AngloAmerican

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LME WEEK
LONDON METALS SEMINAR
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"Innovating the Metals Value Chain: Applying New Technologies and Approaches from Mine to Market"

Acknowledgements

- Good morning to you all. I'm delighted to have been invited by Garry to share some of my thoughts with you today at the start of this prestigious week for the metals industry. I'd also like to acknowledge my industry colleagues. Whether we are in collaboration or competition – we are each responsible for creating an industry that is Fit for Purpose in our modern and changing society. We all have a voice and an important role to play to ensure the industry delivers on its potential – in terms delivering returns to shareholders, creating meaningful and rewarding work for our employees and making sure our contribution to society – whether they be customers, local communities or the broader range of social partners is both responsible and sustainable in each of its many dimensions.

Opening Remarks

- It is great to see so many people here today. Despite the tough times, our industry is alive and well. I'm sure a lot of you in the audience will be in London over the next few days to hold plenty of serious discussions. We certainly look forward to seeing many of our customers throughout the week.
- I hope you will also enjoy some of London's great cultural and social experiences. This is a remarkable world city and it is very clear to me that London is open for business, despite what some would have us believe.
- It is also encouraging to see that LME Week continues to be front and centre of the industry's corporate calendar, as it has been for many decades, even as other exchanges and forms of trading increase.
- The LME was one of a number of factors that brought Anglo American to London back in 1999, when we listed on the London Stock Exchange. It is symbolic of the fact that London was – and still is – the epicentre of global trade and finance for mining and mined products.
- I have no doubt that despite recent political ructions, London will continue to maintain a leadership position in the affairs of the mining industry.

Introduction

- I would like to cover three themes today:
    - First – I would like to share with you how Anglo American is adapting to its changing environment by streamlining our portfolio around the businesses where we see a material competitive advantage. Just as importantly, I will talk about the transformation in our thinking on the markets – we have created a dedicated Marketing business in London and Singapore – completely changing the way we market and sell our products. The approach is grounded in our view on how we create significant shared value in our key customer relationships.

- Second, I will outline how we at Anglo American see innovation and technology as prerequisites to the mining industry's ability to continue to supply our customers in a way that creates value for them…and us. This understanding is critical for all market participants – our customers, the LME, everyone in this room.
- Finally, I will share a glimpse of how we take a different – dare I say innovative – approach when it comes to developing new markets for our products, looking at Platinum Group Metals as a current case in point, and sharing our views on what the future could have in store for this versatile family of metals. We believe it is imperative to play our part in shaping our end markets, creating demand – particularly for those products where your vested interests are tied so closely to those products and the position they occupy in a world so sensitive on so many fronts.
- While we recognise our approach has to be tailored to the product we produce – the common theme we are developing across the business is taking responsibility for what we can contribute to enhance the demand of our products and being even more responsible to balance our supply strategies to meet anticipated levels of customer demand.

Theme 1: Evolving our Business

- As everyone in this room will know too well, the mining industry has gained something of a reputation for over-extending itself in good times.
- However, time and time again, companies have been rescued by a timely uplift in prices – so often so in fact, that many have come to rely on this "get out of jail" card, rather than undertaking a robust assessment of how suitable their business models are for current and future demand patterns and likely operating environments.
- As an industry, there is no doubt that we underestimated the speed and depth of the price decline in 2015, particularly in bulk commodities. Following a 10-year bull-run, at the start of 2016 real bulks prices were equivalent to those of the 1950s.
- Given some extraordinary price volatility in the upwards direction over the last few months, we will see where things settle. Beyond that, though, and looking at the broad spectrum of mined products, the future still looks bright.
- A few data points to remind ourselves – as China becomes a more consumer-oriented economy and real incomes increase across the world's burgeoning middle class, the BRICs alone will contribute more than $7 trillion of annual spending power and we expect to see continued growth in consumer demand – spanning domestic appliances, cars, jewellery, smartphones and all other electronic gadgetry – the list goes on and it all relies on metals.
- At a macro level, by 2050, the world's population is expected to have increased to an estimated 9.6 billion people. Providing enough food, housing, energy and water, while striving for increased living standards will require a concerted drive for new and improved technologies.
- At the same time, increased connectivity is already decreasing the tyranny and cost of distance, allowing for new ways to live and work faster and in more disparate

locations, all driven by technology that is reliant upon what we mine and trade. And when I talk trade, I mean it in its broadest sense.

- Our greater appreciation of humanity's impact on the planet is also propelling advances in how we power our lives and how we consume resources, whether they are grown in the ground, dug from the ground, or recycled from what we have already produced.
- So, given the macro-economic factors of a subdued global economy, maturing developing economies, and the changing demand patterns we expect to see with these macro trends, we all need to be adapting to shape our respective futures.
- Anglo American is well weighted and suited to these demand patterns.
- We are the global leaders in both diamonds and PGMs, and we have a highly competitive position in copper. These are the businesses where we either hold a clear competitive advantage or we believe we can further improve and create a material competitive advantage over time.
- It is also the case, therefore, that we have a natural advantage in those products with exposure to the fast-growing consumer sectors of the global economy.
- Moreover, as the list of new technologies with 'game changing' potential continues to grow, the desire for increasingly modern, connected and clean lifestyles further drives demand for those products – particularly copper and other base metals, as well as the great potential of the platinum group metals.
- As you know, base metals are a key component to a number of innovative and environmentally friendly technologies, from wind turbines and solar panels through to electric vehicles.
- Copper is of course recognised for its superior conductivity and efficiency – over 60% of existing demand is for use as an electrical conductor. As the trend of increased urbanisation, industrialisation and electrification continues, it will further drive demand.
- China by example has underground cabling listed in its 13th Five-Year-Plan and has recently mapped out its non-ferrous metal needs through to the end of the decade, anticipating an increase in demand of 4% year-on-year – and that is 4% on an already very big number.
- As almost 70% of electricity is currently produced from fossil fuels and power generation accounts for over 40% of global CO_2 emissions, we are increasingly aware of the environmental challenges facing our planet.
- This is manifesting in non-fossil fuel based technologies, which also have a very high copper intensity, due to their distributed nature, as well as containing a number of other base metals.
- Nickel's role in stainless and alloy steel, endowing it with strength and corrosion resistance make it a critical component to all renewable energy sources, wind turbines, solar power, hydro, geothermal, biomass, tidal power and Carbon Capture and Storage.
- As demand for these technologies continues to grow, so does the demand for our metals.

- As progressive miners, we must be relentless in our search for new and better methods and technologies to extract our precious resources in a way that meets this demand responsibly and sustainably, not least as we operate in increasingly challenging physical, social and political environments.
- Similarly, we have an opportunity to drive these new technologies forward and actually create new demand for our commodities outside of the long established revenue streams.
- Demand does not materialise by itself and I believe it is our responsibility as producers to support demand in a responsible way that enables a more connected, reliable, and safe and clean society.
- I have talked about how we are pretty well positioned to serve the changing demands of society; I will now touch on how we think about the future of our business and of mining as a whole to ensure we continue to do what we do best – extract metals and minerals in a sustainable way and reliably supply them to our wonderful customers.

Theme 2: The Innovation Imperative

- Innovation is everyone's business in Anglo American – whether thinking about how we keep our people safe, to our engineers and geologists working on less water-dependent or energy-intensive rock-grinding and mineral separation techniques, to working with our copper, coal or iron ore customers to optimise the service and products that we offer.
- Indeed, our approach to marketing across our portfolio is both innovative and evolving – with us partnering with our customers to create joint solutions and new product offerings.
- But innovation is also a question of vision and how we ensure the sustainability of our business activities from an environmental and community perspective. As an industry, we are facing increasing pressures around water, energy, safety, and our environmental and social impact.
- In response, we have asked ourselves a key question:
    - How can we be smarter and more-cost-effective by using new (and sometimes existing) technologies and systems to materially improve how we operate?
- Mining processes have remained largely unchanged for many decades. Admittedly, we have larger-scale operations than 50 years ago, but the underlying technology has remained fairly static.
- This has to change. Anglo American has a long history – almost 100 years – of innovation leadership and a pioneering spirit and we have placed ourselves at the forefront of evolving how we mine, process and market our products. You may have heard us talk about this as FutureSmart™ mining – this is a holistic and innovation led approach to more sustainable mining.
- Through technological advances and a broader innovative mind-set, we hope to address some of mining's major challenges, and in doing so deliver greater value for our customers, for our shareholders and a more sustainable business for all our stakeholders.

- For example, mining is still heavily dependent on water. Without water, the extraction of copper, platinum group metals, diamonds and other valuable products would be extremely challenging and very expensive.
- Our ultimate goal is to create a "waterless mine" and we are investing in a number of innovative ways to conserve, and where possible eliminate, the use of freshly drawn water for our mining processes:
    - We are looking at further tightening our closed loop water systems where we can either minimise any water loss, or re-cycle in a continuous loop.
    - For instance, evaporation at our dams accounts for 10–25% of the total water lost in our mines, costing around $200 million annually to replace. By changing our monitoring and response regimes to more actively manage these losses, we can have a profound positive impact on the local environment, as well as the economics of the mine.
    - We are also looking at combining the dry separation of ore and waste in the mine with new technologies that can dramatically increase the speed and size of mineral liberation.
    - This innovative new first stage of processing creates a pre-concentrate of the ore, rejecting and dewatering waste far earlier in the process. It has the potential to significantly reduce our water and energy usage, while increasing our throughput and the life of the mine.
- You can imagine that such a combination of technologies has the capacity to completely change the game – while helping us ensure that we can supply the metals you need long into the future.
- None of this is possible, of course, without people. We rely on a capable and engaged workforce to continue to deliver the very best from our assets – some of you will have heard my personal mantra of "people are the business".
- When I became the Chief Executive of Anglo American in 2013, we began a process of re-wiring the organisation. We introduced a step change to how we approach and think about the processes of mining. We call this the 'Operating Model'. Now, if you could indulge me for a moment.
- Through a systematic approach to planning and implementing work at each asset and at every stage of the mining process, we have been able to increase our productivity across our asset portfolio.
- Productivity across Anglo American has already improved by 38% since 2012. By the end of 2016, our unit costs will be more than one third lower than in 2012, and our volumes will be up over the same period – from 35% fewer mines. That type of step-change in performance has to be replicated, albeit in a different form over our next 5 years. What we have done in this phase of change is set a new foundation for the next level of change.
- If I look at one of our major open pit operations where we introduced the Operating Model, with virtually no capital we have increased metal output by more than a third – an approach which is transforming the economics of many of our operations.
- It is through embracing these new technologies and approaches that we are positioning our business to improve margins and delivery on our target returns.

- This brings me on to my final point – we not only have the responsibility to operate more effectively as miners, but we also have the opportunity to responsibly support and develop new uses for our mined products, working internally across the entire value chain and with our customers to actually create demand for our products.
- We have done this very successfully with platinum group metals which I will touch on now.
- I appreciate that PGMs are not a traditional focus of the LME (though I understand this may be beginning to change) – it might make sense to put them in context.

Theme 3: Creating the Future for Platinum Group Metals

- We have been a miner of PGMs in Southern Africa since the 1920s, and today produce ~40% of the world's primary mined platinum, as well as being the industry leader in mining, processing and refining our full metal suite.
- For copper, global annual demand is widely estimated at 25 million tonnes per annum. Annual demand for platinum and palladium is significantly smaller – just 250 tonnes each. Clearly, it is a very different market.
- On the supply side, PGMs come from a limited number of deposits in South Africa, and Zimbabwe – where our mines are located – Russia and a few other locations. The primary supply sources haven't really changed in almost a century.
- On the demand side however, the changes have been more rapid and more significant and today, PGMs play a prominent role in transport, in jewellery and in investment. I will briefly touch upon each of these areas and how we are actively developing new frontiers for these metals.

Jewellery

- Platinum jewellery has grown in popularity from the eighteenth century due to its lustre and hardness, gaining further popularity in the nineteenth and twentieth centuries due to its reputation as "the modern metal".
- More recently, major markets have been developed in Japan from the 1960s, as platinum interested consumers due to its white colour; Europe followed, then China from the 1990s onwards.
    - I should point out that Chinese platinum jewellery demand did not grow spontaneously.
    - Careful development and education of consumers, manufacturers and retailers, and brand recognition have helped to grow demand, which has risen to 56 tonnes last year - over *one fifth* of global demand for the metal.
- Through another body, the Platinum Guild International, we are widening our geographic focus on developing a brand presence and demand for platinum jewellery within India and I am pleased to share how successful these efforts have been:
    - Through modest spending and careful analysis, demand for platinum jewellery within the Indian market has grown by 30% per annum over the last five years to seven tonnes. This is roughly the size of a typical platinum mine's annual production.

- We are actively and successfully creating markets for our metals – changing perceptions and creating value from mine to market.

Industrial

- The industrial use of platinum and palladium demand is more recent. Here, the applications of these metals often rely on their unique chemical or catalytic properties.
- Platinum plays an important role as a catalyst in the refining of oil and the production of fertilisers, while palladium and rhodium are also used in many chemical processes – palladium, for example, is used in some of the latest food freshness technologies, extending the shelf life of packaged fresh fruit and vegetables.
- Ruthenium and iridium too have found use in modernising and improving the environmental performance of the Chinese chemical and electrochemical sectors.

Internal combustion engines

- However, the most prominent current use of PGMs, and certainly the largest in terms of weight of metal used per year, is their use in catalytic converters and other environmental applications to reduce emissions.
- Since these devices were developed, they have been instrumental in preventing the release of billions of tonnes of airborne pollutants into the environment.
- It was because of the smog and atmospheric pollution associated with the very large number of vehicles in cities like Los Angeles, that legislation paved the way to the establishment of California's Air Resources Board in 1967 and America's Environmental Protection Agency in 1970.
- Both of these organisations, and later the European Union too, have been at the forefront of the development of emissions control standards for vehicles, providing an opportunity for PGMs.
- At the time, PGM miners and fabricators had to demonstrate that PGM-based catalysts worked, and that sufficient metal could be mined and refined to meet new demand from this entirely new application.
    - This is a great example of the PGM industry reacting to a market opportunity and developing a new source of demand for its products, which continues to this day.
- With emissions rules tightening still further, we also believe the intensity of use will increase well beyond today's levels.
- There has, of course, been plenty of noise about the death of the internal combustion engine.
- Despite some increase in the market share taken by alternatively powered vehicles, we expect the number of internal combustion engine vehicles produced per year – and the amount of PGMs needed to clean their exhausts – to continue to grow for a long time to come.
- However, as Niels Bohr, the famous Danish physicist, once said:
    - "*Prediction is very difficult, especially if it is about the future*."

- In a world of uncertainty, it clearly makes sense to plan for every likely scenario.
- So here is a million-dollar question – What role can PGMs play looking beyond traditional petrol and diesel engines? In short, a major role.

Electric powertrains

- Zero-emission vehicles are an important part of the future, and by that we mean electric vehicles.
- But there is more than one electric vehicle technology: there are battery electric vehicles which quite literally have a battery as their sole source of electric power, and there are Fuel Cell Electric Vehicles (FCEVs), like Hyundai's iX35 and Toyota's Mirai, which generate electric power from hydrogen, emitting only water.
- Why am I talking about this? Well, fuel cells rely on platinum as the primary catalyst.
    - We expect both fuel cell and battery technologies to play a major role, just as diesel and gasoline fuelled vehicles do in today's marketplace, though they both still have their limitations that are being resolved.
    - We expect the greater distance range and more familiar refuelling (in the same manner as you do with petrol or diesel) to help easier consumer acceptance of fuel cell vehicles.
        - We can already see strong acceptance of fuel cells here in London with the fleet of fuel cell buses offering comparable performance to diesel buses.
    - In fact, we have our own Hyundai hydrogen fuel cell vehicle that we use in London, so those of you who may be visiting our metals marketing team at our offices this week will have a chance to kick the tyres.
        - All that is required now is for more filling stations to provide hydrogen and, again, that is happening.
    - And, while battery technology may be better suited to urban driving than long distance driving, we also see hybrid vehicles, such as the Prius, continuing to have a role.
    - Hybrids, of course, combine battery and internal combustion and therefore also have PGM enabled catalysts.
- At Anglo American, we have an important part to play in ensuring that fuel cells are developed to meet their full potential.
- Through our own venture capital program, we have taken an equity share in a number of companies which are primarily focused on the development of fuel cells and hydrogen infrastructure.
- This is however only part of the story and as a platinum industry, we understand that we can't do everything ourselves.
- In fact, we are working very closely with other participants in the value chain to drive the deployment of hydrogen generation and distribution infrastructure around the world along with similar minded partners via industry bodies in the USA, EU, UK and China.

Investment

- At the start of their journey, PGMs were valued for their monetary role due to their lustre and resistance to tarnishing. As far back as 1829, Russia was minting platinum coins.
- Even today, platinum plays a role as an investment, although less widely understood and used than gold, this year we expect some ten tonnes or more of platinum to be bought by investors.
- This is largely the reasoning behind why the industry established a body a couple of years ago to market investment in platinum, the World Platinum Investment Council.
    - We believe there is a strong case to be made for investors to include platinum in their portfolio and the publication of more data is helping to drive increases in investment.
    - Why, for example, is gold an appropriate central bank asset while platinum does not have the same reputation? The only thought that comes to mind is our Central Bank colleagues have yet to venture out into our modern and evolving world. Pump-priming difficult and underperforming economies is tough, demanding and time consuming work.
    - The World Platinum Investment Council is making steady progress and I am confident it will handsomely contribute to widening demand for PGMs into new segments including bullion coins.
- Mining is a long term industry. When a pit is dug or a shaft is sunk, we hope it will be active for many years and potentially decades. So, the ability to drive demand even further into the future in a sustainable way, which benefits *all* concerned, is very important to us.
- To maintain and develop these markets and enable other opportunities for the future, we are investing in the future. Not just in market development, but in terms of our core mining business, our people, and our communities.

Summary

So in summary:

- We are evolving our business, including our approach to marketing our products, to continue to support the changing demand patterns of the future;
- We are focused on the technologies, the systems and the people that ensure we continue to do what we do best in a responsible, sustainable manner benefiting all our stakeholders; and
- We are actively promoting new and innovative avenues to responsibly drive demand for our commodities, collaborating with all participants in our value chains.

Conclusion

In closing, and in the context of innovation, I will leave you with the famous words of Einstein – *"If you always do what you always did, you will always get what you always got."*

I urge you all in this room – at the start of this LME Week – to challenge the status quo, to think innovatively, to share ideas and to be part of shaping the future. We are all participants in a great and colourful industry that the world needs to ensure a sustainable future. Let's make sure we stand up, articulate our story with passion and back that up by doing things right and by doing the right things.

Thank you.