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resourcing the future

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Mr Ian Blayney MLA
Chairman
Economics and Industry Standing Committee
Parliament House
PERTH WA 6000

Dear Chairman

INQUIRY INTO TECHNOLOGICAL AND SERVICE INNOVATION IN WESTERN AUSTRALIA

On behalf of BHP Billiton in Western Australia (WA), thank you for the opportunity to make a submission to the Committee's Inquiry into how technological and service innovation can be encouraged in the State.

With the resources sector progressively innovating to achieve sustainable productivity improvements in the face of increasingly challenging market conditions, the timing for this Inquiry is particularly apt. We hope our insights assist the Western Australian Government to formulate its strategy for diversifying the State's economy and boosting its competitiveness and productivity through innovation.

To assist in its Inquiry, I invite the Committee to visit our Western Australia Iron Ore Integrated Remote Operations Centre (IROC) and further discuss BHP Billiton's approach to innovation. From the IROC we remotely operate control systems for our entire Pilbara-based mine, fixed plant and port operations. The IROC also provides a platform to roll out further technologies.

Yours sincerely

Julius Matthys
Vice President Corporate Affairs
BHP Billiton Western Australia

Submission

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Inquiry into technological and service innovation in Western Australia

Introduction

This submission responds to the Terms of Reference for the Inquiry on behalf of BHP Billiton in Western Australia. BHP Billiton is a leading global resources company, headquartered in Australia with a core portfolio of 19 assets in eight countries across four major commodity groups - iron ore, petroleum, copper and coal. In Western Australia, we operate across three commodities - iron ore, petroleum and nickel.

For BHP Billiton in Western Australia, innovation is about developing and applying new ideas and technologies to create value and stimulate growth. Free markets are fundamental to fostering innovation. In a competitive open market, businesses like BHP Billiton are driven to innovate and continuously improve to maximise productivity and global competitiveness. At a macroeconomic level, innovation drives economic growth and raises living standards for all.

The submission outlines BHP Billiton's approach to innovation and technology, including our priority areas for technology investment. We also identify what BHP Billiton regards as being the key drivers and enablers of innovation within our business and the broader economy.

Put simply, our strategy is to adopt best practice technology where it is proven to deliver value. If the technology exists outside our industry, then we will investigate adopting it at our operations. Where there is potential to develop new technology, we will do so by partnering with world-class institutions and companies.

BHP Billiton is committed to supporting innovation. We do this in a variety of ways, by:

- Collaborating with leading companies and research institutions to adapt and develop technology solutions that add value to our business;
- Fostering an organisational culture which empowers our people to innovate; and
- Investing in the delivery programs to boost capacity in science, technology, engineering and mathematics (STEM) and in research to address major challenges facing our industry.

Governments can encourage and stimulate innovation by creating stable and efficient regulatory settings that support competitive markets and incentivise investment; by investing in critical research infrastructure; and by providing platforms to foster collaboration between the research sector and industry.

Just as the market drives businesses to innovate, research should be driven by business demand, rather than universities developing research and development capabilities trying to bridge the gap in the absence of market pull. We see this as being essential to improving commercial outcomes from research.

Businesses and governments alike must provide the appropriate mechanisms to support a culture of innovation. STEM education provides the foundation for continued innovation, and therefore significant investment in expanding STEM capability is essential to improving productivity and shifting to a more knowledge-based economy.

BHP Billiton is committed to working with government, the research sector and industry to strengthen research collaboration and develop STEM capability to drive innovation and productivity gains to benefit the broader economy into the future.

Drivers of innovation

Ensuring the safe, sustainability of our operations is central to creating long-term shareholder value. We are focussed on investing in technology, system and process innovations that contribute to our productivity agenda, improve the safety of our people and minimise our environmental footprint. In line with these priorities, the Company's technology strategy is focused on five areas:

1. *Future mining methods*, with trials of autonomous haul trucks and autonomous blast hole drilling underway at our Western Australia Iron Ore operations;
2. *Smart, networked operations* that enhance supply chain coordination to deliver improved system throughput like our Western Australia Iron Ore Integrated Remote Operations Centre, which improves transparency across the supply chain, reduces system variability and optimises scheduling to improve productivity;
3. *Enhanced geosciences* to improve our resource knowledge and to utilise our data, drillers and geologists more efficiently and effectively, such as the introduction of down-hole assay technology that enables in-situ grade analysis, saving our Iron Ore business A$10 million per year in drilling costs;
4. *Innovative extraction and processing* to enhance resource recovery and drive a step-change in capital and operating costs, like the heap leaching processing pilot project underway at our Olympic Dam operation in South Australia; and
5. *Low emissions technologies* to mitigate emissions generated by our operations and our products, like those used in our newly constructed 190 Megawatt Yarnima Power Station in Newman. It is gas turbine powered with heat recovery generators to capture waste steam to convert into additional power – this is forecast to reduce greenhouse gas emissions by between 150,000 to 200,000 tonnes of CO2 per year, which is equivalent to removing 40,000 cars from the road.

Our considered approach to technology and innovation focuses on value-add opportunities to adopt, adapt or develop technologies to deliver productivity gains:

- If proven, best practice technology exists and delivers value, we will quickly adopt it at our operations;
- If we identify a technology from outside our industry that can be adapted to add value, then we will;
- Where there is a potential for significant uplift in productivity from investing in new technologies we will develop it ourselves through partnering with world-class institutions and companies.

The three drivers underpinning our strategy – safety, environment and productivity - are discussed in more detail below.

Safety

In *Our BHP Billiton Charter*, we are committed to putting health and safety first and being environmentally responsible. We invest in innovation that will reduce our people's exposure to risk in the field, including:

- The use of fatigue monitoring technologies in our haul trucks;
- The roll out of automated technologies to remove people from potentially hazardous environments while increasing the predictability and productivity of operations;
- The use of thermo imaging cameras to safely and more efficiently diagnose mechanical issues on critical equipment; and
- The integration of real-time analytics of equipment data to enable preventative maintenance to eliminate unscheduled and catastrophic failures while maximising equipment availability.

Environment

BHP Billiton recognises that minimising its environmental impact and reducing emissions is essential to operating sustainably. As a major producer and consumer of fossil fuels and energy, we prioritise greenhouse gas emissions (GHG) reductions and energy efficiency. BHP Billiton is among the sector leaders in setting an absolute target to limit our GHG emissions. As we grow our business, this target encourages us to look for ways to improve our energy efficiency, increase productivity and implement additional GHG reduction projects across our global operations. All our businesses are required to identify, evaluate and implement suitable GHG reduction opportunities, including during project design and equipment selection.

We have a low emission technology strategy that considers investment across a range of technologies that have the potential to lead to material emissions reductions in our operations and across our supply chains. Since 2007, BHP Billiton has invested over A$400 million globally on low emission technology research, development and deployment across a number of projects ranging in scale and complexity. We are prioritising technologies across our businesses that could significantly reduce global emissions and align with our skills and expertise. Although using technology to reduce our own emissions is vital, assisting our customers to implement technologies that can reduce emissions from use of our products has the potential to offer wider benefits.

Productivity

After a decade of major capital investment in expanding our operations, we have shifted our focus to productivity led growth through optimising existing infrastructure, driving efficiencies across our businesses, and safely reducing costs. Since 2012, productivity initiatives across the BHP Billiton Group have delivered almost US$10 billion of annual savings, increasing the cost efficiency of our operations and capital investments. During this time, our Western Australian Iron Ore business has increased production above name plate capacity of 220 million tonnes to 254 million tonnes at the financial year ending 30 June 2015, an additional 34 million tonnes through productivity improvements alone. Leveraging technology, process and system innovations have enabled these significant productivity gains.

Technology is only an enabler, it takes capable, highly skilled and motivated people to relentlessly drive improvement. Our productivity agenda is empowering our people to pursue more efficient and effective ways to work. We actively encourage our employees to identify, collaborate and implement ways to do things better and safer: in short, to be innovative. Our leaders support them by removing obstacles and unnecessary bureaucracy which slows progress and stifles collaboration. This common purpose underpinned by a high performance culture is the foundation for fostering continuous improvement and innovation at BHP Billiton.

We see this played out each day in our Western Australia Iron Ore Integrated Remote Operations Centre (IROC), from where we remotely operate control systems for our entire Pilbara iron ore mining, fixed plant, rail and port operations. The benefit to the business is not the technology alone, it is the improved collaboration and coordinated decision making facilitated by co-locating expertise in the IROC.

The Role of Governments in Supporting Innovation

Understanding that increased productivity and innovation throughout our own supply chain will boost our long-term competitiveness, BHP Billiton has long advocated for measures to boost Australia's international competitiveness through innovation and productivity improvements.

For a range of reasons, productivity has deteriorated in Australia in recent years, with some industries no longer able to compete effectively in the global market. While the recent weakening of the

Australian dollar provides some short-term relief, it is not a sustainable solution. Australia's comparative economic advantages in geology and geography will not underwrite our competitiveness in the next phase of the global growth cycle.

Instead, we must improve the fundamentals that support productivity: raising education and skills standards; building efficient infrastructure to make us a cost-competitive trading nation; and incentivising and developing the technology and innovation required to better generate economic value from our existing resources.

Just as BHP Billiton is focussed on developing the culture and mechanisms conducive to collaboration and innovation within its business, so too must governments provide appropriate policy and regulatory settings to support and encourage innovation across the broader economy. Government can stimulate innovation by fostering investment, facilitating collaboration and developing the infrastructure and knowledge base to support innovation.

Fostering investment

Ensuring open, transparent and competitive markets should be the primary objective of government.

The Australian resources sector is currently facing significant pressures from the volatility of commodity prices and increased international competition. These challenges only reinforce how important it is to have well-functioning markets coupled with the regulatory certainty and political stability to stimulate business confidence. A stable, efficient and globally competitive taxation and royalty regime is an essential foundation to attracting investment and incentivising innovation.

Governments can also cultivate a business climate that rewards innovation through the removal of compliance burden and non-competitive regulation. One important consideration in this regard is ensuring that the intellectual property (IP) regime strikes an appropriate balance between providing sufficient protection to reward and encourage creativity without stifling the diffusion of ideas.

Collaboration

Government can facilitate collaboration by providing simple platforms to encourage and strengthen engagement between industry and the research sector. We acknowledge the inroads already made by the Commonwealth through its Cooperative Research Centres and the Industry Growth Centres Initiative and we encourage the Government of Western Australia to align its efforts with these existing programs.

We recognise that, when managed effectively, CRCs can be an effective tool for driving research partnerships between industry and universities. BHP Billiton currently participates in two of the CRCs, which commenced in 2010:

- CRC ORE (Optimising Resource Extraction), which is aiming to reverse the trend of declining feed grade and deliver innovation from mine to mill.
- CRC DET (Deep Exploration Technology), which is aiming to deliver safer ways to drill, analyse and target deep mineral deposits.

BHP Billiton welcomes the recognition of oil and gas, and mining technology, as areas of Australia's competitive strength under the Industry Growth Centres Initiative. We are engaged in the development of the Mining Equipment Technology and Service Industry Growth Centre. Better articulation of the Centres' operating model will help ensure the Growth Centres are genuine enabling agents and not another layer of bureaucracy.

Independent of these existing programs there appears to be sufficient drive from industry to engage directly with universities and research institutions. Many Western Australia-based research institutions and universities are among the best in the world, and they should be further encouraged to work with industry to facilitate commercialisation. To improve commercial returns, research must be driven by a business demand. That is, when businesses partner with universities to develop solutions, rather than universities trying to bridge the gap in isolation by developing research and

development capabilities with no market pull. Universities and publically funded research agencies must retain their primary focus on fundamental research and facilitating commercialisation, rather than seeking to directly extract income from publicly funded IP.

Recognising the challenges associated with financing and commercialising new technologies, in recent years BHP Billiton has also participated in technology start-up programs, including:

- Unearthed Hackathon – an event focussed on developing technological solutions for operational problems facing the Western Australian mining sector; and
- Energise – An accelerator program that links start-ups to their potential customers in the resources and energy sectors by giving the sponsoring companies the opportunity to evaluate and potentially integrate the start-ups' innovations into their own businesses.

Beyond strengthening our commercial partnerships, BHP Billiton continues to explore ways to work more closely with world-class research institutions through our social investment program, including our:

- Investment in the Cooperative Research Centre for Greenhouse Gas Technologies, CO2CRC, a joint venture between government, industry and research bodies focussed on developing carbon dioxide capture and geological sequestration technologies[1];
- A$12 million investment toward the creation of a world class Engineering Zone at the University of Western Australia to create a centre of excellence for the resources industry; and
- Jointly funded marine research partnership with CSIRO to inform the oil and gas industry's conservation efforts in Ningaloo Reef.

Development of knowledge bases and infrastructure

Government's role in creating, developing and maintaining world-class research infrastructure and a knowledge base is vital to innovation.

Research provides a foundation for further innovation in the broader economy. Therefore, maintaining government investment in critical research infrastructure and basic research is essential. Recognising the current fiscal constraints faced by State and Federal governments, BHP Billiton supports the strategic targeting of investment toward priority areas centred around sectors of comparative advantage, as outlined in the Commonwealth's Industry Growth Centre's Initiative and proposed in the State's Science Statement.

Significant investment in expanding science, technology, engineering and mathematics (STEM) capability is essential to improving Australia's productivity and shifting to a more knowledge-based economy. Government has a critical role to play as supporters and providers of education, training and skills development. BHP Billiton employs around 80,000 people worldwide, many of them STEM professionals, so we too share the responsibility to make sure there is a pipeline of young people who choose to study STEM subjects. We therefore welcome the opportunity to work with government and the broader business community to develop a long term, coordinated STEM strategy to ensure a pipeline of future problem-solvers, innovators and inventors.

BHP Billiton recognises that STEM education provides the foundation for an innovative culture. This is why we are investing in a range of programs to develop knowledge and skills in STEM that our industry and economy will benefit from over the long term, including:

- Our Western Australian Iron Ore business's annual funding commitment of A$27.8 million to STEM education programs, including partnerships with Scitech, Curtin University, UWA Business School and The Graham Farmer Foundation;
- BHP Billiton Group investments including
    - A$22 million to support the Australian Mathematical Sciences Institute to increase the representation of women in the field of mathematics; and

[1] CO2CRC does not receive Commonwealth Government funding and is no longer part of the CRC program.

- A$28.8 million to support CSIRO's program to promote pathways aimed at increasing Aboriginal and Torres Strait Island representation in STEM professions; and
- A partnership dating back to 1981 with CSIRO and the Australian Science Teachers Association to deliver the BHP Billiton Science and Engineering Awards program which recognises excellence and innovation in school science.

More broadly, in recognising the importance of education for developing the leaders and innovators of tomorrow, BHP Billiton makes significant investments toward ensuring access to high quality education services in our host communities, from early childhood through to student scholarships at eminent schools and universities.

Conclusion

Open, competitive markets and a skilled workforce are the key drivers to innovation. Businesses and governments must provide the appropriate mechanisms to support a culture of innovation. Government has three key roles in supporting innovation - fostering investment, facilitating collaboration and developing the necessary infrastructure and knowledge base.

BHP Billiton recognises that within our business and across the broader economy, innovation can enable increased productivity across the value chain. STEM education provides the foundation for continued innovation, and therefore significant investment in expanding STEM capability is essential to improving productivity and shifting to a more knowledge-based economy.

BHP Billiton welcomes the opportunity to work with government, the research sector and broader industry to strengthen research collaboration and develop STEM capability to drive innovation and improve productivity to expand and diversify the Western Australian economy.