent execution. Prices were high in 2018, but you need to be appropriately positioned when an opportunity presents itself. The financial results were exceptional.

As mentioned in my May 2018 Letter to Shareholders, I extensively elaborated on the trends driving structural vanadium tightness. I listed five "Themes". We now must add another "Theme". The International Maritime Organization

**NET (CASH) DEBT & CAPEX**  
(USD millions)



**TOTAL AMG ENABLING TECHNOLOGIES CUMULATIVE CO<sub>2</sub> REDUCTIONS**  
Million metric tons



(IMO) announced in October 2016 that it was going ahead with a global sulfur cap of 0.5% for marine fuels beginning January 1, 2020. The current cap is 3.5%. The new regulations will, undoubtedly, substantially increase the investment in desulfurization units of refineries as a leading mitigation effort in order to comply with the IMO cap. More desulfurization implies more fresh refinery catalysts. More fresh refinery catalysts imply more spent catalysts. Spent catalysts are the feed for AMG Vanadium’s recycling operations, and we are the world’s largest recycler of spent catalysts.

AMG has a stated objective to be the world leader in the recycling of catalysts not only now, but in the future, and we intend to build on our leadership. We are presently conducting a feasibility study to double our recycling capacity in Cambridge, Ohio. In addition, we have announced our intention to partner with Royal Dutch Shell’s subsidiary, Criterion, to determine a way to offer “end-to-end” solutions to refineries facing the challenge of finding a home for the growing spent catalyst waste. China has closed its doors to all sorts of waste, including this particular refinery waste. We will update on these frontiers as necessary.

**AMG MINERAÇÃO**

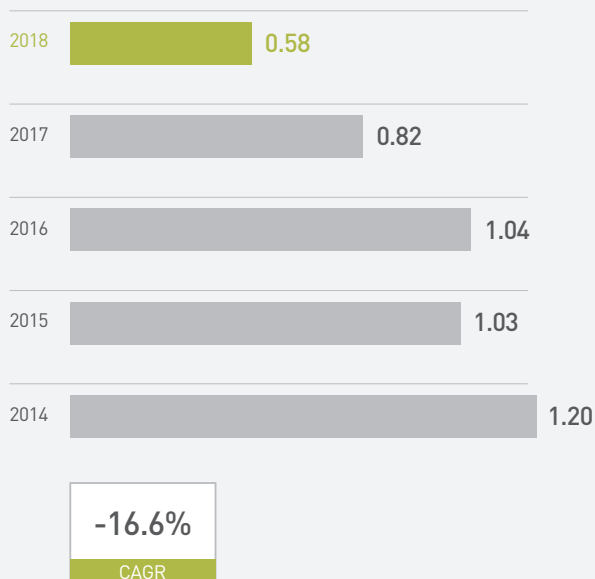
Despite a slight delay in the ramp-up of our lithium concentrate plant in Brazil, we are shipping high quality, in-spec material which has been well-received by our long-term customer. Our EPC contractor plans to conduct our 100% capacity test at the end of May; this test was previously planned for April. We are evaluating the timing and progress of our plans to move forward with a second lithium concentrate plant in Brazil and are balancing that timing against our plans

to move downstream into lithium chemicals. We will continue to evaluate both projects as we consider how to best maximize long-term value for our stakeholders. In addition, as we announced in late February, we are pleased that our lithium management team has been strengthened. On January 1st, 2019, Dr. Stefan Scherer joined us as Chief Commercial Officer of AMG Mineração BV. He has over 20 years of experience in the specialty, fine chemicals and lithium industries.

**AMG TECHNOLOGIES**

On November 28, 2018, we announced the formation of AMG Technologies, combining AMG Titanium Alloys & Coatings with AMG Engineering under a new operational umbrella. Guido Löber, the CEO of AMG Titanium Alloys & Coatings, will lead AMG Technologies, chairing a newly constituted Management Board. The basic idea of this new entity is to strengthen the interface of engineering know-how and operational know-how, thereby supporting the acceleration of process technology innovations. That has been my experience, and a guiding light, in both the formation of AMG in 2006 as well as in companies I have been involved with in the past. We firmly believe that as the technology development in our main vacuum furnace product lines accelerates, and these high-end metallurgical purification and coating processes applying the latest control and automation technologies reach a considerable degree of complexity, the engineering provider must also provide operating services, including owning and operating plants. We have successfully implemented such business models in vacuum heat treatment services, and we continue to pursue concepts where these developments merge with

## LOST TIME INCIDENT RATE



breakthroughs in additive manufacturing technologies. The graphics on the next page show our involvement throughout the sections of the LEAP X engine. AMG Technologies lives within the trend of the aerospace industry's need to increase fuel efficiency.

## VALUES

I wish to conclude with a word on AMG's culture and values—safety, value creation, respect and integrity—which form the basis of how we conduct our operations and how we deal with our employees, business partners and stakeholders. Supported by our Code of Business Conduct and Speak Up and Reporting Policy, company-wide communication and training processes have been installed to ensure that these values are better understood, embraced by everyone and applied without exception.

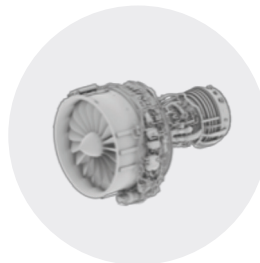
## OUTLOOK

As regards outlook, our last long-term guidance at the AGM in May 2018 was that we would reach \$200 million of EBITDA, or more, by 2020 or earlier. Obviously, we reached our target earlier—and with record numbers all around. For 2019, our target is to exceed the \$200 million mark again.

The updated long-term guidance will be published at the AGM on May 1, 2019.

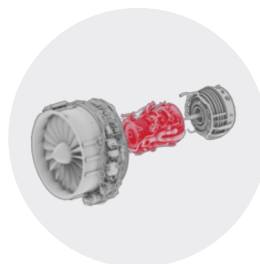
**DR. HEINZ C. SCHIMMELBUSCH**  
CHIEF EXECUTIVE OFFICER

## AMG TECHNOLOGIES PRESENCE IN THE LEAP VALUE CHAIN



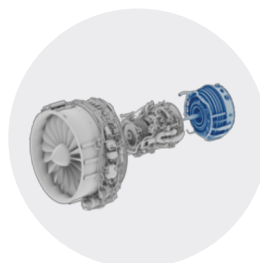
### General Applications

- Remelting Furnaces
- Atomization Furnaces
- Master Alloys for Ti Based Alloys
- Plasma Melting Systems



### High-Pressure Applications

- Equipment for CMC Shrouds
- EB-PVD Coaters
- Hot Isothermal Forging Systems
- VIM Furnaces
- Master Alloys for Ni Base Superalloys



### Low-Pressure Applications

- Hot Isothermal Forging Systems
- Plasma Melting Systems for Titanium Aluminides
- VAR and VIM Furnaces for Titanium Aluminides
- Titanium Aluminide Feedstock