# AGENDA

- 1. Welcome and introductions Chair (10 mins)
- 2. Ministerial expectations Minister Canavan (30 mins)
- 3. Tea break (20 min)
- 4. Work programme discussion Chair / Secretariat (30 mins)
  - a. Terms of Reference / Scope of Taskforce / Paper from the Chair
  - b. Agree forward meetings schedule
  - c. Forward work and products for future meetings
  - d. Stakeholder Engagement & Roundtables
  - e. Communications
  - f. Final Taskforce Report expectations

# 5. Issues papers discussion – All (2 hrs)

Cover Paper – Initial Reform Topics Discussion

- a. New basins / new resources
- b. Reducing the environmental footprint
- c. Building community support
- d. Improving Competitiveness
- 6. Wrap-up Chair (15 mins)
  - a. Action items / next steps
  - b. Next meeting details

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# **TERMS OF REFERENCE**

# **RESOURCES 2030 TASKFORCE**

# 1. Overview

The Australian Government is committed to supporting a world class resources sector. To achieve this, the government seeks to create a policy framework that will increase the international competitiveness of the resources sector, improve the sustainability of resources activities and strengthen community support for the sector.

To inform its current and future activities, the Department of Industry, Innovation and Science (the department) is establishing the Resources 2030 Taskforce (the taskforce). The taskforce is expected to identify and bring forward bold, attainable reforms to the Australian resources sector. Each reform will ensure the sector's competitiveness and sustainability to 2030 and beyond.

The taskforce will operate in 2018 and provide a report to the Minister for Resources and Northern Australia by August 2018. This report will outline the taskforce's recommendations to government and proposed reforms to the resources sector.

# 2. Membership

The taskforce will consist of at least eight members.

Each member will be appointed by the department. They will be a key stakeholder with knowledge of and broad experience across the resources sector.

Membership of the taskforce is restricted to the individual appointed by the department. Members cannot appoint delegates to attend the meeting on their behalf.

The department may appoint new members to the taskforce if required.

# 3. <u>Responsibilities</u>

The taskforce will identify bold, attainable reforms that will ensure the sector's competitiveness and sustainability to 2030 and beyond. To do this, the taskforce will consider the operation of the Australian resources sector, the nature of Australian Government policies and support, and ongoing risks and opportunities.

The taskforce will consider potential reforms in line with the following policy areas:

- **Investment**: business simplification and competitive investment settings
- Communities: regional development and bolstering community support
- **Exploration and business development**: new basins, markets, minerals and geological sciences
- **Innovation and technology**: improving productivity, developing METS and supply chains
- **Environment**: improving environmental performance.

The taskforce will meet four times between March and August 2018. Where necessary the taskforce may agree to meet at additional times.

The taskforce will report its findings to the Minister for Resources and Northern Australia. This report will be made by August 2018. The department will consider applicable actions recommended in the taskforce's report for inclusion in a Resources Statement.

# 4. Consultation

The department will conduct stakeholder consultation on behalf of the taskforce. Where relevant, taskforce members will be invited to attend consultation meetings. Feedback and input received during this consultation will be made available to the taskforce. It is expected that this information will be considered for the taskforce's final report and associated recommendations.

# 5. Duties of members

Members of the taskforce must comply with the *Public Governance, Performance and Accountability Act 2013* and act in accordance with the Australian Public Service Code of Conduct.

Members are also expected to comply with all relevant legislation of the Commonwealth or of any state, territory or local authority. This includes the *Crimes Act 1914*, *Privacy Act 1988*, *Racial Discrimination Act 1975*, *Sex Discrimination Act 1984*, and *Disability Discrimination Act 1992*.

# 6. Confidentiality

The taskforce's considerations and discussions will remain confidential until the release of the final report to the Minister. This will ensure that a robust, critical examination of the sector can occur.

Stakeholder consultation conducted by the taskforce will be public. Information obtained during this consultation will not be considered to be confidential and will be made available to participating stakeholders once the consultation process has concluded.

# 7. Conduct of business

A quorum will be four members and shall include the chair.

Decisions, endorsements and requests for action will be determined by a consensus of those members participating in the meeting. If a consensus cannot be reached, majority vote will be used.

# 8. Secretariat

The department will provide secretarial support to the taskforce. This support may include but is not limited to:

- arranging meetings and meeting agendas
- developing policy papers and research required by the taskforce

- preparing and circulating relevant papers to support the operation of the taskforce
- organising logistical arrangements.

# 9. <u>Sunset</u>

The taskforce has been created to provide a report and recommendations to the Minster to advise on significant reforms for the Australian resources sector. Membership of the taskforce will remain in place until the provision of the relevant report to the Minister.

# **AGENDA ITEM 5**

# **Initial Reform Topics Discussion**

**Action**: Taskforce members to explore areas where bold and attainable reforms will ensure the sector's competitiveness and sustainability to 2030 and beyond.

**Discuss**: Taskforce members to discuss the four Issues Papers under this agenda item, which outline some 'thorny' or big challenges facing the industry in the long-term.

Action: Taskforce members to refine down the challenges, ideas or reforms they wish to progress for future meetings.

# **Minister's expectations**

Minister Canavan outlined in his National Press Club Speech that he is seeking from the taskforce a focus on policies that can attract investment, contribute to regional economic progress, build community support, cut red tape, find new (critical) minerals and ensure that Australia gets best use of its mineral resources before they are exported.

The minister further added that he saw the success of our resources policy, not just in terms of dollars, exports or taxes, but also in terms of people, including Indigenous and those in remote communities. Furthermore, the resources sector will continue to provide jobs and the opportunity for successful business opportunities for decades to come, and that this is something the rest of Australia should support.

The minister's priorities for policy areas where big actions and reforms could be explored are listed in the Resources 2030 Taskforce Terms of Reference, being:

- Investment: cutting red tape and enhancing competitive investment settings.
- Communities: regional development and bolstering community support.
- Exploration and business development: new basins, markets, minerals and geological sciences.
- Innovation and technology: improving productivity, developing Mining Equipment, Technology and Services (METS) and supply chains.
- **Environment**: improving environmental performance.

# **Departmental thinking**

The resources agenda is currently dominated by near-term issues management. However, our short-term focus can obscure long-term challenges that may undermine future success.

The department believes that the development of a long-term agenda for the resources sector is important if we want Australia to continue to have world leading resources and METS sectors, which safely and responsibly maximise the benefits of our natural endowments and human capabilities, and which are proudly supported by the Australian community.

To achieve this outcome, the department considers Australia needs signature actions for long-term challenges such as:

- Driving increased competitiveness and spurring development of new basins and resources.
- A sustainable framework to support long-term research and knowledge creation to address industry wide 'thorny' or big challenges.
- Building stronger community support for resource development.

# **RESOURCES 2030 TASKFORCE**

Securing the future of Australia's resources sector

# **Taskforce deliberations**

The minister and the department are looking for a small set of large, step-change and signature reforms that provide clear policy directions to industry, investors and other domestic and international stakeholders.

Smaller or incremental reform ideas, while welcome, are not the focus for the establishment of the taskforce given its time constrained nature.

For the taskforce to consider in its deliberations of bold reform ideas the Department has prepared four issues papers (agenda items 5a-5d) discussing aspects of the above challenges.

# **Issues papers**

The four issues papers developed under this agenda item address:

- a. New resources, new basins;
- b. Reducing the environmental footprint;
- c. Building Stronger Communities; and
- d. Improving Competitiveness.

Each paper has been prepared to be broad in nature for the purpose of initiating discussion. The department recognises they are not an exclusive set of challenges or only long-term in nature.

The department recognises that the resources sector is experiencing challenging competitiveness conditions with the wind-down in major project construction and development occurring at the same time as falling commodity prices and profits.

In the current environment high input costs, such as energy prices (and security and emission commitments), lengthy project approvals processes, land access, royalties and tax arrangements, and/or tightened restrictions on eligibility for skilled labour migration into the country (which can create potentially higher labour costs) are material issues.

The department recognises that many issues facing the resources sector are complex and do not fit neatly into a short, medium or long term categorisation. However, it is important that the taskforce is guided by the need to focus longer-term to 2030 and beyond.

# AGENDA ITEM 5A

# **Building Australia's Resources Wealth – New Resources, New Basins**

## Taskforce Members may wish to discuss the following:

- 1. Is this a key issue which could critically define the sector's longer term future in Australia?
- 2. Has the paper identified the right set of challenges, drivers and barriers?
- 3. Is this an area the taskforce would like the secretariat to explore further, including as a future focus of roundtable consultation?
- 4. Are there specific aspects that the taskforce would particularly like to focus on?

# What is the challenge?

Australia has been the prime beneficiary from the decade long surge in Asia's appetite for mineral and energy resources. This underpinned the development of many of Australia's major new projects and provinces which, in some cases, were first identified as far back as the 1960s.

However, as many older resource operations are yielding declining grades and move towards closure, we are not adequately replenishing our stock of marketable world-class deposits.

Looking beyond the impact of commodity and profit cycles, the reasons for this are complex.

Onshore and offshore greenfield exploration rates have dramatically fallen over the last half decade and Australia's share of the global exploration spend has also declined (see <u>Attachment A</u>). Opening new offshore or onshore basins or provinces is challenging, particularly in the absence of a tier one resource, due to cost, lack of infrastructure and growing social resistance to developing new areas.

There are perceptions that Australia's geological prospectivity is declining, despite the reality that some 80 per cent of Australia remains relatively underexplored. Our exploration efforts remain concentrated on finding near-surface resources over some 20 per cent of the continent or in brownfield petroleum fields offshore. While new deposits are being found, we have not discovered a tier 1 resource for over 25 years. Australia's deeper geologies, which are as equally prospective as our surface, are largely unexplored due to poorer information, higher risks and costs and a lack of appropriate skills and techniques.

Increasing social pressure to reduce the industry's environmental footprint also suggests mining in the future may well begin to focus on finding and exploiting high quality deeper deposits.

*In the near term* the challenge is how might we might improve exploration success rates and bring on new provinces and regions?

*In the longer term* it might be how do we unlock the potential of the vast areas of Australia's geology which remain under-explored?

# What are the opportunities if we are successful?

Simply put, replenishing and building our exploitable resource base is a critical prerequisite to the long term growth and sustainability of the resources industry.

Opening new basins and frontiers in areas such as the Galilee, Great Australian Bight and in our untapped onshore and offshore gas plays, offer economic gains in the order of hundreds of billions of dollars over many decades and would support regional economic and social development in areas with otherwise limited economic options.

# **RESOURCES 2030 TASKFORCE**

Australia is no exception to the global trend where new quality resources are increasingly likely to be discovered at a greater depth. While this is currently technically and economically 'over the horizon', Australia has an opportunity to be at the forefront of this paradigm shift by creating new knowledge, processes and technology.

Simply put this could underpin the development of a new world-class exportable expertise and cement our position as a global leader in resources and METS for decades to come.

Australia also has the opportunity to shape new mineral markets and meet burgeoning global demand for new era or 'critical' minerals. For example, the United States Government has drawn up a list of 35 critical minerals and Australia is in the global top five for resources of 13 of these minerals.

Another example is the rapidly growing lithium market. As a major reserve-holder of lithium, Australia is on the cusp of significant new opportunities for the export of this mineral. But we must also decide what other opportunities should be seized upon to value-add. Australia can be more than just a miner and exporter. We can also be a processor, to significantly value-add to our commodities, rather than just shipping them overseas in their raw, lower-value form.

# What are we currently doing to address the challenges/opportunities?

The job of finding and developing new resources is predominately and rightly undertaken by the private sector, supported by effective and efficient policy and regulatory frameworks. For offshore Australia this is jointly provided by the Australian and respective state or territory governments, while onshore development is administered by the state and territories.

In terms of regulatory frameworks, there are distinct differences between various jurisdictions and in recent times a number of governments have introduced restrictions on certain types of resource activity. This has led to an inconsistent and often confusing system for investors with eroding confidence in the longer stability of our regulatory regimes.

Other issues often associated with finding new resources include access to land, which is driven by environmental concerns and community engagement issues. However, this is not unique to exploration activities and reflects broader perceptions about the resources sector's environmental performance, engagement practices with the communities, and distribution of benefits. Some of these issues will be covered in separate discussion papers.

<u>Attachment B</u> provides a broad map of direct government support for the development of new resources, moving along the spectrum from the development of new science/techniques and knowledge, the collection of pre-competitive geological data, exploration through to development.

Government support is generally focussed on de-risking exploration and addressing market failures with investment in pre-commercial stage RD&D. Some states and territories provide targeted support in geographic regions or strategies for specific minerals (such as South Australia's Copper Strategy). The Council of Australian Governments (CoAG) have a set of Ministerial and officials level working groups to address cross-jurisdictional issues and promote improved coordination.

# Is additional action needed?

To realise a paradigm shift or step change in our exploration and development outcomes it is arguable that we need to do things differently.

The current matrix of support illustrates a broad range of activity but with little overall coordination. This may mean we are not yielding an optimal return on an investment of necessarily limited

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resources. Feedback also suggests that government and industry funding is increasingly shorter in term and is focused on bottom line issues at the expense of longer term paradigm shifting research.

New knowledge and technology for exploration will ultimately deliver some of the answers to the challenge of declining resources grades and exploration performance. It is questionable whether the current effort will produce an accelerated and comprehensive step-change.

A more focussed and resourced effort could focus on:

- Acquiring new geoscience data and knowledge;
- National or regional exploration and development strategies, including commodity strategies; and
- Developing paradigm shifting exploration techniques, technologies and processes.

# AGENDA ITEM 5A - ATTACHMENT A

# AUSTRALIA'S EXPLORATION PERFORMANCE

# **Key indicators**



% share spent on exploration for minerals

Declining \$ share spent on greenfield exploration, from 40% in 2004 to 32% in 2017





Number of discoveries made by size

Discoveries in recent years tend to be more moderate in size







Australia's share of global exploration expenditure

Declining in global share of exploration expenditure from 19% in 1999 to 13% in 2016



Source: ABS , SNL and MinEx Consulting

# AGENDA ITEM 5A - ATTACHMENT B

# ACTIONS TO INCENTIVISE EXPLORATION AND DEVELOPMENT OF NEW REGIONS

# **BUILDING NEW KNOWLEDGE**



# Government

- CSIRO's Future Science Platforms -Deep earth imaging
- CSIRO's Minerals and Energy Flagships
- CRC Funding Rounds
- R&D Tax Incentive



# Industry R&D

- ACARP
- Rio Tinto Centre for Mine Automation
- BHP Global
   Technology Centre
- Chevron's Perth
   Global Technology
   Centre



- Flinders
- Wollongong



# **Hybrids**

- Unearthed
- Mining3
- CRC DETs
- CRC Mining
- UNCOVER Initiative
- ARC Centre of Excellence for Geotechnical Science

# **EXPLORATION SUPPORT**





Securing the future of Australia's resource sector

# AGENDA ITEM 5B

# **Environment and Sustainability**

## Taskforce Members may wish to consider:

- 1. Is this a key issue that could critically define the sectors' longer-term future in Australia?
- 2. Has the paper identified the right set of challenges, drivers and barriers?
- 3. Is this an area the taskforce would like the secretariat to explore further, including as a future focus of roundtable consultation?
- 4. Are there specific aspects that the taskforce would particularly like to focus on?

# What are the challenges?

The Australian resources sector has significantly improved its environmental management practices over recent decades. This has reduced the sector's environmental footprint, minimised the long-term impacts of development and facilitated effective rehabilitation.

Community and even government views of the industry can be driven by a minority legacy of poor historical environmental practices in Australia and globally, or in some instances, misinformation. One bad apple can indeed spoil the bunch. This can lead to governments succumbing to pressure for over-regulation or even bans and restrictions, which are inconsistent or disproportionate to the science and potential impact. In particular, the rise of social media and the almost immediate transparency that it provides has added new challenges in managing information.

That said, it is undeniable that the Australian community's expectations in relation to the environmental and social performance of resource projects will continue to rise. The resource project of the future will need to reduce its operational and post-life footprint to as small as practicable with minimal long-term disruption to the environment and host communities.

It is essential that mainstream environmental stewardship is a core part of doing business for the resources and Mining Equipment, Technology and Services (METS) industries and governments, and that leading and sustainable practices and technologies are adopted to improve performance and accountability.

There is a range of 'thorny' cross-sectoral environmental issues that stand out as ones which might have a major impact on the future of the sector (though there are undoubtedly others).

<u>Rehabilitation and closure</u> — as more resource projects enter their final stages increasing focus is being applied to the regulatory frameworks and the performance of projects in restoring the environment and managing on-going social impacts. Nationally and globally, this is an area where approaches and regulatory requirements vary greatly.

<u>Tailings management</u> — this is an area with the most risk and concern for operators and regulators. Globally tailing dam failure has caused more loss of life and damage than any other aspect of resource development.

<u>Water management</u> — community conflict around resource projects is often driven by concern over the perceived impact on shared resources, notably water — ground and surface.

<u>Emissions reductions</u> — reducing carbon and other pollutant emissions has now become a mainstream benchmark or indicator used to assess industry performance. This includes emissions from extraction and use.

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How companies develop and communicate such stewardship activities will be essential to demonstrate their commitment to minimising their environmental footprint. This in turn is key to building and maintaining ongoing public trust in the sector's future success.

*In the near term* the challenge is how do industry and government work together to build trust in the sector's commitment to environmental management activities?

*In the longer term* it might be how do we tackle the long-term thorny cross-sectoral issues that can significantly reduce the environmental impact and improve social acceptance of the industry?

# What are the opportunities if we are successful?

Effective environmental management presents key opportunities for the sector and businesses within Australia and those exporting to the world. Well-implemented environmental stewardship can reduce the cost of doing business through greater efficiency, reduced inputs and operating costs and increased competitiveness. It also helps to build public trust and confidence in the sector's ability to manage its impact on the environment. Australia already has outstanding examples of land rehabilitation.

Developing world best practice and expertise in rehabilitation, tailings management and closure could be the genesis of a major new industry. In particular, it would provide new business and employment opportunities for Indigenous Australians, capitalising on their connection with local country and culture. Better and earlier engagement with communities on the post-operation outcomes may significantly improve cost and social outcomes. Harmonising approaches across jurisdictions could also significantly reduce industry costs without jeopardising performance.

# What are we currently doing to address the challenges and opportunities?

There are a range of government and industry initiatives underway to improve environmental performance, particularly in relation to water use and carbon emission reductions. These have resulted in some world-class achievements.

There is a significant amount of research into environmental issues affecting the industry through universities and centre of excellence networks as well as institutions, such as the CSIRO and Geoscience Australia.

Governments at all levels have also undertaken a range of regulatory streamlining reforms and, in places, strengthened environmental oversight. There have been some impressive successes — such as the development of the CSG industry in Queensland. However, there are also examples where this has not worked well with resources either sterilised or frozen.

# Is additional action needed?

It is clear that addressing the 'thorny' cross-sectoral issues will require new ideas, technologies and ways of working.

Many of these cross-sectoral environmental issues have a number of classic 'public good' characteristics (long term, cross-sectoral, no single solution) which mean they are generally beyond the resources of any one government or business to solve.

Feedback again suggests that coordination of the overall effort is lacking (which may or may not be an issue) and that effort might be biased to shorter-term popular issues. Project funding also tends to the shorter term, with longer-term research proposals struggling to attract stable predictable and committed support. Public funding in particular for research is challenging with areas such as Carbon Capture Use and Storage seeing significant reductions in recent years.

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Members are invited to consider whether there may be merit in:

- Developing world-best practice national approaches for mine rehabilitation and closure;
- Ways to improve the long term level and stability of funding for long-term industry wide environmental issues; and
- Opportunities to improve emissions performance upstream and downstream.

Securing the future of Australia's resource sector

# AGENDA ITEM 5C

# Building Stronger Communities - Connect, Communicate, Collaborate

# Taskforce Members may wish to consider:

- 1. How do we bolster community support at national, regional and local levels for resources projects and better communicate their benefits?
- 2. How do we improve the social dividend for affected communities, especially Indigenous communities?
- Are existing industry engagement processes with communities sufficient? Have such processes adapted to new technologies and modes of communication? If not, what needs to happen to improve community support?
- 4. How must industry, governments and affected communities better work together to minimise disruptions to resource industry projects and deliver maximum benefit to regions?
- 5. Looking more broadly, whether there are lessons to be learned from other countries or specific projects? (see Appendix A).

# What are the challenges?

Building strong and productive relationships is a shared responsibility. Social acceptance of mining is dependent on governments and industry actively working with communities to establish constructive and mutually beneficial relationships to build support and explain benefits.

A major challenge is what defines a 'community', whether that be the local population affected by the economic impacts of a project, or the broader Australian community engaged in resource industry issues and engaged through, for example, new social media tools. Regardless, to what extent does the industry need to adapt?

As an example, the 2017 survey by the CSIRO of Australian attitudes towards mining reveals the broad recognition across all regions that mining is of benefit to the Australian economy and our future prosperity. However, at a more local level, the majority of people surveyed were of the view that mining has negative impacts on the environment, especially on water quality. Many others were also concerned about the impact of mining on farming and the effect of workforce trends (especially fly-in fly-out) on their communities. Digging deeper, the survey actually suggests a low overall trust by the community towards the mining sector, a trend that has remained consistent with the previous survey.<sup>1</sup>

Anecdotally, there is strong community support for the benefits that come from mining and resources. For example, in Central and North Queensland, and in the Pilbara region of WA, there is a deep association between jobs and mining projects. Local communities, workers and small businesses can be powerful advocates of the resources sector, but they are also those most likely to feel the effects of the cyclical nature of the resources sector. In short, local support cannot be taken for granted.

Given resource projects are most frequently found in regional Australia, the resources sector is specially placed to build local level support and help drive the development of regional areas.

In Australia, local communities and other stakeholders are considered to have a major influence on the approval of resource development projects, especially through engagement in political,

<sup>&</sup>lt;sup>1</sup> CSIRO. "Australian attitudes towards mining: latest results" 2017.

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regulatory and legal processes. These are the communities with a vested interest in the success of specific projects. However, more recently there is a view that more 'distant' advocacy groups and lobbyists (often international) are increasingly able to dominate resource development and approval processes based on agendas that do not necessarily align with local community interests. For example some urban residents have strong sentiments on resource sector issues, driven by greater access to information and viewpoints as well as an increased capacity to share opinions and mobilise, especially through social media. As a result, local communities often feel that their views are drowned out or neglected, with little consideration given to the local economic and social benefits of resource projects.

# What are the opportunities if we are successful?

Overall, the resource sector is presented with an opportunity to change community expectations. In order to gain greater social acceptance and community 'buy-in', consideration needs to be given to how to improve communication and consultation about social, environmental and economic impacts. There is an opportunity for the resources sector to more broadly convey the benefits of projects to the specific local communities they operate in and to the wider society in order to grow confidence in the activities of the sector.

Specific opportunities include how to:

- Better distribute benefits to communities, in particular in regional and remote regions and with emphasis on Indigenous communities.
- Provide appropriate compensation for any disturbances, including for affected land users and traditional land owners.
- Develop effective negotiation frameworks and supporting legislation for farmers, Indigenous Australians, local communities and industry with respect to shared land and water resources.
- Ensure there remain jobs and training opportunities available in regional and remote communities, especially in response to the transition towards greater automation and machinery being operated remotely.
- Leverage local Indigenous knowledge to guide business decisions, encourage Indigenous employment, promote small Indigenous business enterprises, and provide appropriate policy frameworks to foster growth for Indigenous Australians.
- In the longer term, bolster community support and overcome entrenched anti-resource sentiment driven by the above challenges.

Communities are integral to all stages of a project life cycle. A strong rapport can only be built by adopting mechanisms to keep them informed and engaged. Empowered communities are more accepting of resource development and engage more constructively to build relationships that can add significant value to business operations. This is of course a long-term investment. However, working collaboratively to address the above issues provides Australia with an opportunity to be a world leader in effective community engagement.

# What are we currently doing to address the challenges/opportunities?

At present, many organisations have well-established community engagement programs. These programs aim to align community objectives and work in partnership with governments, civil society organisations and community groups.

The taskforce may wish to identify examples of best-practice community engagement, with a view to highlighting where positive outcomes can be achieved in Australia.

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# Is additional action needed?

A collective approach where industry, governments and the community work in partnership to address such complex issues is vital. However, measuring and monitoring performance and outcomes can be difficult. As such the taskforce may also wish to look more broadly. For example using Canada's "Towards Sustainable Mining" program, which focuses on working with communities and has been adapted and used by other countries and is introduced in <u>Appendix A</u>. Are such approaches useful for Australia?

A better articulated and more visible return to communities hosting resource projects may also generate greater support noting that projects already generate considerable direct and indirect support.

## **APPENDIX A**

# CANADA: Towards Sustainable Mining Program

Towards Sustainable Mining (TSM) is an initiative led by the Mining Association of Canada (MAC) which enables the industry to demonstrate performance in social corporate responsibility annually to their key stakeholders. Participation is mandatory for all members of Mining Association of Canada for their national operations. The program incorporates a set of tools, best practise guidance and reporting protocols to manage risk, measure results and foster progress in the following 3 areas:

- 1. Working in Communities and providing safe and healthy working environments
- 2. Minimising Environmental Impact
- 3. Reducing Greenhouse Gas Emissions and becoming more Energy Efficient

There a six performance areas addressing some of the critical risks and key issues that mining companies need to focus on. These are rated on a 5 level scale from AAA (best practise) – C.

- 1. Aboriginal and community outreach
- 2. Biodiversity Conservation Management
- 3. Crisis Management Planning
- 4. Energy Use and Greenhouse Gas Emissions Management
- 5. Safety and Health
- 6. Tailings Management

Every year companies self-assess against a series of protocols and common performance indicators. Results are published and made transparent to the general public. Every 3 years to calibrate and validate the self-assessments a company will undergo an external audit. The verification is run by qualified independent auditors.

Upon review a subset of the organisation being audited will engage with a Community of Interest (COI) Panel to discuss key findings from the process, issues of concern and answer any questions the panel may have. The COI Panel advisory panel is comprised of various stakeholder groups including: community, environmental, academic, aboriginal, economic and social sectors.

The program is successfully running in Canada for over 10 years and has been adopted by other nations such as Finland, Argentina, Philippines and most recently Spain.

# AGENDA ITEM 5D

# Keeping Ahead of the Game through Innovation and Competitive Business Settings

## Taskforce Members may wish to consider:

- 1. Is this a key issue critical to the longer term future of the resources sector?
- 2. Has the paper identified the right set of challenges, drivers and barriers?
- 3. Is there a need for step-change thinking in our settings or structures to improve long-term innovation outcomes is the answer more resources or better prioritisation of effort?
- 4. What more could be done in terms of business settings to make Australia significantly more attractive?
- 5. Is this an area the taskforce would like the secretariat to explore further, including as a future focus of roundtable consultation?
- 6. Are there specific aspects the taskforce would particularly like to focus on?

# What are the challenges?

Historically Australia's ability to capture a large share of global investment in resources has been the result of a number of critical competitive advantages — some natural and some that have been hard earnt. These include our abundant and diverse resources base, our skills and capabilities in exploration and development, and our reputation for providing a stable and business friendly political and regulatory environment in which to invest.

However, our competitive position is under pressure as new supplies open up and our future success will, in large part, come from being smarter, more efficient and cleaner than our competitors. We cannot afford to rest on our laurels. For example, Australia will soon face new suppliers in increasingly competitive Asian energy markets. The US will soon become a net energy exporter for the first time since the Korean War. In a world where the playing field is levelling out, innovation and technology hold the key to boosting productivity and competitiveness, and to creating new competitive strengths.

Central to this is an acknowledgement that there is far more to the modern resources sector than just 'picks and shovels' and 'digging bigger holes'. The resources sector of today is highly sophisticated, comprising a large ecosystem of interrelated industries each providing a range of equipment and services in order to operate effectively. Similarly there are environmental challenges, such as emissions reduction and land rehabilitation, which need new solutions to the old ways of working.

This means that every link in the value chain, and every industry or firm in each link, can potentially provide a new source of innovation and competitive edge.

Australia's innovation system with respect to resources is well placed through universities and government bodies, such as the CSIRO and key mining and engineering schools and centres of excellence. However, innovation systems must be complemented with competitive business settings and investment frameworks. Recent reviews, such as by the Fraser Institute, show that Australia's settings are beginning to slide in our investment attractiveness.

Against this background it is of crucial importance for the resources sector in Australia to establish an environment which encourages and rewards innovation as a way of generating continual

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progress. This will enable Australia to remain globally competitive and at the forefront of leading mining nations to ensure long term success.

*In the near term* the challenge is how can we better prioritise our science and innovation efforts and improve business settings to boost our competitiveness?

*In the longer term* the challenge might be *how do we better foster longer-term step-change ideas and technologies that position Australia as a global industry leader and underwrite our long term competitiveness?* 

# What are the opportunities if we are successful?

If successful, Australia will cement its role as a global leader in industry knowledge and best practice. Mining and mining-related industries are sectors in which Australia truly can lead the world, despite facing larger competitors. More importantly it will significantly underwrite business and investment competitiveness and promote additional exports of business opportunity from our mining, engineering and technology services sector.

# What are we currently doing to address the challenges/opportunities?

Fostering an environment that induces world leading innovation and new ideas is challenging and few countries, if any, get it completely right.

Industry plays a critical role in seeding, developing and commercialising new technologies and processes, much of which are directed at improving profitability. Governments have traditionally provided fiscal incentives to generate and leverage early stage ideas and R&D as well as the block-funding for critical research infrastructure.

The historical investments Australia has made in mining and petroleum research infrastructure and capacities mean we are well positioned for adding to, and strengthening, existing rungs on the global value chain for the resources sector. We have a number of world-class mining and engineering schools that act as an incubator for new ideas and technologies.

Not everything needs to be invented in Australia. We have traditionally been both a leader and fast follower or adapter of technologies and this will continue to be the case into the future.

The Australian Government has also made significant reforms through its red and green tape reduction agenda. States and territories have also sought to streamline approvals processes and improve regulatory frameworks for resource projects, although standards and approaches continue to differ substantially between jurisdictions.

# Is additional action needed?

While our resource related innovation infrastructure is world class it can be argued that it is becoming more biased towards 'incremental' innovation, which address the business needs of today rather than 'step' changes necessary to meet the more strategic or sectoral needs of tomorrow. A greater focus on aligning research and science with business needs is essential to ensure there is greater pay-off for effort.

However, feedback suggests that funding is increasingly shorter term and cyclical. Coordination of effort is largely driven by individual institutions and businesses rather than through a broader sector-wide perspective. A key is whether our efforts should be more coordinated, ambitious and broader in scope (e.g. a 'moon-shot' type program or approach)?

While governments have made significant improvements in green and red tape reduction, the example of several recent high profile projects, such as the Adani Carmichael Mine, show that

# **RESOURCES 2030 TASKFORCE**

ideological opponents of resource development projects are becoming more adept and willing to use legal processes to frustrate and delay in order to scare away financial backers. Business continues to be frustrated at the 'rail gauge' problem of different regulatory and legal frameworks across our federation.



Australian Government **Department of Industry**, **Innovation and Science** 





AUSTRALIA'S MAJOR EXPORT COMMODITIES **OVERVIEW** 

# Resources have helped build our nation

Since the first gold rush in the 1850s the resources sector has driven our development and the nation's prosperity. Over the 10 year period following the discovery of gold Australia's population grew rapidly and per capita income increased substantially.

Industry and the royalties they pay have helped build Australian communities through the construction of vital infrastructure such as power and water supply, schools and roads.

# The products the sector produces play a role in all of our lives

Mineral and energy commodities are essential to our homes and the way we live. Without them, we would have no cars, roads, electricity, medical equipment or mobile phones, things we heavily rely on in our every day lives.

- A solar panel is dependant on 16 mined metals and minerals. Wind turbines and rechargeable batteries also rely on mined resources.
- A smart phone contains 25 mined metals and minerals all of which could be produced at an Australian mine.
- Australia's coal, uranium and LNG is helping to provide energy security in the Asian region.

## The sector is the cornerstone of the Australian economy

- The sector paid \$25 billion dollars in wages and salaries (2015-16). •
- Resource and energy exports were valued at \$176 billion, accounting for around half of Australia's goods and services exports (2016). •
- The sector employed around 225,000 people (2016). More than double the direct employment before the boom: 89,000 (2003).
- \$9.8 billion in company tax and around \$9.3 billion in royalties and other taxes to state and territory governments (2014-15). •



#### Figure. 2 Australia's resource and energy export markets (2016-17)





Fact Sheet · Australia's Major Export Commodities - Overview



# Growing community confidence...

The development of mutually beneficial relationships between the mining industry, government and communities, provide a platform for social change and economic independence for communities. The Australian Government is committed to ensuring that our communities, industry and governments have high-quality, independent scientific information on the socio-economic and environmental impacts of onshore gas activities. GISERA research projects examine the impacts of coal seam gas and LNG on surface and groundwater flows; geenhouse gas footprints; and socio-economic opportunities. The results of GISERA research are publicly available.

# Supporting sustainable development of our resources...

The Australian Government supports the sustainable and responsible devleopment of our onshore and offshore resources and has programs and regulatory frameworks to ensure the sector is regulated and managed in an effective way. The Leading Practice Sustainable Development Program for the Mining Industry shares Australia's world leading experience and expertise in mine management and planning through 17 handbooks. It promotes sustainable development through proactive adoption of leading practice principles in Australia and internationally. These provide guidance to governments and companies operating in developing countries by providing information on the design and implementation of socially and environmentally responsible mining projects.

# Encouraging emissions reductions...

Fossil fuels will continue to account for a large portion of the world's energy mix for decades to come. The Australian Government is encouraging industry to reduce greenhouse gas emissions through a range of low emissions technologies fossil fuels programmes. For example the government's Carbon Capture Storage (CCS) programmes support an integrated suite of technologies that capture, transport and store carbon emissions produced from the use of fossil fuels in electricity production and industrial processes, preventing the CO2 from entering the atmosphere.



# Encouraging greenfields exploration...

Geoscience Australia estimates that around 80% of Australia remains under-explored. Most of this in northern Australia, the region has significant, untapped potential. The Exploring for the Future Program will provide new data to the resources industry and will help identify major new gas, minerals and ground water resources. In August 2017, Geoscience Australia completed the acquisition of the 1st Exploring for the Future Gravity data, which was made publicly available in October 2017. The government remains committed to ensuring that new deposits continue to be found and a healthy pipeline of resource projects is secured.

Sources: Australian Bureau of Statistics, Department of Industry, Innovation and Science, Office of the Chief Economist, Queenland Resources Council

For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>



Australian Government **Department of Industry, Innovation and Science** 





# AUSTRALIA'S MAJOR EXPORT COMMODITIES ALUMINIUM, ALUMINA AND BAUXITE

The production of aluminium requires three stages—the mining of bauxite ore, which is refined to recover alumina, which is then smelted to make aluminium. Australia hosts large deposits of bauxite and is one of the world's largest producers and exporters of both bauxite and alumina.

> **1st** LARGEST GLOBAL ALUMINA AND BAUXITE EXPORTER

# **\$10 billion** IN EXPORT VALUE IN 2016

Did you know?

6.351 PEOPLE EMPLOYED IN BAUXITE, NICKEL ORE AND OTHER METAL ORE MINING AT THE END OF 2015-16

**\$930 million** PAID IN WAGES AND SALARIES IN BAUXITE. NICKEL ORE AND OTHER METAL ORE MINING (2015-16)



accounting for 22% (2015)

Resources:

**Production:** 

84 million tonnes (Mt) of bauxite, accounting for 31% of global bauxite production (2016)

2nd largest share of world's bauxite resources,

75 years of production at 2015 production rates

21 million tonnes (Mt) of alumina (2016)

1.6 million tonnes (Mt) of aluminium (2016)

# Exports:

1st largest global alumina exporter (2016) 1st largest global bauxite exporter (2016) 4th largest global aluminium exporter (2016)

- Aluminium is used in various products including cans, foil, utensils, cars, bikes and planes.
- One of the first commercial uses of aluminium foil was in 1913, when Life Savers Iollies were first packed in foil.
- Aluminium is second to steel as the most used material in cars. It can provide weight savings of up to 50 per cent compared with the traditional steel structure.
- Aluminium car body structures are equal or superior in strength to steel and absorb twice the crash energy of steel.
- Australia's aluminium production is sufficient to produce 9.3 million cars.
- Aluminium is 100 per cent recyclable and the process uses only 5 per cent of the energy used to make the original product.







Figure 3. Australia's bauxite deposits and operating mines , alumina refineries and aluminium smelters

#### Figure 4. Alumina production by region (2016)



#### Table 1. Australia's bauxite production by state and territory (2016)

STATE/TERRITORY	VOLUME (MT)	SHARE (%)
Northern Territory	9	11
Queensland	29	35
Western Australia	45	54
Total	84	

#### Figure 5. Aluminium production by region (2016)



Figure 6. Aluminium consumption by region (2016)



Sources: Australian Bureau of Statistics, Geoscience Australia, The Aluminium Association, World Bureau of Metal Statistics

## For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>/Office-of-the-Chief-Economist</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>



Australian Government Department of Industry, Innovation and Science

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES

Coal has been providing reliable energy to Australians since the late 1700s when it was originally used as a fuel for heating and cooking. Today the coal industry provides the Australian community with jobs, regional economic activity, and makes large tax and royalty contributions. Coal also provides the region with an affordable energy resource and is a key component in the manufacture of steel.

> 1st LARGEST GLOBAL COAL EXPORTER BY VOLUME (2016)

**\$42.3 billion** IN EXPORT VALUE IN 2016

37,167 PEOPLE EMPLOYED IN COAL MINING AT THE END OF 2015-16

**\$5.7 billion** PAID IN WAGES AND SALARIES IN COAL MINING (2015-16)



# Resources:

**5th** largest share of world's resources, accounting for **10%** (2015)

110 years of production at 2015 raw production rates\$124.2 million coal exploration expenditure (2016)



# Production:

5th largest coal producer (2016)445 million tonnes (Mt) of saleable black coal, accounting for 7% of global production (2016)



# Exports:

391 million tonnes (Mt) of coal (2016)
1st largest global metallurgical coal exporter (2016)
2nd largest global thermal coal exporter (2016)
29% of world coal trade (2016)



# Did you know?

- Metallurgical coal is a non-substitutable raw material in the production of steel from iron ore.
- Every tonne of steel needs about 800kg of metallurgical coal and there is more than 200 tonnes of metallurgical coal in every wind turbine.
- Coal is expected to continue to account for a large portion of the world's electricity generation for decades to come.
- High efficiency low emission (HELE) and carbon capture storage (CCS) technologies are available and can reduce emissions from coal fired power plants substantially.
- 1 tonne of coal powers the average Australia household for approximately 4 months.

Metallurgical Coal: sometimes known as coking coal, is used for the production of steel.

Thermal Coal: sometimes known as steaming coal, is mainly used in power plants for electricity generation.





Figure 5. Australia's coal deposits, operating mines and export ports



Figure 4. Australia's top thermal coal export markets by volume (2016)



Table 1. Australia's coal	production by state 2016	

STATE	VOLUME (MT)	SHARE (%)
New South Wales	195	44
Queensland	242	54
South Australia	0.0	0
Tasmania	0.4	0
Western Australia	7	2
Total	445	

#### Table 2. World's largest coal producers and consumers 2016

PRODUCER	VOLUME (MT)	CONSUMER	VOLUME (MT)
China	3,084	China	3,610
India	654	India	867
United States	605	United States	598
Indonesia	460	Japan	189
Australia	445	South Africa	181
World Total	6,313	World Total	6,671

Sources: Australian Bureau of Statistics, Geoscience Australia, International Energy Agency, Minerals Council of Australia, Office of the Chief Economist

### For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.go.gov.au">www.industry.gov.au</a>

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Australian Government **Department of Industry, Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES COPPER

Copper is a widely-used metal that is essential to our everyday lives-it will be in every appliance and electronic device in your home, the coins in your wallet and in power facilities delivering energy. Australia holds large resources of copper across the continent and is a major producer and exporter of copper ores and concentrates.

\$7.7 billion IN EXPORT VALUE (2016)



PEOPLE EMPLOYED IN COPPER ORE MINING AT THE END OF 2015-16

\$801 million

PAID IN WAGES AND SALARIES IN COPPER ORE MINING (2015-16)



# Resources:

2nd largest share of world's resources, accounting for 12% (2015)

90 years of production at 2015 production rates

\$135.7 million copper exploration expenditure (2016)



# *Production:*

6th largest global copper producer (2016)

948 thousand tonnes (Kt) of mined copper (metal content), accounting for 5% of world mine production (2016)



# Exports:

979 thousand tonnes (Kt) of ores and concentrates exported (2016)

5th largest global exporter of ores and concentrates (2016)



# Did you know?

- · Copper is essential to modern living, where it is used in electrical wiring, household plumbing and home appliances.
- The average home contains 200kg of copper. Australia's copper exports are equivalent to the copper used in 4.8 million homes.
- Copper is 100% recyclable and nearly 80% of the copper that has ever been produced is still in use today.
- · Copper is widely used in advanced manufacturing and renewable technologies.
- · Copper has antimicrobial properties. Copper and copper alloy products can be used to eliminate pathogents and reduce the spread of disease.



### Figure 3. Australia's copper deposits and operating mines



Table 1. World's largest copper producers and consumers 2016				
REFINED PRODUCTION	VOLUME (KT)	REFINED CONSUMPTION	VOLUME (KT)	
China	8.4	China	11.6	
Chile	2.6	United States	1.8	
Japan	1.6	Germany	1.2	
United States	1.2	Japan	1.0	
Russia	0.9	South Korea	0.8	
World Total	23.3	World Total	23.2	

### Table 2. Australia's copper production by state and territory 2016

STATE	VOLUME (KT)	SHARE (%)
New South Wales	212	22
Queensland	264	28
South Australia	290	31
Tasmania	2	0
Western Australia	179	19
Total	948	

Sources: Australian Bureau of Statistics, Office of the Chief Economist, Geoscience Australia, World Bureau of Metal Statistics

## For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au/Office-of-the-Chief-Economist</a> Geoscience Australia: <a href="http://www.go.gov.au">www.industry.gov.au/Office-of-the-Chief-Economist</a>





Australian Government **Department of Industry, Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES DIAMOND

Diamonds were first discovered in Australia while panning for gold near Bathurst in 1851. In 1979, a large diamond deposit was discovered in Western Australia. This deposit has been mined since 1983 and has produced more than 800 million carats of rough diamonds. Diamonds are used in jewellery, computer chip manufacturing, mining and resources exploration and machinery manufacturing. Australia is committed to the sustainable and ethical production of diamonds through the Kimberley Process Certification Scheme.



Ath LARGEST GLOBAL DIAMOND PRODUCER BY VOLUME (2016)



# Resources:

15 years of production at 2015 production rates \$1.9 million diamond exploration expenditure (2016)

# \$642 million IN EXPORT VALUE (2016)



SHARE OF WORLD'S DEMONSTRATED INDUSTRIAL DIAMOND RESOURCES, ACCOUNTING FOR 30% (2015)



## **Production:**

14 million carats of diamonds, accounting for 10% of global production (2016)



# Exports:

13.9 million carats of diamonds exported (2016)



# Did you know?

• Diamond is the hardest natural substance found on earth.

- Diamonds are not only used in jewellery but also have industrial applications in cutting, grinding, drilling and polishing.
- Australia is one of the 80 countries in the Kimberley Process Certification Scheme (KPCS), which is a joint government, industry and civil society initiative designed to stem the flow of conflict diamonds.
- · Since the inception of the KPCS in 2003 the trade in rough diamonds linked to funding conflict has fallen from around 15 per cent of all rough diamonds traded internationally to around 0.7 per cent.

# Figure 1. Australia's diamond exports



# Argyle Diamond Mine

- Argyle Diamonds is the only operating diamond mine in Australia.
- It is owned by Rio Tinto and is one of the largest diamond mines in the world.
- Argyle Diamond mine is the world's largest supplier of fancy coloured diamonds.
- Argyle produces over 90% of the world's supply of pink diamonds.

Fact Sheet · Australia's Major Export Commodities - Diamond

#### Figure 2. Australia's diamond deposits and operating mines



Table 1. World's largest diamond producers

For more information:

Kimberley Process Certification Scheme:

Geoscience Australia: www.ga.gov.au

MINED PRODUCTION	VOLUME (MILLION CARATS) (2016)
Russia	40
Democratic Republic of the Congo	23
Botswana	21
Australia	14
Canada	13
World Total	134

Sources: Australian Bureau of Statistics, Geoscience Australia, Kimberley Process, Office of the Chief Economist, Rio Tinto

www.industry.gov.au/resource/Mining/AustralianMineralCommodities/Diamonds/Pages/KimberleyProcessCertificationScheme.aspx

Department of Industry, Innovation and Science: www.industry.gov.au





Australian Government **Department of Industry, Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES GAS

Gas is commonly used in electricity generation; in household heating, hot water and cooking, and as a vital feedstock for industry, including in the manufacture of plastics, metals, glass, fabric, and fertiliser. Gas can be transported through either pipelines or as liquefied natural gas (LNG) and liquefied petroleum gas (LPG). Either through substantial investment in Australia's gas export industry over the last decade is now creating significant flow on benefits to the Australian community including job creation, tax and royalty revenues.



19.147

PEOPLE EMPOLOYED IN OIL AND GAS EXTRACTION AT THE END OF 2015-16



# Resources:

13th largest share of world's proven gas resources, accounting for 1.9% of total resources (2015)

\$1.4 billion in oil and gas exploration expenditure (2016)

**\$4.8 billion** PAID IN WAGES AND SALARIES IN OIL AND GAS EXTRACTION (2015-16)



# **Production:**

10th largest gas producer (2016)

88 billion cubic metres (bcm) of gas produced, accounting for 2.4% of world production (2016)



# Exports:

45 million tonnes (Mt) of LNG exported (2016)

2nd largest global exporter of LNG (2016)



# Did you know?

- LNG is gas cooled to around -161 degrees Celcius so that it becomes a liquid, making it easier to transport
- At 488 metres, the deck of the Prelude Floating LNG facility in Western Australia would be taller than the Petronas Towers long in Kuala Lumpur, Malaysia if stood upright
- Natural gas is odourless it has a chemical added to it so that gas leaks can be easily detected
- Many items in our everyday life are made using gas, such as plastics (e.g. mobile phones, sunglasses and food packaging), aerosol propellants (deodorants) and refrigerants
- The Ichthys LNG project's gas export pipeline contains 74,000 joints and is 890km in length—the longest in the southern hemisphere.





Figure 3. Australia's gas production



Figure 5. Australia's major gas deposits and operating mines







#### Table 1. World's largest gas producers and consumers (2016)

MINED PRODUCTION	VOLUME (BILLION CUBIC METRES) (2016)	CONSUMPTION	VOLUME (BILLION CUBIC METRES) (2016)
United States	749	United States	779
Russia	644	Russia	456
Iran	190	China	207
Canada	174	Iran	188
Qatar	165	Japan	128
World Total	3,613	World Total	3,648

Note:

1 billion cubic metres (bcm) of gas is equal to 0.74 million tonnes (Mt) of LNG

Sources: Australian Bureau of Statistics, Office of the Chief Economist, Geoscience Australia, International Energy Agency, Department of the Environment and Energy

### For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>/Office-of-the-Chief-Economist</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>



Australian Government Department of Industry, Innovation and Science

# Resources



australia's major export commodities

Gold was discovered in Australia in the early 1800s. The first gold rush started in 1851 and contributed significantly to the economic and social development of colonial Australia—over the 10 year period following the discovery of gold Australia's population grew rapidly and per capita income increased substantially. Gold is a now a major contributor to Australia's export earnings, is produced across the nation, and continues to provide employment in regional and remote areas.

2nd LARGEST GLOBAL MINED GOLD PRODUCER (2016)

PEOPLE EMPLOYED IN GOLD

MINING AT THE END OF 2015-16

PAID IN WAGES AND SALARIES

IN GOLD ORE MINING (2015-16)

**\$17.8 billion** IN EXPORT VALUE (2016)

15.226

\$2.1 billion



# Resources:

Largest share of world's of resources, accounting for 17% (2015)

35 years of production at 2015 production rates

\$618 million gold exploration expenditure (2016)



# Production:

**288 tonnes (t)** of mined gold (metal content), accounting for **9%** of global mine production (2016)



# Exports:

329 tonnes (t) of gold bullion (2016)



Figure 1. Australia's gold exports

# Did you know?

- Gold mining is a global business with operations on every continent, except Antarctica.
- Gold is used in jewellery, technological devices, cutting edge medical diagnostics and as an investment asset.
  - Australia's annual gold production could make 48 million gold medals or could produce the gold components in 12.7 billion smartphones.
- Australia holds the record for the largest gold nugget weighing 72kg, found in Victoria in 1869.



## Figure 2. Australia's top gold export markets by volume (2016)



### Figure 3. Australia's major gold deposits and operating mines



## Table 1. World gold mine production and consumption 2016

MINED PRODUCTION	VOLUME (T)	CONSUMPTION (JEWELLERY, BAR AND COIN)	VOLUME (T)
China	453	China	969
Australia	288	India	666
Russia	254	United States	213
United States	236	Germany	121
Indonesia	169	Thailand	82
World Total	3,222	World Total	3,082

## Table 2. Australia's gold production by state and territory 2016

STATE	VOLUME (T)	SHARE (%)
New South Wales	40	14
Northern Territory	17	6
Queensland	19	7
South Australia	10	3
Tasmania	1	0
Victoria	8	3
Western Australia	193	67
Total	288	

Sources: Australian Bureau of Statistics, Office of the Chief Economist, Geoscience Australia, World Bureau of Metal Statistics, World Gold Council

### For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au/Office-of-the-Chief-Economist</a> Geoscience Australia: <a href="http://www.go.gov.au">www.go.gov.au</a>



Australian Government **Department of Industry**, **Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES IRON ORE

Iron ore is an important commodity to Australia-it influences the budget, the returns of investment funds and has contributed to our high standard of living. The development of mines in the Pilbara in Western Australia also helped build regional communities through the construction of vital infrastructure such as power and water supply, schools and roads. The sector is at the forefront of innovation, with many automation technologies being deployed at Australia's iron ore operations.



1st LARGEST GLOBAL EXPORTER OF IRON ORE (2016)

\$53.8 billion IN EXPORT VALUE (2016)



PEOPLE EMPLOYED IN IRON ORE MINING AT THE END OF 2015-16

\$4.7 billion IN IRON ORE MINING (2015-16)



# Resources:

Largest share of world's resources, accounting for 28% (2015)

65 years of production at 2015 production rates

\$288 million iron ore exploration expenditure (2016)



# **Production:**

1st largest global producer by gross weight (2016)

858 million tonnes (Mt) of iron ore produced, accounting for 41% of world production (2016)



# Exports:

808 million tonnes (Mt) of iron ore exported (2016)



# Did you know?

- · Iron ore is a key component in the production of steel along with metallurgical coal
- In 2016, Australia exported enough iron ore to build almost 9500 Sydney Harbour bridges
- On average, 900 kg of steel is used per car
- Steel is 100% recyclable and can be reused indefinitely
- Steel forms around 80% of all materials used to construct a wind turbine.

## Figure 1. Australia's iron ore exports



#### Figure 2. Australia's top iron ore export markets by volume (2016)



## Figure 3. Australia's iron ore deposits and operating mines



Table 1. World's largest iron ore exporters and importers 2016				
IMPORTS	VOLUME (MT)	EXPORTS	VOLUME (MT)	
China	1,024	Australia	808	
European Union	137	Brazil	374	
Japan	130	Ukraine	37	
South Korea	72	India	22	
World Total	1,500	World Total	1,545	

Table 2. Australia's iron ore production by state and territory 2016

STATE	VOLUME (MT)	SHARE (%)
Western Australia	846	99
South Australia	9	1
Tasmania	3	0
Northern Territory	0	0
Total	858	

Sources: Australian Bureau of Statistics, Geoscience Australia, Office of the Chief Economist, World Steel Association

# For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>



Australian Government Department of Industry, Innovation and Science

# Resources



australia's major export commodities

Nickel is used widely for its anti-corrosive properties, with more than 80 per cent of nickel used to make alloys including stainless steel. These alloys are used heavily in the construction industry, the automotive industry and the medical industry. Nickel also gives our 5, 10, 20 and 50 cent coins their silver appearance. All of Australia's nickel ore is produced in Western Australia.



\$2.3 billion IN EXPORT VALUE (2016)

6,351 PEOPLE EMPLOYED IN BAUXITE, NICKEL AND OTHER METAL ORE MINING AT THE END OF 2015-16

**\$930 million** PAID IN WAGES AND SALARIES IN BAUXITE, NICKEL AND OTHER METAL ORE MINING IN 2015-16



# Resources:

Largest share of world's proven resources, accounting for 24% (2015)

80 years of production at 2015 production rates

**\$51.5 million** nickel and cobalt exploration expenditure (2016)



# Production:

204 thousand tonnes (Kt) of nickel ore (metal content), accounting for around 10% of global mine production (2016)All of Australia's mine production comes from Western Australia.



# Exports:

**211 thousand tonnes (Kt)** of nickel (metal content) exported (2016)



# Did you know?

- Australia's mined nickel production is enough to make 58 trillion 50 cent pieces.
- Nickel is anti corrosive and has a high heat resistance, making it useful in various applications.
- Nickel-containing materials play a major role in our modern lives ranging from food preparation equipment, mobile phones, medical equipment, transport, buildings, to power generation.

## Figure 1. Australia's nickel exports



### Figure 2. Australia's top nickel ore export markets by volume (2016)



Fact Sheet · Australia's Major Export Commodities - Nickel

### Figure 3. Australia's nickel deposits and operating mines



#### Table 1. World's largest nickel producers and consumers 2016

MINED PRODUCTION	VOLUME (KT)	REFINED CONSUMPTION	VOLUME (KT)
Philippines	347	China	1,090
Canada	236	Japan	146
Russia	222	USA	146
New Caledonia	209	South Korea	86
Australia	204	India	58
World Total	2,003	World Total	2,026

Sources: Australian Bureau of Statistics, Geoscience Australia, Nickel Institute, Office of the Chief Economist, World Bureau of Metal Statistics

### For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au/Office-of-the-Chief-Economist</a> Geoscience Australia: <a href="http://www.go.gov.au">www.industry.gov.au/Office-of-the-Chief-Economist</a>



Australian Government Department of Industry, **Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES OII

Oil has been fundamental to our increasing standards of living over the last century and a half. Australia has produced oil commercially since the 1960s and the petroleum (oil and gas) industry is an important driver of our prosperity.

Oil is crucial to the production of transport fuels, such as petrol, diesel and jet fuel, as well as heating oils such as kerosene. By-products from oil refining are also critical to the production of plastics, chemicals, lubricants, waxes, tars and asphalts. Nearly all pesticides and many fertilisers are made from either oil or oil by-products.



**\$5 billion** CRUDE OIL EXPORT VALUE (2016)

> PEOPLE EMPOLOYED IN 19.147 OIL AND GAS

EXTRACTION AT THE END OF 2015-16

\$4,829 million PAID IN WAGES AND SALARIES FOR OIL AND GAS EXTRACTION (2015-16)



# *Resources:*

25th largest share of world's resources, accounting for less than 1% (2016)

**\$1.4 billion** in oil and gas exploration expenditure (2016)

# *Production:*

32nd largest global crude oil producer (2016)



17.2 million tonnes (Mt) of crude oil produced, accounting for

less than 1% of world crude oil production (2016)



# Exports:

13 billion litres of crude oil exported (2016)

34 billion litres of refined oil products imported (2016)



# Did you know?

- The word "petroleum" literally translates as "rock oil." It stems from the Greek word "petra," meaning rock, and the Latin word "oleum," meaning oil.
- Oil is often measured in barrels, which is equal to 42 US gallons or 159 litres.
- The US consumed almost 20 million barrels of oil per day in 2016, more than any other country.
- · Oils are not just oils; each oil field is unique and has its own chemical fingerprint.
- Australia has some of the oldest (Proterozoic; McArthur Basin) and youngest (Cenozoic, Bass Basin; Mesozoic Gippsland Basin) oils in the world.





Fact Sheet · Australia's Major Export Commodities - Oil

### Figure 3. Australia's oil consumption by sector (2015-16)



#### Figure 4. Australia's major oil deposits and operating mines



#### Table 1. World's largest oil producers and consumers (2016)

CRUDE OIL PRODUCTION	VOLUME (MILLION BARRELS PER DAY)	REFINED OIL CONSUMPTION	VOLUME (MILLION BARRELS PER DAY)
United States	13.6	United States	19.9
Saudi Arabia	12.3	China	12.4
Russia	11.2	Japan	4.0
Canada	4.5	Korea	2.6
Iran	4.3	Germany	2.4
World Total	93.7	World Total	97.1

Sources: Australian Bureau of Statistics, Office of the Chief Economist, Geoscience Australia, International Energy Agency, Department of the Environment and Energy

For more information: Department of Industry, Innovation and Science: www.industry.gov.au Office of the Chief Economist: www.industry.gov.au/Office-of-the-Chief-Economist Geoscience Australia: www.ga.gov.au



Australian Government **Department of Industry, Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES URANIUM

Uranium is used as a nuclear reactor fuel to produce a low-emission source of energy. It has a high energy content relative to other fuel sources-one tonne of uranium can produce the equivalent electricity generated from 16,000 tonnes of coal. Australia has the world's largest resources of uranium and is home to the largest known uranium ore body, Olympic Dam in South Australia.



**Zrd** LARGEST GLOBAL URANIUM PRODUCER (2016)

HOME TO THE 4TH LARGEST URANIUM PRODUCING MINE IN THE WORLD - OLYMPIC DAM (2016)

# \$915 million IN EXPORT VALUE (2016)



# Resources:

Largest share of world's resources, accounting for 29% (2015)

210 years of production at 2015 production rates

\$23.4 million uranium exploration expenditure (2016)



# *Production:*

6.2 thousand tonnes (Kt) of Uranium Oxide or yellowcake  $(U_z O_o)$  production, accounting for 8.5% of global production (2016)



# Exports:

7.4 thousand tonnes (Kt) of Uranium Oxide exported (2016)



# Did you know?

- There are three producing uranium operations in Australia: Ranger in the Northern Territory, Olympic Dam and Four Mile in South Australia.
- All Australian production is exported and it is Australian policy that uranium produced here can only be sold to countries with existing safeguards and non-proliferation requirements in place which are relevant to the recipient country. This ensures that countries are committed to peaceful uses of nuclear energy.
- Uranium is a controlled ore and cannot be exported without a permit.
- Nuclear reactors accounted for 11% of global electricity production (2015).



# Olympic Dam

- Is the largest known uranium orebody in the world.
- Is Australia's largest underground mine and is the 4th largest uranium producing mine in the world (2016).
- Is a polymetallic mine producing copper, uranium, silver and gold.

#### Fact Sheet · Australia's Major Export Commodities - Uranium

#### Figure 2. Australia's uranium deposits and operating mines



#### Table 1. World's largest Uranium producers and consumers

REFINED PRODUCTION	VOLUME (KT)	REFINED CONSUMPTION	VOLUME (KT)
Kazakhstan	28.1	United States	23
Canada	15.9	European Union	22.2
Australia	6.2	China	13.8
Niger	4.1	Russian Federation	6.1
Russian Federation	3.6	Japan	0.5
World Total	73.1	World Total	83.4

Sources: Australian Bureau of Statistics, Geoscience Australia, Office of the Chief Economist, World Nuclear Association

## For more information:

Department of Industry, Innovation and Science:

www.industry.gov.au/resource/Mining/AustralianMineralCommodities/Uranium/Pages/default.aspx Office of the Chief Economist: www.industry.gov.au/Office-of-the-Chief-Economist

Geoscience Australia: www.ga.gov.au



Australian Government Department of Industry, **Innovation and Science** 

# Resources



AUSTRALIA'S MAJOR EXPORT COMMODITIES 7INC

Australia has been producing zinc since 1901, when the development of a new process allowed for the economic extraction of zinc from Broken Hill. Today, Australia is one of the world's largest producers and exporters of zinc and the industry employs thousands of people, particularly in Northern Australia.





\$2.3 billion IN EXPORT VALUE (2016)



PEOPLE EMPLOYED IN SILVER-LEAD-ZINC ORE MINING AT THE END OF 2015-16

\$698 million

PAID IN WAGES AND SALARIES IN SILVER-LEAD-ZINC ORE MINING (2015-16)



## *Resources:*

Largest share of world's proven resources, accounting for 31% (2015)

40 years of production at 2015 production rates

\$46.5 million silver, lead and zinc exploration expenditure (2016)



# **Production:**

884 thousand tonnes (Kt) mined zinc (metal content) in 2016

44% of Australia's production is from Queensland (2016)



## Exports:

7th largest global exporter of zinc slab (2016)

1,070 thousand tonnes (Kt) of zinc (2016)



# Did you know?

- · Because of its stong anticorrosive properties, about half of the zinc that is produced is used to prevent iron and steel from rusting.
- · Zinc is used in construction, vehicles, infrastructure and batteries.
- Zinc alkaline batteries are wided used in radios, flashlights, cameras and toys.
- Zinc air batteries are commonly used in hearing aids and watches.
- Zinc can be fully recycled without loss of properties.

## Figure 1. Australia's zinc exports



#### Figure 2. Australia's top zinc export markets by volume (2016)



# Figure 3. Australia's zinc deposits and operating mines



Table 1. World's largest zinc producers and consumers 2016			
REFINED PRODUCTION	VOLUME (KT)	REFINED CONSUMPTION	VOLUME (KT
China	6,853	China	6,724
South Korea	964	USA	819
India	758	India	689
Canada	718	South Korea	622
Japan	561	Japan	470
World	14,004	World	13,914

Table 2. Australia's zinc production by state and territory 2016		
STATE/TERRITORY	VOLUME (KT)	SHARE (%)
New South Wales	134	15
Northern Territory	193	22
Queensland	390	44
Tasmania	88	10
Western Australia	78	9
Total	884	

Sources: Australian Bureau of Statistics, Geoscience Australia, International Zinc Association, Office of the Chief Economist, World Bureau of Metal Statistics

### For more information:

Department of Industry, Innovation and Science: <a href="http://www.industry.gov.au">www.industry.gov.au</a> Office of the Chief Economist: <a href="http://www.industry.gov.au/Office-of-the-Chief-Economist">www.industry.gov.au</a> Geoscience Australia: <a href="http://www.gov.au">www.industry.gov.au</a>

Resources 2030 Taskforce

Securing the future of Australia's resources sector

# For Official Use Only

# Meeting Minutes Resources 2030 Taskforce Meeting

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