



Australian Government
**Bureau of Resources
and Energy Economics**

Promoting Australian Prosperity

**Sustaining the Boom with
Export Infrastructure**

bree.gov.au

ABOUT THIS PUBLICATION

To ensure Australia realises the full benefits of the ‘mining boom’ its physical and social infrastructure must grow to support projected higher export volumes. The Department of Regional Australia, Local Government, Arts and Sports (DRALGAS), the Office of Northern Australia and the Department of Resources, Energy and Tourism (RET) commissioned the Bureau of Resources and Energy Economics (BREE) to prepare an outlook to 2025 for Australia’s major Australian bulk commodity exports (coal, iron ore and natural gas) and the infrastructure required to support the expected volumes. This publication provides the key messages of the full report. The full report provides more detailed analysis and can be found on the BREE website, www.bree.gov.au.

ABOUT THE BUREAU OF RESOURCES AND ENERGY ECONOMICS

The Bureau of Resources and Energy Economics (BREE) is a professionally independent, economic and statistical research unit within the Australian Government’s Resources, Energy and Tourism (RET) portfolio. The Bureau was formed on 1 July 2011 and its creation reflects the importance placed on resources and energy by the Australian Government and the value of these sectors to the Australian economy. BREE’s mission is to support the promotion of the productivity and international competitiveness of Australia and enhance Australia’s environmental and social sustainability, and also national security, within the resources and energy sectors.

The Executive Director/Chief Economist of BREE is Professor Quentin Grafton. He is supported by a dedicated team who specialise in quantitative modelling, data management and statistical analysis. BREE delivers forecasts, data research, analysis and strategic advice to the Australian government and to stakeholders in the resources and energy sectors. For more information on BREE and what it does, please visit www.bree.gov.au or contact BREE by mail, telephone or email.

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PROMOTING AUSTRALIAN PROSPERITY: SUSTAINING THE BOOM WITH EXPORT INFRASTRUCTURE

WHY INFRASTRUCTURE MATTERS

Australia has an infrastructure system that many of us may never use directly. It includes the network of pipelines, roads, rail and ports, both privately and publicly owned, that facilitated the exportation in 2011 of about 400 million tonnes (Mt) of iron ore, 300 Mt of coal and 20 Mt of liquefied natural gas (LNG). In total, mineral and energy exports delivered by 'made in Australia' infrastructure, were worth over \$170 billion and provided direct employment for over 200 000 Australians in 2010–11.

EXPORT INFRASTRUCTURE

Over the past decade, over \$30 billion has been invested to develop and improve privately and publicly owned export infrastructure in Australia. These investments have created thousands of jobs and ensured a world-class delivery system that extracts and then carries by rail, road or pipelines Australia's mineral/energy resource exports to overseas markets. Last year, this system allowed Australia to ship more than 700 Mt of mineral and energy commodities to market.

Australia is a 'lucky country' blessed with vast reserves of iron ore, coal and gas that far exceed its current or future domestic needs. These mineral riches provide it with an opportunity to export the surplus. These exports, in turn, create jobs and tax revenues that have helped make Australia a world leader in the mining and energy export business. These benefits have not just been for the miners, but increased volumes and high commodity prices have greatly helped to increase the standard of living of many Australians.

CHALLENGES AND OPPORTUNITIES

To sustain and share the benefits of the boom, Australia will need to maintain its more than 700 Mt of volumes through its existing export infrastructure. Australia will also need to double again this throughput by 2025 if it is to sustain the benefits of the mining boom into the future. This is a big ask, but one that Australia can achieve.

Without an expansion of export infrastructure, Australia will fail to realise the opportunities of more employment, higher revenues, improved services and increased incomes that exports generate. The challenge for the mining companies, the rail operators, and the port owners is to plan, to build and to deliver the required export infrastructure on time and in ways that protect the environment.

PLANNING FOR THE FUTURE

The Australian government has been proactive in assessing and managing the possible risks to export infrastructure. In 2011 the Department of Regional Australia, Local Government, Arts and Sports (DRALGAS) and the Department of Resources, Energy and Tourism (RET) commissioned the Bureau of Resources and Energy

Economics (BREE) to deliver a detailed economic analysis of what Australia may expect to export in the future under different market conditions, and the infrastructure capacity required to support these exports.

As part of its work, BREE was asked to consult with key mining sector stakeholders and to also provide an assessment of the regional infrastructure capacity required to support future growth of iron ore, coal and LNG. The full technical report by BREE that includes an Executive Summary and Key Findings is entitled Australian bulk commodity exports and infrastructure – outlook to 2025. It is available free of charge and can be downloaded from the BREE website, www.bree.gov.au.

INTERNATIONAL COMPETITION AND DOMESTIC RISKS

Australia faces two key challenges—international competition and domestic risks in terms of private and public sector planning and construction. Internationally, the risk is that if we delay our infrastructure investments or fail to build on time, competing countries will increase their exports at Australia’s expense. These national competitors include existing and emerging bulk commodity suppliers such as Indonesia, Colombia and Mongolia for coal; Brazil and West Africa for iron ore; and Qatar, the Russian Federation and North America for LNG. In addition, Australia must continue to compete with low cost domestic producers in two of the biggest growth markets: China and India.

The domestic challenge for the private and public sector is to plan and to build additional infrastructure on time to ensure growing export volumes are unconstrained by bottlenecks. In the past decade Australia has become much better at managing this huge logistical challenge. For example, because of long delays in loading coal onto vessels at the port of Newcastle (the world’s largest coal export facility), a capacity framework was developed with the assistance of the Australian Government. This capacity framework has allowed the port authorities and infrastructure providers to plan better for future investment. It has also allowed stakeholders (mine, rail and port authorities) to better understand the constraints within the system.

BREE assesses that future exports of coal, iron ore and LNG will become increasingly reliant on projects that are currently at a planning stage, but not yet under construction. It is these planned for but not yet completed projects that are subject to the greatest risk of delays. On the basis of its research, BREE concludes that the capacity of planned infrastructure projects progressing through approval processes exceeds the projected volumes of exports for coal, gas and iron ore out to 2025. Consequently, it assesses the risk of Australia not having sufficient export infrastructure as ‘manageable’ for all commodities in 2025. This risk assessment, however, is conditional on Australia constructing the required export infrastructure on schedule and utilising the built infrastructure at a rate no less than what has been experienced over the past few years.

continued on page 8

PROJECTED IRON ORE EXPORTS

The chart (right) shows Australia's exports of iron ore (by volume) and share of world iron ore trade. The time periods reflect historical data in red, medium term projections to 2017 published in BREE's Resources and Energy Quarterly – March Quarter 2012 in orange, and long term projections developed for this report in blue. A similar chart for LNG is shown on the opposing page.

Robust growth in steel production is expected to support growth in world iron ore consumption. Australia, with its substantial iron ore reserves, is expected to remain a major competitor in the market for world iron ore trade. BREE estimates that in 2025 Australia's share of global trade in iron ore could range from 45 per cent to 55 per cent with export volumes projected to be between 885 Mt to 1082 Mt.

The growth in Australia's projected iron ore exports will require a substantial expansion of export infrastructure to prevent bottlenecks occurring. BREE estimates that by 2015 Australia will have export infrastructure capacity to support iron ore exports of around 745 Mt. To support projected export volumes an additional 337 Mt of infrastructure capacity will need to be built by 2025. Although this represents a 50 per cent increase on the infrastructure capacity expected by 2015, there are a considerable number of projects already planned that could provide for this expansion.

Iron Ore: Market Share and Projected Exports

Please refer to page 4 of the PDF version.

Iron Ore: Projected Exports and Infrastructure Capacity

Please refer to page 4 of the PDF version.

PROJECTED LNG EXPORTS

Australia has the fastest growing expansion of LNG capacity in the world with seven LNG plants currently under construction with a combined annual capacity of around 57 Mt. In 2025, Australia's market share of world gas trade that includes both LNG and pipeline trade, is estimated to range from 10 per cent to 15 per cent. Export volumes are projected to be between 86 Mt and 130 Mt. To achieve the higher end of the projected range of LNG exports, Australia will require several new LNG trains to be built over the next decade.

LNG: Market Share and Projected Exports

Please refer to page 5 of the PDF version.

LNG: Projected Exports and Infrastructure Capacity

Please refer to page 5 of the PDF version.

Australia's Key Bulk Commodity Basins and Ports (2012)

Please refer to pages 6–7 of the PDF version.

PROJECTED THERMAL COAL EXPORTS

The chart (right) shows Australia's exports of thermal coal (by volume) and share of world thermal coal trade. The time periods reflect historical data in red, medium term projections to 2017 published in BREE's Resources and Energy Quarterly – March Quarter 2012 in orange, and long term projections developed for this report in blue. A similar chart for metallurgical coal is shown on the opposing page.

Supported by the start up of new coal mines in Queensland and New South Wales, Australia is expected to increase its market share of world thermal coal trade. BREE estimates that Australia's market share in 2025 will range from 23 per cent to 33 per cent depending on developments in existing coal producing countries, such as Indonesia, and emerging competitors, particularly Mongolia. Based on these market shares for Australia; BREE's projected thermal coal export volumes in 2025 range from 267 Mt to 383 Mt.

BREE estimates that Australia currently has export infrastructure to support thermal coal exports of around 219 Mt. A further 57 Mt of infrastructure capacity is under construction that is expected to be operational by 2015. To support the projected export volume in the high market share scenario a minimum of 108 Mt of additional infrastructure capacity will need to be built by 2025. BREE estimates there are proposals to build around 400 Mt of additional infrastructure capacity by 2025.

Thermal Coal: Market Share and Projected Exports

Please refer to page 8 of the PDF version.

Thermal Coal: Projected Exports and Infrastructure Capacity

Please refer to page 8 of the PDF version.

PROJECTED METALLURGICAL COAL EXPORTS

Robust growth in steel production is expected to support increases in the global consumption of metallurgical coal. Australia, with its high resource grade and geographic advantage in supplying key Asian steel producers, is expected to maintain a high market share of global metallurgical coal in the long-term. In 2025, Australia's market share is projected to be between 56 per cent and 66 per cent, with exports ranging from 260 Mt to 306 Mt.

BREE estimates that by 2015 Australia will have port infrastructure capacity to support exports of around 251 Mt of metallurgical coal. To support the higher end of the projected exports range an additional 55 Mt of infrastructure capacity would need to be built by 2025. BREE estimates there are proposals to build infrastructure that could provide an additional 88 Mt of port capacity.

Metallurgical Coal: Market Share and Projected Exports

Please refer to page 9 of the PDF version.

Metallurgical Coal: Projected Exports and Infrastructure Capacity

Please refer to page 9 of the PDF version.

PROMOTING AUSTRALIA'S PROSPERITY

The projected export volumes from Australia in 2025, in the absence of export infrastructure constraints, range from 267 Mt to 383 Mt for thermal coal, 260 Mt to 306 Mt for metallurgical coal, 885 Mt to 1082 Mt for iron ore, and 86 Mt to 130 Mt for LNG. The huge projected increases in export volumes to 2025 are a result of expected robust economic growth in emerging economies, especially in China and India.

Projected export growth represents a potential volume increase from 2011 to 2025 of between 119 to 235 Mt for thermal coal; 127 to 173 Mt for metallurgical coal; 446 to 643 Mt for iron ore; and 67 to 111 Mt for LNG. In total, for all four commodities, this represents an increase of between 760 Mt and 1162 Mt, contingent on sufficient export infrastructure and import demand. The very large projected volume increase will help offset expected declines in bulk commodity prices (see price chart on opposing page) and assist Australia to maintain the value of its mineral and energy exports.

Projected Exports (Low Market Share)

Please refer to page 10 of the PDF version.

Bulk commodity prices

Please refer to page 11 of the PDF version.

Greater exports will support Australia's long-term prosperity and will be worth hundreds of billions of dollars in export revenues over the next 10–15 years. This growth can only occur if Australia has sufficient export infrastructure into the future. While planning for infrastructure required in 2025 may seem premature, it can take up to ten years to design, seek approvals and then build large infrastructure projects. Indeed, some large infrastructure projects will need to pass the approval processes within the next couple of years if they are to be completed by 2020.

The next five to ten years is a critical period for Australia—a time when commodity prices should remain sufficiently high enough to stimulate additional mining investment by the private sector. The sensible choice is to plan and to build the export infrastructure Australia requires for its future prosperity. While it is prudent to build the infrastructure required, no more than this amount is needed because the high costs of construction make it uneconomic to construct facilities that are operated at low rates of utilisation. It is for this reason that the Queensland Government recently chose not to go ahead with some of the terminal developments (T4 to T9) for coal exports at Abbot Point.

REGIONAL GROWTH AND 'SOFT' INFRASTRUCTURE

Over the next decade Australia has the opportunity to create the world's biggest and best export infrastructure system for coal, iron ore and LNG. Such a delivery system will require very large capital investments by the private sector and careful planning

and co-ordination by all levels of government. While the costs and challenges are substantial, the benefits of getting it right are much greater. Making the appropriately sized and located export infrastructure investments, and also at the right time, will help grow Australia's productivity and lower the average cost of getting our exports to market. This will allow Australia to remain globally competitive, maintain employment and to grow its standard of living.

Much of the volume growth in bulk commodity exports is expected to occur in regions where there are already large exports, such as in the Pilbara in Western Australia (iron ore and LNG), in New South Wales (coal) and in Queensland (coal), or where the infrastructure to support future exports is already under construction, as is the case for Queensland for LNG.

EXPORT VOLUMES BY STATE

In terms of thermal coal, almost all the projected increases in export volumes will come from New South Wales (Hunter Valley) and Queensland (Surat and Galilee Basins) with initial expansions likely to occur first in New South Wales. For metallurgical coal, export growth is projected primarily from the Bowen Basin in Queensland with a smaller proportion coming from the Hunter Valley.

Volume growth in iron ore exports will mostly come from existing and new developments in the Pilbara. Over the next decade, iron ore mines in the Pilbara will continue to be developed at a faster rate relative to mines in other parts of Australia. Faster development of Pilbara iron ore deposits than in other regions is expected because of its higher quality ores that can be extracted at a lower unit cost. The companies that will develop these iron ore projects have a proven track record of successfully completing large-scale mining projects with associated infrastructure.

Growth in LNG exports will be from Western Australia (Carnarvon Basin off the Pilbara coast), Northern Territory (offshore some 900 kilometres west of Darwin) and Queensland (primarily in the Surat Basin, but also in the Bowen Basin) with the developments of gas liquefaction plants at Gladstone to convert coal seam gas to LNG.

A key priority for federal and state governments will be to ensure that there is sufficient skilled labour to construct and operate the required export infrastructure. This will help Australia share the benefits of the boom and avoids shortages of workers with the appropriate skills. A better skilled workforce also helps to avoid project cost overruns and delays.

An important objective for the federal and state governments in the development of export infrastructure will be to ensure that social services and 'soft' infrastructure are delivered to benefit and to support communities in the export regions. The provision of these community services will require federal, state and regional co-ordination and adequate local planning so that the needed schools, hospitals and other services are provided when required.

Bulk Commodity Export Volumes

Please refer to page 12 of the PDF version.

FUTURE PROSPERITY

The ‘take home’ message is that Australian existing and planned export infrastructure are sufficient to meet expected export volumes. To ensure that the additional export infrastructure is able to meet the expected export demands by 2025—that could be as much as an extra 760 Mt to 1162 Mt per annum—gets built, on time, and without expensive cost overruns the private sector needs to make the necessary investments in the infrastructure system. State and federal governments must assist with good planning and coordination. The Australian government is a committed partner in these efforts to sustain the benefits of the boom for decades to come.